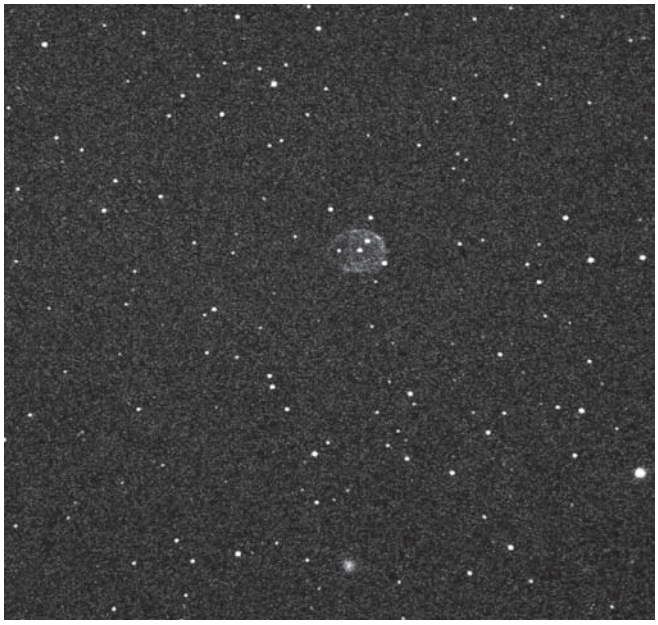
Observers' Forum

NGC 246 – an overlooked planetary nebula in Cetus



NGC 246 imaged by Dr Nick Hewitt in Umbria. TMB 115mm f/7 refractor with Canon 350D SLR camera, 120s exposure. South is at the top and west to the right in this image.

Cetus is a sprawling and not particularly prominent constellation, probably best known for the long-period variable star Mira (omicron Ceti) and the Seyfert galaxy M77. There is another object in Cetus that is often ignored, the planetary nebula NGC 246. Although lying 11° further south than M77, and being almost 2 magnitudes fainter, it is visible from the UK providing you have a reasonable southern horizon and dark skies. Discovered by William Herschel in 1785 November, it was number 25 in his class V objects – very large nebulae. He described it as 'Four or five pretty bright stars ...the enclosed space filled with faintly terminated milky nebulosity'. Milky nebulosity is an apt description of the visual appearance of many planetary nebulae, but what has bothered some observers is that Herschel saw the nebulosity contained by the stars, not associated with them, whereas images clearly show a large area of nebulosity with bright stars superimposed on it.

Steven O'Meara discusses this puzzle in his book *The Caldwell Objects* (Sky Publishing Corporation and Cambridge University Press, 2002) and came to the conclusion that Herschel, and some recent observers whose visual descriptions do not entirely match what images show, were only seeing the brighter western part of the nebula and not seeing the fainter eastern region. He also suggested that this may account for some experienced observers believing they had not seen the central star, as it would be offset from the nebulosity.

Most of Cetus lies in the southern sky, with only the whale's head reaching over the equator and into the northern hemisphere. NGC 246 is located at the western end of the constellation, at RA 00h 47m 03.3s and Dec –11° 52min 19sec (2000.0). This puts it 6° north and just under 1° east of the 2nd magnitude star β Ceti (Deneb Kaitos), which culminates around 02.00UT at the end of August. With a catalogue size of 4.6×4.1 arcmin it is large – 60% larger than the Owl Nebula in Ursa Major. Some references give its magnitude as 8, but this is its photographic magnitude; visually it is much fainter at around 10.6. Distances to planetaries are notoriously unreliable, but most references put it between 1,600 and 2,100 light years (491 to 644 pc). The circa 10th magnitude central star, which may be variable, is highly evolved and has a temperature of around 200,000K. It is also a binary star, with a 14th magnitude companion 3.8 arcsec away.

An image of the planetary, by ex-Section Director Dr Nick Hewitt, is shown above. It was obtained during his visit to Umbria last summer with his TMB refractor. The image has been cropped from the original wide field view. The 'opening' on the eastern side of the nebula is clearly visible. Also shown in Nick's image, and visible as a 'hazy star', is the 12th magnitude galaxy NGC 255, discovered by William Herschel on the same night that he discovered NGC 246. The galaxy lies 26' north of the planetary.

