

PeGASus
Newsletter of the
Royal Astronomical Society of Canada
Prince George Centre

September 2005

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

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The RASC-PG meets next at 7:30 pm
Wednesday September 28
at The Observatory

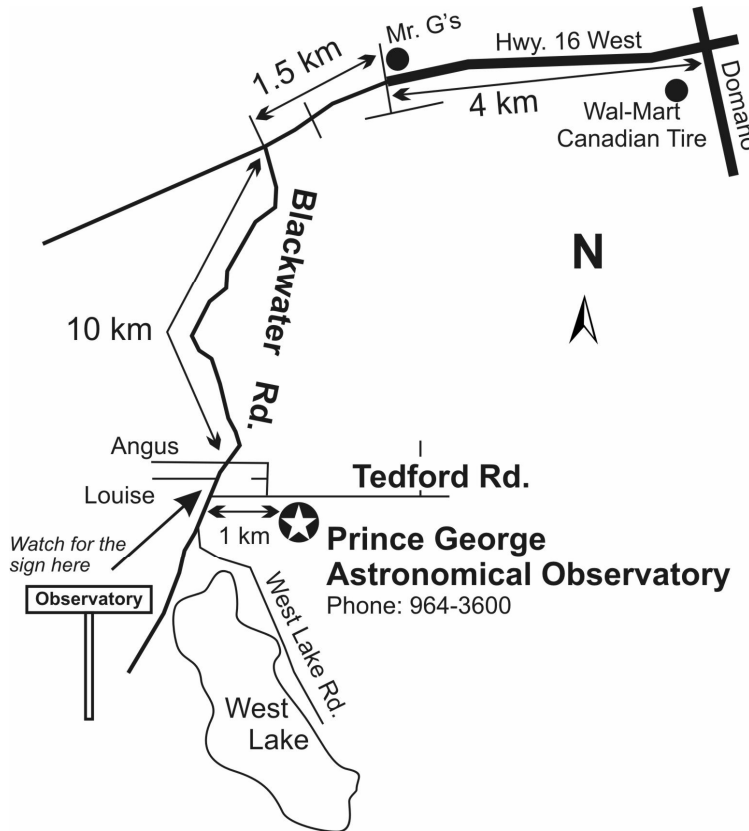
Important Notice:

Annual General Meeting and Elections will be held October 26 7:30 pm
at the observatory



September 10 th
aurora photos
By
Hugh Kennedy





Contributions to the newsletter are welcome.

Deadline for the next issue is

October 14 2005

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Coming Events

Open Houses run every Friday evening March through May

Sept. 24 NOVA session #2

Sept. 28 General Meeting 7:30 pm Observatory

Oct. 12 Executive Meeting (SpeeDee Printers—5th & Brunswick)

Oct. 15 NOVA session #3 7:30 pm Observatory

Oct. 26 ANNUAL GENERAL MEETING (Elections) 7:30 pm Observaotry

Oct. 29 NOVA session #3 7:30 pm Observatory

Open Houses run every Friday evening August through November

Members Nights run every Saturday evening August through November

Editorial

Gil Self

Guest Editorial by Wayne Saunders

Hope that all had a great summer.

All the fishing, visiting relatives, friends and so on. This is just a short note, to bring all members up to speed on the current projects that I am aware of. These projects are developing both at the observatory and at different members homes, this is not a complete list

They are not exclusive projects either. By that I mean not one person owns the project so all are welcome to share and participate, in fact several projects need special talents to bring about a professional looking conclusion., Enough yap.

Projects I am working on.

Youth education ie. "PRO D Day" a follow up to last years very successful start up.

Need help coming up with ideas to get the youth of today tuned up on astronomy.

Volunteers needed.

Preparing to automate the dome drive getting chains and welder lined up likely happen sept / oct. months as our current welder is starting back to school, so will be Saturday and Sunday work.

Working with Glen Harris who has a whole list of projects that he has been working on.

Computer up grades, software changes etc.

