

## The 29th European Symposium on Occultation Projects

### ESOP XXIX, York University, 2010 August 20–24

Almost every year since 1981 the European Section of the International Occultation Timing Association (IOTA-ES) has held an annual meeting at a location in Europe. In 2010, it was the turn of the UK to host this, the 29th meeting of the European Symposium on Occultation Projects (ESOP XXIX), which was sponsored by the Institute of Physics. The city of York was chosen as the venue, with facilities provided by the University at their Heslington campus. The organising committee comprised BAA members Alex Pratt, Len Entwisle, Melvyn Taylor, Richard Miles and Andrew Elliott. The Association provided an account for registration and monitoring of payments, with valuable help from Jean Felles at the BAA Office.

Some 35 delegates attended (see photo), many of whom were accompanied by their partners. The format of the symposium usually comprises a welcome meal on Friday evening, then two days of meetings followed by two or three days visiting local places of astronomical significance. Sightseeing trips are organised for guests and partners not wishing to attend the symposium. On this occasion, a day trip to Jodrell Bank was arranged with a second day based in York, with visits to the historic Observatory near the city centre (conducted by Martin Lunn), York Minster and to the location of the Treasurer's House, from where John Goodricke first observed and discovered the variability of the stars Algol and  $\delta$  Cephei. Activities also included a boat trip along the River Ouse and a visit to the National Railway Museum.

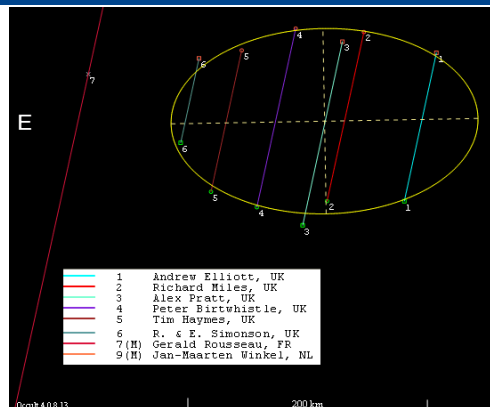
At the symposium a total of 23 presentations was given on wide-ranging subjects including the history of occultation phenomena as seen from northern England, early observations of Baily's beads seen during solar eclipses, accounts of successful grazing lunar

occultations and asteroidal occultations, observations of mutual eclipses and occultations of the galilean moons of Jupiter, seasonal variation in the atmosphere of Pluto as probed by occultation and photometric studies, use of high-speed photometry to detect occultations involving Edgeworth–Kuiper belt objects, and accounts of various observing methods, accurate timing and software developments facilitating analysis.

One highlight for UK observers was an account of the 2010 occultation by asteroid (130) Elektra, when all six positive timing chords were made from the UK, far exceeding successes of previous years. The late Andrew Elliott was to have given this talk but illness prevented him from so doing and Alex Pratt gave the presentation instead. Preliminary results depicting the profile of Elektra can be found at: [http://www.euraster.net/results/2010/20100220-Elektra-crd\\_temp.gif](http://www.euraster.net/results/2010/20100220-Elektra-crd_temp.gif)

Several group discussions were held including one about the widely-observed occultation of the 2nd magnitude star  $\delta$  Ophiuchi by (472) Roma, which took place on 2010 July 8. This event was unusual not only because some observers saw the star disappear with the naked eye but also that, owing to the large apparent size of the star, the ingress and egress stages were gradual.

From a presentation on occultation statistics, it was shown that more and more successful observations are being achieved year by year as improvements are made in astrometric accuracy both of stars' positions and of the orbits of solar system objects. Indeed the first successful occultations by trans-Neptunian objects were reported at the



Timing chords for the successful occultation by (130) Elektra on 2010 February 20. [euraster.net](http://www.euraster.net)

meeting. Also, the sheer number of stars for which accurate positions are known is forever increasing, as is the number of known minor planets. As a result, we can look forward to ever-increasing opportunities for occultation observing in the future.

