

Chapter 1

Welcome to Amateur Astronomy!

Welcome to amateur astronomy! If you are new to this field, and especially if you have never owned a telescope before, this chapter is for you. Otherwise, feel free to skip ahead. I've tried to write a book that I'll actually use while observing. Parts of it are quite specialized; take what suits you and save the rest for later.

Amateur astronomy, like other hobbies, is something you can go for a little or a lot. Computerized telescopes make casual stargazing easier than ever before, since you don't have to gather up star maps and look up planet positions before going out under the sky. At the other end of the spectrum, the advanced amateur with a busy, semi-professional observing program will find that a computerized telescope is a real time-saver. Both approaches to amateur astronomy are respectable, and so is everything in between.

The key to enjoyment is to have realistic expectations and continue building your knowledge and skill. Looking through a telescope is a very different experience from looking at photographs in books, and it may take some getting used to. If you don't already have a telescope, get some experience looking through other people's telescopes before buying one of your own. Contact a local astronomy club if possible.

1.1 Using a telescope

Newcomers are sometimes surprised to find that spectacular objects such as the Horsehead Nebula are not normally visible in telescopes at all — the eye cannot accumulate light the way the camera does. But other nebulae, such as M42, are far more spectacular visually than on film because the eye can see the faint outer regions without overexposing the center. Likewise, the three-dimensional ball shape of a globular star cluster is more impressive “live” than in pictures because the eye covers a greater brightness range. And the ever-changing phenomena of Jupiter, Saturn, sunspots, and variable stars provide a constant supply of new sights — though the real colors of the planets are much more subtle than the bright colors of computer-processed pictures.

One important tactic is to use low power. Unlike microscopes, telescopes do not perform well at their highest powers; this is true of *all* telescopes because of the wave properties of light and the turbulence of the earth’s atmosphere. Most astronomy is done at $20\times$ to $100\times$, with 15- to 40-mm eyepieces. Use whatever eyepiece gives the most comfortable view — usually the lowest-power one — and switch to high power only when actually necessary.

1.2 Learning the sky

A computerized telescope will help you learn the sky; it won’t eliminate the need to do so. Every time you set up your telescope, you will need to identify at least two bright stars. Although the telescope will try to find the stars for you, things go much more smoothly if you learn to recognize them on your own.

Don’t try to memorize a star map; that would be tiresome. Instead, find something in the sky that catches your eye, then use a map to identify it. (My personal career began with the Belt of Orion.) Some constellations, such as Ursa Major and Cassiopeia, jump right out at you; others are obscure, and you will never need to learn them. Not one astronomer in a hundred can sketch *Camelopardalis* from memory.

You'll also need to build your awareness of how the sky moves, how the moon goes through its phases, and so forth. That's what Chapter 2 is about, but a couple of hours of *watching*, repeated every week, will make the sky come alive in a way that no diagram can do.

Above all, though, don't let imperfect conditions, imperfect equipment, or a lack of technical mastery keep you from looking at the sky. On the first night with a new telescope, just take it outside and *look!* Start by viewing distant treetops and the Moon; then examine anything that looks interesting — bright stars, star clusters, the Milky Way, or whatever you can see, whether or not you can identify it. You've just begun a lifelong adventure.

1.3 Is a computerized telescope right for you?

Computerized telescopes are not ideal for everyone. There are three situations in which I do not recommend purchasing one.

First, if you are completely unfamiliar with the sky, you are probably not ready for any telescope, not even a computerized one. Instead, get some star maps and perhaps a pair of binoculars, and spend several evenings looking at the stars, learning some constellations, and becoming aware of how the sky moves. Until you can identify at least a few constellations, you will not be able to set up a computerized telescope reliably, nor will you know whether it's working correctly once you get it going.

Second, if you need maximum optical performance at minimum cost, you will probably not want to spend the extra money for a computerized mount. Instead, go for a **Dobsonian** telescope (a Newtonian on a low-cost alt-azimuth mount that looks like a cannon). Finding objects with a Dobsonian takes considerable skill and extensive use of star maps, but the views are rewarding, especially under a dark country sky. A given amount of money will buy a much larger Dobsonian than any other kind of telescope. Dobsonians can be outfitted with computerized setting circles later.

Third, if you want to do astrophotography on a limited budget, you need smooth drive motors, which the cheapest computerized telescopes do not