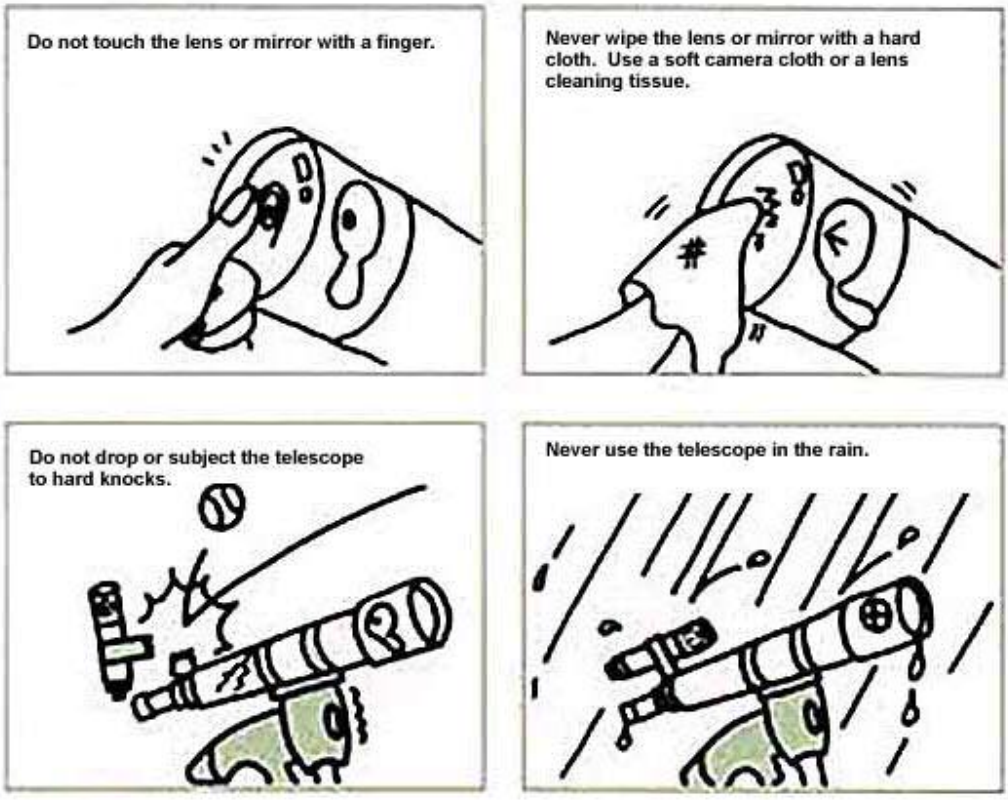
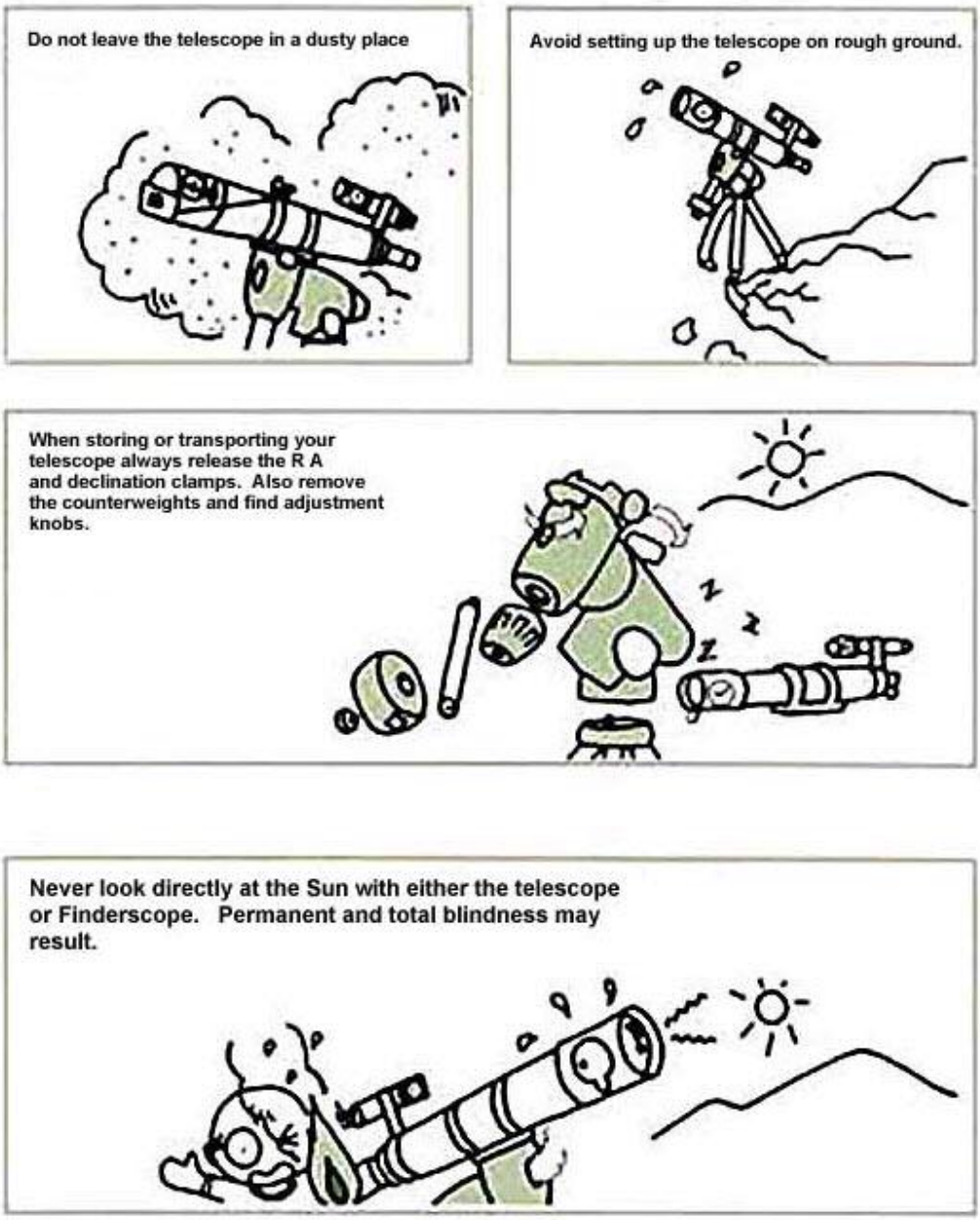
How to use your astronomical telescope for the first time.