From time to time IOTA has published the *Occultation Newsletter*, of which the editor recently retired, and a discussion had been held on the way forward for this publication. A new approach was identified whereby a group of individuals would serve as coordinators for their part of the world and a small committee would collate their contributions. This initiative has now come to fruition with the establishment of the *Journal of Occultation Astronomy* (JOA), a quarterly online periodical written in English. The first volume has now been issued and is available at <http://www.iota-es.de/ON%20Nr%201%20Final.pdf>.

The very first JOA article is a six-page illustrated account of ESOP XXIX written by Alex Pratt, where many more details of the symposium can be found. Interested readers are strongly encouraged to have a look at the new JOA, which is of very high quality and downloadable for free.

Photo galleries of ESOP XXIX are available via the Web at [http://www.flickr.com/photos/xxix\\_esop\\_2010/](http://www.flickr.com/photos/xxix_esop_2010/).

A video slideshow has also been provided by Matti Suhonen at <http://www.ursa.fi/ursa/jaostot/pikkuplan/tapahtumat/esop2010/esop2010.html>.

A video recording of the meeting was made by the writer, some 11 hours in all, which Andrew Elliott was able to watch at his leisure. The next ESOP meeting will take place on 2011 August 26–30 at the Archenhold Observatory, in Berlin.

**Richard Miles**



Delegates attending the 29th European Symposium on Occultation Projects at York University.

## NGC 6888 – the Crescent Nebula

Dominating the northern Milky Way in summer, Cygnus is home to numerous nebulae including the North American, the Pelican and the Veil. While these large patches of nebulosity are deservedly popular, there are also many smaller objects that are equally intriguing but often overlooked. One of these is the emission nebula NGC 6888, commonly known as the Crescent Nebula. It lies approximately  $2.7^\circ$  south-west of gamma Cygni, the magnitude 2.2 yellow supergiant which marks the centre of the Swan, at RA 20h 12.0m and Dec  $+38^\circ 21'$  (2000.0). Discovered by William Herschel in September 1792 it has a quoted magnitude of 8.8 and a size approximately  $18 \times 13$  arcmin, although visually it is a more difficult target than its magnitude and size might suggest. Distance estimates place it some 4,700 light years away with a physical size of around  $15 \times 24$  light years.

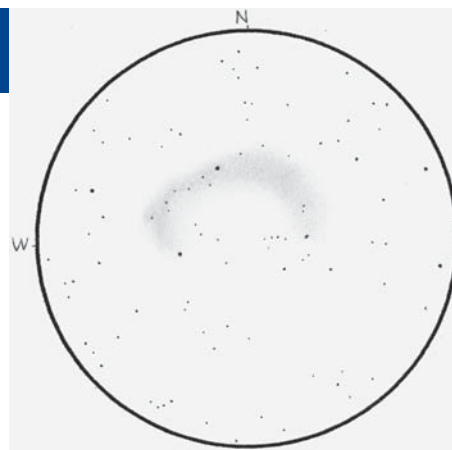
Called the Crescent Nebula from its visual appearance in medium sized (*ca.* 30–40cm) amateur telescopes, professional and many amateur deep images show that there is also a complex area of fine filamentary structure inside the crescent which makes it look much more like a jellyfish than a crescent (the nebula is tilted to our line of sight by about  $45^\circ$ ). Professional infrared images also show a much larger outer nebulous envelope. At the heart of the nebula is a Wolf–Rayet star (WR 136) and it is this star that is responsible for the Crescent's appearance.

