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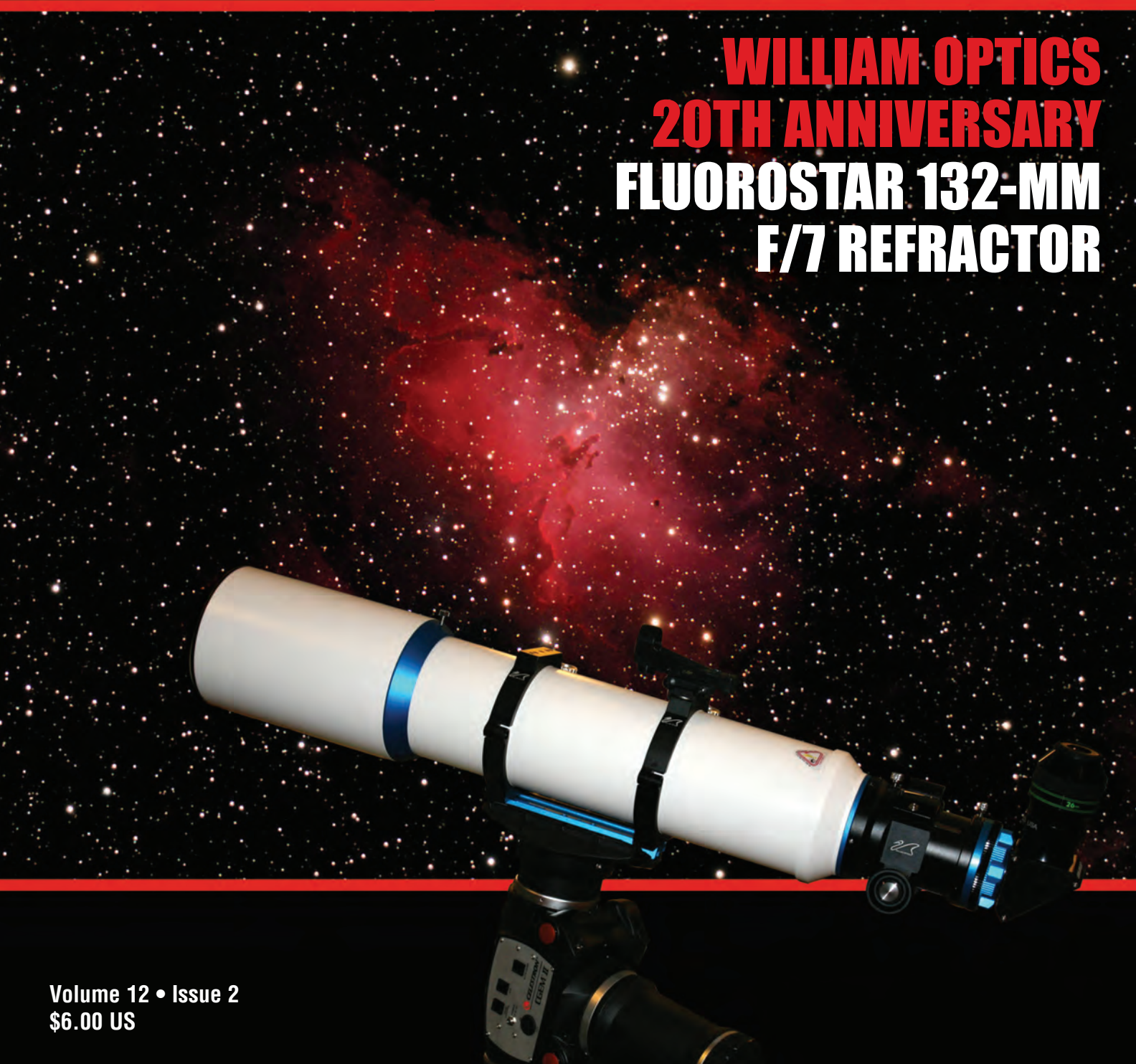
WILLIAM OPTICS 20TH ANNIVERSARY FLUOROSTAR 132-MM F/7 REFRACTOR



Volume 12 • Issue 2
$6.00 US

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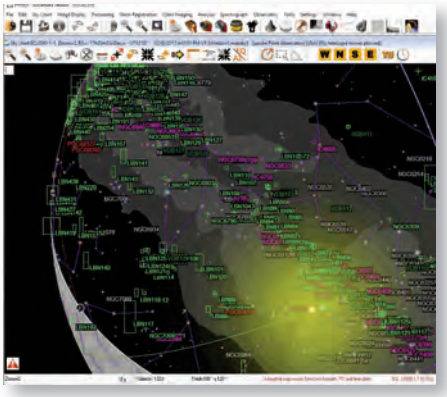
Cover Story: Pages 35-52

Dr. James R. Dire's cover article reports his experiences with William Optics' 20th anniversary-edition 132-mm f/7 Fluorostar, which apochromatic refractor features a triplet objective designed with FPL053 and a capable three-inch V-Power focuser. Dr. Dire combined the telescope with a 0.8x focal reducer, field flattener to capture the background image of the Eagle Negula. Dr. Dire was so impressed with the review sample, he decided to purchase it.