A quick guide to setting up and using your telescope for the first time. There are 10 pages in this section which cover a variety of topics to help you get the best out of your telescope.

Please note that some of the features shown on the following pages may not be available on all models.

Precautions:



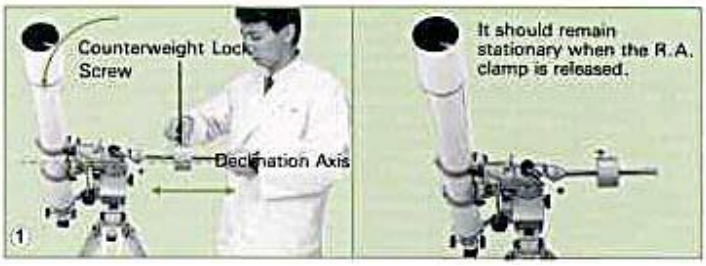


Balancing an Equatorial Mount

To eliminate undue stress on the mount, the telescope should be properly balanced on the mount after all of the standard accessories such star diagonals and finderscopes, have been attached to the telescope. An unbalanced telescope may cause damage to the telescope, mount or motor drives.

Proper balancing is essential for accurate tracking with a motor drive as well.

Step 1



To balance the mount, release the Right Ascension (R.A.) clamp and position the telescope off to one side of the mount. The counterweight bar should extend horizontally to the opposite side of the mount. Without tightening the RA clamp, gradually let go of the telescope to see which way that it rolls. Loosen the counterweight and move it so that it balances the telescope. Re-tighten the counterweight.

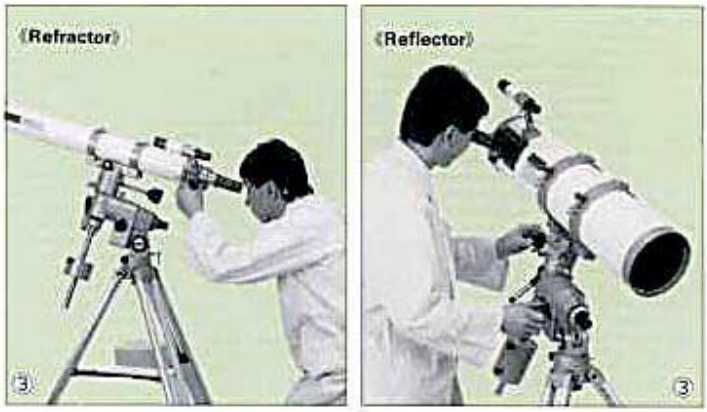
Step 2

The telescope should also be balanced on the declination axis to prevent any sudden motions when the Decl' clamp is released. To balance the telescope is Decl, release the RA clamp and rotate the telescope to one side of the mount (as per step 1). Once this is done, lock the RA clamp to hold the telescope in place. Now hold the telescope tube with one hand while releasing the Decl. clamp with the other. The telescope will most likely rotate around the Decl axis (pitch forward or backwards). Slightly loosen the tube-ring
screws and slide the telescope either forward or backward in the tube rings until it remains stationary when the Decl. is released. Retighten the tube-ring screws.

