Breaking New Ground in the Beginner's Market

This ultraportable gem sports features that many bigger, costlier Dobsonians lack. | **By Joshua Roth**

Take-Anywhere Telescope

Orion StarBlast Astro Telescope with a 4½-inch f/4 Newtonian optical tube, unit-power finder, two eyepieces, and tabletop altazimuth mount.

US Price: $149

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My *Sky & Telescope* colleagues and I have collectively spent well into the six figures in the pursuit of our astronomy hobby, mustering a fleet of eighty-odd telescopes and untold hundreds of accessories. Apochromatic refractors, computer-slewed catadioptrics, and even a few collectibles with names like Quantum and Clark line our living rooms and home observatories. And what we don't own ourselves, we often get to play with on our readers' behalf. Among recent test subjects: a fully robotic $10,000 equatorial mount and Schmidt-Cassegrain telescopes that use Global Positioning System technology to orient themselves.

So it's telling that the test subject to draw the biggest crowd in the office recently was a stubby tabletop "Dob" with a rela-

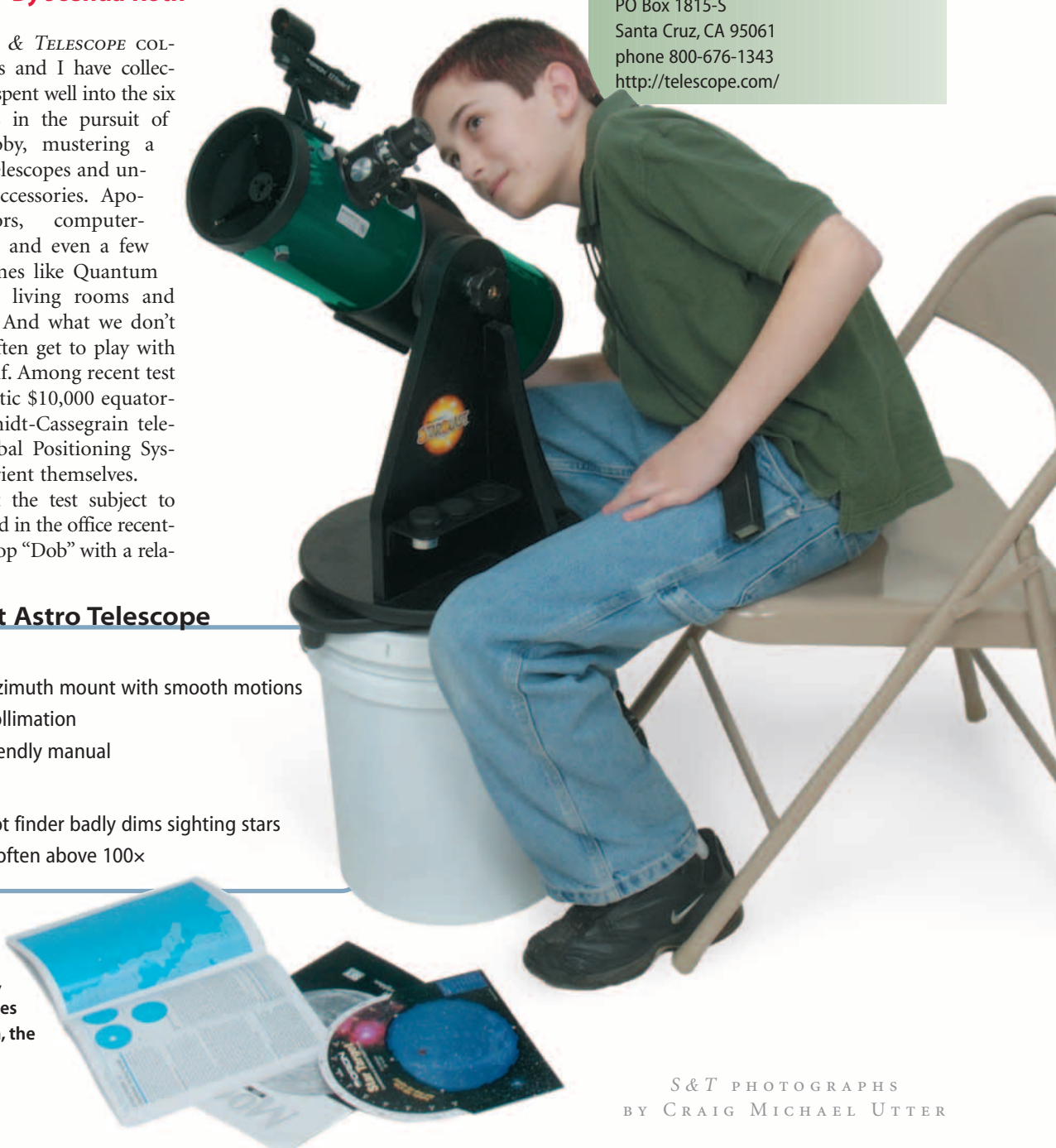
Orion StarBlast Astro Telescope

What we liked:

- Stable, sturdy altazimuth mount with smooth motions
- Fully adjustable collimation
- Thorough, user-friendly manual

What we disliked:

- Unit-power red-dot finder badly dims sighting stars
- Images begin to soften above 100×



Orion's spunky 4½-inch StarBlast reflector is remarkably portable, easy to use, and provides nice views of the Moon, the planets, and beyond.

S&T photographs by Craig Michael Utter

Above, left: **The StarBlast's optical tube is cradled in a hinged, felt-lined metal clamp that can be readily adjusted with a single easily gripped thumbscrew. Not only can the tube be removed from the mount for cleaning or storage; it can be rotated to optimize the eyepiece angle. What's more, it can be balanced even if an unusually heavy eyepiece is placed in the focuser.** ***Above, right:*** **Among the many conveniences of the StarBlast's stable, sturdy altazimuth mount are an eyepiece rack and a knob for adjusting the friction in the altitude (up-and-down) axis.**

The Orion StarBlast comes with a thorough instruction manual, two eyepieces, a red-dot sighting device, and a basic version of *TheSky,* a "desktop planetarium" astronomy program.

tively puny 4½-inch mirror. This, however, is hardly a surprise. For one thing, the kid in each of us was saying, "I wish I'd had one of those when *I* got started!" For another, we're always thrilled to see affordable telescopes that reward a beginner's first efforts to find and view celestial targets. It isn't perfect, but the StarBlast Astro Telescope by Orion Telescopes & Binoculars breaks new ground in this regard, and at $149 it's an unmatched bargain.

