The Messier star clusters of Auriga

Open star clusters are some of the most beautiful objects in the sky. And while clusters may look attractive on a computer screen, nothing can compare with the view of a rich and sparkling cluster seen through a wide-field eyepiece. In addition, while most galaxies, for example, need a large aperture to be seen as anything but a hazy patch, open star clusters can be enjoyed in almost any aperture and often a small rich field instrument will give a more aesthetically pleasing view than a large telescope. With Auriga high overhead on February evenings three excellent Messier open clusters are on view including,

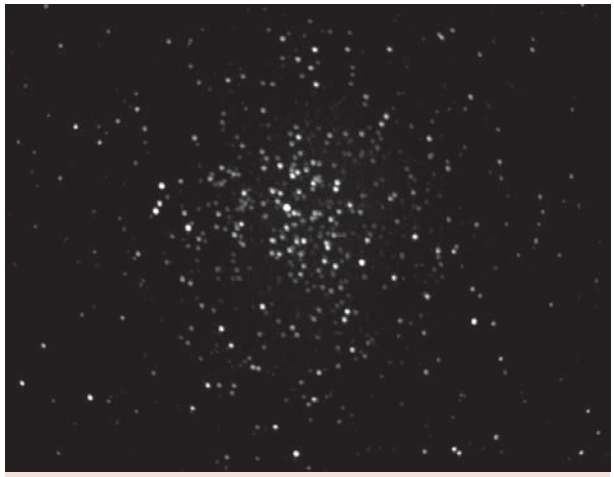
M36: 4×30s at f/3. *Cliff Meredith.*

in the opinion of the Director, possibly the finest cluster in the northern sky.

These clusters are nos. 36, 37 and 38 in Charles Messier's catalogue, although only one cluster, M37, was discovered by Messier, the others being reported by Le Gentil several years earlier. It is now known however that all of these clusters had been observed in the 17th century by the Italian astronomer Giovanni Hodierna, astronomer at the court of the Duke of Montechiaro; a fact which was unknown to Messier and his colleagues at the time.

M36 (NGC 1960) is located at position RA 5h 36.3m and Dec +34° 8.4' (2000.0), which puts it just inside the main body of Auriga. Trumpler, in his 1930 classification of clusters, called it a class 1,3,r, meaning it was rich, detached and with a strong concentration of bright and faint stars. All three clusters lie at a similar distance of around 4000 light years, although their ages differ significantly. M36 is the youngest at 30 million years, so has no red giant stars, unlike M37, which at an estimated age of 300 million years is far more evolved and contains several. At magnitude 6.0 and with a diameter of 10 arcminutes M36 contains around 60 stars, the brightest being magnitude 9.0. A feature of observing open clusters visually is that the pattern of stars, as seen in an eyepiece, often takes on a shape which is not always obvious in a photograph or on a computer screen. To most observers M36 takes on the shape of a crab or flying insect when seen through a 150mm or larger telescope.

M37 (NGC 2099) is the real beauty of the trio and a cluster to which I return to time after time. It is the object to observe to restore your faith in visual astronomy after a frustrating night of hunting some obscure nebula or galaxy. Located outside the body of Auriga, south-east and midway between a line joining theta Aurigae and beta Tauri, M37 is located at 5h 52.3m and Dec +32° 33.2'. At magnitude 5.6 and with a diameter of 15 arcminutes it can just be seen as a hazy spot with the naked eye from a really dark site. M37 is a very rich cluster containing around 1800 stars, many faint but the brightest being around magnitude 11. Its Trumpler class is 1,2,r, making it rich, detached and with a strong concentration of medium range brightness stars. The best way of appreciating M37 is to observe with an eyepiece giving a field of around 30 arcminutes, so that the cluster dominates a slightly sparse surrounding field. On a night of unsteady seeing the cluster will sparkle like a mass of diamonds. Smyth raved about this cluster and Webb called it '...one of the finest in its class'. Many observers remark that the cluster gives the impression of a fully resolved globular cluster. I find that it appears slightly crescent shaped, while others make it pear shaped.



M37: 3×30s at f/3. *Cliff Meredith.*

The final Messier cluster, M38 (NGC 1912) lies well inside the body of Auriga at RA 5h 28.7m and Dec +35° 51.3'. It is similar in diameter to M37, but contains far fewer stars (around 160), the brightest of which is a magnitude 7.9 yellow giant. The age of M38 is estimated at 220 million years, slightly younger than M37 but considerably older than M36. Trumpler classified it as rich, detached, a slight concentration and with stars of a medium range in brightness. It is another easy to find object, as it lies midway on a line joining two 2.6 magnitude stars, theta and iota Aurigae. Visually it is a beautiful cluster, with chains of stars forming a distinctive X shape. Just 30 arcminutes to the SSW of M38, and connected to it by a circlet of stars, lies another cluster, 8th magnitude NGC 1907. Much smaller than M38 with a diameter of just 5 arcminutes, but quite rich, it makes an interesting contrast with its brighter, bigger and looser neighbour.

