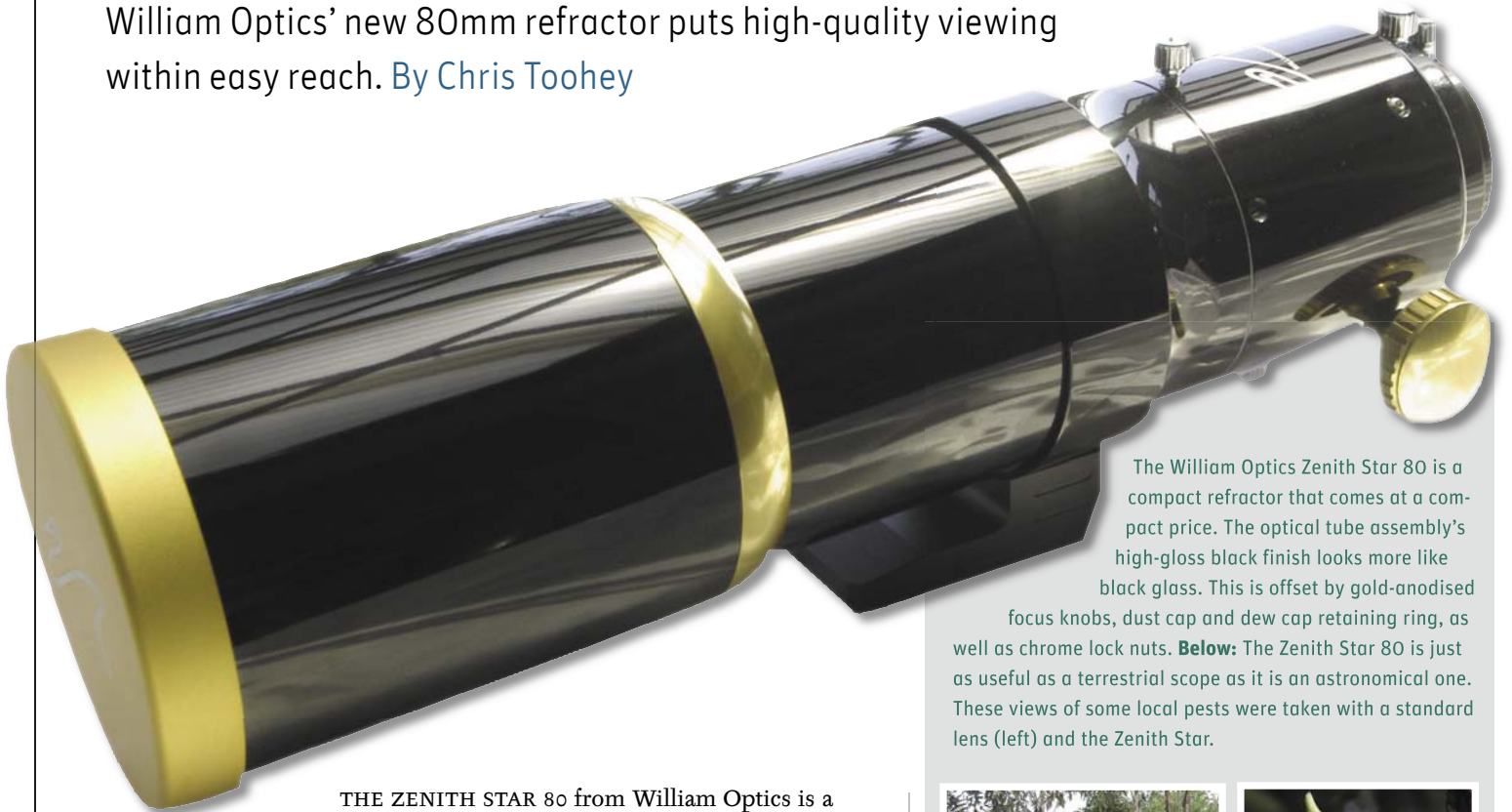


Small Scope, Big Performance

William Optics' new 80mm refractor puts high-quality viewing within easy reach. *By Chris Toohey*



The William Optics Zenith Star 80 is a compact refractor that comes at a compact price. The optical tube assembly's high-gloss black finish looks more like black glass. This is offset by gold-anodised focus knobs, dust cap and dew cap retaining ring, as well as chrome lock nuts. **Below:** The Zenith Star 80 is just as useful as a terrestrial scope as it is an astronomical one. These views of some local pests were taken with a standard lens (left) and the Zenith Star.

THE ZENITH STAR 80 from William Optics is a 80mm f/6 achromatic refractor, and as such it joins an extremely competitive small refractor market. It deserves to succeed because it has a lot going for it.

