SPACEWATCH

the newsletter of the Abingdon Astronomical Society

September 2001

"Ascender Spaceplane"

by Mark Radice of Bristol Spaceplanes Ltd.

Welcome back to a new season of Abingdon Astronomical Society meetings. I trust you all had a good summer and enjoyed the mainly sunny weather. Now that the evenings are getting darker earlier evening observing is becoming easier. However, the most spectacular sky at the moment is that of the morning, when Venus shines brightly before (and even after) sunrise, and Jupiter is not that far away. The two passed very close by each other in August but are now pulling apart again.

The Night Sky this Month

The summer triangle is still high in the sky in the evening and, naturally, so are Lyra, Cygnus and Aquila, whose brightest stars (Vega, Deneb and Altair) form the triangle. Scorpius is low on the southern horizon during the evening.

The planets

Mercury is almost lost in the glow of sunset. It reaches inferior conjunction on the night of the 12th/13th.

Venus is brilliant at magnitude -4 in the morning sky. If you haven't seen it yet, then you simply haven't been up early enough! It rises around 4:30am and remains visible to the naked eye until well after sunrise.

Mars is very low above the southern horizon in the evening. It's the brightest object in the southern sky after sunset at magnitude –0.7 and is orange in colour. If you haven't seen it this year, you haven't much time left before it gets two close to the sun again. This is an opportunity which won't return for almost two years.

Jupiter is bright (at magnitude –2.2) in the morning sky to the far right of Venus, rising around 1:30am.

Saturn is the planet to the right of Jupiter. It's at magnitude –0.2 and rises around 11pm.

Uranus (mag. 6) and Neptune (mag. 8) are both in Capricornus all month. Pluto (mag. 14) is in Ophiuchus.

Moon Phases:

Full: 2nd; Last Quarter: 10th; New: 17th, First Qrtr: 24th.

This month's Deep Sky Object

By Paul Warren

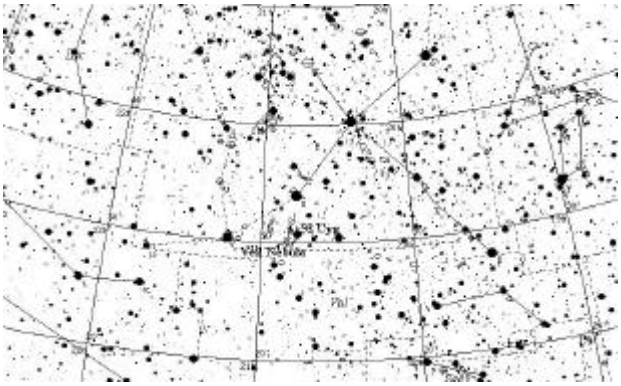
I'm going to start the new season with a **bang** and a **challenge**! The object comprises two different NGC numbers, namely NGC 6960 and NGC 6992, and commonly known as "The Veil Nebula".

The Veil occupies quite a large area, spanning nearly 3 degrees across, but has a reputation of being a difficult object to see. I challenged myself to find it last year, and was pleasantly surprised to discover that it was quite easy both to find and to see.

You will need fairly dark skies to see this (by dark, I mean away from big towns and away from the orange skyglow). You will also need a clear sky without thin haze. I don't know what the minimum aperture size is, but I have seen it clearly with a 5 inch telescope (without the aid of a nebula filter). Robert Burnham (author of Burnham's Celestial Handbook) reports that the brightest part of the nebula can be seen using 7x50 binoculars, but I haven't been able to do this.

The easiest way to find The Veil is to locate epsilon (ε) Cygni in your finderscope. Now drop your view due south in declination and you will run into 52-Cygni. One part of The Veil can be seen north and south of this star, but this is the fainter part of the veil (NGC 6960). Move the scope so that it is say half a degree north of

52-Cygni, and then pan over to the left of this star. You should run into the brightest part of The Veil (NGC 6992) in 2 to 3 degrees.



