PERTH OBSERVATORY
Department of Conservation and Land Management

PERTH OBSERVATORY VOLUNTEER NEWSLETTER

JUNE 1998

Editor: Bevan Harris

Editorial

With our winter solstice occurring on the 21st, this month provides us with the longest nights of the year. In between the winter squalls and storms, this provides perfect opportunity to capturing the delights of the galactic centre, as well as the Milky Way regions in Crux and Carina.

The recent Volunteer Dinner held at The Pines Buffet Restaurant in Scarborough, attended by 24 staff and volunteers, proved to be a great success and an excellent way to mark the end of the 1997/98 tour season. Personally, it provided me with a great opportunity to gain some much appreciated feedback about changes I have incorporated into this newsletter over the last couple of issues. Many thanks to those of you who gave me encouragement and suggested further changes for future issues.

Further feedback is welcomed, so please feel free to contact me with your comments or suggestions about how you would like to see your newsletter. Without making the task too onerous for myself, I would like to include material which is useful at a variety of skill levels, as well as the usual news of upcoming events, Observatory news (such as discoveries) and the like. I have also received a couple of offers for future articles (at least that was my impression <grin>), so watch out for these in coming months.

NGC 2997 in Antlia

The featured article this month examines the use of averted vision, a vital skill which if used correctly can enable you to see more of the faint fuzzies. It is one in an ongoing series written by US amateur and astronomy educator Jeff Medkeff and generously donated for use by the wider astronomical community. Further articles by Jeff may appear from time to time in this newsletter.

A new feature from this issue is *In the Eyepiece*, a segment which features typical objects which are suitable for viewing on night tours. Each month a different object will be highlighted with both historical and descriptive information as well as an accompanying image. For added interest, a brief extract pertaining to the object will usually be included from the journals of historic and otherwise notable astronomers.

I hope you enjoy this issue.

Highlights In The Sky

After a dearth of bright planets in the evening sky since February, we see their gradual return with appearance of Mercury and Jupiter toward the end of the month.

Rising less than an hour before the Sun on the 1st, this month **Mercury** provides us with an opportunity for both morning and evening viewing. It passes through superior conjunction on the 10th before reappearing in evening twilight late in the month. A challenging alignment with a very thin crescent Moon (17 hours old) and Pollux occurs on the 25th before Mercury crosses into Cancer on the 30th.

Following its recent appulse with Saturn, the rapidly lowering **Venus** begins the month in eastern Pisces as it heads towards the Sun. It moves into Taurus on the 19th and passes the Pleiades around the 22nd, where it is close to the waning crescent Moon, before finishing the month next to the Hyades cluster at first light

Throughout the month **Mars** remains too close to the Sun to be observed. However it may be glimpsed between the horns of Taurus the Bull in the dawn sky at month end.

Phases of the Moon	FQ: Tue 2nd	FM: Wed 10th	LQ: Wed 17th	NM: Wed 24th

Having recently moved into Pisces from Aquarius, **Jupiter** rises around 0100 at the beginning of the month and is prominently visible high in the north east as morning approaches. It heralds its return to evening skies around the 23rd when it rises immediately prior to midnight and by month end is rising about 2330.

Saturn, continuing to climb away from its encounter with Venus, is seemingly in distant pursuit of the fleeing Jupiter. Located on the opposite side of Pisces near the border of Cetus, it rises before 0400 early in the month and a little before 0215 at month end. It will be visible next to the 25 day old Moon on the 20th.

Dimly visible **Uranus** is in the middle of Capricornus throughout the month. It rises around 2200 at the beginning of the month and shortly before 2000 at month end.

Neptune is situated in Capricornus near the border of Sagittarius and rises almost an hour before Uranus throughout the month.

Pluto is in Ophiuchus heading towards the extreme northern border of Scorpius. As it is well placed for evening viewing following last month's opposition, why not set yourself a challenge and seek out this elusive wanderer? Located about 0.75° N of Upsilon Ophiuchi, it rises around 1740 at the beginning of the month and near 1545 at the end. You'll need at least a 20cm (8") scope and dark skies to succeed. Oh, you'll be needing the chart on p97 of Astronomy 1998 too!