The telescope is now balanced.

Step 3 - Your First Look

You should intially use your telescope in the daytime when it is easier to locate the knobs and clamps. This will help you familiarise yourself with the telescope and make things a lot easier at night.

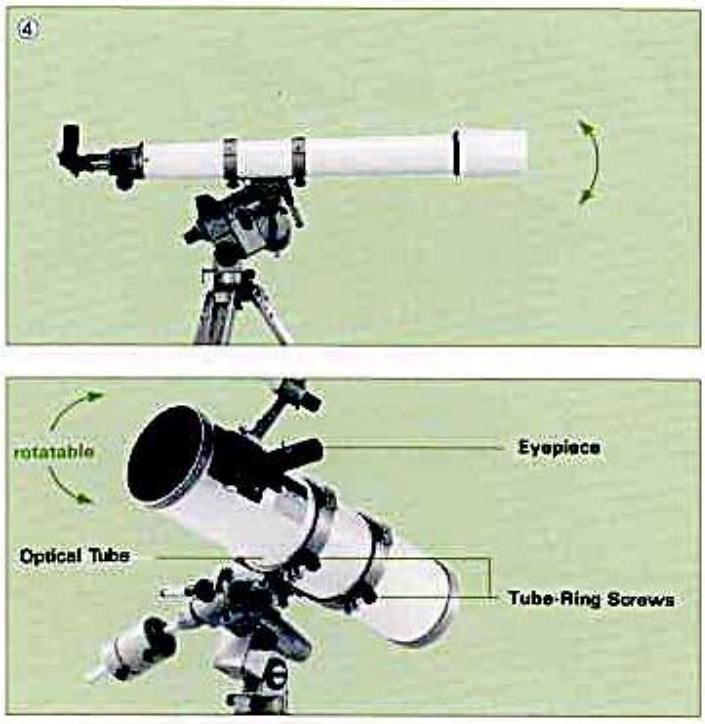


Attach a low power eyepiece (ie with a longer focal length). High power eyepieces (ie with shorter focal lengths) make the field of view smaller and darker and are harder to focus.

Remove the lens caps and look through your telescope.

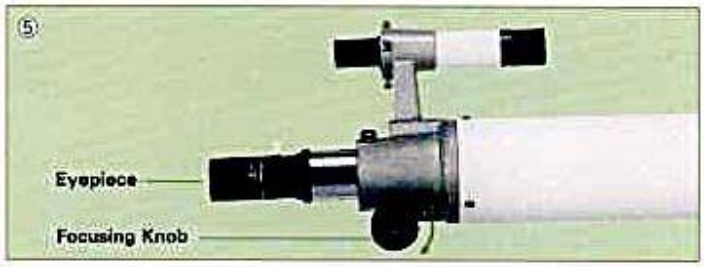
Step 4

Try to find a clear object more than 200m away. Point the telescope toward the object after loosening the R A and Decl. clamps.



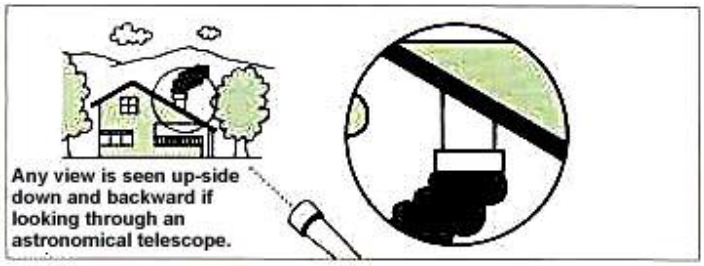
The eyepiece angle can be adjusted on a reflector telescope by rotating the optical tube in the tube rings after unfastening the tube ring clamping screws.

Step 5



Gradually turn the focussing knob until your object comes into sharp focus.

