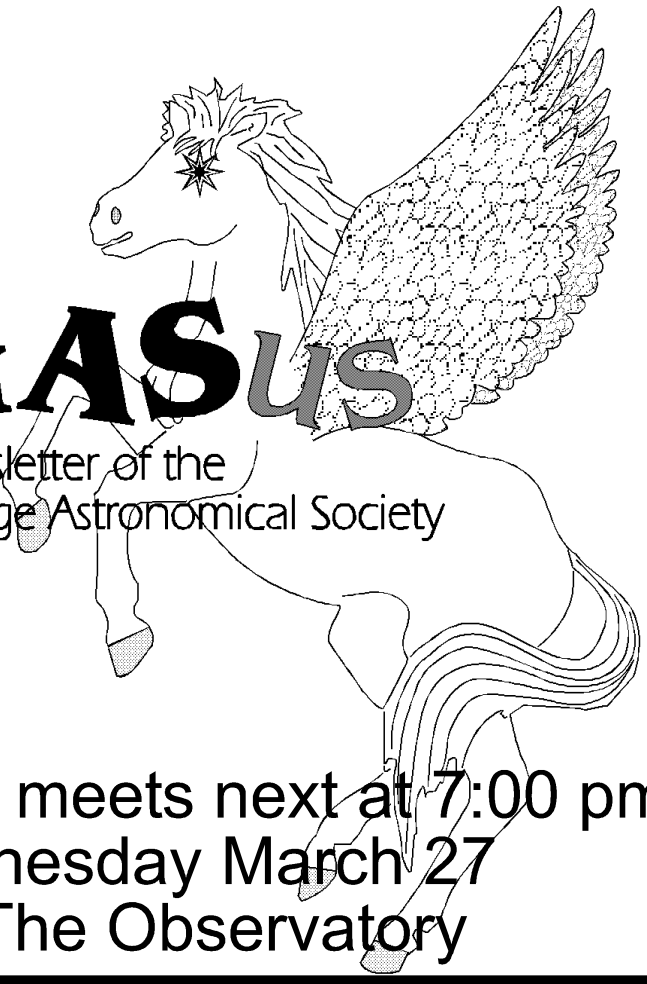
March 2002 ISSUE #119



the PeGASus

Newsletter of the
The Prince George Astronomical Society

The PGAS meets next at 7:00 pm Wednesday March 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

March 12

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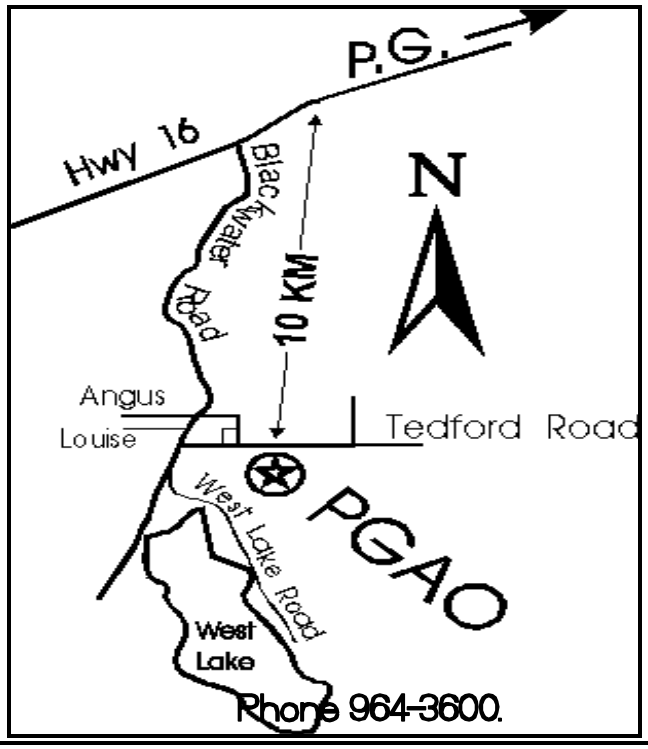

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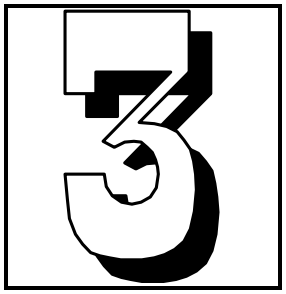


Editorial

By Gil Self

We have a lot going on at the end of March 2002 , probably more than I can do justice to here. Everyone should try and get a look at the excellent presentation that Maurice Sluka has put together on our behalf. Maurice has taken responsibility for the dark-sky project, and has done an amazing job. The package that he presented to the city for there comments and consideration, looks like we hired a professional firm and spent a lot of money. I am certainly glad Maurice is in our corner on this one.