Glen and I have been working on the radio astronomy program that is in it's infancy here at the Prince George Center.

Summation Radio Sky Pipe installed on several more computers. Intent is to have the raw data published to the internet with it being updated every 4 - 6 hours and archived to CDROM so that processions of other amateur astronomers could access the data if needed. Great Idea for the UNBC students with papers to write.

Purchased A to D converter boards along with required parts unit constructed.

Design and layout printed circuit boards for signal processing before being fed into A to D boards. Boards laid out parts purchased. Check board produced ok for production.

Need suitable cabinets or some thing made up or thought up.

This project has a projected completion date of OCT. 1 The use of A to D board allows a slower computer to do a great job of recording meteor data . As well as a source that can be accessed off the internet.

3 New antennas were made at the start of the summer period, with one installed at the observatory the others at the homes of Glen and Wayne. It is to be noted that the cost of these antennas was donated ~ \$36.00 each.

A receiver kit was ordered from "The Jove Project" from NASA. Has not arrived This will allow us to monitor the radio signals that Jupiter and the sun produce. Antennas to be erected at the observatory. These are short poles ~ 20 feet in height there are need for 4 poles. Volunteers anyone.? If the poles and antennas were up when the kit is received it would be a very short time until this project would be complete.

A very simple radio telescope has been produced and will be taken to the observatory. Its main use will be in the introduction of Radio astronomy as it very clearly demonstrates microwave radiation from warm bodies. Brain has said that he will attempt to use the telescope to assist in the explanation of HR temperatures and I will use it in the Pro D Day Program. Need interested Parties to pick up and run with this project as well.

A very successful presentation was made at the public library during the month of August. This was done in conjunction with Reading week

Welcome NOVA Course Members

Maurice has added to the DVD library throughout the summer. Have a look at it .

The Web Page is Awesome and growing every day . Way to go Brian.

Hugh and Annette have done a bang up job upgrading the hardware " New Class Room Computer"

Doug with keeping the water up in the cistern

. Volunteer and lets hear your ideas for a better more active club. Elections are coming.

Wayne

The Night Sky for October 2005

by Bob Nelson, PhD

Hi Folks,

Here I am late with this month's column and away from home to boot. I am writing this from the warm room of the Plaskett telescope (the 72 inch) on a cloudy night. As usual, I am gunning for taking spectra (and determining radial velocities) of selected eclipsing binaries. Last night (my second night of twelve) was wonderfully clear. I took eight spectra of target stars (plus five standard stars); however, I have not been able to get any meaningful results so far. Something seems to be wrong with my procedure and analysis, but I am unable at the moment to say what it is. Hopefully, I will get it sorted out soon and have a productive run (as I did last April when I got a beautiful velocity curve for XZ UMa). I'll let you know how I make out in the end when I get back!

Here is what is happening in the sky this month:

PLANETARY ROUNDUP:

MERCURY, the speedy planet, is basically lost in the glare of the Sun this month.

VENUS, in Libra at the start of the month, passes into Scorpius on Oct 7, and then on into Ophiuchus on Oct 21. On Oct 1, it's a 19" gibbous disk 64% illuminated and sets a little over an hour after sunset; by month's end, it's a 24" disk almost exactly half illuminated and sets two hours after sunset.

MARS, in Aries, rises at mid-month about an hour after sunset and is visible all night. It's a 19.5" disk of magnitude -2.0 and will get smaller and dimmer as the Earth races away from it as it does every ~2 years (synodic period – opposition to opposition). The next opposition will be on Nov 7.

JUPITER, in Virgo, sets at mid-month about 20 minutes after sunset. This is a real challenge object (unless you have a go to scope and can observe it before sunset) – wait until next year!

SATURN, in Cancer, rises at mid-month at about 00:50, PDT. It's not really observable by most folks unless you stay up reeeaaallly late (like moi) or are an early riser and can sneak in an observation before going to work. FYI, it's a 17" disk of magnitude 0.3.

