

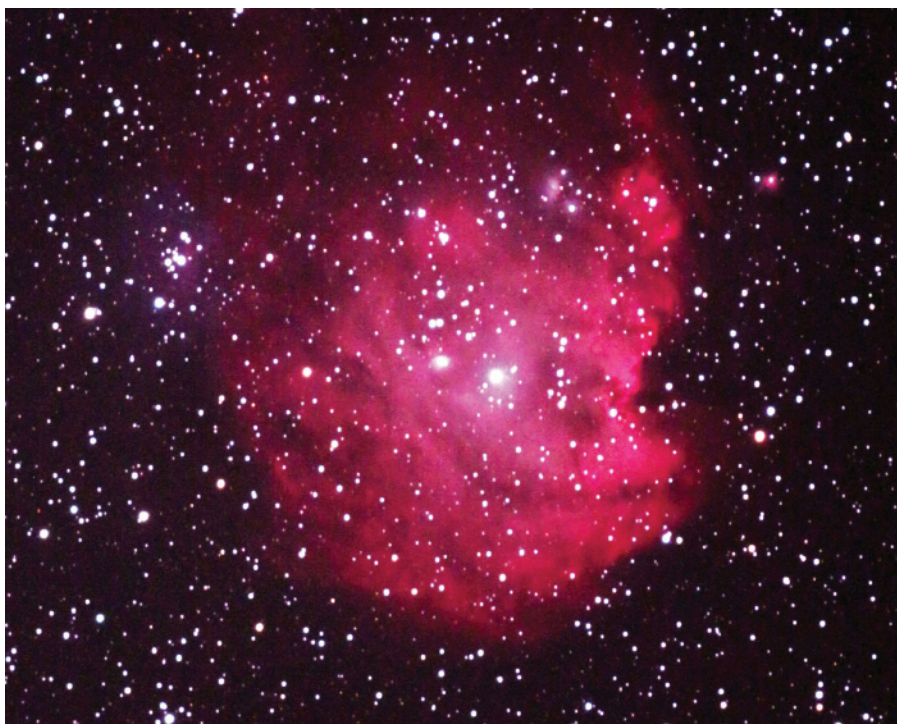


PRODUCT REVIEW

by Terence Dickinson

Explore Scientific's 5-inch Apo Refractor

Quality apo refractors are more attractively priced than at any time in the past. Read how this new entry rates in our tests.



IN THE LATE 1950s, I requested a glossy catalogue from Unitron Instruments, at that time one of the major telescope suppliers for amateur astronomers. Unitron was famous for its full line of achromatic refractors, which ranged from a tiny 40mm model to the colossal 6-inch monster with a tube that towered 10 feet above the observatory floor. After an agonizing three-week wait, the catalogue finally arrived. I was transfixed, staring intently at each page, imagining myself controlling the bigger models, sketching the festoons in Jupiter's equatorial belts and splitting threshold double stars. I decided the 5-inch was for me. No need to be greedy and take the 6-inch—a scope that would require a dome the size of the smaller ones I had seen on the David Dunlap Observatory administration building.

I was dreaming, of course. At \$2,000,

APO DEEP SKY In a 14-minute exposure, the Explore Scientific 127ED, fitted with a Borg 0.85x compressor and a modified Canon 7D DSLR at ISO 2000, imaged nebula NGC2174.

the complete 5-inch scope was the same price as a new Ford sedan in 1958, the year I first saw the catalogue. And there I was, in high school, with not much more than lunch money to my name.

In those days, and for well over a century before, refractors were, above all else, both long and expensive—typically with f/15 focal ratios. This was to combat chromatic aberration, a violet fringe rimming bright objects, especially prime targets like planets and the Moon. At f/15, chromatic aberration is suppressed but still visible in achromatic refractors greater than about 90mm aperture.

Until the 1980s, the achromatic refrac-

tor was the only type of refractor available to backyard astronomers. But the inherent inability of its two-element (crown and flint glass) objective to focus all visible colours to a point meant that the spilled light—mostly blue, some red—compromised performance, not to mention its cumbersome long tube.

THE APO BREAKTHROUGH

The breakthrough came in the 1980s, when several telescope manufacturers began offering refractors incorporating a special glass (either fluorite or ED glass) in one of the objective elements that greatly reduces chromatic aberration. When properly made, this objective comes so close to eliminating chromatic aberration that the scopes were designated *apochromatic*—effectively free of false colour—with the added bonus of being about half the length of an achromatic refractor.

Apochromatic (“apo”) refractors offer optimal backyard-astronomy performance in sizes from 3.5-to-5-inch apertures. Until relatively recently, apo refractors were five to eight times the price of similar aperture achromatic refractors. Today, prices have inched down out of the stratosphere, with some 4-inch apo optical tube assemblies (i.e., mount sold separately) now available for under \$1,000. But 5-inch apos have always been resistant to price reduction—until now. The arrival late last year of the Explore Scientific 127ED optical tube assembly at US\$2,000 marks a significant price breakthrough for this size apo refractor.