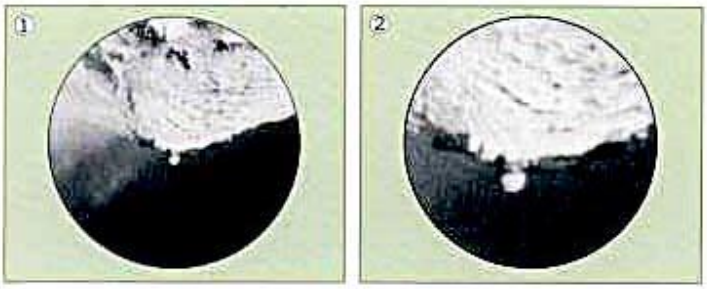
Step 6



Whoops - the image is upside down and back to front! Thats OK - all astronomical telescopes operate this way as it doesn't matter in space. There are special eyepieces called erecting eyepieces that correct this inversion, but they do cause a small loss of light and with such faint objects as there are in space, all light is needed.

Changing eyepieces.

To remove the eyepiece, loosen the eyepiece setscrew and slide the eyepiece out. Slide the chrome barrel of a higher power eyepiece (with a shorter focal length) into the eyepiece adapter/holder and retighten the setscrew to hold it in place.



The size of the image that you now observe through the telescope will be bigger, but the area (called the Field of View) is smaller (narrower).

Using the Finderscope.

The view through a finderscope is also upside down and back to front - just as in the main telescope. However there are some differences.

a) A cross hair reticle is seen. This is for pinpoint accuracy.
b) A wider Field of View is seen than when the main telescope is used. This is due to the lower magnification of the Finderscope.

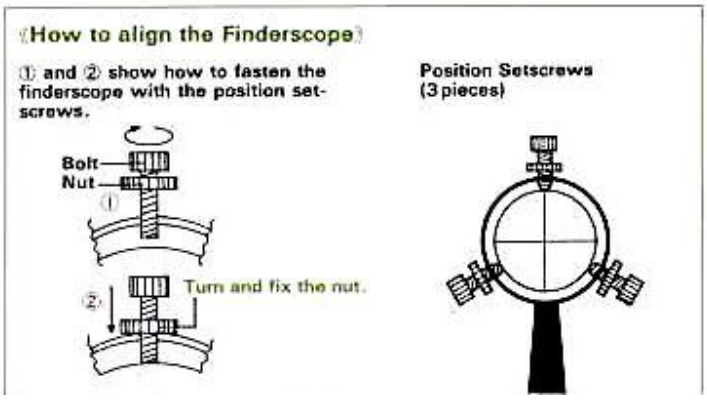
The Finderscope is simply there to help you easily locate objects and bring them within the view of the main telescope. Even using its lowest power eyepiece, your telescope is still very powerful with a narrow field of view and finding objects can be difficult. This is why telescopes are equipped with low power finderscopes.

Before you can use the finderscope properly you will need to make sure that the finderscope is aligned to the telescope. If the same object that is centred in the cross hairs of the finderscope is not centred in the main telescope, then you will need to adjust the finderscope using the 3 setscrews as shown. This can be a fiddly process but patience will pay off.

Aligning the Finderscope.

Insert a low-powered eyepiece into the telescope. Point the telescope at a clear object about 1km away, focus and centre it in the field of view. Tighten the R A and Decl clamps to hold the telescope still.

Bring the same object into the centre of the crosshairs of the finderscope by adjusting the setscrews.

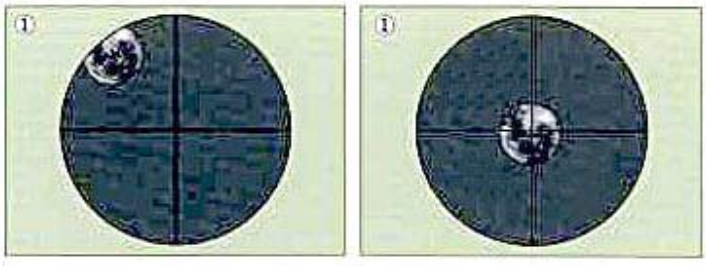


Your First Observation - the Moon.

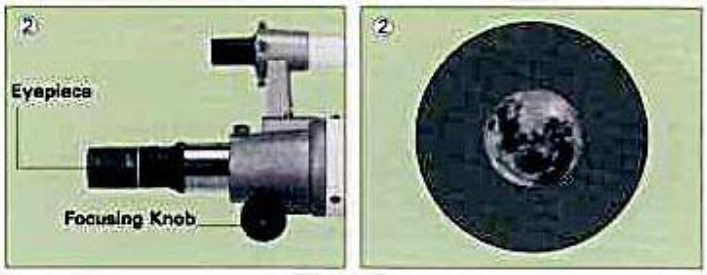
Now, you are ready to point your telescope towards the night skies. Although you may start with any astronomical body, we recommend that you start with the brightest objects first and work your way through to the fainter ones. Here is a good beginner's viewing list:

1. The Moon 2. Jupiter 3. Saturn

Now lets look at the Moon.