NEPTUNE, in Capricornus, at mid-month is low in the southeast at sunset and sets at about 01:30, PDT. As usual, it's a 2.3 disk of magnitude 7.9.

PLUTO, in Serpens, sets at mid-month at about 22:00, PDT. As usual, it's a starlike object of magnitude 14.1 and is, as always, a challenge object. (You need good finder charts or a go to scope that is well aligned.)

CONSTELLATIONS to look for in October (at 9:00 PM, PDT) are Pisces Austrinus, Capricornus, Aquarius, Delphinus, Vulpecula, Equuleus, and Pegasus.

Pisces Austrinus (PsA, "the Mouth of the Southern Fish") is, of course, a southern constellation lying well to the south of Pegasus. The northern boundary is at declination -25 degrees, so we can therefore see only about a 10-degree northern strip provided that it is on the meridian and we have a good southern horizon. Its brightest star is Fomalhaut (mag 1.2, spectral type A3 V, surface temperature 8500 K) and is a white main sequence star some 16 times brighter than our own Sun. Its distance is 7.7 parsecs (25 light years). In 1983, the satellite IRAS discovered an infrared excess deduced to come from a huge circumstellar disk four times the size of our solar system. The particles in the disk are thought to be icy dust particles warmed by the star. Recent observations indicate a hole that could have been swept out by a yet-undiscovered planet. [Some of the information has been paraphrased from <http://www.astro.uiuc.edu/~kaler/sow/fomalhaut.html>.]

Capricornus (Cap, “the Water Goat”), when on the meridian, is low in our southern sky but should be visible in its entirety. Its brightest star is Delta Cap, at a rather uninspiring magnitude 2.85, but its brightness varies with a period of 1.02 days (it’s an Algol-type eclipsing binary discovered by John Herschel). It too is an A-type star and lies some 38.5 light years from us. It is also suspected of being intrinsically variable (a pulsating variable) of the Delta Scuti (short period, low amplitude pulsations) type. [ibid]

Also in Cap is the globular cluster M30, well known to the Messier-chasers. It has an overall magnitude of 7.2 (not bad) and measures some 8.9 arcminutes along its major axis (it’s slightly elliptical in shape), and was observed by William Herschel, as well as you-know-who.

Aquarius, (Aqr, “the Water Bearer”). It lies to the east and north of Capricornus, and is readily observable in its entirety to us Prince Georgeans. It lies on the zodiac (important for those that fall prey to horoscopes) and is well known to all. It lies out of the galactic plane and contains globular clusters M2, M72 and NGC 7492. It also contains the open cluster M73. Its brightest star is Beta Aqr (magnitude 2.87, Spectral type G0 Ib, meaning that it is slightly hotter than the Sun but is a supergiant; it emits a whopping 2000 times the luminosity of our own Sun). The reason that Beta Aqr is not brighter visually is that it lies a 600-1000 light years away! The common name is Sadalsuud, meaning in Arabic “The Lucky One”. [ibid. Hey – this is a neat source worth bookmarking! It’s written by Jim Kaler, prof emeritus at the Univ. of Illinois. Home page: <http://www.astro.uiuc.edu/~kaler/sow/sowlist.html>; it also contains scads of other goodies.]

Delphinus, (Del, “the Dolphin”) is a tiny constellation lying northeast of Aquila and entirely contained in the northern hemisphere. It’s not overly interesting but contains the globular clusters NGC 6934 and 7006.

Vulpecula, (Vul, “the Fox”) lies to the north of Delphinus. Lying as it does in the Milky Way, it contains numerous nebulae, open clusters and variable stars. One of its best known nebulae is the Dumbbell Nebula, a planetary nebula (PN) which, like most of its ilk, resulted from the explosion of a star undergoing core collapse at the end of its hydrogen-burning phase. No one knows why PNs attain the shape they do; indeed some display really exotic shapes like helices, undoubtedly as a result of magnetic fields. This one has two lobes; they may result from rotation or as a result of the inhomogeneities of the local interstellar medium (my speculation).