Comet 1998 J1 (SOHO)

Image courtesy of Michael Horn

A new comet was discovered just 8° from the Sun in images taken by the SOHO satellite on May 3. Designated 1998 J1 (SOHO) and reported in IAU Circular 6894, the comet is now well placed for observing from the southern hemisphere. After passing by Orion's belt in late May, it is now in the vicinity of Sirius and will be located next to M41 on June 6. On the 11th it will pass by NGC 2354 before moving into Puppis around the 16th to end the month next to NGC 2546 near the border of Vela.

NOTE: On June 1 the comet was observed to undergo an outburst by South Australian amateur Michael Mattiazzo, exhibiting (at the time) an intense blue green disk of third magnitude.

The comet's discoverer, the SOHO (SOlar and Heliospheric Observatory) satellite, is located 1.5 million km from Earth at the L1 Lagrangian point. This is a gravitationally stable point between the Earth and the Sun, where the satellite is able remain in essentially the same position (relative to the Earth and Sun), thus enabling it to maintain a constant gaze at the Sun in order to seek out solar anomalies. SOHO has discovered more than 50 sun grazing comets since it was launched last year, including the two most recent ones which were reportedly widely in the general media after they collided with the Sun.

The accompanying image was taken on May 23 1998 at 0839UT by Queensland amateur Michael Horn, Comet SOHO is seen passing by the Horse Head (B33) and Flame (NGC 2024) Nebulae in Orion.

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
1998	06 01	06 28.51	-15 29.9	0.933	0.775	46.7	72.1	6.7	
1998	06 06	06 52.52	-21 38.4	1.005	0.895	52.6	64.2	7.5	
1998	06 11	07 14.37	-26 37.0	1.086	1.010	57.3	57.8	8.2	
1998	06 16	07 34.56	-30 41.3	1.174	1.119	60.9	52.5	8.8	
1998	06 21	07 53.44	-34 04.4	1.266	1.224	63.8	48.2	9.4	
1998	06 26	08 11.25	-36 56.1	1.360	1.325	65.9	44.5	9.9	
1998	07 01	08 28.18	-39 23.9	1.457	1.422	67.5	41.3	10.3	

Orbital elements courtesy of the Central Bureau for Astronomical Telegrams

Time Sheets - URGENT

Could all volunteers who work out of normal hours and/or personally retain there time sheets please send them to the Volunteer Coordinator (Jamie Biggs) **AS SOON AS POSSIBLE after June 30**. It is essential that we have an official record of the time you have generously donated so that we can reward you, keep the insurance people notified and show the rest of our department the extent to which the Observatory and CALM are benefiting from the volunteer programme. Would you please forward your time sheets each quarter (ie the end of March, June, September and December).

In the Eyepiece - Omega Centauri

Omega Centauri is the largest and brightest globular cluster visible in the sky. It has been known for literally thousands of years, appearing in Ptolemy's catalogue, and labelled as a star by Bayer in the early 17th century. Edmund Halley was the first to recognize it as a cluster in 1677.

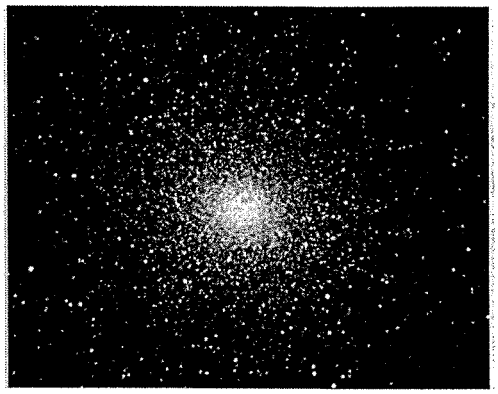
Appearing to the naked eye as a hazy patch at magnitude 3.7, this giant extends over an area greater than two-thirds that of the full Moon. Small telescopes and even binoculars begin to resolve its outer regions into stars, but it remains a splendid sight at any aperture.

Visually, the angular measurement of the cluster is 36.3 arc minutes, which equates to a diameter of around 180 Ly. However, estimates of the diameter from photographic plates can at least double these values.

The cluster's brilliance and large apparent size are due partly to its relative closeness, which at 17000 light years makes it among the nearest globular clusters to us. The title for the nearest globular cluster, at a rather neighbourly distance of 8200 Ly, goes to the faint NGC 6397 in the constellation Ara.

It has been estimated that Omega Centauri contains more than one million stars. The stellar density at the core is thought to be some 25000 times greater than in the solar neighbourhood, with the average interstellar distance measuring around 0.1 Ly.