For many years, I have regarded 5-inch aperture as the largest size apo refractor that is still reasonably portable. (Set up in the backyard, this is an impressive scope.) Its 20-pound tube assembly—which includes a 50mm illuminated-reticle finderscope and 2-inch mirror diagonal as standard equipment—would be a bit of a handful to raise to the top of a full-height equatorial mount like my Vixen GPD, opposite page, were it not for the handle integrated into the tube rings. The handle makes hoisting the tube assembly atop the mount a simple procedure. (Mount and eyepieces must be purchased separately—standard practice with this class of apo refractors.)

Everything about this telescope is impressive in detail, from the impeccable glossy white enamel finish to the solid focuser with its 10-to-1 fine-focus feature. The focuser has several adjustment bolts clearly identified in the owner's manual that allow fine-tuning of the focusing tension. The 8x50 finderscope is above-average optical quality for a standard-equipment item. It even has an illuminated reticle (batteries included). Likewise, the included 2-inch diagonal is a premium unit with a brass compression ring to securely lock the eyepieces.

The telescope drawtube has the same compression ring system, which can be tightened just enough to secure the diagonal but not too much to prevent the diagonal from being rotated to a more

comfortable angle. After several nights, I found this a suitable substitute for a fully rotating focuser housing, the one feature this instrument lacks.

Most of today's highest-priced apo refractors utilize three-element objectives, with the central member of the sandwich of three closely spaced elements made of Ohara FPL-53 ED glass (or its equivalent, made by another glass company). Some apos have only two elements, with one FPL-53 element. Another arrangement is a triplet, with the central piece made of FPL-51 glass, a slightly less "exotic" version of ED glass. This latter arrangement, with Hoya FCD1 glass, an equivalent to FPL-51, in the central position in the triplet, is used by Explore Scientific for its 127ED apo refractor. The entire telescope is manufactured in China to Explore Scientific's specifications, developed at its California headquarters.

textbook stellar Airy discs and surrounding diffraction rings. Suppression of chromatic aberration was excellent, with the most stringent test—the edge of the Moon's disc—showing no false colour.

On Mars at 190x, the north polar cap was the most distinct feature—a white button atop the 11-arc-second-diameter peach-coloured disc. On the night of the best seeing, at least four distinct darker regions presented themselves, including Mare Erythraeum and Mare Sirenum. On that same night, Saturn displayed its rings tipped just 3.5 degrees from edge-on. In the moments of best seeing, I caught the thread-thin shadow of the rings on the planet.

Placing the telescope on a larger mount for photography, I spent a few hours gathering some images with a filter-modified Canon 7D DSLR, one of which is displayed here. The scope is a full dual-purpose photo/visual instrument.

As an avid user of apo refractors for more than 25 years, I think I know where to look for shortcomings. With this scope, I didn't find any. If you have always wanted a serious apo refractor, this may be the one for you. As for me, I'm glad I started saving for a car rather than that monster 5-inch achromatic refractor of my dreams half a century ago. ■

SPECIFICATIONS

Explore Scientific 127ED apochromatic refractor

Aperture: 127mm (5.0 inches)

Type: triplet apochromatic refractor (Hoya FCD1 ED glass)

Focal length/focal ratio: 952mm, f/7.5

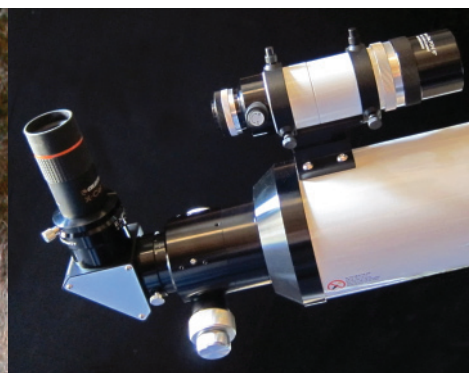
Weight (tube assembly, including standard accessories): 20 pounds

Standard accessories: tube mounting rings, 50mm finder, 2-inch diagonal, dovetail plate

Price: US\$1,999; available through select Canadian dealers or direct from www.explorescientific.com

OPTICAL PERFORMANCE

During an extended run of unseasonably mild, clear weather in mid-March, the 127ED sat beside my Astro-Physics 155mm ED apo in my observatory. For five nights, I went back and forth between the two and can report that the new kid on the block made a fine showing. The 127ED is a superb apo refractor with



5-INCH APO REFRACTOR

Explore Scientific's 127ED is a serious-aperture apochromatic refractor visually free of false colour. Planets are contrasty, deep-sky views awash in pinpoint stars. Out of the box, the scope is ready to place atop an equatorial mount, like this Vixen GPD. Other recommended mounts: Celestron CGEM and Sky-Watcher HEQ-5.