Equuleus, (Equ, “the Little Horse”. I always think that this rhymes with “screw loose”, but perhaps I am mistaken in the pronunciation.) It lies to the east of Delphinus and is smaller yet than the latter (it is one of the smallest constellations in the sky; however, Sagitta is smaller). It contains a number of NGC objects (read “galaxies”) but little else. The brightest star is Alpha Equ, a double star detectable visually and by its spectrum. Read all about in Kaler [ibid] if you want to know more.

Pegasus (Peg, “the Flying Horse”, our patron constellation – yeah!) As everyone knows, it lies outside of the Milky Way and is rather sparse overall, despite its great size. The great square is easily recognized and contains the open cluster NGC 7772, near the bottom left. Near the western boundary, and almost into Equuleus, is Messier 15, one of the finest globular clusters in the northern sky (after M13 and M5. It’s tied with M3 for overall brightness.)

Best wishes to all,
Bob



Photos by
Hugh
Kennedy



Experiences of a New Observer

I came into the NOVA course with little or no experience in Astronomy. As a child my father bought a cheap Sears Refractor telescope but all we ever really looked at was the Moon.

I expressed an interest in Astronomy again a few years back and asked around my family for the location of the Old Sears telescope. Try as we might we could not find it. Personally I started looking at telescopes again in the summer of 2004. Shopping is a Hobby of mine (much to my wife's chagrin) and I love the hunt for a deal. I started to read a lot of beginners guides to buying a telescope.

Soon Christmas time came around and no commitment yet came from me for a purchase of a scope. Turns out Christmas morning my oldest sister who had drew my name for a gift gave me another Sears Refractor. She told me that if I wanted something more she would understand if I traded it in for something I wanted. I went back to Sears and looked at what they had in stock. Well after reading so much the last while on different telescopes I knew I would not be happy with a Sears Scope. We returned the Sears Scope and put the money aside for what I really wanted.

It was at this time I had e-mailed Brian at the PG Observatory to ask his opinion. I had looked the site up on Google and found Brian's e-mail. Brian was very helpful with information and also told me that a course for beginners would be starting in January. The course was called NOVA or New Observers to Visual Astronomy Program.

My wife Annette and I decided to join the course to learn more about the night sky. We also purchased a new 8" Celestron Starhopper Dobsonian telescope from Island Eyepiece on Vancouver Island. This was one decision I later found out I was so happy I made. Buying a nice telescope at a very reasonable cost helped me get more excited about the NOVA course and certainly made viewing a wonderful experience.

The NOVA course got me comfortable around the night sky and added a nice social event every two weeks to our calendar. Also the members at the PG Observatory make you feel very welcome as a new member and there is no lack of assistance to help you learn. I talked to my friend Jim about what I was doing and he soon joined the NOVA class also. Jim ended up getting an 8" SkyWatcher Dobsonian. Tied into the NOVA class our instructor Brian wanted us to try to achieve a viewing certificate called Explore the Universe Certificate. This is a challenging program for the new astronomer covering all major astronomical objects including constellations, bright stars, the Moon, Deep Sky Objects, and Double Stars. Suitable for both binoculars and telescopes. However in my opinion using the 8" DOB makes it a lot easier to achieve this. I found myself too shaky to use binoculars to get meaningful viewing in.

Over the next few months I was amazed at the things I seen and how talented some of the members were at knowing the night sky. During the Messier Marathon I learned how important it is to prepare yourself if you are going to view. During the marathon I viewed 29 Messier objects. This paled in comparison to Doug Wayland who closed in on 100 objects that night. Of course the biggest thing I learned was how organized he was with maps. I was soon into StarryNites and Cartes du Ciel learning how to print off maps and keeping them in a binder. I spent quite a few nights out at the Observatory with Jim trying to close in on the objects for the Explore the Universe certificate. Keeping your notes and drawings in order was essential to achieve this. During my last few viewing sessions I actually had each object printed off on a map and the time I would look for it. In early May I finally finished all of the objects I needed to do. I finished up the drawings and handed it in to Brian for him to confirm. Both Glen and Jim finished before me.