When I first set eyes in the Zenith Star 80 I was impressed by its amazing finish. The high-gloss tube looks more like black glass than anodised metal. The same flawless black covers the focuser, draw tube, 2" eyepiece retaining ring and 1 1/4" adaptor. This style is offset by gold anodised focus knobs, dust cap and dew cap retaining ring, as well as the chrome lock nuts.

The overall appearance is one of simple elegance and functional beauty achieved by meticulous attention to detail.

One person described this telescope as the prettiest he had seen. Well, if a telescope can be pretty, then this is it. While telescopes are for looking through, not at, it's true that human beings value pride of ownership and the beauty of fine craftsmanship. The build quality of the Zenith Star 80 is up there with the very best on the amateur market. In fact, in many ways it reminds me of an Astro-Physics StarFire.

The Zenith Star 80 comes in a strong, well-made carry bag. It is padded with dense foam rubber, moulded to receive and protect the optical tube



assembly from scratches and shock during transport. The foam is cut for three 1 1/4" eyepieces, one 2" eyepiece and a 2" star diagonal. There is also a meshed pocket in the zippered lid of the carry bag, which would be handy for storing maps, note pads and star charts. A carry handle and shoulder straps are included. The bag is compact at 48x26x16cm.

The tube assembly has a retractable dew cap, a 2" Crayford focuser with focus lock nut, 1 1/4" eyepiece adaptor, connecting points for a finderscope bracket, and a connecting bracket for mounting on a camera tripod.

Inside the tube is an extensive array of light baffles designed to prevent internal reflections and to preserve high contrast. These baffles are contoured to follow the converging light path of the objective lens, and are similar to the baffles machined into the tube assemblies of Astro-Physics refractors.

The focusing mechanism really is a superb piece of work. It is truly robust, beautifully finished and smooth and positive in its movements. The Crayford design allows for a notch free, continuous feel, which will delight visual observers and photographers alike. The whole assembly is rotatable through 360 degrees. Heavy cameras and eyepieces can be rotated independently of the optical tube itself without the need to undo the lock nuts and retaining screws that hold these items in place. Once you get used to this feature you'll wonder what you ever did without it!

There is no slap or play in the focus mechanism. Even heavy CCD cameras should not present a problem. The retaining collar of the focuser and the 1 1/4" adaptor both have a brass ring grip fitted in locating channels. These firmly hold the star diagonal and eyepieces in place without marking them in any way.

With the dew cap retracted the tube measures 380mm in length. It weighs in at 2.4kg.

Optical Tests

Tests were carried out using the following eyepieces: 2" dielectric William Optics star diagonal, 41mm Panoptic, 16mm Nagler II, 7mm Nagler, 30mm Sirius Plössl, 2" Astro-Physics 2x Barlow, and 1 1/4" Celestron Ultima 2x Barlow.

My first look through the Zenith Star 80 was during the day in bright summer sunlight. I checked out the image for sharpness, contrast and secondary spectrum (the purple halo of unfocused light surrounding bright objects in images formed by

Zenith Star 80

An affordable, high-quality 80mm f/6 achromatic refractor.

Price: around \$660

Available from several dealers in Australia (check the ads in this magazine), or contact William Optics via the web at www.william-optics.com

achromatic lenses).

At a magnification of 69x, the image snapped into focus. Contrast was brilliant. The colours of leaves, flowers, and even the number plates on cars a kilometre away, were vividly imaged. As expected there was some colour fringing around bright objects, but it was minimal. So slight was the secondary spectrum that I began to wonder whether this was a semi-apochromatic refractor.

William Optics makes no real performance claims for the Zenith Star 80. They simply describe it as a "Doublet Element Design". They also advise in the instruction manual to limit magnification to 100x. This is a conservative and welcome approach. However, I would rate this as a semi-apochromat, for sure. Views through the 16mm Nagler II during the day rendered a virtually colour-free image at 30x.

At night my first target was an eight-day-old Moon. Using a 7mm Nagler at 69x the view was wonderful. Again the image simply snapped into focus. Crater rims and mountain ranges were razor sharp and their shadows jet black. Looking at the bright lunar limb was a surprise. At this magnification there was very little purple halo at all. In fact it was barely visible. The view had a similar level of colour correction to my old Unitron 75mm crown-and-flint f/16 doublet. This is amazing when you consider the Zenith Star is much faster at f/6. Its colour correction is significantly better than other short-focus achromats that I've seen over the years.