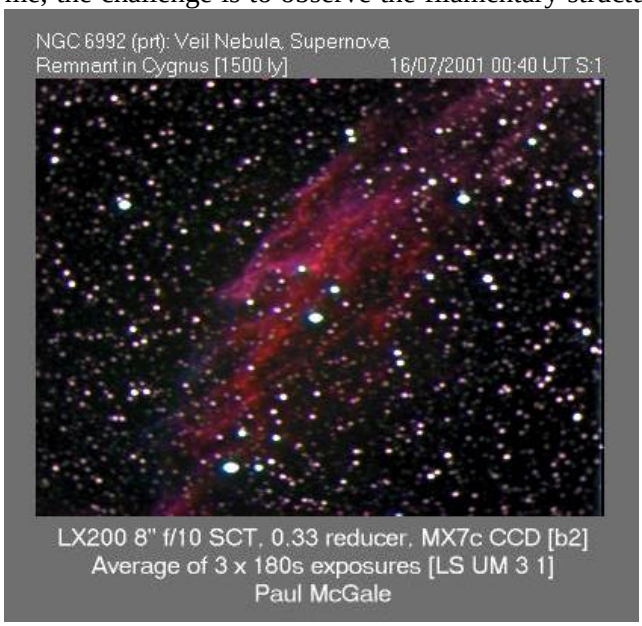
With my 5 inch 'scope I only saw the brightest part of the nebula. However, on a society observing session last year I was observing this with my C5 and my UHC filter. The detail that I saw was quite staggering. Two of us observed filamentary structure in the nebula. The Veil nebula is one object which works very well with a good nebula filter (say an O III or a UHC), and I have only seen filamentary structure using such a filter.

I have recently observed The Veil with my C8 (8 inch scope) and was able to make out the fainter part by 52-Cyg. However, initially I was unable to make out anything at all. Why was this? Because I wasn't using my **lowest** powered eyepiece. This is one deep sky object where you want the lowest magnification possible! Oddly enough, I think that my C5 gives me a nicer view of The Veil than does my C8. This is partly because of the size of this object. Even in my C5 I had to move the telescope to see all of the nebulosity.

On good nights, I can watch this one object for ages – it really does captivate me, and it is certainly one of my favourite deep sky objects. It possesses a delicate appearance, which can sometimes exhibit glorious filamentary structure.

So what is The Veil? Well, it is believed to be a supernova remnant, which exploded some 25,000 years ago (I told you I was starting off with a bang!). Charles Messier only recorded one such object in his famous catalogue, and that was his first entry, namely M1 (the Crab Nebula). The Veil is thought to be about 1500 light years away, which would give it a diameter of 70 light years.

So is The Veil a "challenge" ? From my usual observing location (my back garden which has fairly dark skies) I have to admit that it is fairly easy to see this object. For me, the challenge is to observe the filamentary structure.



For other locations, it may be challenging to see it at all, especially in the absence of a nebula filter.

Another extra-solar planetary system

There are many extra-solar planets (planets outside the solar system) known today. Many are detected because of the effect they have on the proper motion of their parent star as it slowly moves across space relative to more distant stars. Most of these planets are large gas giants orbiting close to their stars. This is because it is easiest to find planets in short-period orbits and easier to find larger planets. The larger the planet, the larger the wobble induced and the easier it is to measure it. The closer in they are, the shorter-period a wobble they induce upon the stars they circle and the more quickly this can be observed. But now astronomers have been hunting for these planets long enough to find longer-period wobbles in stars, and therefore they are beginning to detect giant worlds orbiting farther out.

One such discovery is the second planet found orbiting the Sun-like star 47 Ursae Majoris near the Great Bear, and it makes this system look very familiar. Unlike most

extra-solar planets, these two have fairly circular orbits in an arrangement reminiscent of Jupiter and Saturn.

The 47 UMa system, however, is scaled differently. The two planets have the same mass ratio as Jupiter and Saturn do, but they are each 2.5 times heavier. They have the same ratios of orbital periods but complete their orbits four times faster, revolving around the star every 3.0 and 7.1 years. They have the same ratio of distances from their sun as Jupiter and Saturn do, but they circle 2.5 times closer in, at 2.1 and 3.7 astronomical units.

