

# Preface

It was a book that initially inspired me to observe the night sky: Patrick Moore's *Observer's Book of Astronomy* (1968 edition). The things that really caught my eye in that book were the superb planetary paintings by the late Leslie Ball and pictures of 1960s amateur telescopes: Henry Brinton's 12½-inch reflector, Patrick's 12½-inch reflector and run-off shed, and J. Hedley Robinson's observatory at Teignmouth.

I was ten at the time, but I knew that one day I wanted to get planetary images like those sketched by Leslie Ball, wanted to own a good telescope, and wanted to write a few books like Patrick. Thirty-five years on, my ambitions have not changed at all, but technology has moved on. Amateurs are now achieving what professionals achieved in 1968, both in terms of limiting magnitude, resolution, and discoveries! The "new" amateur astronomer still strives for the best telescope in his or her backyard, but can now observe in the warm, using CCDs and robotic telescopes. My feelings about that first astronomy book have stayed with me, and I firmly believe that amateurs are still principally inspired by spectacular planetary, cometary, and deep-sky images. I also believe that pictures of observers and their equipment are essential in any book about observing the night sky. There are plenty such images here.

The biggest challenge for any writer in this field is to decide at what level to pitch the book. The other problem is what to leave out; publishing, like everything else, is governed by economic constraints. I hope I've got the balance right because, above all, this book is intended to inspire determined beginners and experienced observers alike. I have split the book into two parts, dealing with the basics and equipment first and then moving on to the observers and their techniques.

Complete beginners will want to read Chapters 1 to 3, but the experienced observer has my permission to start at Chapter 4!

Above all, I want this book to encourage and lead the potential new amateur astronomer on a voyage of discovery, ultimately emulating the remarkable people discussed in Part II.

Good luck on your voyage.

Martin Mobberley  
Suffolk, United Kingdom  
July 2004



# Acknowledgments

I am indebted to many fellow astronomers who have freely donated images to this book. It is a policy I have always adopted myself; if anyone wants to use my images, they can have them – just drop me a line; I'm flattered that others want my images! To be honest, most amateur astronomy books would not be commercially viable if not for the generosity of amateurs in this way. But, even though I knew how generous my fellow astronomers were, I was staggered by the speed and enthusiasm with which they flooded me with their pictures!

I am indebted to the following astronomers:

Ron Arbour; Mark Armstrong; Tom Boles; Mike Brown; Denis Buczynski; Ron Dantowitz; Brad Ehrhorn; Andrew Elliott; Ray Emery; Nigel Evans; Steve Evans; Sheldon Faworski; Maurice Gavin; Ed Grafton; Karen Holland; Guy Hurst; Nick James; Chris Kitchin; Brian Knight; Weidong Li; Jan Manek; Pepe Manteca; Hazel McGee; Michael Oates; Arto Oksanen; Donald Parker; Damian Peach; Terry Platt; Gary Poyner; Tim Puckett; Gordon Rogers; Michael Schwartz; Greg Terrance; Roy Tucker; and James Young.

Many thanks also to the following companies and organizations:

Starlight Xpress; Meade Instruments Corporation; Celestron International; RC Optical Systems; Astrophysics; Scopetronix; IOTA-ES; SBIG; JPL/NASA; ESA; Apogee; Finger Lakes Instruments; and Lick Observatory.

I must also thank my parents for their support: in particular, my father's help in all my astronomical endeavors.

Finally, my thanks must also go to John Watson (London) and Louise Farkas (New York) and their respective teams at Springer, without whom this book would not exist at all!

Martin Mobberley  
*Suffolk, United Kingdom*  
July 2004

## CHAPTER TWO



# Buying a Commercial Telescope

## Musings on Telescope Usage

This book is unashamedly intended to inspire amateur astronomers to join the exciting new breed of amateurs who use high-tech to observe and image the night sky. Many of these amateurs will already have purchased their dream telescopes and can easily skip this chapter without loss. However, an increasing number of newcomers to this hobby appear to be people who have spent many years working hard and earning money, with the dream of spending a good chunk of their savings on some top-notch equipment when they finally retire or leave the rat race. In other cases, younger observers have simply saved hard so they can afford the equipment of their dreams as soon as possible. With so much money at stake it is important to make the right decisions and not to be disappointed by an expensive mistake.