I decided to double the magnification of the 7mm Nagler with the superb Astro-Physics 2x Barlow. At 137x the image was beautiful, crisp, contrasted, and

WHAT WE LIKE:

Excellent Optics

Superb finish and Build quality

Rugged Construction

Compact and truly portable

WHAT WE DON'T LIKE:

Nothing really – the product performs as advertised



Left: A view of the rear of the Zenith Star 80 showing the 2" Crayford focuser and 1.25" reduction fitting.

Right: The objective lens is fully multicoated to enhance image contrast.

AS&T RATINGS

The William Optics Zenith Star 80	
Optical performance:	★ ★ ★ ★
Construction and finish:	★ ★ ★ ★ ★
Overall:	★ ★ ★ ★
★★★★★ Sensibly perfect. No meaningful improvements possible. ★★★★★ Any shortcomings will go unnoticed in normal use. ★★★ Defects noticeable but do not seriously affect performance. ★★ Defects noticeable during normal use – performance compromised. ★ Defects so severe that the equipment is virtually unusable.	
Ratings are intended to convey performance compared with equivalent equipment and should not be used to predict the relative performance of instruments having markedly different specifications.	

Bottom-line summary:
Has the potential to form the heart of an excellent take-anywhere, quick-setup system.

it still had only a hint of secondary spectrum. In my opinion the Zenith Star 80 is the next best thing to a true apochromat.

Next I decided to use the Zenith Star to appreciate one of its real strengths, its wide field of view. With a 41mm Panoptic I could fit all the Belt stars of Orion and very nearly the whole Sword into the same field of view. The Pleiades were spectacularly framed – the principal stars were shown as brilliant bright blue points of light, set among lots of pin-like stars scattered around the field of view.

I replaced the Panoptic with a 11/4" 30mm Sirius Plössl. The view was still impressive. The Pleiades were contained within the field of view, as was the whole of the Sword of Orion.

Initial star tests were carried out at 137x using the 7mm Nagler and 2x Barlow. When viewing Sirius this combination revealed a well defined, round Airy disc with clean first and second diffraction rings. The intense light of Sirius was handled well with no flaring or scattered light. Some secondary spectrum was visible but it was less than expected. Best focus was at a precise point, indicating little or no spherical aberration. There was no astigmatism and collimation was perfect.

Extra focal rings either side of the focus were round and clean. The bright outer annulus was virtually identical in intensity when defocused five wavelengths either side of focus. This very high level of spherical correction was consistent with the sharp images seen in general viewing.



A look underneath the telescope reveals a handy focus locking knob and photo-tripod bracket.

Alpha Crucis was cleanly split with black space separating two round, neatly-defined Airy discs with their first diffraction rings just touching one another.

When Saturn rose high enough for observation the seeing was only average. Yet the Zenith Star 80 produced a lovely clean, crisp image. Saturn was at opposition so there was no shadow of the planet on the rings. Nevertheless the telescope easily defined Saturn's disc against the bright background of the rings. The planet's equatorial cloud belt and the darkening of its pole were clearly seen. The Crepe Ring (Ring C) could be spotted as it passed across the face of the planet. More remarkable was its visibility in the black space that it occupies between Ring B and the disc of Saturn. I'll admit that it is not easy to see at that point, but if you know what it should look like and if you know where to look you will see it through this little refractor.

Also visible was the colour difference between Ring A and Ring B. The Cassini Division came in and out of view with fluctuations in the seeing.

All of this detail was visible at 137x. Remembering that the Zenith Star 80 is sold as an achromatic telescope, even the most critical observer would have to praise its optical performance.

Accessories

A solid array of high-quality accessories is available at extra cost. William Optics can supply them to match the superb optical and mechanical quality and standard of finish of the telescope. These include a 6x30 finder, mounting rings and 2" star diagonal with dielectric mirror (as used for this review). Also available is a 2" erect-image 45° diagonal for terrestrial viewing. This has to be the best erect-image diagonal I have seen. The fact that it accepts wide-field 2" eyepieces makes it a must for those who want truly spectacular views of terrestrial targets.

The Zenith Star 80 would be a superb choice for a spotting scope or a wide-field astronomical telescope. It gives more than adequate views of the planets and the Moon. It is as good in this regard as my f/16 75mm refractor, which was described at the time I bought it as "the most useful and satisfying instrument for the amateur".

The Zenith Star 80 would be a good choice for a first telescope, but a novice would need proper advice on what accessories to buy. Its rugged construction and compact size make it a maintenance-free, go anywhere telescope. Sheer optical and mechanical quality and brilliant finish will ensure pride of ownership for a lifetime. With a price tag of around \$660 it occupies a unique niche in the market place. *

Chris Toohey is a member of the Sutherland and Central West astronomical societies, and has been an amateur astronomer for more years than he'd care to admit.