I should fill you in on several of the other things underway but instead I suggest you come to the meeting on the 27th and get caught up in person. Instead I will hand this space over to Doug Wayland and his article about our first Messier Marathon.

My First Messier Marathon

By Doug Wayland

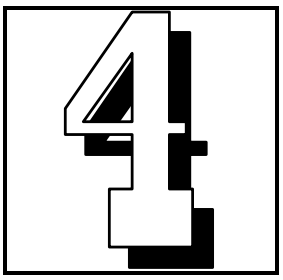
Saturday, March 16th was extremely clear and anticipation for a great Messier Marathon was high. The only down side was that the beautiful clear skies were the product of an arctic high pressure zone. Temperatures were predicted in the-20 C range and if that wasn't enough, brisk north winds would make the wind chill feel like -30, risk of frost bite was high.

Twelve club members including myself, Brian Battersby, Glen Harris, Rod Herd, Maurice Sluka, Gerhard Bierman and his wife Reva, Rob Frith, Kane Sanders, Ryan Unruh, Ben Daigle and John Ascah turned out for a pot luck dinner at the observatory. The food was fantastic. We ate at about 18:00 and were outside to start the marathon by 18:45. I logged M 45 at 18:51 and M 42 at 18:58. That was all we could get in the still bright sky. A thin crescent moon was etching an arc low in the western sky, what a beautiful sight in the low power eyepiece.

Scopes set up outside were my LX 10, Brians Tal 150-P, Gerhards home made 10" dobby, the clubs 10" dob, the clubs C-8 and Ryans small refractor. Some members were using binoculars on tri-pods.

We don't have a real low horizon to the west so the sky was still bright when we went looking for our first two evening rush hour targets, M 74 and M 77. We wanted to catch them before they set below the trees. I could identify enough stars in my finder to know I was on target for both, but couldn't actually see them in the eyepiece so we missed them. I also knew that comet Ikeya-Zhang was near M 74 and was thinking of going for it when at 19:08 Brian shouted "I see the comet". Boy was he excited. He showed me where it was and I got it in the eyepiece as well.

Continued on page 7



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 March 27
7:00 pm at The Observatory

The Night Sky for April 2002

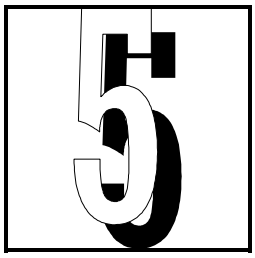
by Bob Nelson, PhD
Hi Folks,

Since I wrote you last, I have had a successful observing run at Mt John (which is the University of Canterbury observatory about three hours southwest of Christchurch). On a clear Thursday afternoon, I threw some stuff together and hustled down intending to stay a night or two. Well, I stayed 6 nights in all; two were wonderfully clear, one clouded over halfway through, and the rest were totally cloudy or marginal (useful for practice). I started observing this eclipser of the Algol type (two distinct stars giving constant light between eclipses) which had a period of 0.95 days (= 23 hours). Well, most of the night was extremely boring, and it only started going into an eclipse just before dawn when the telescope was pointing nearly at the horizon. I managed to cover the eclipse, but only just (NO ONE works this close to the horizon!!!).

Next night, I realized that it was pointless to observe the same star since its cycle would only advance by about one hour each night. I therefore selected a much nicer star - WY Horologium which, at declination -65 deg 36' is circumpolar at Mt John (latitude 44.0 deg S). It was discovered by the Hipparcos satellite, was classified as a contact binary with a period of 0.4 days (= 9.5 hours). That's the kind of star I like. In two nights, I got a complete light curve in B, V, R and I (blue, visual, red and infrared). The only trouble is that no one is sure exactly what it is!! Its light curve resembles that of a contact binary, but with differences. My office mate succeeded in getting a spectrum a week later, but that only adds to the confusion.

