The R.A. and Decl. graduation rings (setting circles) are helpful to search for faint nebulae and clusters which are hard to be found with the naked eye. To make a search with the graduation rings, you first have to locate a bright star near the object you want to observe. The following is an example on how to use the graduation rings.

Example: Finding the Ring Nebula, M57

From the star atlas, you will see that the Ring Nebula, M57, is close to the star Vega. Vega is a bright star of magnitude 1 and can be seen from Spring to Autumn in most places. Let's use Vega as a base to find M57. (The telescope must be polar aligned.)

①Find the coordinates (right ascension and declination) of Vega and M57 in a book or star atlas.

	R.A.	Decl.
Vega	18h36m	39°
M57	18h52m	33°

②Center Vega in the field of view of the telescope using a low-power eyepiece (under 50X).

③Turn the R.A. graduation ring and set it to 18h36m (18 hours 36 minutes).

④Set the Decl. graduation ring to 39 degrees.

⑤To have the telescope moved to M57, turn the R.A. slow-motion control knob or drive the R.A. motor until the R.A. and hour graduation ring is set to 18h52m.

⑥Turn the Decl. slow-motion control knob or drive the Decl. motor until the Decl. graduation ring is set to 33 degrees.

⑦The Ring Nebula can now be seen in the field of view. But, it may be very small. Try to use a higher-power eyepiece.
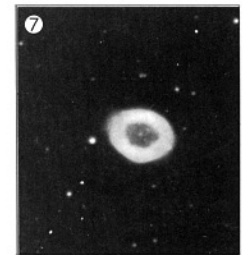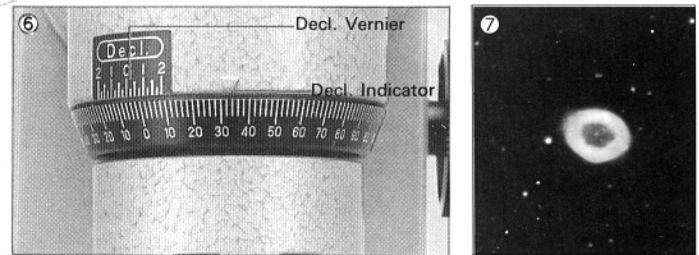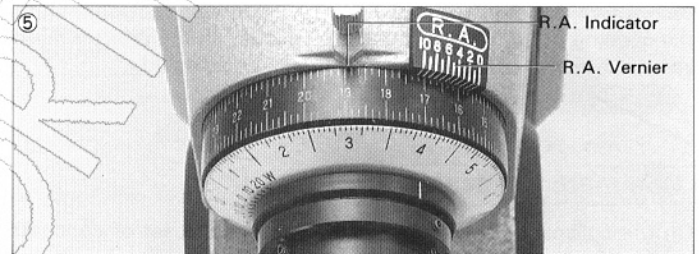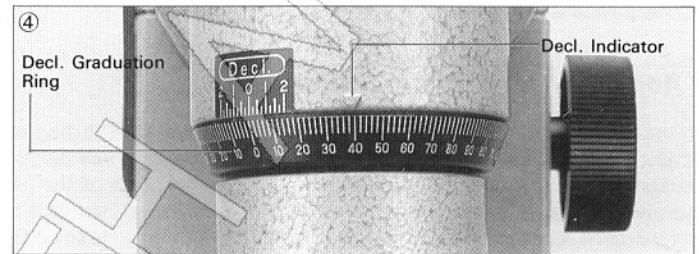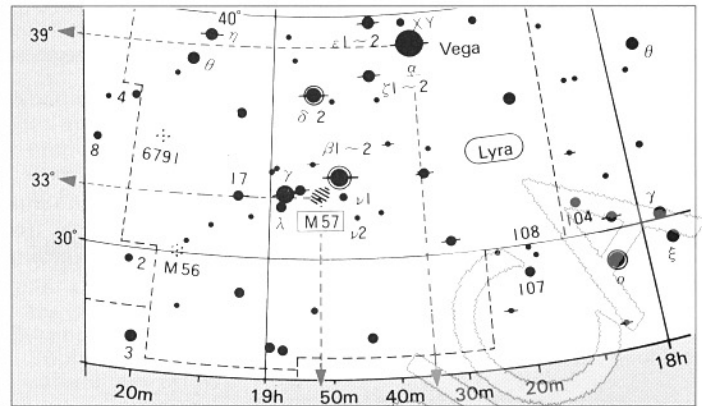
How to use the Verniers

If you use the verniers, the R.A. and Decl. graduations can be set more precisely.

① **Reading the R.A. graduation with the vernier**

On the right example, the vernier graduation 0 is positioned between 22h0m and 22h10m. The R.A. graduation and vernier graduation coincide at the vernier graduation 4. Then, the R.A. graduation is read as 22h4m (22h0m+4m).

② **Reading the Decl. graduation with the vernier**

The vernier graduation 0 is in the middle of the Decl. vernier. Use the vernier graduation in the increment direction of the Decl. graduation. On the right example, the vernier graduation 0 is positioned between 48° and 50°. As the Decl. graduation is incremental to the left side, use the left side vernier graduation. The Decl. graduation and vernier graduation coincide at the vernier graduation 1° 30'. Then, the Decl. graduation is read as 49° 30' (48° +1° 30').

③ R.A. Indicator — R.A. Graduation Ring

④ Decl. Graduation Ring — Decl. Indicator

⑤ R.A. Indicator — R.A. Vernier

⑥ Decl. Vernier — Decl. Indicator

⑦

〈Example〉

① R.A. Vernier — R.A. Graduation

② Decl. Vernier — Decl. Graduation