In This Issue



Industry News/New Products

ATT Contributing Writers

Andy Cheng is an unabashed nerd who works in the PC/tech industry, and astronomy fits well into that personality. He is primarily a visual observer, but has fantasies of being an astrophotographer as well. Andy has been a member of the Texas Astronomical Society in Dallas, Texas for the past 7 years. He owns a 16-inch Lightbridge, Borg 101ED refractor, and an Astro-Tech AT66RC, as well as the Hubble Optics UL Dob that is featured in this issue. When weather cooperates, Andy can be found observing from his front yard with his dog Luna.

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. He very recently was named the president of Methodist College in Peoria, Illinois after serving as 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.

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.

Paul Temple is a retired pastor currently teaching Earth and Space Science in high school. His observatory, TRO, features 2 robotic telescopes, an 11" Celestron and an 8" Meade LX200. Paul is a speaker for the American Association of Variable Star Observers and has presented papers at Mid-America Regional Astrophysics Conference, AAVSO Conferences and a Poster at the Kepler Science Conference.

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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WILLIAM OPTICS 20TH ANNIVERSARY

Fluorostar 132-mm f/7 Refractor

By Dr. James R. Dire

It's hard to believe William Optics has been in business for more than 20 years, but they have. So, in 2017, to celebrate two decades of making quality refracting telescopes, William Optics introduced 20th anniversary-edition telescopes. William Optics shipped two of these instruments to me to review: a 61mm ED doublet and a 132mm triplet apo. I will cover the 132-mm refractor (hereafter called the WO132) in this review and the other in a subsequent article.

I have reviewed several refractors over the years, with objectives ranging in size from 70 mm to 150 mm. In general, there is a big increase in performance for every inch of aperture going from three to six inches. This is because each inch greater in size provides a noticeable increase in resolving power and light gathering power. Resolving power increases linearly with objective diameter, while light gathering power increases with the square of the objective diameter.

For high-quality apochromatic refractors, price increases considerably with objective diameter, too. Whereas high-quality four-inch triplet apos range from $1500 to $2500, depending on glass type

Image 1 – The William Optics 20th-Anniversary Fluorostar 132 apo was well packaged for shipping.

Image 2 – The Fluorostar 132 comes with a lightweight but sturdy soft-side case.

Image 3 – With the focuser cranked in all the way and the dew shield completely retracted, the telescope fits compactly inside of the foam-lined case.

Image 4 – The 132mm apo works nicely with a very portable Celestron CGEM II mount.

Image 5 – The pristine triplet objective, designed with FPL-53, and baffled interior provided excellent high contrast and perfect color corrected images.

and other features (focusers, diagonals, tube rings and cases), five-inch triplet apos of matching quality range from $3000 to $4500 in price, depending on the same factors. Six-inch telescopes of comparable quality range in cost from $6000 to $8000. Larger refractors are typically custom made, and the price skyrockets with size.

I classify telescopes in the five-inch range to be those with objective sizes from 120 to 132 mm. With a diameter of 5.2 inches, the WO132 is the largest production telescope in this range. Typical for this type of instrument, the focal ratio is f/7, yielding a 924-mm focal length. Using the thumb rule that the maximum theoretical magnification is 50 times the diameter in inches gives a 260X value. This can be achieved with a 3.6-mm eyepiece.

The WO132 came in a box surrounded by six layers of bubble wrap securely taped onto the box (**Image 1**). UPS handled it quite carefully, as I don't think one bubble was popped. Inside the box was a nicely padded soft carrying case (**Image 2**) containing the telescope (**Image 3**). Some large apos come with standard or optional aluminum cases, but for a telescope this size, the extra weight of those cases may be too heavy and bulky to easily carry. I found this padded case easy to carry, and it offers ample protection for the telescope. The total case weight with telescope is around 30 pounds (13.5 kilograms).

The telescope is beautifully crafted with a pearl-white tube and blue trim (**Image 4**). Previous William Optics telescopes I have reviewed in *ATT* (see Volume 8, Issue 4 and Volume 7, Issue 5) had gold or red trim. I like the new blue accent color the best of all!

The telescope comes with two strong, hinged tube rings, with five holes threaded on the top and bottom of each.

It also comes with a Vixen-style dovetail plate and tube cover, which like other William Optics telescopes matches the trim color. I already owned the William Optics two-inch diagonal and red-dot finder shown with the telescope in Image 4.

Of course, the real beauty of the telescope is not what's on the outside, but what's under the hood. **Image 5** shows the pristine, air-spaced triplet objective lens set. It also shows the flat black tube interior and baffles, which guarantee high-contrast images at the eyepiece end. The objective uses high-quality, extra-low dispersion FPL-53 glass providing perfect color correction.