However, not to worry. I like a good puzzle - you never know what might turn up! I'll let you know next month if I know anything more. I'm still hoping to use the 14" telescope of the Canterbury Astronomical Society (which is 20 minutes from town), but there are real problems with their dome - which hasn't been operable in over a year - so stay tuned. (In the meantime, thanks to Gil for packing up my CCD camera and to my son Denis for bringing it down on the plane.)

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



PLANET ROUNDUP

MERCURY It's a 5.4" disk of magnitude -1.4. On April 15, it sets about an hour after the Sun, so it should be visible in binoculars just after sunset if you know where to look. Just follow an imaginary arc that the Sun follows - the ecliptic - back about 9 degrees and you should see the tiny disk.

VENUS sets at mid month about 2 hours after the Sun (getting better!). It's now a 10.8" disk of magnitude -3.9 and in the gibbous phase.

MARS, essentially in Taurus all month, sets about 3 hours after Sunset. It's a 4.2" disk of magnitude 1.5.

JUPITER, in Gemini all year, sets at mid month at about 1:30 AM. It's a 36.4" disk of magnitude -2.0. Still a great sight, folks.

SATURN, in Taurus until the end of August, sets at mid month at about 11:20 PM. It's a 17" disk mag 0.1. Ditto.

URANUS, in Capricornus all month, rises at mid month about 2 hours before the Sun. As usual, it's a 3.6" disk at about magnitude 5.7.

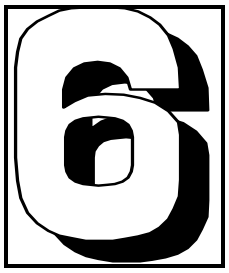
NEPTUNE, in Capricornus all year, rises at mid month about 3 hours before sunrise. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises at mid month at about 11:15 PM. As usual, it's a 0.1" disk at magnitude 13.8

Daylight savings time returns on the night of March 31 / April 1. (Blaaaaat!!) (For us in New Zealand, it ended Mar 16/17. Yeah!!)

CONSTELLATIONS to look for in April (at 10 PM, PDT) are Central Hydra, Crater (Crt), Sextans, Leo and Leo Minor.

Central Hydra ("The Sea Serpent", not to be confused with Hydrus, "The Water Snake" - WAY to the south, hence the "s" at the end of the constellation name) is out of the Milky Way and contains two galaxies: NGC 3923 and 3621. The former is a 2.0' x 1.2' ellipse of magnitude 10.7; the latter, a 12' ellipse of magnitude 10.0. One of the catalogues in Guide 7 tells me that NGC 3923 is travelling away from us at some 1400 km/s and is therefore about 20 megaparsecs (64 million light-years) away, using Ho = 70 km/s/Mpc for the Hubble constant.



Crater ("The Cup") contains galaxies NGCs 3672, 3962, and 3887 plus the 6th magnitude variable star SY Crt. (The Hipparcos catalogue -- available in Guide 7-- tells us that it's a slow irregular variable of spectral type M3 III (that makes it a cool red giant) and is 570 times as bright as the Sun and lies 570 light years away.)

Sextans ("The Sextant") contains the galaxies NGCs 2974, 3115, 3166, and 3169.

Leo ("The Lion") is familiar to most of us. It's a constellation that actually resembles what it's supposed to be. The head of the beast, on the right, contains at its base the first magnitude star Regulus. It also contains numerous galaxies (almost to many to mention) M65, 66, 95, 96, 105, plus NGC 3628, 3384, 2903. Those from the first group are typically 10th magnitude and 5-10' in size. The latter group are generally fainter, typically 11th magnitude (NGC 2903 is 9.5) and smaller 3-5' (NGC 2903 is 12.5'). Note that M65 and 66 is a famous pair visible in the same field of view.

L**eo Minor** ("The Little Lion") contains galaxy NGC 3344 (10.4 mag, 7.2' in size).

Clear skies,
-Bob

NEW BOOKS AT THE PUBLIC LIBRARY.

By Yvonne Whebell

THE GREAT ATLAS OF THE STARS by Serge Brunier, Constellation photography by Akira Fujii. Firefly Books. 2001. Photographs in large format appear as they would to the naked eye or with binoculars, and transparent diagrams are overlaid showing the constellations. The author has included notes on the mythology, as well as the physical characteristics of the stars in various constellations.