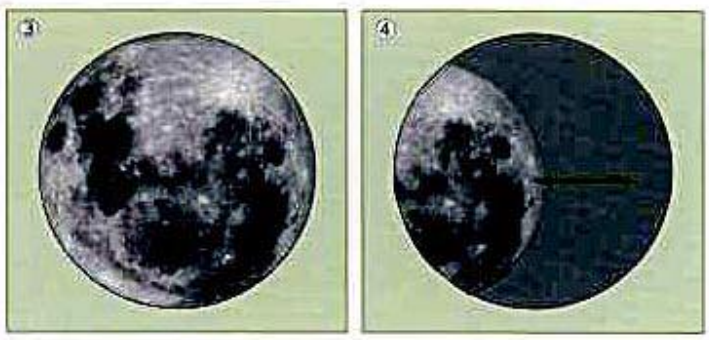


Loosen the RA and Decl clamps. Turn the telescope and locate the moon in the finderscope and centre it in the crosshairs.



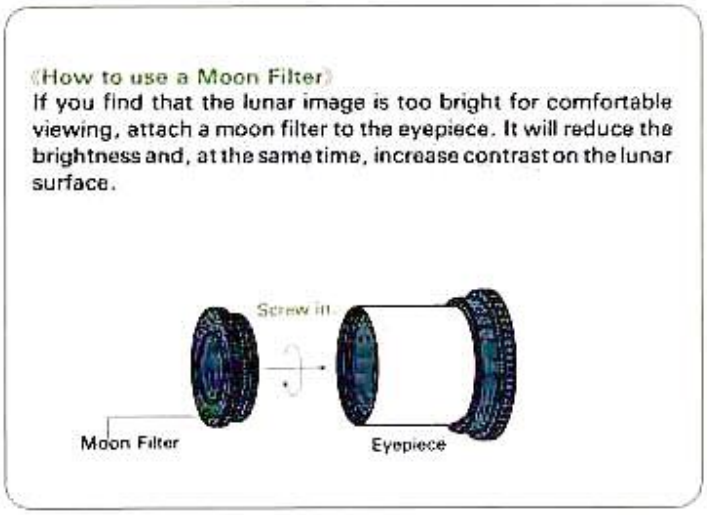
Put in a low power eyepiece (with a longer focal length). Using a lower power (about 50x magnification) you will be able to see the entire lunar disc.

If you desire a close up of a luna region, use a higher power (shorter focal length) eyepiece.



However you need to keep in mind that the rotation of the Earth will cause the moon to drift out of view. This effect is more pronounced at higher magnifications. You will need to manually adjust the telescope using the R A and Decl. slow motion control knobs.

Note - A full moon is actually the worst time to look at the Moon. During the partial phases there are deep/long shadows on the Moon's surface which reveal a lot of detail.



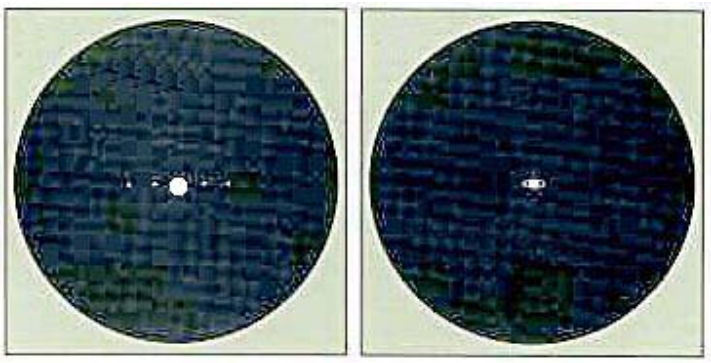
Observing Jupiter and Saturn

Planets such as Jupiter and Saturn appear to move steadily across the sky from East to West. They appear as bright stars. Most astronomy publications will tell

you where the planets can be found in the sky each month. We strongly recommend that you purchase a copy of Astronomy 2002

Use the finderscope to locate the planet and insert a low power (long focal length) eyepiece in your telescope. Jupiter will appear as a small disc. You will also be able to see the four Gallilean moons of Jupiter, although sometimes one or more of them are behind Jupiter and temporarily out of sight.

