ASTRONOMY TECHNOLOGY TODAY

Your Complete Guide to Astronomical Equipment

THE NEXSTAR EVOLUTION 6 AND SKYPORTAL • MALLINCAM SKYRAIDER NETBOOK KIT REVIEW
THE TPO 6-INCH NEWTONIAN TELESCOPE • THE SBS SEEING MONITOR
FORNAX LIGHTRACK MOUNT • LOOKING BACK SERIES - WILCOX RINGS

The APM
152mm f/7.9 ED-APO

Volume 10 • Issue 3
$6.00 US

ATT Contents

Cover Story: Pages 35-40

Our cover pictures APM's remarkably affordable 152-mm f/7.9 ED-APO of which contributor Mark Zaslove provides his impressions of its visual performance, describing the views as essentially free of false color, even when observing the brightest night-sky objects. The background image is an ultra-widefield of the Constellation Orion region captured with a Canon 60Da and an 18-mm lens carried by Fornax's Lightrack II camera tracking mount, on which Gary Parkerson reports in this issue. The image is a stack of ten 3.0-minute exposures at ISO 800.

In This Issue

Industry News/New Products

ATT Contributing Writers

James Chen is a retired Department of the Navy and Federal Aviation Administration Radar and Surveillance Systems Engineer. He is author of Springer books, entitled *How to Find the Apollo Landings Sites a Guide to the Hubble Space Telescope Objects*, and *The Vixen Star Book User Guide*. He has served as a part-time technical and sales consultant for two Washington DC-area telescope stores for over 30 years. A fourth book for Springer, *The Celestron NexStar Evolution and SkyPortal User Guide*, has been completed and will be published later this year.

Dr. James Dire has an M.S. degree in physics from the University of Central Florida and M.A.and Ph.D. degrees from The Johns Hopkins University, both in planetary science. He has been a professor of physics astronomy at several colleges and universities. Currently he is the Vice Chancellor for Academic Affairs at Kauai Community College in Hawaii . He has played a key role in several observatory projects including the Powell Observatory in Louisburg, KS, which houses a 30-inch (0.75-m) Newtonian; the Naval Academy observatory with an 8-inch (0.20-m) Alvin Clark refractor; and he built the Coast Guard Academy Astronomical Observatory in Stonington, CT, which houses a 20 inch (0.51-m) Ritchey–Chrétien Cassegrain telescope.

Alan Holmes is the former co-founder and president of SBIG. He now heads up Cloudland Instruments which consists of a team of CCD sensor engineers dedicated to providing custom solutions to challenging optical problems. He also co-founded Santa Barbara Scientific (SBS) which provides sales support for specialty products using or supporting SBIG cameras.

Jim Meadows has written books on amateur astronomy including *Beginning Remote Video Astronomy ... So, what's the matter?* He also hosts the Remote Video Astronomy website - http://remotevideoastronomy.com/ - to help provide ideas and resources in the field of video astronomy.

Gary Parkerson discovered early in his amateur-astronomy career that he was as fascinated by the tools of astronomy as by the amazing celestial objects they reveal – perhaps more so. When not writing about astro-tech, he covers industrial technology for a variety of online resources.

Erik Wilcox lives off the grid on the Big Island of Hawaii, and has been observing for over 20 years. When he's not viewing from his dark backyard sky, he spends his spare time hiking, kayaking, snorkeling, and performing music.

Mark Zaslove is a two-time Emmy Award winner and recipient of the coveted Humanitas Prize. Mark is a born-again astro noobie, who once had an Optical Craftsman scope as a kid, and is now recapturing his youthful enthusiasm (with a digital twist) and having a lovely time doing it.

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Industry News/New Products

The TPO 6-inch Newtonian Telescope

A Tremendous Value on a Competent All-Purpose Newtonian

By Dr. James R. Dire

Every time I travel to Southern California, I make it a point to stop in Oceanside Photo and Telescope (OPT) to browse their inventory of astronomical equipment. When there, I am like a kid in a toy store, although these are not toys! They have the largest telescope show room I have ever seen. There are literally too many wonderful instruments from which to choose. I must be crazy for tempting myself like that, since I already own seven telescopes, and I really don't need another. But as an astronomer who is often called upon for advice from future telescope owners, it's best that I have seen the various models first hand and have studied the workmanship.