My first recommendation is never to buy your telescope from a camera store in a shopping mall. These stores rarely employ assistants who are knowledgeable in the field of astronomy or telescopes. Buy your telescopes from a main dealer who will have the experience and expertise to help you if you need advice or if your telescope develops a fault.

For the beginner, the choice of buying a telescope with an equatorial mounting (one that can follow the stars as the Earth rotates), or an alt-azimuth mounting, will largely be determined by whether you wish to take photographs and CCD images or are purely a visual observer. Main dealers can advise you on these sort of considerations as will your local astronomical club, group, or society.

Buying your telescope from a main dealer does not mean that you will become one of the world's dedicated. The number of Go To Schmidt-Cassegrains sold

throughout the world is truly amazing, but so is the number appearing in second-hand ads! Perhaps this is because the percentage of buyers using their telescopes to their full capacity is tiny. Maybe something is wrong somewhere.

In my experience, the biggest single reason for amateurs not using their equipment is simply a lack of spare time. The unpredictability of cloud is another big factor; you can't say "I'll reserve Wednesday night for observing"; it just doesn't work like that. The third factor, and something you can do something about, is having equipment that is always ready to roll, easy to use, and just outside the back door. I can't emphasize this last point enough. Any telescope that is intended for regular use should if at all possible be permanently mounted in the owner's backyard in an observatory that is simplicity itself to open up. If you can arrange this, then within ten minutes of leaving the house, observations can be made and images collected. The observatory pictured in Figure 2.1 was specifically designed for ease of use and has been fully described in *More Small Astronomical Observatories*, in this series. It is edited by Patrick Moore and was published in 2002.



**Figure 2.1.** The author's user-friendly LX200 run-off shed.

My observatory is a lightweight, compact run-off shed which glides freely up and down on its rails, is a joy to use, and has transformed the ease with which I carry out astronomy. Obviously, the compact dimensions of the 30-cm Meade LX200 inside the shed played a major part in minimizing the size of the shed.

## Recommendations

This conveniently leads me to my definite recommendation about buying a commercial telescope. If you have astrophotography/imaging aspirations and \$2000 to spend, consider buying a modern Schmidt–Cassegrain *from a reputable dealer*.

I have used my LX200 far more than the 36- and 49-cm Newtonians I also own; it is simply far easier to use and the Go To facility, which slews the scope within 5 arc-minutes of the target, saves so much time.

Years ago, Schmidt–Cassegrains had a poor reputation for high-resolution work, but now most of the world's leading planetary imagers and supernova patrollers use them. With modern CCDs and accessories they are unbeatable technological value for money. Perhaps their biggest advantage is their compact size; with a 30-cm Newtonian, the eyepiece can end up almost anywhere, a set of steps or even a stepladder often being required, whereas a Schmidt–Cassegrain eyepiece is nearly always conveniently placed.

I will stress again, a **telescope that is easy to use is the best telescope to own**, and Schmidt–Cassegrains are the easiest medium-aperture telescopes to use. The leading planetary observer Damian Peach, who has never owned an observatory, is shown with his 28-cm Celestron Schmidt–Cassegrain in Figure 2.2.

Okay, so that's my recommendation for amateurs with \$2000 and more to spend, but let's come down to earth for a moment and consider a newcomer with a more limited budget.

If you are spending between \$200 and \$1000 and are primarily interested in visual observing, take a serious look at a Dobsonian reflector. Dobsonians are simply Newtonian reflectors mounted on a low-friction alt-azimuth mounting. They cannot be used for long-exposure photography unless heavily modified. They are named after the Californian ex-monk John Dobson, who has spent his life promoting the construction and use of these “easy-to-use” reflectors. As well as being user-friendly, they are an extraordinary value for the money.

In 2003, \$200 will get you a 114-mm (4.5-inch) Dobsonian; \$350 will get you a 150-mm Dobsonian; and \$480 will get you a 200-mm (8-inch) Dobsonian. Larger apertures are also readily available and a 250-mm (10-inch) Dobsonian, often considered the best portability/aperture compromise, will only set you back \$650. Many experienced amateurs will tell you there is no substitute for aperture, and Dobsonians provide the biggest aperture for your money.