On June 4th 2005 the annual year end Barbeque takes place. Glen, Jim and I will get our certificates. A wonderful accomplishment in a new interest and one I can see lasting a lifetime.

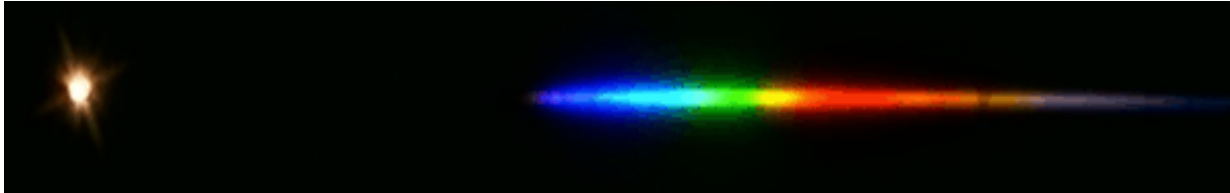
Hugh Kennedy



Hi Guys

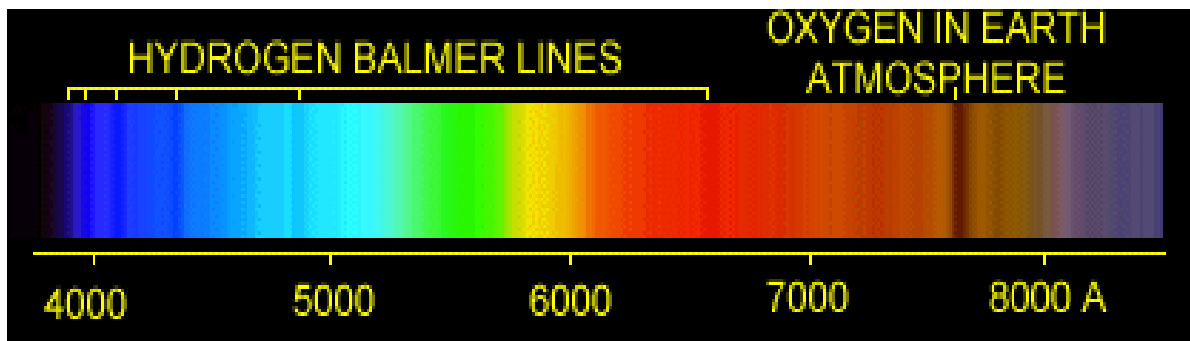
The summer has not been all fun and games (i.e., fishing, etc.) here. As many may know, I started a project last fall that would allow me to do spectral analysis of stars.

I am reporting that I am able to get photos using a Meade DSI C camera and a filter called StarAnalyzer . That are similar to the following image of Vega. (This is not my image but it does illustrate the following steps.)



Notice that Vega is on the left hand side of the photo -- this is called the zeroth order image. To the right of that image is a blue-thru-violet spectrum -- this is the first order image.