The brightest stars in the cluster are red and yellow giants some 1000x more luminous than our Sun. It also contains one of the richest populations of variable stars, which are predominantly RR Lyrae (or cluster) variables with a pulsating period of less than a day.



FACT *file*

Name :	Omega Centauri
Type of object :	Globular cluster
Other names :	NGC 5139
Constellation :	Centaurus
RA :	13h 26m 44s
Dec :	-47° 28' 37"
Magnitude :	3.7
Distance :	17000Ly
Size :	36.3'
Diameter :	180Ly
NGC description :	!!!eL,B,eRi,vvC

"The noble globular cluster Omega Centauri is beyond all comparison the richest and largest of its kind in the heavens. The stars are literally innumerable, and as their total light affects the eye hardly more than a star of 4th magnitude, the minuteness of each star may be imagined..." John Herschel

Supernova 1998ce

The automated supernova search program has scored another victory with a supernova discovered on March 19th by Ralph Martin, Andrew Williams and Simon Woodings. Designated **SN1998ce** and reported in IAU Circular 6912, the supernova is located in the galaxy MCG -4-24-19, which is located in the constellation Hydra near the border of Antlia, at RA 10h10m35s Dec -25°49m31s (2000.0). The supernova's discovery and position were confirmed with additional images taken at Perth Observatory on May 21st. No supernova was apparent in a previous image to mag. 19 taken on May 3rd.

The MCG galaxies are listed in the Morphological Catalogue of galaxies, which is a Russian compilation from the 70's and 80's. MCG -4-24-19 is about 40 megaparsecs (abbreviated Mpc) or greater than 130 million light years distant. This is the Observatory's fourth supernova discovery in 1998, after SN1998a, SN1998e and SN1998x.

Courtesy: IAUC 6912

Night Tour Attendances

The final tally of visitors for the 1997/98 Night Tour season was 4167, which is just one less than for the previous year's record figure! This represents a fine effort which we wouldn't have been able to achieve without the invaluable assistance rendered by the night tour volunteers. For comparison, before we employed volunteer assistance the attendance figure was about 2200.

Telescope Practice Nights

As announced last month, the popular telescope practice nights will now continue year round to further assist Night Tour volunteers in maintaining and enhancing their skills in telescope handling and in the acquisition of objects of interest. The format of the practice nights has also been expanded to include a 30 minute talk on a topic which is either astronomical or otherwise related to the Observatory's activities. The talk will occur before the practice session begins and will be accompanied by light refreshments (cheese and biscuits etc). This activity is part reward, part social, part information dissemination that the Observatory will endeavour to provide for the benefit of **ALL volunteers**.

Government Astronomer, Jamie Biggs will initiate the talks on Monday 22 June 1998 with a slide show/talk concerning the "Basics of Radio Astronomy". It should be possible for volunteers or visitors to deliver a talk on future occasions if it is appropriate. Would you please contact Greg Lowe on 9293 8255 to confirm your place for the evening.

Annular Eclipse

Now is the time to make your arrangements if you are planning on viewing next February's annular solar eclipse next February 16th. The path of annularity crosses the WA coast near Greenough, passing over the towns of Mullewa and Cue before entering the remote interior and into the Northern Territory. Coordinates for the Western Australian portion of the ground track are listed below, but watch for more information in next month's newsletter.

Universal	Northern Limit		Southern Limit		Center Line		Sun Alt	Sun Azm	Path Width	Central Durat.
Time	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude				
	° ′	° ′	° ′	° ′	° ′	° ′	°	°	km	
07:25	29 38.9S	113 23.2E	29 53.4S	113 41.7E	29 46.1S	113 32.4E	48	285	39	00m45.5s
07:30	28 28.4S	115 29.3E	28 43.4S	115 49.6E	28 35.9S	115 39.4E	46	282	41	00m47.0s
07:35	27 15.0S	117 42.5E	27 30.4S	118 05.0E	27 22.6S	117 53.7E	43	278	43	00m48.7s
07:40	25 57.9S	120 05.4E	26 13.9S	120 30.6E	26 05.9S	120 17.9E	40	275	46	00m50.6s
07:45	24 36.5S	122 41.4E	24 53.0S	123 10.1E	24 44.7S	122 55.6E	36	272	50	00m52.8s
07:50	23 09.5S	125 35.8E	23 26.6S	126 09.0E	23 18.0S	125 52.3E	32	270	54	00m55.2s

Source: http://planets.gsfc.nasa.gov/eclipse/OH/Path1999.html#1999Feb16A

VLT Achieves First Light

The European Southern Observatory has announced that First Light has been achieved with the first VLT 8.2-m Unit Telescope at the Paranal Observatory. Scientifically useful images were obtained as scheduled on May 25 - 26 1998.

