

# Preface

The modern amateur telescope maker is indeed lucky. The choice of top-rate building materials, glass types, instrument designs and technical resources has never been better. Inexpensive ray trace programs abound, allowing the Telescope Nut (TN) to enter the realm of optical design or simply adjust an existing recipe to test an idea. The amateur telescope maker (ATM) finds great satisfaction in the construction process and after a spell of “cosmic touring” with the completed scope, the urge grows to begin a new, usually bigger, instrument. The ATM dreams of reduced tube currents, higher wave-front correction, and perhaps a bigger field. The night sky is their “test track”, their “proving ground”—a close double separated, a faint NGC object spotted. Although a few bridge the gap, contributing to astronomical science is typically not in the cards for these builders. The instrument and its perfection alone is their passion and life hobby. It is from this dedicated group, down through the years—both amateur and professional—that so much innovative design has emerged to the benefit of all astronomers. We applaud this fine tradition. It has provided the underpinnings, the very tools used to help reveal the characteristics of the universe.

How can the joy of telescope making be explained? Is it the wonderful mixture of skills—designing the instrument, machining the cells, building the tube, and grinding and polishing the beautiful optics? Or is it something more magical—the promise of an even better view than with the last instrument, or the lure of discovery? Can it be the camaraderie of like-minded friends and the joys shared? Is it the technical problems solved, the anguishing moments overcome? Just what drives the ATM? I think it’s all of the above and more. We are a rare bunch of birds for sure; just ask any of our non-TN acquaintances!

Schematically, the visual telescope seems so simple: a “black box” that transforms a large beam of light into a small beam, by way of an eyepiece, just the right size in this example, to exactly fit our eye’s pupil. The ratio of the beam diameters is called the magnification and the ratio of the areas is suggested in the wonderfully delightful phrase “light-gathering power” or perhaps “light-grasp”. We need only look into the eyepiece and the illusion is complete: the stars appear closer to us (wider apart) and seem brighter, bringing thousands of unseen stars into view. We have, in effect, simply scaled-up the human visual detection system: the eyeball! And when the telescope is used with film or a CCD, the system is conceptually even simpler since the instrument is just a big camera.

Why are there scores of telescope designs to accomplish the same basic function? Reasons can be found in the literature, but reduced to a simple answer we

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can say that the observational requirements in each astronomical discipline are not exactly the same nor are personal preferences. Each category of instrument has special advantages; *i.e.*, shorter tube, greater coma-free field, better color correction, lower focal ratio, less light scatter, more portability, less cost and on it goes. In the case of disciplines for instance: solar telescopes do poorly on faint galaxies and “light bucket” Newtonians haven’t a chance as a white-light coronagraph; nor are rich field telescopes at their best on the planets. A 60mm refractor would be a more than difficult choice with which to visually observe M 109—an example of how the required aperture can drive instrument design and, in fact, can have more to do with instrument choice than any other requirement. Up to about 300 mm aperture the designs to satisfy various requirements seem endless. However, as the required aperture increases, even slightly, over this value the “simple” Newtonian or Cassegrainian forms and their many variations take front and center on the ATM’s workbench.

The type of telescope described in this book has been my ATM passion for over 40 years. I’ve never found a small telescope design so versatile, with so many possibilities and so delightful to use under the stars. In 1984 I self-published the book *Amateur Construction of Schupmann Medial Telescopes*, which led to the construction of many notable and beautifully successful Schupmann’s, thus fulfilling a dream. Many years have passed and it’s time to bring the subject up to date.

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