Y.W.

Continued from page 3

Even in the still bright sky a tail was visible. Everybody was excited and all instruments were trained on the comet. We had a bit of time before we had to move on to the next Messier objects so we admired the comet for about 45 minutes. As it got darker and the comet was starting to dip into the tree tops, it got much more impressive. I'm not good at estimating magnitudes, but it probably was around mag 4. It was barely visible the naked eye. It was most spectacular in binoculars, sporting about a three degree long tail. In my LX 10 and 35mm Ultima eyepiece the nucleus was bright with fuzz all around and the tail extended out of the field of view. This alone made the marathon a memorable experience. Everyone forgot about the cold for awhile and the marathon.

I suddenly realized that M 79 had slipped behind some trees from my vantage point. I thought I had missed what should have been a sure score. Then I looked over to where the C-8 was set up. I ran over there and could see that M 79 would still be in the open for a short while. I steered the C-8 around and lined up where M 79 should be and without using charts spotted it between the two stars that flank it on the north and south. I logged it as number three for me seen at 19:42. That was close.

Then it was time to start the marathon in earnest. I had printed out finder charts from my Sky Tools software ahead of time and had them in sequential order. That contributed greatly to my successful and speedy finding of objects. I logged M 31, 32, 110 and 33 in quick succession, then to Cassiopeia for M 52 and 103. M 76 and 34 fell next in Perseus. Then back to Orion for M 78 and M 43, which was not visible earlier when I got M 42 in the bright sky. I won't list all that I have seen, but I finished all the rest of the list up to the Virgo cluster by 21:50. It was time to go into the observatory class room to warm up. My fingers and feet were numb. By the article in Astronomy magazine I was a couple hours ahead of schedule. A few people were succumbing to the cold and were staying inside a lot and would start going home soon.

After warming up and putting warm buddies (little heat packets) in my gloves, I went back outside. At 22:48 I began my journey through the realm of galaxies. Once again having excellent finder charts from Sky Tools, designed specifically for my scope set- up, helped tremendously. By 23:34 I was through the dreaded Virgo cluster. M 68 in Hydra was very faint for a globular, but I logged it at 23:41 just above the horizon in the SE. Time to go in and warm up again.

I was back out at 00:27 and began picking off some of the high summer objects that were rising in the NE. By 01:05 I was through to M 56 on my list, that was 70 objects for me so far. Time to warm up again.

