

# Observing the Galaxy

The Galaxy offers an amazing range of different types of objects to be observed, and if we exclude double and variable stars (dealt with elsewhere), allows all sorts of observations to be undertaken for sheer enjoyment, rather than for serious 'scientific' purposes. The naked eye is more than adequate – indeed it is admirably suited – to take in the overall splendour of the Milky Way itself in its course across the sky, provided dark-sky conditions can be found, away from the bane of street lighting. Those persons who are fortunate enough to live or to be paying a visit south of the Equator, where the magnificent star clouds of the Southern Milky Way stretch from Sagittarius all the way round to Carina, are indeed to be envied. The bright northern section, best seen in the summer months, extends from Sagittarius through to Cygnus and is only a little less spectacular, with the brilliant Scutum star cloud and the Great Rift in Cygnus. On the side away from the galactic centre the Milky Way is naturally not so striking, but it can still be followed all the way round the sky, as it takes in constellations such as Cassiopeia, Auriga, Monoceros and Puppis.

The naked eye and low-power binoculars are ideal for tracing the intertwining star clouds and dark lanes, and there is quite a large number of observers who derive great pleasure from trying to distinguish all the dark nebulae described by Herschel and others. As some of these are of very low contrast, the finest seeing conditions and the very keenest eyesight are required for the details to be perceived, so that even this apparently simple pastime may require considerable skill and perseverance.

Some of the Galaxy's most spectacular objects can be located by the naked eye alone, e.g. the globular clusters M13 (in Hercules), 47 Tucanae and Omega Centauri, as well as the Orion Nebula itself and the various open clusters like the Pleiades, Praesepe and Kappa Crucis (the Jewel Box). However, binoculars or a wide-field telescope are needed fully to appreciate their beauty, which so captivates many observers that they take great pains to render them in drawings, checking their impressions and representations against those of the old-time observers. There are many other tasks which observers set themselves purely for the sake of interest, such as seeing how many of the closest stars they can locate, finding the faintest planetary nebulae, or even on a rather simpler level, finding the star with the greatest Declination South (or North) which they can see from their usual observing site. In the process of 'sight-seeing' many observers learn to find their way around the sky with ease, a skill sometimes envied by their colleagues who follow a more specialized programme of observation.

However, it is in photography that the Galaxy both offers the greatest challenges to the skill and patience of the observer, and also affords the opportunity for the simplest equipment to produce useful and striking pictures. With only an undriven camera and moderately fast film a short exposure will show the major constellation patterns at least as well as they can be seen by the naked eye.

The length of exposure which can be given on an unguided mount will depend upon the focal length of the lens being used and on the amount of trailing which can be allowed. Although long undriven exposures may be quite spectacular, they are

confusing, and unsuitable for individual objects. However, even the simplest form of camera mount will give very worthwhile results, especially with wide field lenses. When a telescope is used, with its long focal length and high magnification (compared with normal camera lenses), accuracy of mounting and of drive become all-important. In most cases, and particularly when long exposures are in prospect, it is essential for the observer to guide the telescope all the time during the exposure, to compensate for the various inevitable inaccuracies which occur. This can become very tiring, and one can only admire the early photographers (and a few modern ones) who spent hours obtaining a single exposure. Modern fast black and white and colour films have naturally helped a great deal, although grain size may be a distinct problem with some films under certain circumstances.

Nevertheless quite long exposures are still required for very many faint objects, particularly nebulae (and galaxies), and here all films – with the exception of those expensive emulsions especially developed for astronomical photography – suffer from the limitation known as 'reciprocity failure'. This has the effect of failing to produce an increase in the density of the image corresponding to the increase of exposure time: when dealing with exposures of a fraction of second, as in most normal photography, exposure time and density are directly linked, but when exposures run to many minutes the relationship

*The North American and Pelican nebulae in Cygnus, photographed by C. R. Martys, Bakewell, Derbyshire, using a 350mm × 500mm Schmidt telescope, in a 20-minute exposure on N2/H2 baked hypersensitized Technical Pan film, with high-contrast copying.*