On a recent trip to OPT, after drooling over 6-inch carbon-fiber APOs and a 10-inch carbon-fiber truss-tube Ritchey-Chrétien reflector, both of which I wanted and neither of which I could afford, I spotted a small Newtonian in the

Image 1 - TPO 6-inch f/6 Newtonian on an Explore Scientific Twilight II alt-azimuth mount

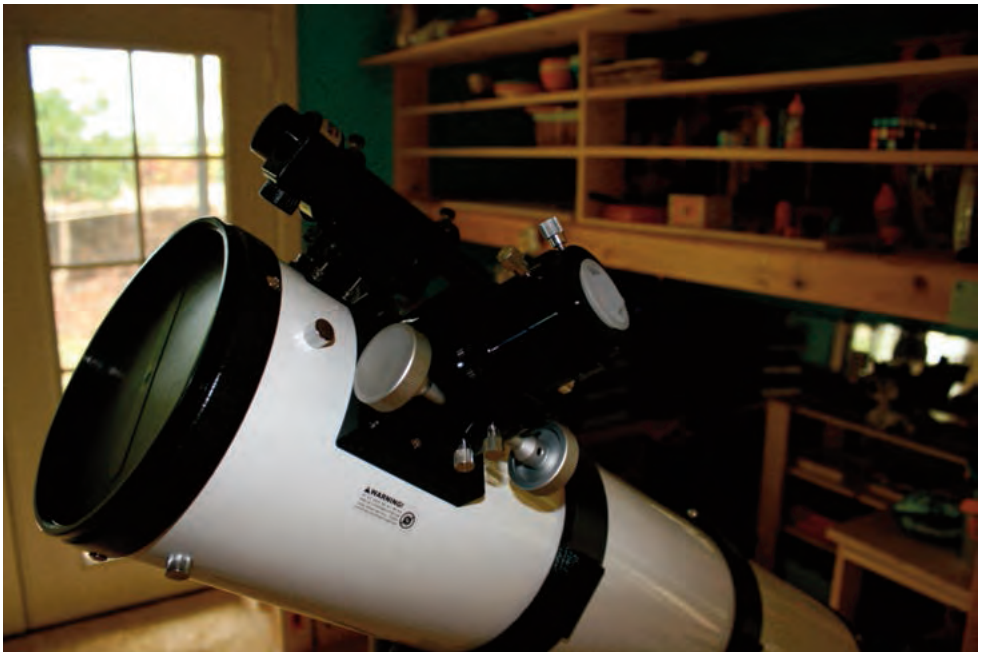

Image 2 - The reviewed version of the 6-inch f/6 TPO Newt is equipped with a single-speed 2-inch focuser. OPT reports that the current version carries a dual-speed 2-inch Crayford-style focuser.

back of the store. The optical tube assembly (OTA) had no manufacturer markings. It appeared to be a 6-inch f/6 reflector. I was intrigued.

Most Newtonians sold today are optically fast, with focal ratios between f/4 and f/5, and some even faster. Fast Newtonians suffer from exaggeration of an aberration called "coma," which causes stars to become elongated and teardropped shaped the farther from the center of the field of view they lie. I prefer to look through f/6 or slower Newtonians, where the effects of coma are not as obvious.

I initiated a conversation with one of OPT's very knowledgeable sales representatives about this telescope. While OPT sells many big name brands of telescopes, this particular scope was their own house label, which they called TPO (OPT in reverse). TPO also stands for Third Planet Optics, a clever name, indeed. The telescope OTA sold for a mere $200 without a mount. At that price, I thought I would take one home for a test drive.

Image 1 shows the entire OTA. I have it mounted on an Explore Scientific Twilight II alt-azimuth mount, which I already owned. The telescope came with a 6x30 finderscope, with mounting bracket, and a nice pair of tube rings! I added a red-dot finder, as the field of view in the 6x30 finder is small, and I can find objects more quickly with the red-dot finder.

The focuser (**Image 2**) is a single-speed 2-inch design. It works quite well for visual work and is much better than you would expect on a $200 telescope. There are two screws on the bottom of the focuser – one for tension and the other to lock it into place. The focuser also has a brass compression ring with two setscrews to hold eyepieces or a camera firmly in place.

The position of the focuser provides the proper back focus for a camera to be attached. Therefore, an extension tube must be used in the focuser for eyepieces. A 2-inch diameter extension tube and a 2-inch to 1.25-inch adapter are provided with the OTA. Note in Image 2 the glossy, black, hard-plastic end ring on the OTA and the black tube cover. The cover is a snug friction fit inside of the tube end ring.

The secondary mirror assembly is shown in **Image 3**. The secondary is held in place with a four-vane spider. The primary mirror is center marked to make collimation easier with a laser tool. The secondary mirror is adjusted using the three Phillips-head screws. The interior of the tube has a nice flat-black finish.

The back of the primary mirror cell

is shown in **Image 4**. The mirror cell is very simple, which keeps the cost of the telescope low. There is minimal airflow through the hole in the back and around the sides of the mirror, but due to the small mass of the mirror, cooling is not an issue. The three larger-diameter thumbscrews are used to collimate the primary mirror, while the smaller-diameter thumbscrews lock the mirror in place. After initial collimation, I transported the telescope back and forth to my dark site several times in my car and the collimation held.

I compared the telescope side-by-side with my six-inch refractor (see my article in *ATT* Jul/Aug 2015) using the same eyepiece. First, Newtonians do not suffer from chromatic aberrations like acromatic refractors. Therefore, I found viewing the Moon and planets to be much more pleasant in the Newtonian. With a 5-mm Tele Vue Nagler eyepiece (183×), I was able to watch Io and its shadow transit Jupiter.

