

Observing Hints

Purchase an index card file box to keep your AstroCards clean and dry. Use one card at a time and file the card after each use. Use the title page as a marker. Use dividers to file the cards by constellation or right ascension depending on which filing system you prefer to use. The sets of *AstroCards* may be filed together or kept separate.

Adapt your eyes to darkness for at least ten minutes and avoid white light when observing. A small flashlight fitted with a deep red filter will help preserve your night vision. If you don't have a red filter, tape red paper or red plastic over the flashlight.

A wide-angle, low power eyepiece should be used to search for deep-sky objects. By using your lowest power eyepiece, you gain the widest field of view and the brightest possible image, a major advantage in seeing a faint object clearly. The most suitable lens are wide field eyepieces between 25mm and 40mm.

Your eye must be centered on the light path of the eyepiece. Position your eye as close as possible without making contact with the lens until you can see the entire field of view. If you wear glasses, it is often necessary to remove them and refocus. The most comfortable focus is "long." Extend the eyepiece a little more than necessary, then focus in just enough to get a sharp image. Do not try to adjust focus on galaxies or nebulae because these are diffuse objects. The best possible focus may be obtained by adjusting the focus on a moderately faint star so that the image is pinpoint.

A clear moonless sky away from street lights and other external light sources is a must for good observation of deep-sky objects especially nebulae and galaxies. If you are troubled with excessive light pollution at home, look for a good location away from home at a park or home of a friend or relative.

Instructions

1. Use the left chart to locate constellations and "guide stars." An arrow points to the "guide star" in both the naked eye left map and the detailed chart at right. Center the viewer's crosshairs on the "guide star."
2. With the right chart (See fig. 1), use the "guide star" as a starting point, moving the crosshairs to each bright star in a path toward the deep-sky object. This is called "star hopping." After the crosshairs are centered on the area where the object is indicated, the object will be visible in the eyepiece assuming that the viewer is properly aligned with the telescope. You may find it helpful to draw lines on the chart that indicate an imaginary route between the "guide star" and the object. (See fig. 2.) Also, outline stars that form obvious patterns, such as triangles, parallelograms, and other asterisms.

The right ascension and declination of objects are listed for users of mechanical or digital setting circles. In most cases, setting circles will help point the telescope near the object. If the object is off target, the right chart will help identify the field. Many of the brighter objects will be visible in a typical 8x50 viewer.

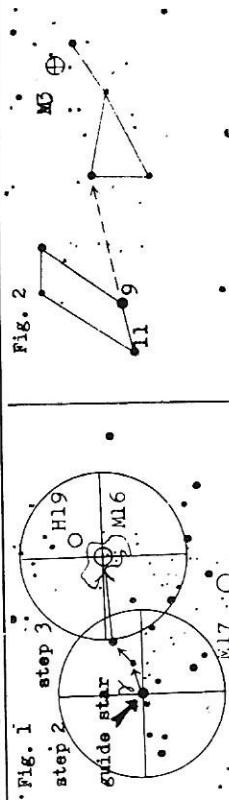
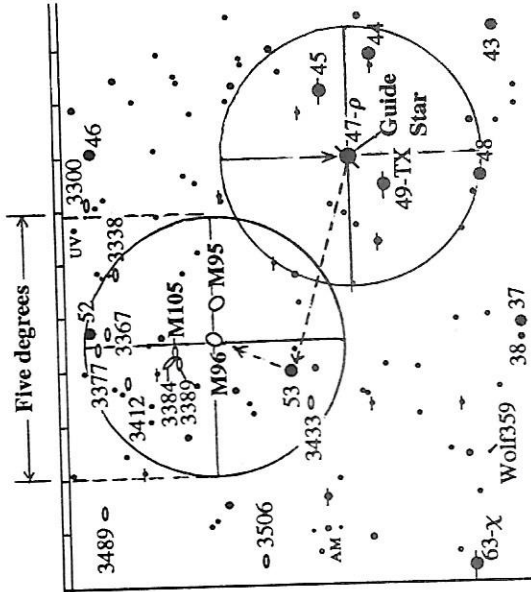


Fig. 2

Chart Scale

The typical 8 x 50 viewer has a five degree field of view as shown at right. The chart scale above the right chart is indicated between the double lines. This scale will help you judge the field of view as seen through your viewer. Study the bright stars and turn the chart to match what you see through the viewer. To "star hop" use the "guide star" as a starting point, moving the crosshairs to each bright star in a path toward the deep-sky object you want to observe.