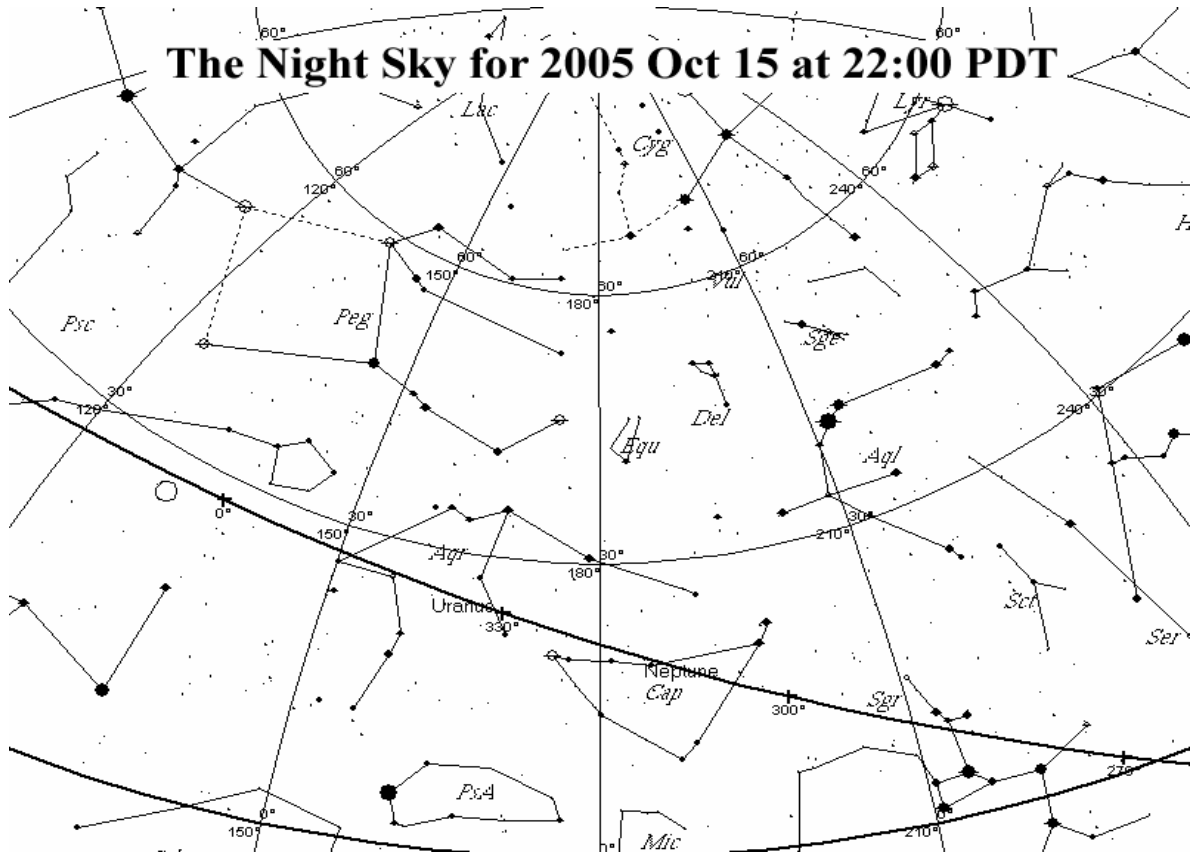
Using software “Gimp”, one then takes a very small slice -- say 5 pixels high -- and the full width of the first order image. Resizing to say 25 pixels high gives the image below, which can then be calibrated. In the above image notice the dark vertical lines in the red brown area; these are oxygen lines cause by the Earth's atmosphere. Using these lines (that have known wavelengths), one can calibrate the image. Knowing that the first order image center is 0 Angstroms and the Earth's O2 lines are ~7600 Angstroms, one can count the pixels from 0th order to the location of the O2 lines and divide them into the wavelength to get the scale. Example: 0 to 560 pixels gives us the O2 lines at 7600 Angstroms and a scale of $7600/280 = 13.6$ Angstroms/pixel. 280 pixels will give us a wavelength of $13.6 \times 280 = 3800$ Angstroms and so on . [Editor's note: This linear procedure only works for small angles -- say less than 10 degrees or so (depending on the errors one is willing to tolerate). For larger angles a more complicated formula must be used.]



Notice how the darker lines in the lower picture show us the hydrogen lines of Vega.

Wayne

The Night Sky for 2005 Oct 15 at 22:00 PDT



On July 17th my wife, Gretchen, and I joined a nine member Antares graze observation team led by Walt Morgan. This was an 800-mile return trip to Tumwater, Washington (a suburb of Olympia).

The graze on the moon's dark limb in the north polar area occurred between 8:34 and 8:37 PM PDT, before sunset at 9:01 PM. But Antares was first seen at 7:58 PM in my 8-inch Dobsonian at 64x and was bright orange and obvious during the grazing occultation. The skies were cloudfree for many hours and quite reasonably transparent. Seeing was respectable for the low altitude of the event, only 14 degrees. Antares was a crisp point, not the boiling blob that it usually is at home. And I did not see any of the flashes of spurious colour that I usually see when viewing Antares at home either. In summary, I have little evidence for significant seeing-induced changes in the brightness of Antares that evening.