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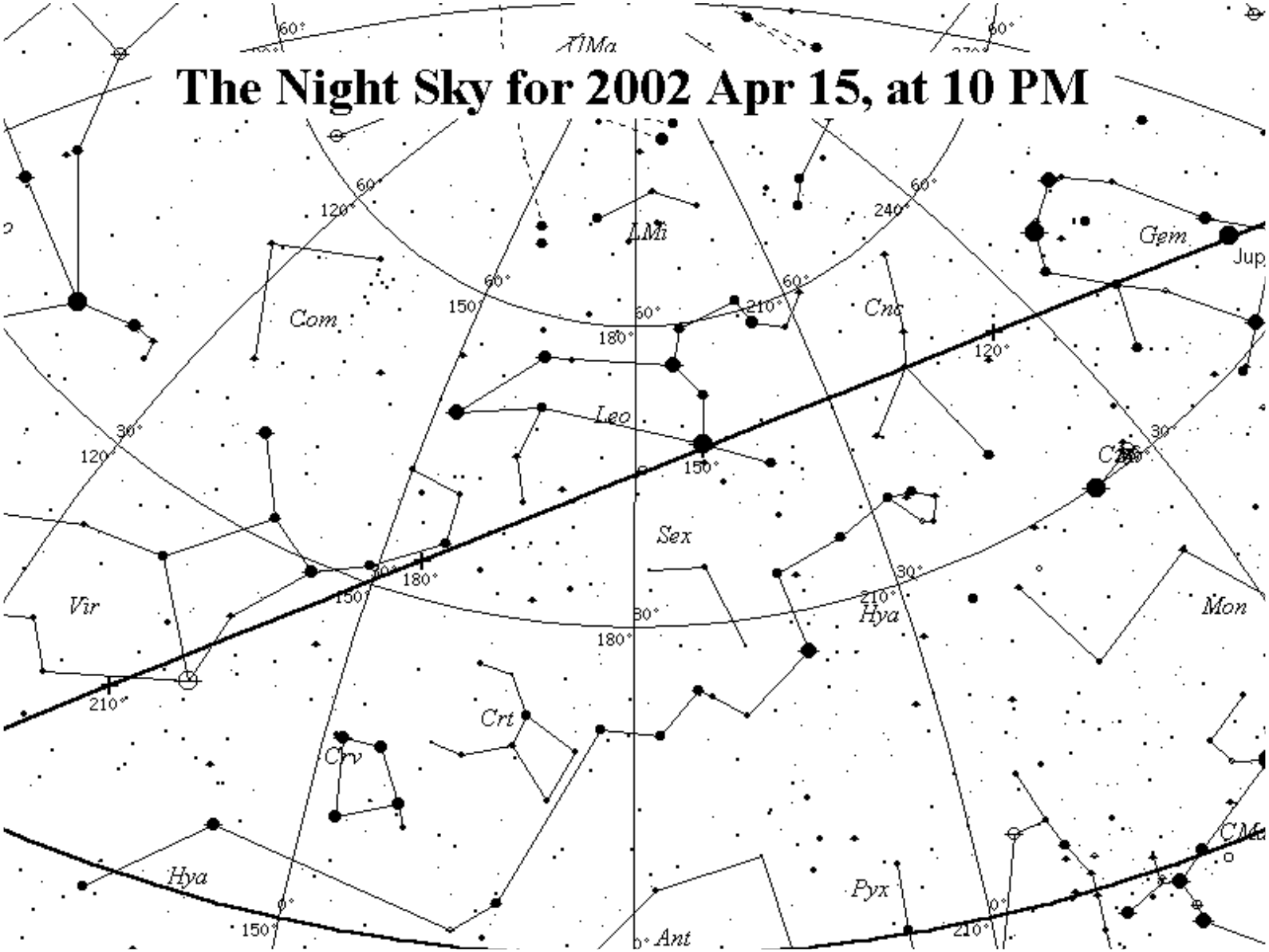
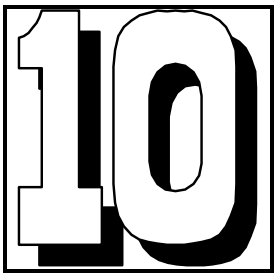
The Night Sky for 2002 Apr 15, at 10 PM





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By 02:00 there was only myself and two other suckers for punishment left. From 02:07 to 02:16 I got M 29, 39 and 80. By 02:30 I was the only one left, but I had been logging so well that I was determined to stick it out until daylight and hopefully get 100 objects.

I found myself having to wait for objects to rise, which was a blessing as that gave me a chance to warm up. I never got totally warm though and I felt chilled. Fortunately the wind stopped, but -20 is still very cold even without the wind. The air was very dry and up until this point I went without a dew shield, but when the wind stopped I decided to put one on just to be sure not to fog up.

From 02:56 to 03:22 I got through Vulpecula, Sagitta, Scutum and most of Ophiuchus as well as part of Scorpius. Time to wait for more to rise.

I went back out at 03:53 to look for Comet 2000 WM1 Linear, which I bagged exactly where my Sky Tools chart said it would be. It was a small but obvious fuzzy glow with a bright nucleus. No tail was evident and it was not nearly as impressive as Ikeya-Zhang.

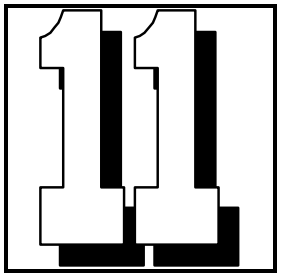
From 03:57 to 04:18 I got M 16, 17, 18, 24, 25, 23, 21 and 20. At 04:22 I bagged M 62 in Ophiuchus, and then went back down to Sagittarius for M 8 and 22 by 04:29. I was on M 28, but couldn't see it, probably because of the low angle and it was starting to get light. I logged M 15 in Pegasus as my last object at 04:40. I could not get M 6 or 7 as well as all those globulars in the bottom of the teapot. It was also getting too light to get the Aquarius objects or M30.