A Marvelous Mount

Although a purist could argue that the StarBlast's altazimuth mount departs from the traditional Dobsonian design, it shares the Dob's simplicity, stability, and ease of use. The StarBlast's mount features Teflon-on-laminate bearings for the azimuth (left-right) and altitude (up-down) axes. The altitude axis can have its friction adjusted easily in the field with a large knob that presses down onto a ring of ball bearings — a very useful feature.

The Achilles' heel of most inexpensive telescopes is a mount that wobbles in the slightest breeze or when the user touches the focuser, making observing all but impossible. Not the StarBlast. I used it on windy nights and frequently changed eyepieces without once losing sight of my target. One caveat: the telescope's triangular base should be placed securely upon a sturdy table or other rock-solid support, as the telescope is too short to be useful when set directly on the ground. My tests were carried out with the StarBlast riding a five-gallon paint bucket filled with sand (make sure the lid is secured if you choose to follow my example).

The StarBlast's mount cannot readily be motorized for hands-off high-power viewing, and it is unsuitable for most kinds of astrophotography. However, even at 75× (the magnification yielded by the StarBlast's 6-mm eyepiece), hand-tracking the Moon, planets, and double stars was a cinch. Beginners should have no trouble doing so once they get used to the images being upside down, as is standard with Newtonian reflectors.

The StarBlast's backlash-free motions are particularly impressive when compared to some of the other telescopes available in its price range. I found the StarBlast vastly easier to move about the sky than the commonplace altazimuth mounts that regulate altitude with threaded metal rods and side-to-side motion with wobbly, undersize couplings. I also found observing more enjoyable with the StarBlast than with a short-focus refractor on a photographic tripod.

Optical Assessments

Maximizing the available low-power field of view presumably motivated Orion to choose a 4½-inch f/4 primary mirror. With the included 17-mm (26×) eyepiece the StarBlast yields a field of view spanning 1.8°. An optional eyepiece with a 27-mm field stop will yield nearly 3½° — wholly encircling the Pleiades or Orion's Sword. With a midrange star atlas like *Sky Atlas 2000.0,* the StarBlast's 1.8° field of view is just wide enough to star-hop from a bright, readily found star to an elusive nebula, galaxy, or star cluster.