Wolf–Rayet stars are extremely hot and energetic evolved stars of the live-fast-die-young category. They reach their red giant stage after only a few million years on the main sequence compared to several billion years for stars like the Sun. The expelled envelope of this star forms the outer edge of what we now see as the Crescent, with much of the inner material coming from later stel-

lar ejections. These later ejections take place at much higher speeds – typically 1,500 km/s compared to only 4 or 5 km/s for the earlier ejections – and the 'snow plough' effect from these later stellar winds as they pile into the slower red giant wind causes the gas to heat up, glow and emit X-rays. NASA's *Chandra* X-ray satellite observed the Crescent in 2003 and the composite X-ray and optical image is shown at <http://chandra.harvard.edu/photo/2003/ngc6888/>. The Hubble Space Telescope has also observed the nebula and the image is shown at <http://www.spacetelescope.org/images/opo0023a/>.

Over the last few years the Section has received drawings and images of the nebula from Peter Carson, Bob Garner, Nick Hewitt, Dale Holt, Carl Knight, Cliff Meredith, Gordon Rogers, Jeremy Shears, Fred Stevenson, Andrea Tasselli and Bob Winter and some of these are shown here.

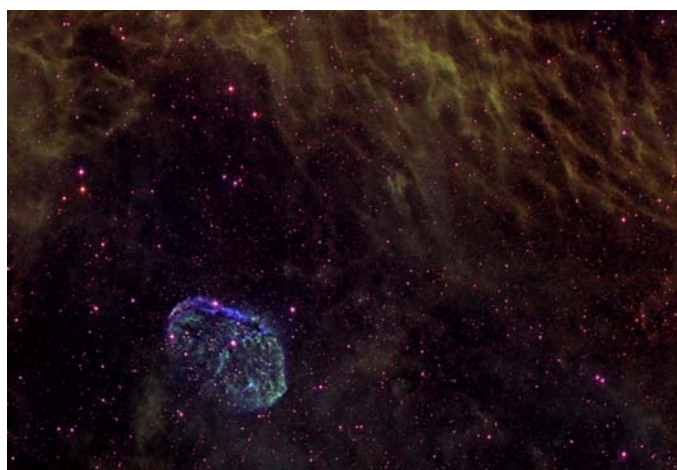
The Director and Assistant Director have also jointly observed the Crescent in 20-inch (50cm) and 25-inch (63cm) reflectors; the latter observation, from high altitude in Tenerife using a OIII filter, showing almost as much detail in the nebula as many photographs. Carl Knight's drawing was made from Sawston, Cambridgeshire using



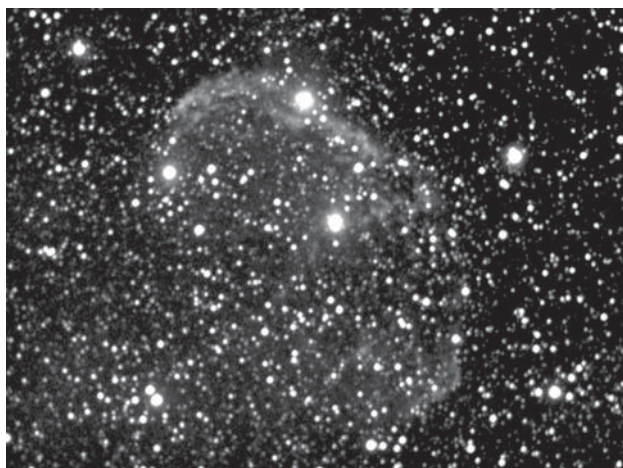
*Carl Knight*

a 30cm f/10 Schmidt–Cassegrain (SCT) at a magnification of  $\times 127$  which gave a field size of 34 arcmin. Carl used a UHC filter to enhance the nebulosity and although this reduces the brightness of the stars it does not do so as much as a narrower band OIII filter.

