



## Clusters and bubbles in Cassiopeia

One of the delights of the autumn and early winter night sky is the sight of Cassiopeia high overhead inviting you to explore it. It is a constellation that has everything: bright star clusters and faint nebulae in abundance, planetary nebulae and even easy to spot galaxies. And, of course, with its familiar W shape, it is one of the few constellations recognised by many people with only a passing interest in astronomy.

Two showpiece objects in Cassiopeia – one for the visual observer and one for the imager – lie close together on the sky. They are the open cluster M52 and the emission nebula NGC 7635. With a visual magnitude of 6.9 and a diameter of 15 arcmin, the 100-plus stars in M52 make it one of the most condensed of Messier's open clusters. Discovered by him in September 1774 it is readily found in binoculars as a hazy glow by sweeping upwards from the stars  $\alpha$  and  $\beta$  – the two stars forming the right hand side of the W – for a distance of about six degrees. Although binoculars resolve only a few stars, a 20cm telescope turns the cluster into a glittering mass with a dominant 8th magnitude yellow star on the south-western edge. Peter Grego, observing the cluster recently with a 20cm Schmidt Cassegrain, remarked that there were just too many stars to plot them all accurately. As with many deep sky objects, references differ on the distance to M52, but most put it at around 4,000 light years giving the cluster a diameter of 15 light years. Keen observers may also notice the smaller open cluster Czernik 43 lying just to the southeast.

Less than half a degree to the southwest of M52, at RA 23h 20.7m Dec +61° 12min (2000.0), lies the complex mass of nebulosity known as NGC 7635. Although a difficult visual target it is popular with imagers, and the Deep Sky Section has recently received images from Peter Carson, Bob Garner, Cliff Meredith, Gordon Rogers, Fred Stevenson and Andrea Tasselli. The image by Peter Carson shown here, which includes both M52 and NGC 7635, shows how close these two objects appear on the

sky, although of course, as with many deep sky objects, this is purely a line-of-sight effect, and the nebula lies at almost twice the distance of the cluster at around 7,100 light years. Peter's image is a composite taken from his light polluted home in Leigh-on-Sea, Essex (H-alpha) and Kelling Heath, Norfolk (RGB). He used a Televue TVNP101 APO refractor on a G11 mount with Starlight Xpress HX916 CCD camera, SBIG ST4 auto guider and True Tech and Astronomic filters. Total exposures times were 80min in H-alpha and 30min each in RGB.

NGC 7635 is commonly known as the Bubble Nebula, but this name only really refers to that part of the nebula containing the 'bubble', which, with a diameter of just 3 arcmin, is considerably smaller than the rest of elongated 15x8 arcmin nebula. Although the bubble images relatively easily, it is visually very difficult to observe. Even with large telescopes it is a difficult target and although it is an emission nebula, filters do not appear to be of much use. Discovered by William Herschel in November 1787 (number 52 in his class IV – planetary nebulae) the discovery is yet another example of just how good an observer he was.

It is interesting that Herschel catalogued the nebula as a planetary – although this was purely on its visual appearance – as it has also been classified as a planetary nebula in many references until recently. The first edi-

tion of *Sky Atlas 2000* listed it as such, although the latest edition plots it correctly as a diffuse emission nebula. The 'bubble' itself is now known to have been formed by fast stellar winds at speeds of up to 2,000km/s streaming away from the massive hot Wolf-Rayet star near the bright arc of material – material nearest to the star is the hottest and so shines brighter than the rest, with the hollow bubble showing the edge of the expanding shock wave.

Both the bubble and the extensive surrounding nebula are shown well in the image by Bob Garner of Greenford, Middlesex, who also images from a light polluted site. The image here was obtained using a 350mm Newtonian reflector with Starlight Xpress 716 CCD camera and a variety of filters, all mounted on a Fullerscope Mark IV equatorial. Total exposure time was 130 minutes. The other image here, showing detail in the bubble itself, was obtained by Fred Stevenson of Amersham, Bucks. using a 14 inch (350mm) Meade SCT at f/5 and Meade DSI Pro CCD camera and comprises exposures of 15 minutes each in LRGB.

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



NGC 7635. Top, bubble and surrounding nebulosity, Bob Garner. Bottom, Detail in the bubble, Fred Stevenson.



NGC 7635 with M52. Peter Carson.



## Scopes in the sun



*Observatorio de la Divisa*



*Observatorio de la Contraviesa*

There can be no doubt that the pursuit of astronomy is so much more enjoyable when it is carried out under clear, dark skies. For this reason, some BAA members have abandoned the skies here in the United Kingdom in favour of more settled locations. One excellent example of such a place is southern Spain, and three BAA members, Paul Downing (ex-president of the North Houston Astronomy Club), Tony Angel (ex-chairman of Croydon Astronomical Society) and Karen Holland have established observatories in the Alpujarras range south of the Sierra Nevada mountains near Granada.

