

## The Dark Adapted Eye

Eyes must be dark-adapted to enable observers to see the majority of Deep-Sky objects: it takes a good ten minutes to dark-adapt your eyes. If the weather outdoors is a bit chilly, you can get your night eyes more comfortably by staying indoors with your eyes closed or in a dark room. Meanwhile, you have already set up the telescope and it too is acclimatising to the outside temperature. If you want to look at maps or notes outdoors, use a lamp or torch covered with a red filter.

### Eye Position.

Your eye must not touch the eyepiece as this can cause vibration, but at the same time it must be centred on the emergent light beam. This is impossible to do when your eyes are not dark-adapted. After you get your night eyes, you will see that the sky appears in the telescope as a bright, luminous grey rather than black. Given this target, your eye will automatically centre on the eyepiece. Obviously, a low-power eyepiece is easier to use because it has a bigger exit pupil.

A second feature of proper eye position is that your eye must be at or near the exit pupil point. If you are too close, you will get a hit-and-miss shadow effect; if too far, you will lose valuable area in the field-of-view. High-power eyepieces always require a closer eye position than low-power ones. If possible, try to keep both eyes open as this is much less tiring than the usual one-eye squint.

### If you wear glasses.

Take them off if you are far sighted. Your unaided eyes will then see distant objects clearly. Short-sighted people have to keep their glasses on to see distance. The best practical solution is to use a Barlow Lens to achieve higher magnifications as eyepieces below 12mm (1/2 inch) have too short an exit pupil point to allow spectacle wearers to see the entire field of view. Note, however, that even with Barlows, a long eye position means you will still see only a reduced field of view.

## Telescope Mountings

There are two basic types of mounting, the altazimuth and the equatorial. The altazimuth is the simpler and cheaper. It has two axes that allow you to move the telescope up and down (altitude) and from side to side (azimuth). This mount is fine for daylight viewing and quite adequate for a beginner involved in basic astronomy.

The equatorial mount also has two axes at right-angles to each other, but one (the left and right axis) is tilted so that it can be set parallel to the Earth's axis - a north-orientated angle to the horizon, equal to the latitude of the observer. This polar or Right Ascension axis is aligned on the celestial pole, a point about  $1/2^\circ$  off the star Polaris - the Pole Star.

The other axis, which is aligned to the chosen object to be viewed is the Declination axis. The declination is the apparent height of an object above the observer's horizon.

By moving the telescope slowly round the polar axis, the rotation of the Earth, which causes the illusion of the movement of objects through the sky is counteracted and the observed object remains centred in view. This tracking motion can be easily motorised and automated to allow comfortable viewing during long periods of tracking.

Most refractors and Newtonian reflectors are mounted on a German-type equatorial, which incorporates a counterbalance. While this adds to the overall weight, and can be tricky to get the telescope in perfect balance, particularly when using heavy cameras or eyepieces, it does allow access to all parts of the sky.

Many Schmidt-Cassegrain telescopes are on fork mounts, which need no counterbalance but have the disadvantage that access to the region around the pole of the sky is restricted, particularly so if a camera is fitted. They can be used either as an altazimuth, or as an equatorial. In the latter mode, a wedge, normally supplied with the instrument, has to be fitted between the mount and the tripod to tilt the mounting to match the observer's latitude.

The base of the mount also usually houses a motor drive that allows the telescope to track an object in the field of view as it traverses the sky.