If you are unfamiliar with the constellations, use the cards along with a rotating star wheel or star atlas that shows the outlines of the constellations.

The constellation containing the deep-sky object and "guide star" is illustrated as it appears at culmination, therefore, if it is east or west of the meridian, the card must be angled in that particular direction (See fig. 3).

Unless you are using an image-erecting prism, the right chart must be used upside down to match the inverted image of an astronomical telescope. When facing south, the card is held upside down and level, but when observing objects toward the east or west, the card is turned progressively until it is held lengthwise when facing due east or west (See fig. 4). When facing north, the card is held right side up and need not be inverted. If the object is above Polaris it is actually south of it (See fig. 5).

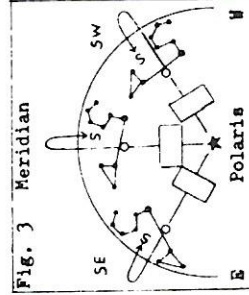


Fig. 3 Meridian

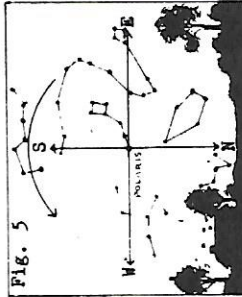


Fig. 5

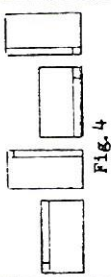


Fig. 4

Abbreviations & Chart Symbols

- M = Number in Messier's Catalog
- NGC = Number in Dreyer's New General Catalog
- H = Number in Herschel's Catalog
- RA = Right Ascension for epoch 2000
- Dec = Declination for epoch 2000
- ∅ = Size (apparent diameter)
- (') minutes of arc, (") seconds of arc
- m = (Mag) magnitude
- (v) visual, (p) photographic
- Jan = Three letter abbrev. for month of culmination
- Tau = (Taurus) Three letter constellation abbrev.
- * = Star or stars (40★ = 40 stars)
- N = North
- = Galactic or Open Star Cluster
- ⊕ = Globular Cluster
- ♁ = Planetary Nebula
- ☉ = Galaxy
- = Nebula

Open Star Cluster Types

- (Shapley's Classifications)
- c = Very loose & irregular
 - d = loose & poor
 - e = intermediately rich
 - f = fairly rich
 - g = considerably rich & concentrated
- #### Planetary Nebulae
- I = stellar
 - IIa = oval, homogeneously bright, concentrated
 - IIb = oval, homogeneously bright, without concentration
 - IIIa = oval, nonuniformly bright
 - IIIb = oval, nonuniformly bright with brighter edges
 - IV = annular
 - V = irregular, intermediate to diffuse nebulosity
 - VI = anomalous

de Vaucouleurs Revised Morphological Galaxy Classification System

- Examples: Sa = Large amorphous center and diffuse tightly wound arms, Sb = Intermediate class between early Sa and late Sc types, Sc = Highly branched well-differentiated arms, resolved into stars and HII regions, small nuclear regions.
- #### E Elliptical galaxies
- eE = Compact, E0 = Globular structure
 - E1 = Slightly elliptical form, E2-6 Ellipticity increasing
- #### S0 Lenticular Galaxies
- SA0 = Non-barred, SB0 = Barred, SAB0 = Mixed, S(r)0 = Inner Ring, S(s)0 = S-shaped, S(rs)0 = Mixed, SO = Early, SO* = Intermediate, SO+ = Late
- #### S Spiral Galaxies
- SA = Non-barred, SB = Barred, SAB = Mixed, S(r) = Inner ring, S(s) = S-shaped, S(rs) = Mixed, m = Magellanic
 - Stages: SO/a, Sa, Sab, Sb, Sbc, Sc, Scd, Sd, Sdm, Sm.
- #### I Irregular galaxies
- IA = Non-barred, IB = Barred, IAB = Mixed, I(s) = S-shaped, IO = Non-Magellanic, Im = Magellanic, cl = Compact, Pec = Peculiar
- (All types)
- : = Uncertain, ? = Doubtful, sp = Spindle,
 - (R) = Outer ring, (R') = Pseudo outer ring
- #### Approximate Stellar Magnitude Scale
- Left Chart
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| ● | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| ● | ● | ● | ● | ● | ● | ● | ● |
- Right Chart
- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
- Right Chart
- #### Globular Star Clusters
- Concentration: I = densest, XII = loosest