Paul Downing and his wife Liz are using a series of telescopes at the **Observatorio de la Divisa** ( $36^{\circ}51'42''\text{N}$ ;  $3^{\circ}15'30''\text{W}$ ) for astrophotography and general astronomical research. The observatory is located at about the height of Ben Nevis and benefits from excellent

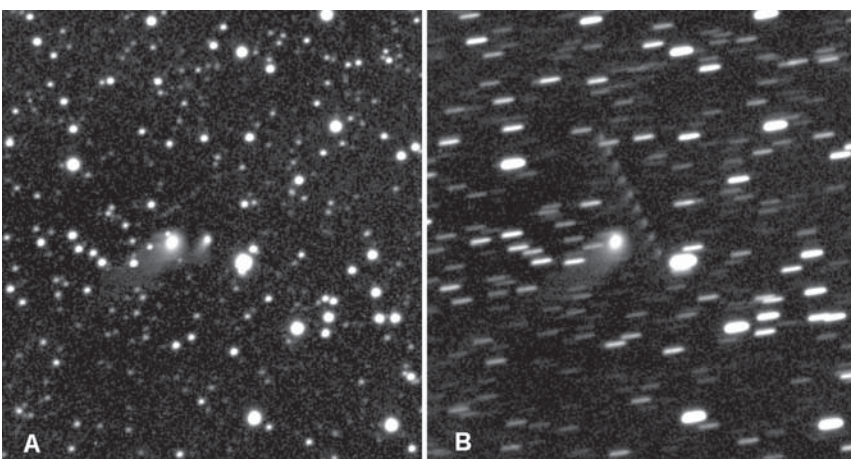
skies. The image of Messier 51 on the following page is an example of what is possible in the dark skies of the area and was taken using a 355mm aperture Schmidt-Cassegrain telescope and SBIG ST10XME CCD camera. Their images have been widely published, including a major contribution to a new catalogue of Arp galaxies from Willman-Bell (see <http://willbell.com/HANDBOOK/arp.htm>).

Tony and his wife Ros meanwhile are embarked on an even more ambitious venture at their **Observatorio de la Contraviesa** ( $36^{\circ}52'37''\text{N}$ ,  $3^{\circ}14'57''\text{W}$ ), developing a series of roll-off roof and domed observatories. Their location is only a couple of miles from that of Paul and Liz, situated in a group of mountains called the Contraviesa, part of the Alpujarras range. The domed observatory contains a C14 and is

intended mainly for CCD work using a FLI Maxcam2, while the large roll-off roof observatory contains a 355mm LX200 mainly for public observing. A solar and planetary observatory is also under construction on top of one of the hills close by.

As well as carrying out their own individual work, Paul and Tony intend to continue to work together on joint projects. A recent project was undertaken following receipt of a BAA e-bulletin alerting observers in the UK and Europe to a very rare appulse of two comets, periodic comet 189P/2007 N2 (NEAT) and comet C/2005 L3 (McNaught). These two comets came within a whisker of being in the same position in the sky at the very same time during the evening of 2007 July 20. Comet 189P was 15th magnitude and just 0.2 AU from the Earth whereas 2005 L3 was around 5 AU moving much more slowly. Despite this, the second comet was the brighter of the two at around 14th magnitude. Although observers in the UK were disappointed as the country was plagued by a huge swathe of cloud at the time, skies were kinder and darker in Spain. The CCD images given here were made from a series taken at Paul's Observatorio de La Divisa under good seeing conditions.

The third member of the trio is Karen Holland who, with husband Andrew, has a holiday home a little further to the east in the village of Jorairátar ( $36^{\circ}55'38''\text{N}$ ,  $3^{\circ}6'32''\text{W}$ ) where she uses a 254mm aperture Dobsonian telescope and binoculars for observing from her terrace. Karen has already shared views of the skies with her local neighbours, and recently spent an evening observing with Tony at his observatory. Karen hopes to work with Tony and Paul in the future on collaborative projects, and participate in public and local school observing sessions.



**Images of the rendezvous of comets 189P/(NEAT) and C/2005 L3 (McNaught) taken on 2007 July 20. The position at closest approach was RA 17h 21.5m, Dec.  $-01^{\circ}59'$ .**

**A.** Synthesised composite image approx.  $7'$  square showing the appearance of the two comets near to closest approach at 22:02 UT (355mm SCT with  $f/7$  focal reducer and SBIG ST10XME CCD).

**B.** Stacked image tracked on the motion of C/2005 L3 (McNaught) showing the relative motion of comet 189P/(NEAT).  $9 \times 60$ sec exposures taken at about 3 minute intervals. (Courtesy of Paul Downing, processed by Richard Miles)

**Richard Miles, Paul Downing, Tony Angel & Karen Holland**