The refractor was more adept than the Newtonian at splitting close binary stars. For deep-sky objects, both the Newtonian and refractor preformed quite well. However, I was able to see fainter nebulae with the TPO Newtonian. For instance, with a 31-mm Tele Vue Nagler eyepiece, I could only see the brightest regions of the Rosette Nebula on the north side of the

Image 3 - The secondary mirror assembly is a four-vane style that is adjusted via three Phillips-head screws.

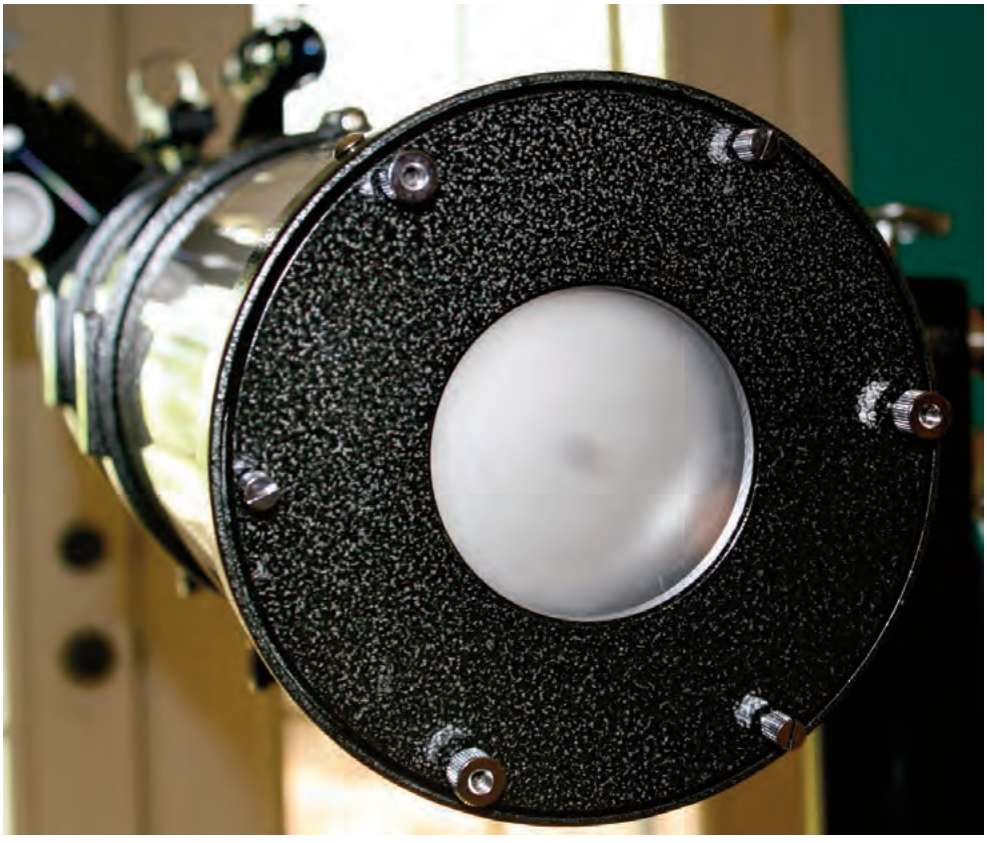

Image 4 -The mirror cell is very simple, which keeps the cost of the telescope low. The three larger-diameter thumbscrews are used to collimate the primary mirror, while the smaller-diameter thumbscrews lock the mirror in place.

central hole. With the TPO Newtonian, I could make out much of the Rosette on all sides of the open cluster NGC2244.

The TPO 6-inch f/6 telescope with the 31-mm Tele Vue Nagler eyepiece provided a 2.8-degree true field of view (FOV) at 29×. This is perfect for framing all of Orion's Sword or M31 with its two companion galaxies. The stars are pinpoint from the center to the edge of the eyepiece, with no hint of coma. The other workhorse eyepiece in my collection that performs exceptionally well with this telescope is a Tele Vue 13-mm Ethos. It provides a 1.4-degree FOV at 70×. This wide FOV means plenty of viewing can take place before nudging the manually controlled alt-azimuth mount is needed.

Overall, I am very impressed at the performance of this telescope. The value is tremendous. It is small enough to transport and set up quite easily, and the 6-inch aperture brings a lot of objects into view not captured in 3- to 4-inch refractors or 5-inch catadioptric reflectors. ATT

SPECIFICATIONS AND FEATURES:

Aperture: ..... 6 inches (152.4 mm).
Focal length: ..... 912 mm.
OTA outer diameter: ..... 7.25 inches (184.15 mm).
OTA length: ..... 23 inches (584.2 mm).
OTA weight: ..... 10.5 pounds (4.76 kilograms).
Focuser: ..... 2-inch dual-speed Crayford-style (current version).
Included accessories: ..... 8x50 straight-through cross-hair finder (current version), 1.25-inch compression-ring adapter and 35-mm extension tube.