At 04:53 I called it quits at a total of 96 objects. Not quite the hundred I had hoped for, but I was extremely satisfied. I was now starting to feel tired and I had to concentrate so as not to leave anything behind as I packed up to head home for some much needed sleep.

One thing I can say is that although it was unbearably cold, I did not have to deal with any cloud what so ever. I think that my total of 96 was as good as you can get on March 16 from our observatory. Higher ground would have given us M 74 and 77 and perhaps some of those globulars in the bottom of the teapot and M6 and M7.

I wouldn't want to do this again tomorrow or next week, but I'll be ready for next year.

D.W.



Astronomers Like It Backwards

By Orla Aaquist

I have a terrible memory for meaningless names and telephone numbers. One of the main reasons that I decided to study physics rather than biology or chemistry is so I did not have to memorize words like *farnesyl protein transferase*, *antisense oligonucleotides*, *methylidenecyclohexadienones* and *dimethylidenecyclohexadienes*. For the most part, physicists choose sensible terminology, such as chain reaction, gravitational constant, momentum, and wavelength, which are easy to say and remember. Occasionally they go a little crazy and invent properties such a charm and beauty to describe elementary particles called quarks, but all this is fairly innocent compared with *methylidenecyclohexadienones*. Astronomers usually have the imagination of physicists when picking names. Terminology such as *big bang*, *black hole*, and *interstellar medium* are of little consequence in the face of *antisense oligonucleotides*. However, unlike the rest of physics, astronomers have a knack for choosing backward classification schemes.

Some of the more obvious examples of this backwardness are the stellar magnitude system, the luminosity classification of stars, and the numerical sub classification within the spectral classification scheme OBAFGKM. The magnitude system is self explanatory and requires no explanation. The luminosity class is pretty obvious, too, but let me briefly point out the problem. Luminosity classification is represented by Roman numerals: class I are the most luminous supergiants, class III are the normal giants and class V are the so called dwarf (main sequence) stars. Apparently, the greater the luminosity, the smaller the Roman numeral. This seems backwards to me. The third case, the sub classification of the spectral sequence, is similarly backwards. In particular, a B2 star is hotter than a B4 star. Below are two somewhat obscure examples.

In 1941, Rudolf Minkowski introduced a simple classification scheme, still in use today, to designate supernovae. Based only on their emission spectrum, he distinguished two types of supernova, *type I* and *type II*, which were originally classified based on the existence of hydrogen spectral lines. *Type Ia* does not show hydrogen lines, while *Type II* does. If this is true, why not use the more sensible designations *type H* (for hydrogen) and *type M* (for metals).

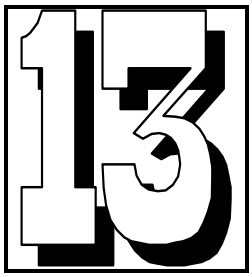
Today, astronomers believe that Minkowski's type I supernovae are caused by the collapse of the white dwarf component in a red-giant-white-dwarf binary system. They now refer to this class of supernovae as type Ia. Type II and type Ib supernovae are caused by the collapse of a single massive star at the end of its life, the latter of these somehow having lost its outer envelope prior to the final collapse and, consequently, generating a somewhat different spectrum that happen to resemble type I spectra.

I do not know about you, but I have problems remembering which is type I and which is type II. It seems to me that if Minkowski had reversed his somewhat arbitrary notation, I would have less trouble remembering the taxonomy of supernovae. In particular, type II supernovae should be the event that involve a binary system because two (II) stars are involved, and type I supernovae should be the explosion from a single (I) star. Of course, type Ib supernovae should maintain the same designation under this reversed scheme.

Here is a similar example. In 1944, astronomer Walter Baade, using the 100-inch telescope and Mount Wilson Observatory, resolved the central region of the Andromeda galaxy and its two companions, M 32 and NGC 205, into stars. Based on the colour of the stars he identified two stellar populations in these objects: *type I* and *type II*. The scheme is identical to that used by Minkowski to designate supernovae events, and just as arbitrary. In his 1944 paper, Baade summarized the characteristics of the two types as follows

> "*Characteristic of the first group (type I) are highly luminous O- and B-type stars and open clusters; of the second (type II), short-period Cepheids and globular clusters. {…} The two types of stellar populations had been recognized among the stars of our own galaxy by Oort as early as 1926."*

So, why not use type B (for blue) and type R (for red) rather than type I and type II? Alternatively, since the type I stars were clearly associated with the spiral arms and the type II with the galactic bulge, why not use the designation type S (for spiral arms) and type B (for bulge). Either would have been a tad more original and easier to remember. Fortunately, we no longer use the type I and type II designation introduced by Baade. Modern astronomy texts



referred to the two stellar groups as *population I* and *population II*. Big improvement.