Saturn with its beautiful rings will be smaller but still easily visible. Remember that these planets (while nearby in astronomical terms) are still so far away that spacecraft take years to get to them.



When conditions are good you can succesfully use higher magnifications. You will be able to raise the magnification greater than 100x. You will be able to see the coloured cloud belts of Jupiter and the Great Red Spot (if it is turned towards us at the time). The rings of Saturn will be more visible and even the dark division between the rings (Cassini's Division) can be seen.

General Cautions.

1. Never try to view through glass windows. As clear as the glass may seem, when compared to the fine optical glass of your telelscope, it will produce distortion and a loss of brightness and clarity. If you are observing through an open window air movement through the window (owing to the temperature difference between the inside and the outside air) may cause image instability and distortion.

2. Stars cannot be observed in an enlarged image because they are very far away from the earth compared with the planets. However your telescope can show you many stars and star formations that are not visible to the naked eye.

3. Train your eye for observation. A celestial object observed through a telescope looks different depending on the experience of the observer. In other words - more experienced observers "see" more detail. With repeated observation experience you will begin to see objects and details that you could

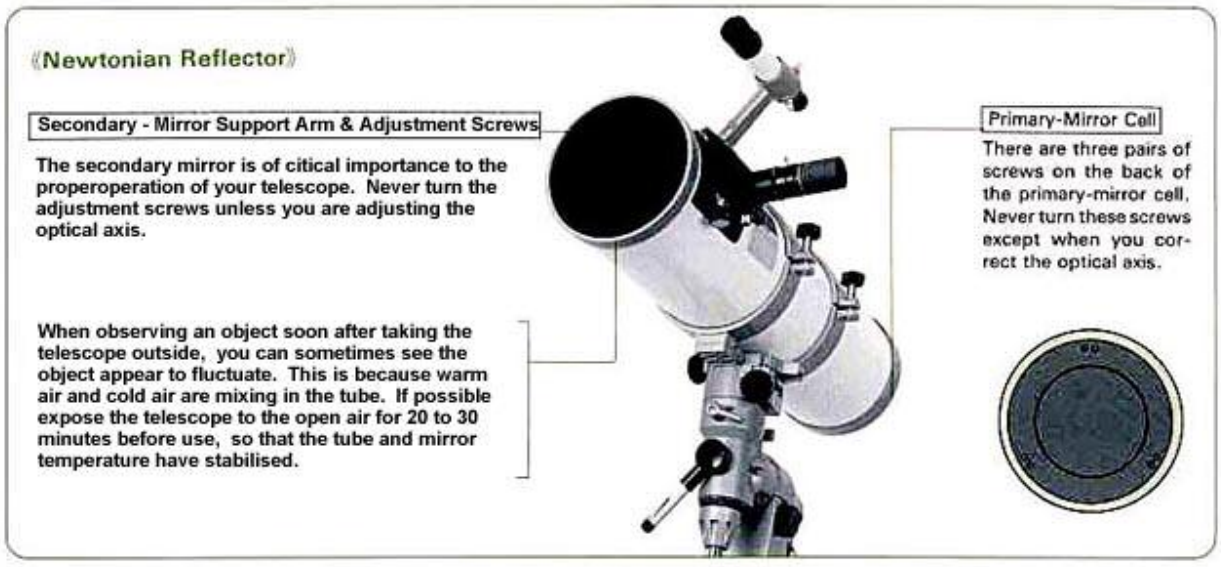
not earlier observe. Sometimes averted or peripheral vision (glancing slightly away) will help you see more.

4. Objects appear to move very fast. Because a telescope looks at a very small "piece" of space under high magnification the apparent movement of an object can appear very rapid. For example Jupiter can cross from one side of the "view" to the other in as little as 90 seconds. This motion is called "apparent motion" because it is caused by the Earth turning underneath us rather than the object itself moving.

