

Collimating a Newtonian Reflector...

Correct optical alignment is fundamental to a Newtonian's performance. All the mirrors and lenses should be centred and angled properly so that the objects aligned in the centre of the view are symmetrical: called collimation. If the optical assembly is severely misaligned, optimum focus and resolution will not be achieved.

The test for poor collimation is easy. While viewing a bright star, slowly take it out of focus. If the resulting expanding disc of light is not symmetrical, there is a problem.

The figures illustrated here show the view looking through the focussing tube without the eyepiece fitted. Figure one shows the likely view when neither the primary nor secondary mirrors are aligned. Figure 2, the view after aligning the secondary, and Figure 3 after aligning the primary so that the reflection of the secondary is exactly concentric within it.

To collimate the mirrors, point the telescope towards a lighted area and look into the focusing tube with out the eyepiece fitted. If it is like the view in Figure 1, both the primary mirror and the secondary mirror are out of proper alignment. First adjust the secondary mirror. Loosen the three positioning screws on the secondary mirror and rotate the mirror until the image of the primary mirror is centred in the secondary mirror. Tighten the screws again.

Then, the view in Figure 2 will show the secondary mirror's supports of apparent unequal length. This is because the position of the secondary mirror is correct, but that of the primary is not. To correct the primary, loosen the three screws behind the mirror and reset the mirror. Until you have all the reflections lined up as in Figure 3. Correction of the optical axis is now complete. Although collimation is difficult to do perfectly first time, with practice it becomes easier.

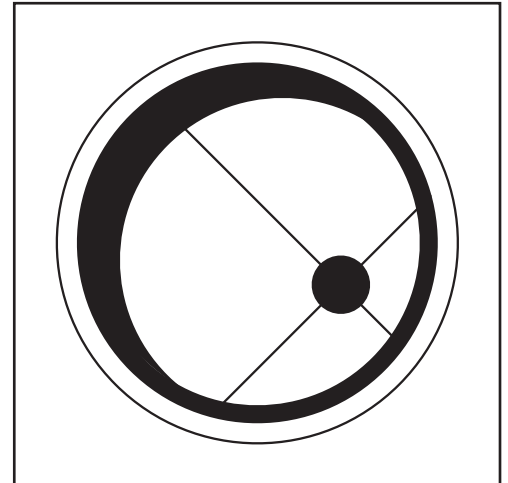


Figure 1: When neither Primary nor Secondary mirrors are aligned.

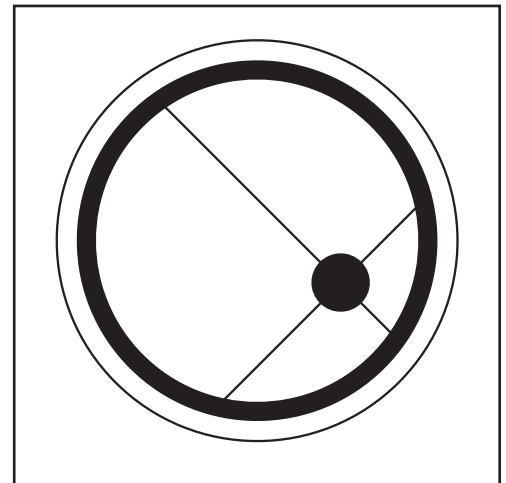


Figure 2: After aligning Secondary mirror.

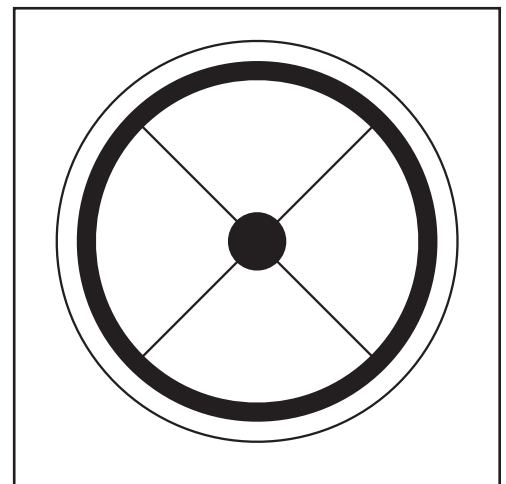


Figure 3: After aligning the Primary mirror so that the reflection of the Secondary is exactly concentric with it.