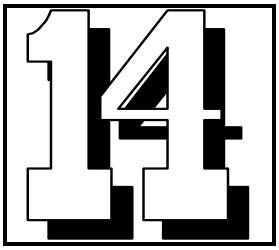
Analysis of the spectrum of these stars indicated that population I stars (the spiral arm stars) are rich in metals whereas population II stars are metal poor. So perhaps we could use the designation population P (for poor in metals) and population R (rich in metals). After considerable analysis of the stellar dynamics of the two populations, Eggen, Lynden-Bell and Sandage in 1962 suggested "that the oldest stars {population II} were formed out of gas falling towards the galactic centre in the radial direction and collapsing onto the plane from the halo." According to this model, the population II stars formed while the primordial gas cloud was still collapsing. The more massive of these first generation stars enriched the collapsing interstellar medium with heavier elements as they quickly evolved to the supernovae stage. The ejected gas, as well as the remaining primordial cloud, gravitated into a thin disk of enriched gas, from which the population I stars were formed. The population II stars maintained their original orbits, hence forming the spherical component of the galaxy. Since most of the gas settled into the disk of the galaxy, no further star formation took place in the halo of the galaxy; however, star formation continued in the disk. With each generation of stars, the disk became progressively enriched with the heavier elements or metals.

Once again, astronomers got it backwards. Population I stars would be a sensible name of the stars that formed first (I) and population II stars should be the name given to the stars that formed second (II). It would certainly help memory challenged people, like me.

Why do astronomers have this tendency to get classification schemes backwards? The problem dates back to about 130 BC when the Greek astronomer Hipparchus invented the magnitude scale for designating the brightness of stars.

But That's a story another

O.A.



April Star Hop in Leo

While it remains to be seen if April goes "out with a lamb" it definitely came "in with a lion". To find Leo look for its head and mane formed by the asterism the Sickle, it also looks like a backwards question mark, lying about 3 dipper handle lengths directly beneath the bowl of the dipper. The brightest star in Leo, Regulus, forms the base of the Sickle. Greek mythology has it that Leo is the immortalised form of the Nemean Lion. The lion reportedly fell from the Moon and attacked the countryside surrounding the city of Corinth until Hercules killed it.

Hop #1: M65, M66, NGC 3628 – Galaxies.

There are many galaxies in Leo including 5 on the Messier list but, at around 10th magnitude these three are among the brightest and easiest to find. With low power, 40x or less, they are close enough together to see all three in a single field of view. To find them start by locating the star Theta Leo. It is at the base of the triangle of stars forming Leo's hindquarters. Using binoculars or a finder scope you will see a trio of stars about 1.5° directly beneath Theta Leo. The brightest of the trio is mag 5 and the others are magnitude 6.5 and a 7. Centre your low power eyepiece on the magnitude 7 star and the galaxies will be within you field of view.

Hop #2: M105, M96, M95 – Galaxies.

To find these galaxies start by locating Alpha Leo and Theta Leo. Draw an imaginary line between the two roughly in the middle along the line you will see a magnitude 5.5 star this is Flamsteed number 52 Leo. Directly beneath number 52 you will see a magnitude 5.3 star, Flamsteed number 53. Using your finder scope (or binoculars) centre on the area between Flamsteed 52 and 53 you will notice a mag 7 star centre in your low power eyepiece. A quarter of a degree to the south-east is a grouping of 3 galaxies, M105, NGC 3384 and NGC 3373. Only one of these is brighter than mag 10, M105, so it will probably be all that you see here. By moving the 7 mag star close to the north edge of your low power eyepiece you should notice the bright galaxies M 96 and M 95 enter the field of view M 105 should also still be visible. If you have a really wide field of view (like my scope) you will technically be able to put all 5 galaxies in the field of view although, actually seeing them is another matter.