The ESO claims that the performance of this giant telescope has met or surpassed the design goals just one month after the installation and provisional adjustment of the optics, particularly where achievable image quality is concerned. Exposures lasting up to 10 minutes have confirmed the accuracy and stability of the telescope's tracking systems.

The success of these early tests is seen as proof of the ESO's development concept that an actively controlled, single thin mirror, can yield a very superior performance. It is claimed that the angular resolution achieved even at this early stage is unequalled by any other large ground-based telescope.

Work is proceeding on further optimization of the optical, mechanical and electronic systems. Following the completion of the commissioning and science verification phases of the facility, the first visiting astronomers are scheduled to be received from April 1, 1999. The second, third, and fourth VLT Unit Telescopes are planned to come online in 1999, 2000, and 2001, respectively.

An amazing amount of faint details is shown in this high-resolution exposure (0.49 arcsec) of the central dust band in the nearby, southern galaxy Centaurus A. The VLT Unit Telescopes will be able to image many other galaxies in similar detail.

This image was taken with the Test Camera of the VLT UT1 telescope on May 22, 1998, during a short, 10 sec exposure through a red filter to demonstrate the great light collecting power of the 53 m^2 mirror of the VLT UT1. The insert shows a complete view of Centaurus A taken with another telescope.

Images and text courtesy of ESO

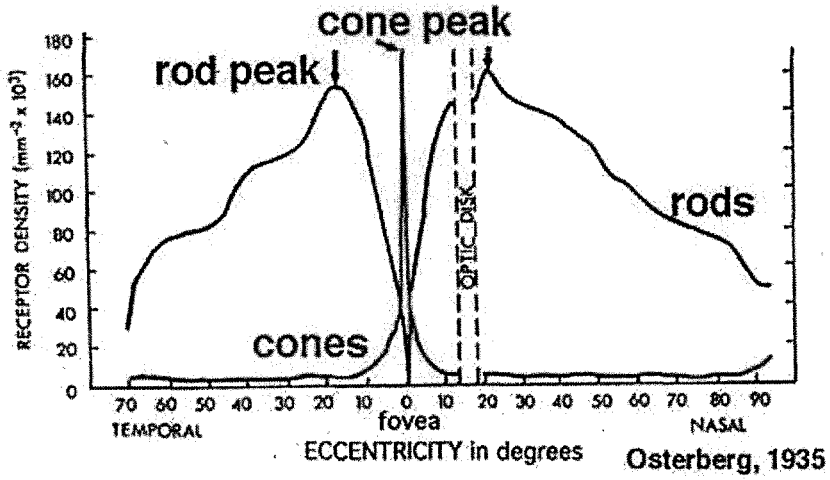
Just What is Averted Vision, Anyway?

Astronomers often employ an observing technique called "averted vision", the art of looking slightly to the side of a faint object being studied. This works because, we are told, there are more rods slightly off the optical axis of our eyes. But there is a great deal more to it than that, and with some understanding of the physiology of the eye, it will be seen that there are right and wrong ways to use averted vision.

It is true that the density of rods peaks well outside the center of vision. Since the rods are the eye's faint light detectors, it stands to reason that this peculiarity of physiology is what makes averted vision work. The density of the rods at a point 20 degrees off the center of vision reaches about 160,000 rod cells per square millimeter. This is a greater density than the peak density of the cones - the eye's bright light and color detectors - on the fovea (the center of vision), where cones only reach about 140,000 cells per square millimeter.

The point of greatest density of the rods does not correspond to the point of greatest sensitivity, however. The area of greatest sensitivity has been shown to vary considerably from observer to observer, but it is never as far as 18 degrees from the center of vision. The reason for this has to do with the manner in which the retinal cells are "wired" to the brain.

In the fovea, each cone is connected to a single ganglion cell, which in turn is hooked up to a nerve fiber that eventually joins the optic nerve. As we move away from the fovea, each ganglion cell starts to service several cones or rods. Eighteen degrees from the fovea, 100 rods might be connected to a single ganglion cell. At some point on this line extending outward from the fovea, the number of rods per ganglion cell is such that the eye operates at peak sensitivity. For most people, this point is somewhere between 8 and 16 degrees from the fovea.