Our anonymously purchased StarBlast had an acceptable if unremarkable paraboloidal primary mirror. The views it offered were light-years ahead of those we had three years ago through a 4½-inch reflector with a spherical primary mirror (*S&T:* March 2000, page 63). That said, our StarBlast's primary wasn't a perfect paraboloid; bench tests showed alternating zones of under- and overcorrection. (Another StarBlast anonymously purchased by a staff member for personal use proved to have a better mirror than our test scope.)

Left: **The StarBlast's low-profile rack-and-pinion focuser, while largely made of plastic, is very smooth if a bit stiff, and it holds 1¼-inch eyepieces with two thumbscrews, preventing annoying wobbles. It also has enough range of motion to accommodate a wide range of commercially available eyepieces. Users must beware trying to drive the eyepiece in beyond the focuser's range of motion, as a few plastic teeth could be snapped off this way.** ***Below:*** **Observers see lots more when they sit comfortably at the eyepiece. Being able to rotate the optical tube makes comfortable observing easily attainable with the StarBlast.**

Under the stars, image quality held up quite well up to about 100×, and at that magnification (obtained with an optional 9-mm Orion Sirius Plössl and a Celestron Ultima 2× Barlow lens) I was able to cleanly resolve the Cassini Division within Saturn's ring system as well as several tightly spaced double stars (Gamma Leonis, Lambda Orionis, and Castor). However, while the StarBlast delivered reasonably crisp medium-power views of Jupiter and Saturn, things softened up noticeably beyond 100×.

Several features enhanced my experiences at the eyepiece. Focusing was sure and precise with the surprisingly smooth low-profile rack-and-pinion focuser. The four-vane spider holding the secondary mirror aloft had exceptionally thin (0.5-mm) vanes, and consequently the diffraction spikes flaring from Jupiter, Saturn, and bright stars were as unobjectionable as any I've seen in a mass-produced reflector. The simple but robust plastic mirror cell didn't pinch the primary, and no astigmatism was evident in my star tests, even at the single-digit temperatures that prevailed during most of my observing sessions.

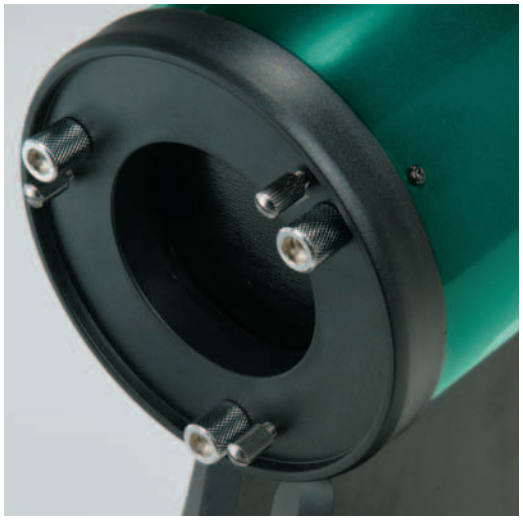
The StarBlast's secondary mirror is just large enough to fully illuminate the center of the focal plane, and it was correctly placed (in fact, our telescope arrived with both mirrors in essentially perfect collimation). Finally, the two Orion Explorer II eyepieces that come standard with the scope have decent antireflection coatings that suppressed unwanted ghost images.

Minimal Assembly Required

Before taking the StarBlast out to tour the late-winter sky, I removed it from its snug styrofoam packaging and rotated the tube assembly to mimic the setup on the front cover of the clearly written, user-friendly instruction manual. I then proceeded to attach its EZ Finder II reflex sight, which projects a red dot onto a partially transparent window. The manual had excellent sidebars on eye relief, light pollution, and magnification, as well as the obligatory warning against observing the Sun without proper filters.