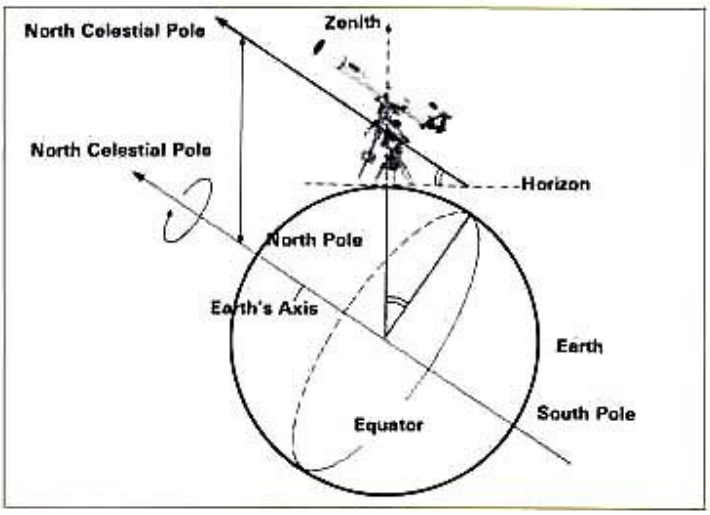
5. Telescopes and people both need to be allowed time to aclimatise to the night. Your telescope needs about 20 minutes to cool down to the same temperature of the surrounding air so that warm air inside the telescope does not cause air currents and distortion. You need about 20 minutes in darkness (and after each exposure to lights) so that your eyes can adjust to maximum sensititvity in the darkness.

6. If you need a light source - use a red light as this coloured light will not effect your eyes' adaptation to the darkness.

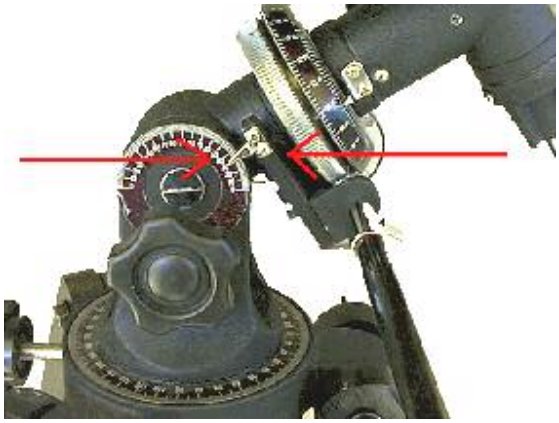
7. City lights and air pollution greatly reduce the amount of objects that you can see with your telescope as well as the brightness and clarity of them.



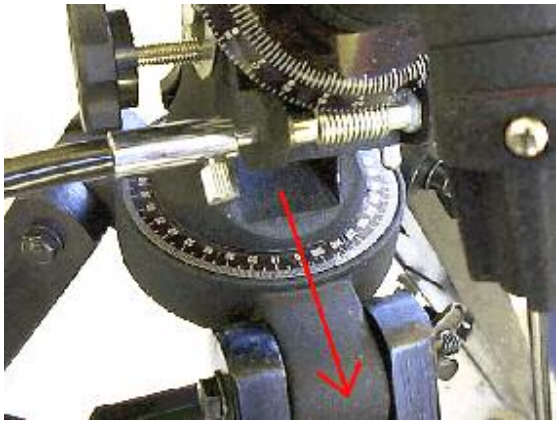
The stars appear to move across the sky and revolve around a celestial pole. This motion is caused the Earth's rotation about its own axis. In order to have your telescope track the stars properly as they move across the sky, the telescope's axis must be parrallel to the Earth's axis.



These are brief instructions only. We have included more complete instructions on setting up your telescope in polar alignment here



Set the latitude graduation pointer to the latitude of your location, as indicated above.



Set the polar axis of your telescope to face south (or north in the northern hemisphere). A compass will assist you.

How to use the R.A. and Decl. Graduation Rings (Setting Circles).

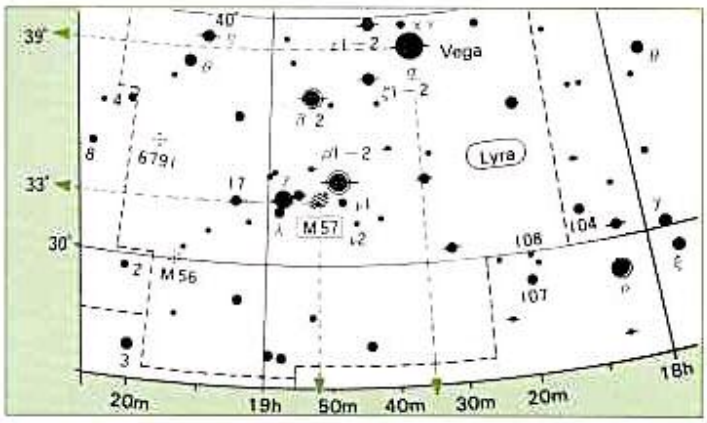
This section is for more advanced users and your telescope mount may be slightly different in its layout than the one shown. However the principle is the same.