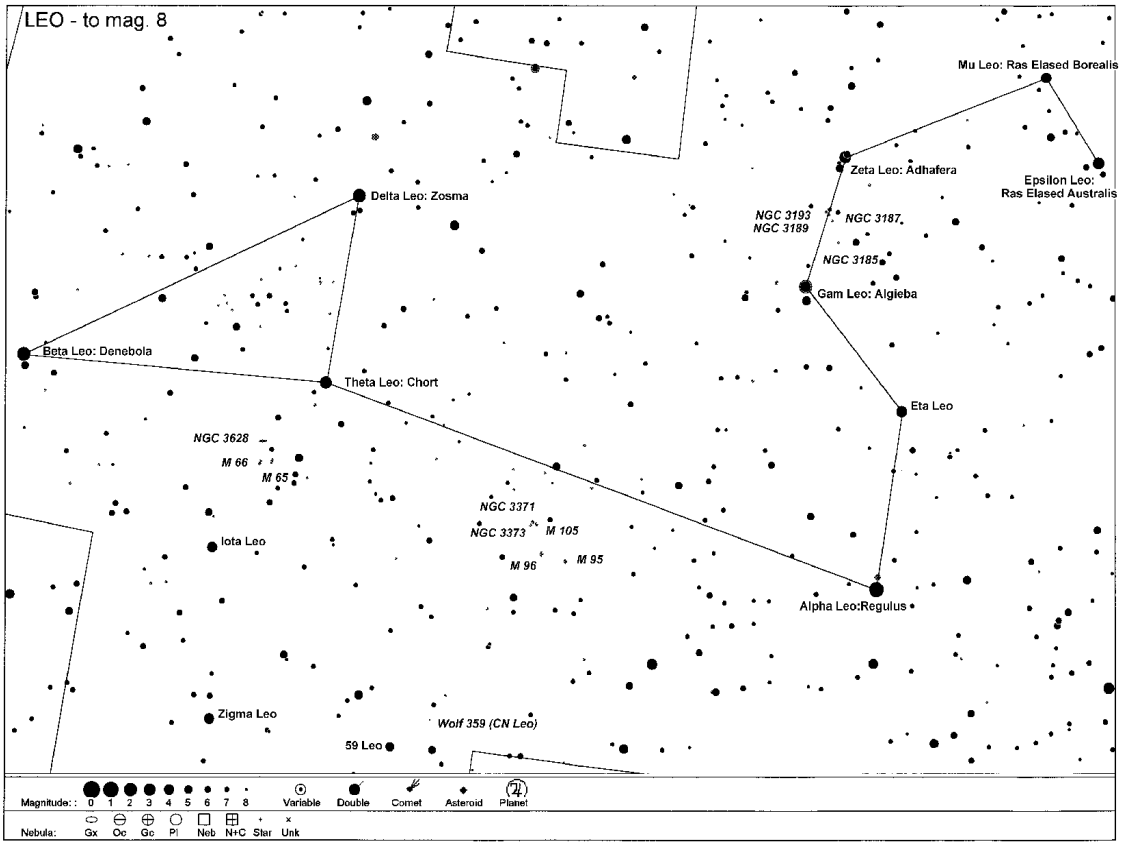
Hop #3: NGC 3193, NGC 3189, NGC 3187, NGC 3185 – Galaxies.

One last group of galaxies to find is located right in middle of the Sickle. To locate them find the 2.6 mag star above Regulus called Algieba or Gama Leo. Then find the next star up the Sickle, Zeta Leo it is mag 3.4. To find the galaxies simply draw an imaginary line between Gam and Zeta Leo and look right in the middle of the line. These galaxies are all fainter than magnitude 10 so create some finder charts for your scope with you favourite software and head off to some dark skies to spot them. A modest amount of aperture, about 8 inches, would be a good thing too.

Hop #4: Wolf 395 (CN Leo) - Variable Red Dwarf Star.

At mag 13.6 this star is visually unremarkable but the facts surrounding it are incredible. It is one of our closest neighbours in space with only Alpha Centauri and Barnards Star being nearer. The reason it is so faint in our skies is because at roughly the size of Jupiter it has only about 8% of the mass of our Sun and is 1/63,000 as luminous! To find this amazing star you will need some excellent star charts such as *Burnham's Celestial Handbook*. The general location, close to 59 Leo, is marked on the chart accompanying this article.

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
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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.