Over a period of 99 seconds, I recorded eight Antares events, four disappearances and four reappearances. This was a marvellous experience, a night when I formed what I know will be a lifelong memory! In 41 years of observing lunar occultations, the only experience that can begin to compare was the Sept 10, 2001 Saturn graze which also occurred in Washington state.

With eight events recorded, my station was one of the luckiest of the nine stations. One station saw ten events; other stations saw four or six events; and two stations saw only one disappearance and one reappearance.

My tape states that three of the four disappearances were gradual fades before disappearing entirely. The last reappearance also took some noticeable time to fully brighten. So four of the eight events were gradual, effectively showing resolution of the red supergiant star's disk with the aid of the tangentially-moving moon. I was ecstatic since the chance of resolving Antares's disk was the main reason that I drove 800 miles.

It was wild at the beginning, with five events occurring in the first eight seconds at my station. First there was a fade followed by a 1.2 second disappearance. (The period of fading was as long or longer than the subsequent period of complete invisibility!) After reappearing, Antares faded again, then disappeared for 1.3 seconds. After reappearing again, the orange star remained visible for only 1.6 seconds before going out again. These were the five events in eight seconds.

After disappearing for that third time (the only instantaneous disappearance without a fade), it remained hidden for 28 seconds. After 20 seconds of visibility, Antares faded again and went behind terrain for 43 seconds. The final reappearance was a gradual brightening.

I have a videotape from Steve Preston showing the two southernmost tracks and they got some wonderful very slow fades on videotape. The best one very slowly fades and re-brightens without ever disappearing to my eye (well, it might possibly wink out for a tenth of a second when it is at its faintest, but I don't think so). I brought Steve's videotape to the Sept 7th meeting of the centre, but there was not enough time to show it.

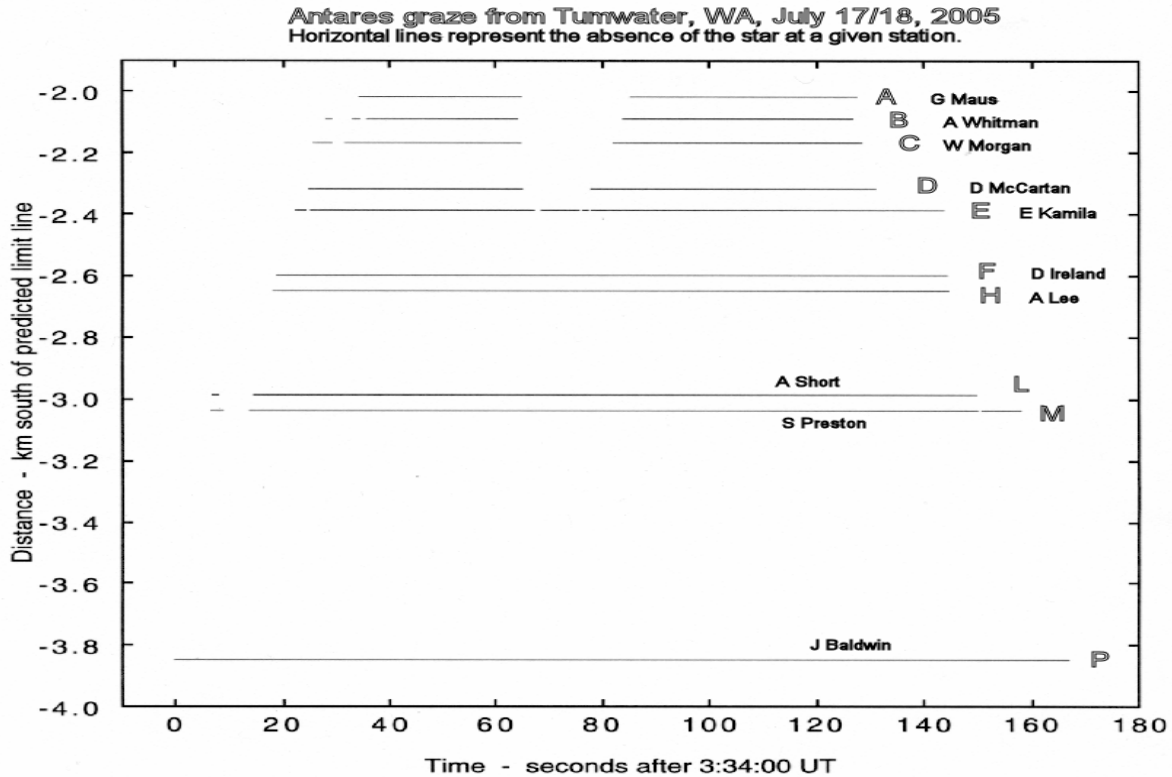
The scenery of the Cascade Mountains, both ways, and Whidbey Island on the return made for a scenic drive, as well, which convinced Gretchen that we should go. On the way home, while driving through the dark tunnel on the freeway express lanes in central Seattle I noticed that my battery warning light was on. Who knows how long it was on? (The warning light was nearly invisible in sunlight.) Limped into Everett and left considerably poorer, with a both a new battery and an alternator.