The R.A. and Decl. graduation rings (setting circles) are helpful in in locating faint nebulae and clusters which are too hard to find with (or invisible to) the naked eye. To make a search with the graduation rings, you need to locate a bright star near the object you want to observe. The telescope must be in accurate polar alignment.

Example: Finding the Ring Nebula - M57

From a star atlas or chart, you will see that the the Ring Nebula M57 is close to the star Vega. Vega is a bright star of magnitude 1 and so is easily found. Lets use Vega as a base star to find M57.

Find the coordinates (right ascension and declination) of Vega and M57 from your star atlas or chart.

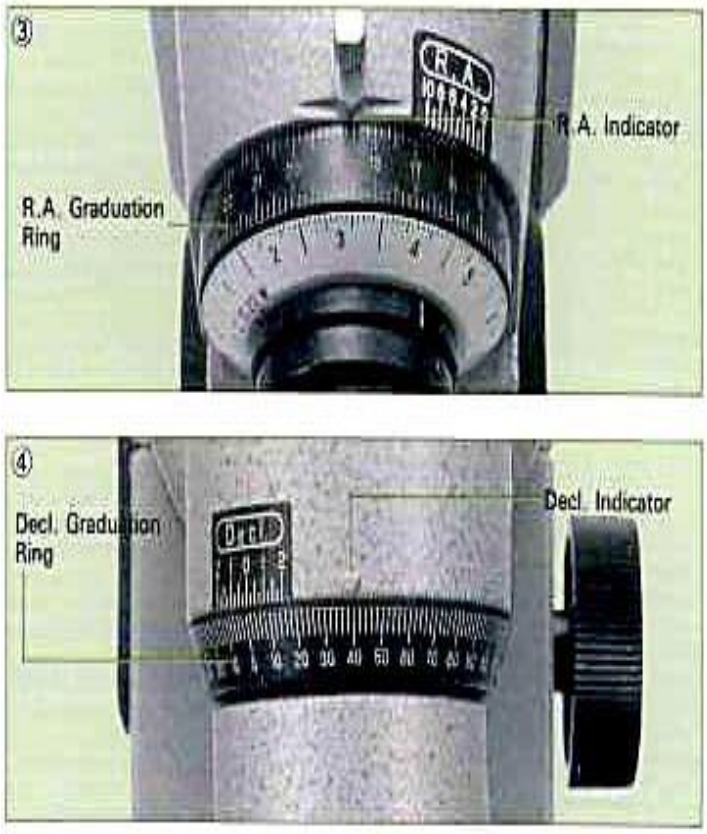


From the chart above they are:

	RA	Decl.
Vega	18h36m	39º
M57	18h52m	33º

Centre Vega in the fild of view of the telescope using the lowest power eyepiece. Turn the R A graduation ring and set it to 18h 36m (18 hours 36 mins). Set the Decl graduation ring to 39 degrees.

To have the telescope move to M57, turn the R A slow motion control knob until the R A graduation ring is set to 18h52m. Turn the Decl. slow motion control knob until the Decl. graduation ring is set to 33 degrees.



The Ring Nebula can now be seen in the eyepiece but it may be very small. Increase the magnification by moving to the next largest eyepiece.

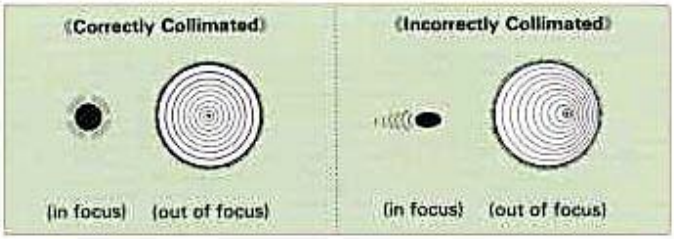
Collimation and the Optical system of a Newtonian Reflector.

Your new Tasco telescope is supplied correctly collimated. However if it has been handled roughly or jarred severely then it is possible that the telescope has been knocked out of collimation. That is to say one or more of the mirrors have been knocked off the optical axis of the telescope.

We have provided this information in order to enable you to recognise an incorrectly collimated telescope. However we do not recommend that you attempt to recollimate your telescope yourself as it is possible to damage the

mirrors. **Any such damage is NOT COVERED BY WARRANTY and we will not accept any liability for damages so caused.**

Checking the collimation of your telescope.



Look at a bright star through the telescope. If the star is seen as a small dot in the centre of the field of vew then the telescope is collimated correctly. If however the star appears distorted to one side, or it appears to have a "tail" like a comet then it is out of collimation