Source: http://insight.med.utah.edu/Webvision/imageswv/Ostergr.jpeg

But so far we have only been considering the sensitivity of the eye as a function of an image's angle from the fovea. One might suppose that it makes a difference if we avert our vision to the left or right, up or down, or at some angle. And it does matter. The most effective direction to avert our eyes is that required to place the object on the nasal side of our vision. Simplified, this means if you are a right-eyed observer, you shift your eyes to the right; if a left-eye observer, you shift your gaze to the left. Whichever eye you use, you avert your gaze in that direction.

By using this most efficient portion of the retina, you will experience a gain of some four magnitudes or more over your direct vision! The effect of this is not insignificant. It means the detection or not of many stars and most details in deep sky objects.

It is important not to avert your vision the opposite direction - that is, if right eyed, you should not use averted vision by shifting your gaze to the left. This will place the image on the blind spot, right where the optic nerve connects to the retina. Nothing will be seen in such a circumstance, no matter how bright!

This poses an interesting dilemma for binocular observers and for those who use binocular viewing attachments on their telescopes. Averting one eye to its optimal position puts the image on, or nearly on, the blind spot on the other eye. This is counterproductive; the advantage of the binocular system is its use of two eyes. Inadvertently disabling one eye makes no sense. The solution is simple, and astronomers have been saying it for centuries: look up!

The second most efficient direction to avert your gaze is upward - look in the direction of the top of your head, so that the image is below your center of vision. The area of the retina in use here is somewhat less sensitive than the optimal horizontal location, but only slightly so. Doing this does not put the image in the blind spot of either eye, and considering the gains to be had from binocular vision, this will likely prove as efficient (or more so) under such conditions as using the optimal monocular method.

If you choose to avert your gaze downward, you will find your averted vision slightly less sensitive again. In actuality, the retina is every bit as sensitive here as it is if you avert your vision upward, but it is sensitive over a much smaller area. Thus, it is harder to consistently rest the image on the "sweet spot".

Some observers will notice that their most sensitive areas are slightly to the side and down, or in other ways not exactly as eye physiology would suggest. In my case, I find averting to the right and slightly up (I am right eyed) is best for me. There are large variations in the way our eyes are made up - in fact, our retinas are even more distinctive than our fingerprints. Almost nothing can be said categorically about vision, but we can say what will apply in the majority of cases. It is well known that experienced observers see much more detail, and many fainter objects, than beginners. I believe that this is caused in part by the observer learning about the individual characteristics of his or her eyes over the course of many nights of observations.

Next time you are out with your binoculars or telescope, take some time to explore these different areas of your vision. It might be quite apparent what is the most promising averted vision method for you. And if it happens to be something other than what medical science predicted, don't let that stop you from doing it your way. They are, after all, your eyes, and only you know what you can see with them.

Courtesy: Jeff Medkeff

In Conclusion

In my ceaseless wanderings around cyberspace - or the Internet if you prefer - some time ago, I stumbled across this poem. Although I'm not a great student of poetry, I do consider myself to be a (somewhat poor) student of astronomy and therefore found this particular poem to be rather inspiring. I can particularly identify with the closing stanza.

The Old Astronomer to His Pupil

Reach me down my Tycho Brahe, I would know him when we meet,
When I share my later science, sitting humbly at his feet;
He may know the law of all things, yet be ignorant of how
We are working to completion, working on from then to now.

Pray remember that I leave you all my theory complete,
Lacking only certain data for your adding, as is meet,
And remember men will scorn it, 'tis original and true,
And the obloquy of newness may fall bitterly on you.

But, my pupil, as my pupil you have learned the worth of scorn,
You have laughed with me at pity, we have joyed to be forlorn,
What for us are all distractions of men's fellowship and smiles;
What for us the Goddess Pleasure with her meretricious smiles!

You may tell that German College that their honor comes too late,
But they must not waste repentance on the grizzly savant's fate.
Though my soul may set in darkness, it will rise in perfect light;
I have loved the stars too fondly to be fearful of the night.

Sarah Williams

If you have something to contribute to the newsletter, you can submit it to me via fax on (08) 9250 8240 or e-mail to <bmh@bigpond.com>. Alternatively, submissions may be pinned to the volunteer notice board for collection. Thanks, Bevan