If mass-produced reflectors could be built so their optics never, ever went out of alignment, there would be no need to instruct their owners how to collimate

Left: **The primary-mirror cell has three pairs of push-pull bolts for collimation. These can be adjusted without tools, though in practice only the larger, spring-loaded screws are necessary. The telescope's short tube means that the user can easily make the adjustments while looking in the focuser.** ***Right:*** **Collimating the StarBlast is easy thanks to niceties such as a center-dotted primary mirror.**



their instruments. However, no Newtonian reflector we're familiar with is impervious to eventual misalignment, and collimation is crucial when the mirror has a fast, f/4 focal ratio, as the StarBlast does.

Thus it's clearly advantageous that, unlike some other short-focus reflectors, the StarBlast can be user-collimated. Facilitating this endeavor are the three spring-loaded screws that enable the primary mirror to be easily hand-tilted, a central "dot" (actually an even more useful "doughnut") on the primary mirror, and a helpful "collimation cap" that fits in the focuser and takes much of the guesswork out of the process.

Of equal importance, the relevant instructions are far better than those I've seen accompanying other inexpensive reflectors. Even so, I worry that the manual might lead some overeager owners to unnecessarily monkey with an adequately collimated secondary mirror. The secondary is far more difficult to position and tilt than the primary, and minor secondary-mirror misalignment can be made up for when collimating the primary, a far easier task (*S&T:* June 2002, page 111). In any case, the generally excellent manual neglects to remind users to realign the EZ Finder after every collimation tune-up.

What the StarBlast Can Show

Once the StarBlast is collimated, the EZ Finder must be aligned so its red dot lines up with the object one sees centered in the telescope's eyepiece. This took me some time: the plastic stalk holding the finder flexed every time I tried to optimize the fairly stiff azimuthal adjustment. Eventually, though, I was able to use the EZ Finder to target Jupiter and Saturn even when the 75× eyepiece, with its narrow field of view, was in place.

And I was pleasantly surprised when I did so! Jupiter's Galilean satellites were pinpricks of light, each surrounded by a neat diffraction ring. The planet itself

Fun and Frustration with a 2½-Pound Wonder

Will kids have fun with Orion's FunScope, a 3-inch (76-mm) reflector with a racy rocket-shaped body just 12 inches long? I'm sure they will: its optics are better than those in most telescopes sold as toys. In fact, our test unit sports a paraboloidal f/3.7 primary mirror. Its respectable views would have been even better if it had been perfectly collimated, but the primary was noticeably misaligned and cannot be adjusted. Even so, with the standard 30× image-erecting eyepiece I enjoyed an acceptably detailed (if somewhat soft) view of the waxing gibbous Moon and was just able to perceive the rings on a recognizable — if tiny — image of Saturn.

That said, while the FunScope will enable kids to pursue perennial daytime diversions like reading billboards a mile away and watching bees fly in and out of a hive at a safe distance, it probably isn't an effective tool for getting to know the night sky. As the telescope lacks a sighting device of any kind, I had trouble pointing it to just about any astronomical target besides the Moon. The optional 15× eyepiece (a bargain at $9.95) helped, with its very wide 4° field of view.

But switching to higher power — either 30× with the supplied eyepiece or 50× with a second optional ocular, also $9.95 — was tricky. The nonstandard eyepieces' slotted barrels have to be mated with two plastic tabs in the telescope's helical focuser, and after fumbling to insert a higher-power eyepiece in the dark I invariably found that the telescope no longer was pointing at its target. (Another minus: the plastic tabs that hold the eyepieces in place are rather easy to break if the eyepiece is pushed rather than twisted into the focuser — as is inevitable, Orion's printed warnings notwithstanding.)

I bought my FunScope for $59.95 on impulse at one of Orion's dealers late last year. At press time Orion listed the telescope in its mail-order catalog. But according to merchandising vice president Stephen Peters, later this year the telescope may be available only from Orion's dealers. Furthermore, by the time this issue reaches readers the scope will sell for $89.95. Peters recommends inquiring by e-mail (sales@telescope.com) or telephone (800-676-1343) to locate the dealer nearest you.

With its appealing red-rocket shell, cartoonlike user's manual, and image-erecting 30× eyepiece, the Orion FunScope promises kids a good time exploring by day or night, and its optics are better than those of most scopes sold as toys. However, pointing the FunScope at Jupiter and Saturn proved difficult even for an experienced observer.