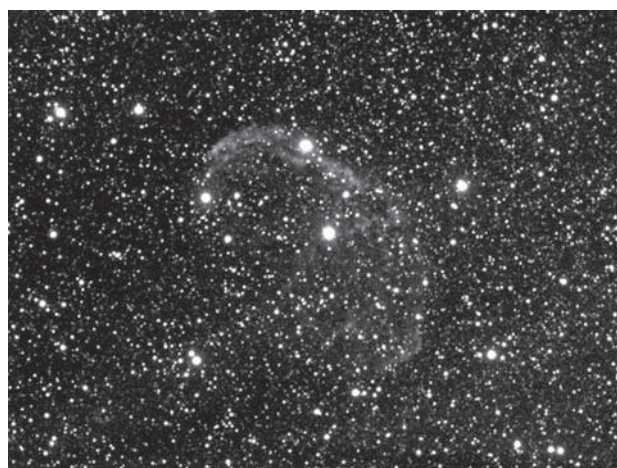
Cliff Meredith's (20cm f/3 LX 200 SCT,  $4 \times 8$ min) and Nick Hewitt's (11.5cm f/7



*Gordon Rogers*



*Cliff Meredith*



*Nick Hewitt*





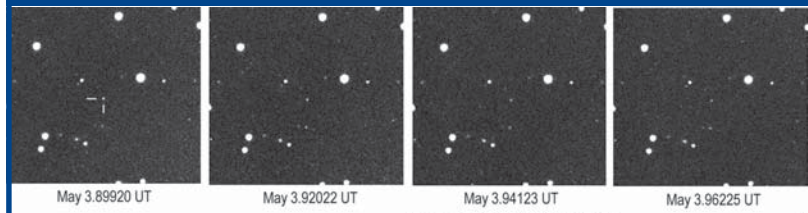
TMB refractor, 5x1min) images show similar levels of detail to Carl's drawing (they have also been flipped horizontally to give the same orientation as the drawing) although both images show fine detail towards the south of the nebula that has eluded Carl's eyes. Peter Carson's image on the cover of this *Journal* goes much deeper and shows considerably more structure. Hints of the larger outer nebula can also be seen in his image.

Gordon Rogers' image, made from his observatory in Long Crendon, Bucks., was shot through a Takahashi FSQ 85 f/5.3 refractor using a selection of narrow band filters and processed using the popular Hubble palette. Total exposure was 340min consisting of 80min H-alpha, 100min SII and 160min OIII. Not only is considerable detail shown in the Crescent itself but fine structure can also be seen in the elusive outer nebula.

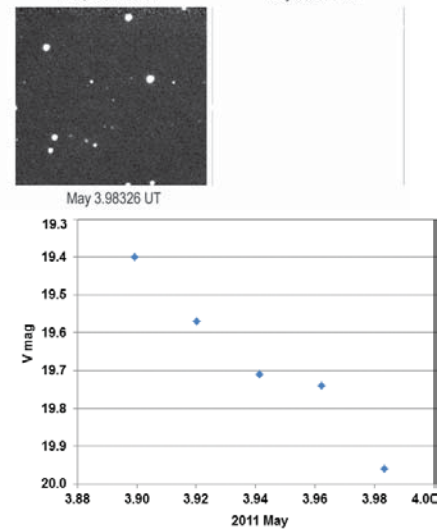
The light June nights are not an ideal time to hunt for faint nebulae, but Cygnus is still well displayed when real darkness returns. If you observe NGC 6888, or any of the other vast areas of nebulosity in Cygnus, please let the Section have your observations.

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

## Afterglow of a gamma-ray burst



David Boyd captured the fading light of the afterglow of GRB110503A on 2011 May 3 with a 350mm SCT + SXVR-H9 CCD camera and V filter. Each image is a stack of 30x60sec exposures. The images were stacked and measured using *Astrometrica* and the UCAC3 catalogue. The lightcurve shows the magnitude of the afterglow dropping at ~0.25 mag/hr. The mean position of the GRB was measured as RA 8h 51m 6.19s, Dec +52d 12' 27.3". It was first detected by NASA's *Swift* satellite at 17:35 UT on May 3 at an estimated optical magnitude of 15.75. *D. R. S. Boyd.*



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