Visually an OIII filter is almost a necessity when observing NGC 246, unless you have a very dark southern horizon and a large telescope. Viewing the planetary in a 30cm Dobsonian from COAA, Portugal a few years ago it was barely visible without the filter – only the brighter western region being obvious – but very prominent with it. Its visibility was also particularly sensitive to magnification. With a filter it appeared as a large C-shaped patch of uniform nebulosity with 5 stars scattered across the disk. Observed in a 62cm telescope from an altitude of 2,000m in Tenerife the view was simply stunning, with mottling visible over the disk and brighter patches on the northern rim.

Nebula filters have revolutionised visual astronomy, allowing emission objects to be seen in mediocre skies when they would normally be either impossible or else very difficult. William Herschel of course did not have access to these filters, and the fact that he could see this nebulosity at all confirms what a superb visual observer he was. If you observe or image this planetary please send me your observations, along with equipment details and sky conditions. I am particularly interested to know the smallest aperture needed to see it visually from the UK.

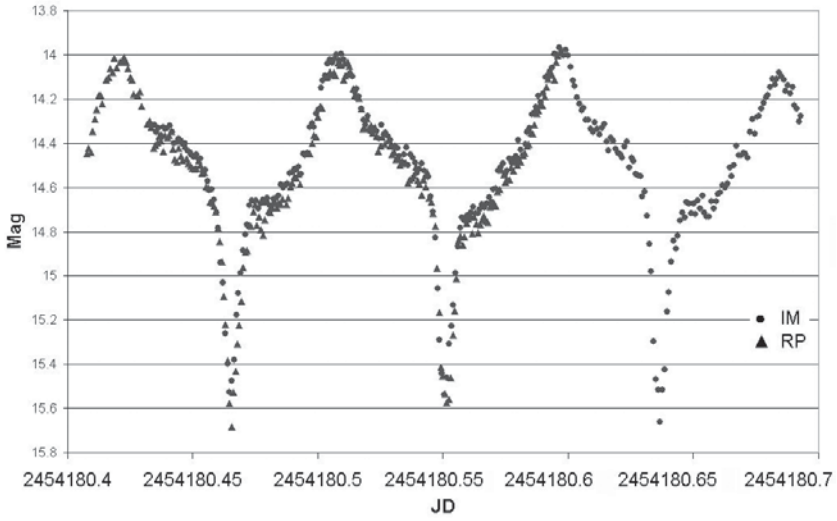
Stewart L. Moore, *Director, Deep Sky Section*

DV UMa in outburst: an eclipsing cataclysmic variable

The observations shown here were made by Ian Miller (IM) and Roger Pickard (RP) on the night of 2007 March 20/21 of DV UMa, which is an eclipsing cataclysmic variable star with deep eclipses of 1.5 mag or more. The orbital period is 0.08597 day and eclipses last slightly less than 20 minutes.

Cataclysmic variable stars (CVs) are a class of interacting binary system undergoing mass transfer via a gas stream and accretion disc from a Roche-lobe filling secondary to a white dwarf primary. A bright spot is formed at the intersection of the disc and gas stream, giving rise to an 'orbital hump' in the light curve. The light curves of eclipsing CVs can be quite complex, with the accretion disc, white dwarf and bright spot all being eclipsed in rapid succession and this can be seen in the accompanying light curve.

The class of CVs known as dwarf novae intermittently undergo outbursts of between 2–5 magnitudes. DV UMa is a member of the SU UMa sub-class of dwarf novae, which also exhibit superoutbursts (about 0.7 mag brighter than normal outbursts) at semiregular intervals.



The instrumentation used was: IM, 0.35m f10 SCT with Starlight Express SXVFH16 CCD (unfiltered); RP, 0.30m f6.3 SCT with Starlight Express MX716 CCD with V filter This CCD was kindly on loan from Jay Tate of the SpaceGuard Centre, Powys.

On the light curve IM's observations are an average of 6 ten-second integrations whilst RP's are single sixty second integrations.

Roger Pickard & Ian Miller, *Variable Star Section*