While hardly designed for astrophotography, the StarBlast does allow you to take quick snapshots of solar-system targets with a digital camera. *Sky & Telescope* associate editor Gary Seronik snapped this 1/60-second exposure of the waxing crescent Moon last March with a Nikon Coolpix 4500 camera coupled to a 14-mm Tele Vue Radian eyepiece.

was sharply edged, with abundantly textured equatorial belts. The shadow Saturn cast upon its clearly delineated ring system was visible at 75×. So was the Cassini Division (at the rings' "tips," or ansae, where it is most conspicuous).

The Moon is most astronomers' first target, and for good reason. Even at moderate magnification it presents a wealth of detail, and a good telescopic view of our natural satellite can satisfyingly substitute for space travel. The vagaries of New England winter weather prevented me from trying out our anonymously purchased test unit on the Moon. However, I had the opportunity to use another StarBlast at this year's Winter Star Party, and the views I enjoyed of the waxing crescent Moon through the telescope's Explorer II eyepieces were surprisingly contrasty and free of ghost images.

Deep-sky observing with the StarBlast was remarkably satisfying once I got past one major roadblock: the EZ Finder. Its window dims stars by at least a half magnitude (I couldn't see most of the naked-eye stars in the Pleiades or Orion's Sword through it). What's more, while the red dot projected on the window can easily be brightened or dimmed, even at its feeblest it outshone many of the stars I use as steppingstones to nebulae, star clusters, and galaxies. I only partially overcame these problems by looking through both eyes, with one trained on the red dot, and by nodding my head back and forth.

Once I did find my stellar starting points, I readily star-hopped to a couple dozen deep-sky objects with the 26× eyepiece. Sprawling open clusters like Cancer's M44 and Gemini's M35 were reasonably sharp to the edge of the 17-mm's field — no seagulls here! I was struck by how conspicuously two orange-red giant stars stood out from the crowd by dint of their colors in Perseus's Double Cluster. In Auriga, M38's dramatic X was obvious, as were E. T.'s outstretched arms in the "E. T. Cluster" (Cassiopeia's NGC 457, also known as Caldwell 13).

In M42, the Orion Nebula, three of the Trapezium mini-cluster's four corner stars were readily apparent at 26×, with the fourth winking in and out as the seeing varied. So was the "fish's mouth," the dusty indentation in the nebula's otherwise bright core. Ursa Major's paired spiral galaxies, oval M81 and spindly M82, readily displayed their disparate forms at 26× despite considerable skyglow (the faintest stars visible to the naked eye from my suburban site were about 4th magnitude). The Eskimo Nebula (NGC 2392), a 9th-magnitude planetary nebula in Gemini, clearly stood apart from its neighboring stars at 26×, and its bright core and fuzzy envelope were obvious (if tiny) through the StarBlast's 75× ocular.

Specifications at a Glance

Orion StarBlast Astro Telescope		
US Price	$149	
Effective aperture*	4 3/8 inches (111 mm)	
Central obstruction*	1 1/16 inch (33.3 mm), 30%**	
Focal length*	455 mm (f/4.1)	
Supplied eyepieces	17 mm	6 mm
Magnification	26×	75×
True field*	1.8°	2/3°
Weight*		
13 pounds (6 kilograms), entire telescope		
4 pounds, optical tube		

* measured by *Sky & Telescope*

** expressed as a percentage of the effective aperture

While the StarBlast's carrying handle seems a convenience, oculars might fall out of the eyepiece rack if the scope is held at arm's length; better to get a solid grip on the assembly while carrying it upright.

Not for Kids Alone

By themselves, none of my astronomical observations with the StarBlast were remarkable. But along with the telescope's wide field of view, its rock-solid mount, and its smooth, backlash-free motions, they demonstrate that the StarBlast will enable the first-time telescope owner to enjoy a far wider variety of astronomical experiences than many (possibly *all*) other similarly priced instruments.

Orion is justifiably marketing the StarBlast as a kid's scope, and I wouldn't hesitate to buy one for a reasonably mature child with a demonstrated interest in astronomy. But even old-timers might find it an ideal second (or third, or . . .) scope for grab-and-go stargazing, camping trips, or possibly even airline travel.

Despite having logged 18 years of deep-sky observing with dozens of instruments, senior editor Joshua Roth *still feels a childlike rush of excitement whenever he gets to try out a new "kid's" telescope.*