As the sensitivity of observations improves we are finally seeing planetary systems that look more like our solar system.

A Black Hole at the centre of it all

All galaxies with a central bulge, including our own Milky Way, are thought to have black holes at their centres. From observations of the gravitational effects on surroundings stars, it appears that a very dark mass weighing about 2.6 million times the mass of the Sun lies at the exact centre of our Galaxy.. A supermassive black hole is the obvious possibility, but it's not the one. A single large cluster of dead stars (ones whose nuclear fuel has run out) could have the same effect, or maybe a large cloud of neutrinos, or some other exotic, unseen dark matter.

However, from recent observations from the orbiting Chandra X-ray Observatory, there is evidence that there is indeed a black hole at the centre of our Galaxy.

Earth's solar system slowly orbits the core of the Milky Way at a distance of about 27,000 light years. The core is in the constellation Sagittarius, but intervening clouds of gas and dust block our view at visible wavelengths. In 1974, however, astronomers discovered a strong, compact source of radio energy, dubbed Sagittarius A* (that's "A-star", not an asterisk I forgot to tell you about!), located at the centre of the Galaxy. About 10 million stars are now thought to orbit within a light year of the radio source. To put that in perspective, the nearest star to Earth's solar system is a bit more than four light years away.

The Chandra satellite found that X-rays coming from Sagittarius A* vary dramatically in as little as 10 minutes. In that short a time, an X-ray (travelling at the speed of light) can only travel 180 million kilometres, only a little more than the distance from the Earth to the Sun. Therefore the X-ray source cannot be much larger than that. And, according to general relativity, anything that small with 2.6 million solar masses must quickly collapse to become a black hole.

Eclipse Expedition to Madagascar

by Andrew Ramsey

There was a total eclipse of the Sun visible from a path across southern Africa on June 21st this year. I flew with two friends to the capital, Antananarivo, and then cycled south to the Isalo National Park, to the small town of Ranohira. There we waited in anticipation as the Moon slowly covered the Sun's disk. The sky was about 50% covered in clouds and we hoped we would be lucky enough to see this rare, but spectacular sight.

Unfortunately a large menacing cloud covered the Sun from our vantage point just east of the Isalo National Park in southern Madagscar. So after travelling all that way, the last 300km by bicycle we were robbed of the spectacular sight of the total eclipse of the Sun. We did see the sky go dark, and the golden panoramic horizon all around us. We also saw Jupiter shining brightly to the left of the cloud. I suppose we fell foul of the dramatic changes in weather which can often occur during a total eclipse of the Sun. The wind which brought the cloud in so quickly died completely just before totality.

We did however meet Jon Andrews and Lynn from Oxford a couple of days later. They were only a few miles away from us during the eclipse and were lucky.

Just minutes before totality the same cloud moved away from their line of sight and they saw the whole show.

Here are some of their photographs showing totality beginning:

Photographs copyright © 2001 Jon Andrews, Oxford.

SOCIETY E-MAILING LIST

The society's e-mailing list is used to publicise "first-clear-night" observing evenings and for alerting members to hot news on objects to observe.
To subscribe: send an email to

abiastro-subscribe@topica.com .

You will then receive all e-mails sent to the list.
To post e-mails on the list: send an email to

abiastro@topica.com .

To unsubscribe: send an email to

abiastro-unsubscribe@topica.com

WEB SITES

Don't forget the new web site address for Abingdon Astronomical Society:-
http://www.abingdonastro.org.uk

Our webmaster, Chris Holt, would welcome any material for the members observation page – particularly photographs.

ISS/Iridium data:
http://www.heavens-above.com/main.asp .

Space weather & aurora forecasts:
http://www.pfrr.alaska.edu/~pfrr/AURORA/INDEX.HTM .

DATES FOR YOUR DIARY

17th to 21st September (First Clear Night): Observing Evening at Britwell Salome.

24th September: Beginners' Meeting in the Perry Room. 8pm.

8th October: Speaker Meeting 8pm. "The Planet Mercury" by Sebastian Linfoot of Abingdon Astronomical Society.

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your help and contributions. Please send any news, observations, photos, etc. to:
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