M38: 4×30s at f/3. *Cliff Meredith.*

The images of the three Messier clusters shown here were obtained by Section member Cliff Meredith, observing from Prestwich, Manchester. Cliff uses a 200mm LX200 SCT with Starlight Xpress MX7-16 CCD. The field size of each image is approximately 27×18 arcminutes. Exposure details are given below each image.

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Observers' Forum

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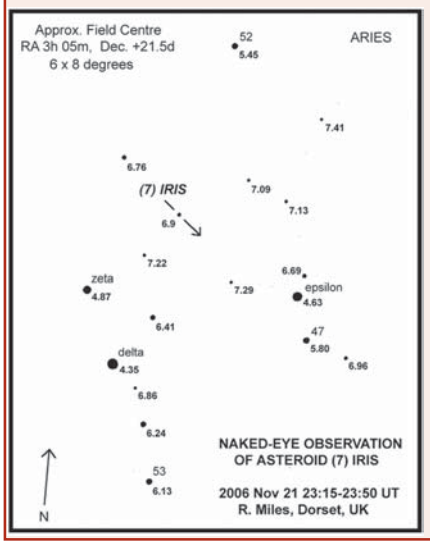
Naked-eye observations of asteroid (7) Iris

Encouraged by a very satisfying meteor watch observing the Leonids during the early morning of 2006 November 19, I read with interest an e-mail from a friend, Gérard Faure, who was successful in visually detecting the asteroid (7) Iris even though its visual magnitude was about 6.9 at the time. He lives near Grenoble, France and he travelled into the mountains to a height of 1200m in search of skies of good transparency. He too had watched for Leonids on the night of November 18/19 but also attempted to spot (7) Iris without optical aid. He reported seeing a 'fugitive star' located in an empty area of sky between zeta Arietis and 52 Arietis, later confirmed as the asteroid, as well as seeing stars down to magnitude 7.2.



At the time the sky had just cleared following rain showers and so I thought I would see if I could manage a similar feat of observation. I obtained the asteroid's approximate position from the BAA *Handbook,* namely RA 03h 08m, Dec +23d, and made a mental note of the arrangement of stars within about 3–4° of this position using *Norton's*. Then sitting in a comfortable seat and wearing my ordinary pair of spectacles, I settled down to observe that part of Aries, noting the pattern of stars I could see. Between 23:15 and 23:50 UT, I gradually built up a mental picture of the star field, some brighter stars being visible continually but others only appearing momentarily with averted vision.

After committing the patterns to memory, I went inside and sketched the arrangement of stars using Norton's atlas to get an accurate measure of the brighter stars. Delta Arietis (V=4.35) was the brightest star in the area. I then checked my sketch against stars shown in *Uranometria* and with the planetarium program, *GUIDE 8.0* (see diagram). In all, I concluded that I had managed to observe stars with the following V magnitudes:

- Stars brighter than 6.00 visible all of the time;
- 6.13, 6.24 and 6.41 easy within about 5-10 seconds of trying;
- 6.69, 6.76, 6.86 and 6.96 with some care seen several times;
- 7.09, 7.13, 7.22 and 7.29 each seen two or three times;
- 7.41 glimpsed once or twice.

Iris was clearly the interloper, and from its difficulty of seeing I estimated its visual magnitude at 6.9. At the time, it was located in a region of sky devoid of stars brighter than mag 9. All of the stars that I charted corresponded to real stars, none being 'imagined'. I understand from Guy Hurst that George Alcock had managed a similar exercise some years ago, demonstrating that although (4) Vesta is the only asteroid which reaches brighter than magnitude 6.0 from time to time, others are potentially within reach of the naked eye.

Although trying to see faint objects with the naked-eye has no scientific merit, it is still quite an exciting thing to undertake. One difference is that there is no optical enhancement so you are seeing something with 'your very own eyes' and this has some philosophical merit in my mind. Others might want to try this for themselves. The most favourable asteroids to observe visually are (4) Vesta at V=5.4 in 2007 May, (1) Ceres at V= 6.9 in 2009 Feb and (2) Pallas at V=7.0 in 2014 Feb. The next 'bright' opposition of (7) Iris will be in 2017 Oct reaching V=6.9. Also, at least four other asteroids can attain 7th magnitude.

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