That's largely because Dobsonians also have no motors or electronics. There's almost nothing to go wrong. It is possible to get digital “setting circles” to fit to the altitude and azimuth bearings of a Dobsonian to tell you where to push it to find the object you are looking for. Gary Poyner, one of the world's leading variable-star observers, uses a large 45-cm Dobsonian to make up to 12,000 variable-star estimates per year! A modern Meade Dobsonian is shown in Figure 2.3.



**Figure 2.2.** Planetary imaging expert Damian Peach and his 11-inch (28-cm) Celestron Schmidt–Cassegrain at his former UK home in Rochester, Kent. Note the lack of any observatory! Photo: courtesy Damian Peach.

I've described the various Schmidt–Cassegrain models in Chapter 4 and also the amazingly portable ETX Maksutovs from Meade. Meade's 90-mm ETX has been a runaway commercial success because it combines total portability with a \$500 dollar price tag; however, a 90-mm aperture would leave many amateurs feeling starved of light!

You may also be tempted to buy an equatorially mounted reflector from a major manufacturer. Up to the 1980s, a large-aperture equatorially mounted Newtonian was the amateur's dream telescope. But that was before Schmidt–Cassegrains became so competitively priced and mass-produced. It was also in an era when amateurs wanted a wide visual field of a degree or more for when they were star-hopping to a target. Plus, in those far-off days, many amateurs built their own telescopes, *including* the optics!

In the twenty-first century, commercial Newtonians appear to have split into two categories, namely: the alt-azimuth mounted Dobsonians and the equatorially mounted short-focus Schmidt–Newtonians.

One thing Schmidt–Cassegrains *can't* deliver is a wide field of view. Many visual observers crave a 2-degree field, and can get this from a short-focus Newtonian. And a system with a focal length of less than one meter will give a

**Figure 2.3.** A Meade 12.5-inch (32-cm) Dobsonian. Photo: courtesy Meade Instruments Corporation.



CCD field of view of some 20 arc-minutes, even with the smallest CCD detectors. Wonderful for when those bright comets come along!

That’s the philosophy behind Meade’s excellent LXD55 series Schmidt–Newtonians.

The “ultimate Newtonian” is probably the long-focus planetary instrument; I’m talking here about  $f/7$ – $f/10$  Newtonians, of 25–40 cm aperture. Mirrors of these very long focal ratios can be ground and polished to perfection and are far easier to collimate than short-focus reflectors. They can also incorporate the tiniest secondary mirrors, to minimize diffraction effects. The views they can provide of the planets are exquisite, but no-one makes them commercially, because they are just too long to mount solidly at a reasonable cost.

I think I’ve said enough about buying a commercial telescope, but I would just like to offer a few bullet points:

- Buy a telescope from a national main dealer.
- Read the equipment reviews in the astronomy magazines like *Sky and Telescope*, *Astronomy Now*, or *Astronomy*.
- Search the Internet for telescope discussion groups.
- Visit your local astronomical club or society and ask to look through members’ telescopes before you make a decision.



- Accept that you will always regret not having bought a bigger aperture!
- Mount your new telescope permanently if at all possible, in an easy-to-use observatory with as few bushes and trees obstructing the view as possible.
- If you have less than \$200 to spend, keep saving.
- If you are a visual observer with less than \$2000 to spend, think Dobsonian.
- If you have CCD imaging aspirations, think Schmidt–Cassegrain.

There is, of course, one option I haven't touched on – buying a second-hand telescope. To be honest, it's a lottery. One reason for selling a telescope is that it is a pile of junk, even if it still looks glossy and new. Equally, another reason is just that the owner doesn't have the time to use it.

Personally, I would always insist on a demo of (or opportunity to try) any second-hand telescope before making a purchase. You'd test-drive a second-hand car, so why not a telescope? If you can take along a member of a local astronomical society or knowledgeable friend, even better. There are certainly second-hand bargains to be had, but care is needed – remember, “buyer beware”!