The Antares graze was a wonderful experience. Thanks to Bruce McCurdy of Edmonton Centre for the inspiration -- I probably would not have travelled that far for a graze if I hadn't read (and reread) Bruce's report of his Aldebaran graze eight years ago: " I had a similar experience observing the Aldebaran graze on 1997 October 20 from near Morningside, Alberta. I drew the luckiest station, in the dead centre of a very long (and well-calibrated) line. This was the largest graze expedition I have ever heard of: there were 31 astronomers in all, including 16 from Edmonton, 14 from Calgary, and Brian Skiff who happened to be visiting to give the Edmonton RASC a talk. We had at least two scopes per station; at lucky Station 7, my observing partner Harris

Christian and I saw 13 events: six disappearances, six reappearances, and one fade that never quite disappeared before returning."

The results from all of the Antares graze stations are shown in the graph made by expedition leader Walt Morgan (who came all the way from California for this event).

Alan Whitman



The results of our Tumwater expedition for the Antares graze, Sunday evening, July 17, 2005, are shown graphically above. Each horizontal line represents a D-R pair of events at a particular station, i.e., it is the period during which the observer could not detect the star. The horizontal lines can therefore also be interpreted as the presence of the moon.

Note that the vertical scale is greatly exaggerated. Successive tick marks on the vertical axis represent a spacing of 200 m between observers, and that translates to 200 m elevation change on the lunar profile. Successive tick marks on the time axis represent 20 seconds, and that translates to about 16 km at the moon - about 80 times as far.

The set of observations is very consistent. Two major peaks toward the northern limit are obvious - and they were expected. Just where they would be was not so obvious. A careful study before the graze led to the conclusion that a miss might be observed anywhere north of 1.5 km south. It is now believed that the actual peak reached to about 0.5 km south.

The bottom of the valley between those two main peaks is clearly defined by the observation at station E. On your copy of the plot you probably can make out a gap near 68 seconds (it is 1.3 seconds in duration), but you may not be able to make out two more gaps, a few seconds later, that were each less than one second in duration.

Some leading edge lunar structure is clearly shown by stations B and C, and also by stations L and M. Other small peaks were observed at individual stations.

Stations A through M were well-grouped in time along the graze path, with their predicted central graze times falling within a 0.3 second window. Adjusting for those small differences would not be detectable on the scale of the plot, so no adjustments were made. Station P was northwest of the Olympics, a calculated 73 seconds earlier on the graze path, so 73 seconds were added to those times to place them on this plot.

Thank you for your participation. Walt Morgan