The optical tube assembly (OTA) has a diameter of 141 mm (5.5 inches), while the dew shield has a diameter of 168 mm (6.6 inches). The fully-extended tube length is 104 cm (41 inches), but with the dew shield retracted, it is only 78 cm long (30.7 inches). The OTA only weighs 19.8 pounds (9 kilograms)!

The WO132 comes with a three-inch, rotating V-Power focuser (**Image 6**). These Taiwan-made focusers are being used on many telescopes made in China and Europe and are in my opinion in the same league as a Starlight Instruments' Feather Touch or JMI focusers. While I did not feel the V-Power turned as smoothly as the Feather Touch or the JMI EV-1 I have on other telescopes, it was close.

The V-Power is a heavy-duty, dual-speed Crayford-style focuser with excellent lifting power. As shown in Image 6, the drawtube is graduated in both English and metric units and extends out four inches (10 cm). Under the weight of one of my 22-ounce eyepieces and a diagonal, or one of my CCD cameras, I could not detect any flex in the focuser. A setscrew on the bottom of the focuser locks the focuser in place.

Image 7 shows another view of the focuser. Note the

Image 6 – The telescopes comes with a three-inch V-Power Crayford focuser. The drawtube can be extended four inches and has graduations in both inches (with 0.0625-inch ticks) and centimeters (with millimeter ticks).

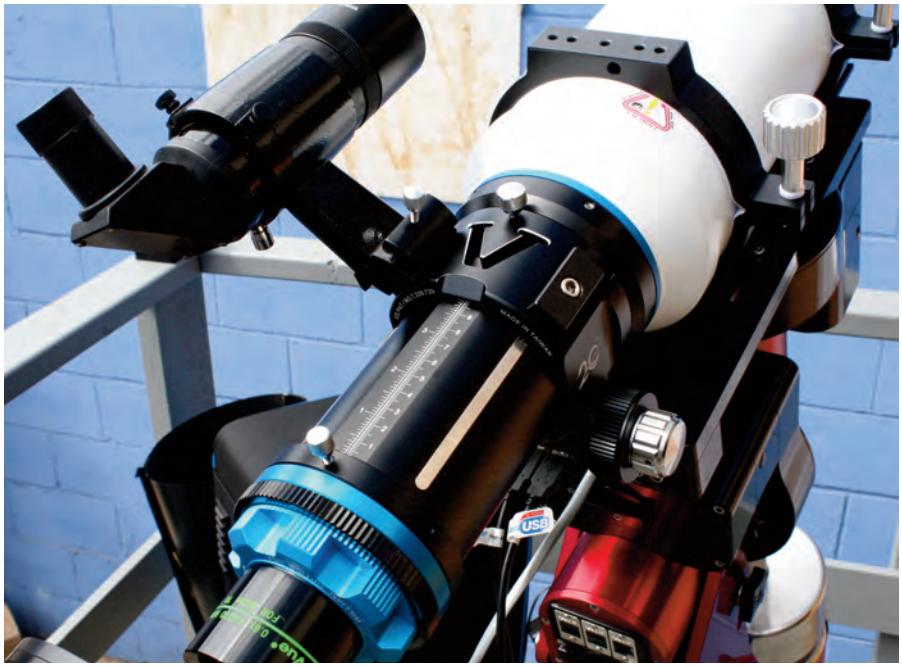

Image 7 – Another view of the focuser showing the two-speed knob on the right side, the finderscope bracket shoe on the left side, and the rotating focuser lock screw above the V. Also note that each tube ring has five tapped holes on the top and bottom for use with many styles of dovetail plates and accessories.

standard shoe for a finderscope bracket, which can be mounted on the top right or left side of the focuser. My Orion 9x50 finderscope fit perfectly in the V-Power shoe.

The heavy duty and lengthy focuser allowed William Optics to make the overall length of the OTA shorter than would be for a shorter drawtube focuser. With the focuser cranked in all the way and the dew shield retracted, the telescope fits into a case approximately the same size as the one I have for my four-inch f/7.9 apo.

Images 6 and 7 show the focused position with my CCD camera when using a 0.8x focal reducer/field flattener (FR/FF). The drawtube is extended almost 3.875 inches (98.4 mm). Likewise, when using the telescope visually, I also had to crank out the focuser nearly all the way for most of my eyepieces to focus. In some cases, with my longer focal length, two-inch Televue Nagler or Ethos eyepieces, there was not enough back focus. Therefore, I have to put these eye-

Image 8 – The author needed to use his 35-mm long extension tube for long focal-length, two-inch eyepieces to achieve enough back focus for use.

pieces in a 35-mm extender (**Image 8**) before placing in the diagonal in order to obtain focus. If William Optics had only made the OTA one inch longer, with the same focuser, I would not need the extender for these eyepieces.

The WO132 uses the William Optics RotoLock Adapter System. The RotoLock holds a camera, diagonal, or other barreled astronomy accessory firmly in place. Once locked in, a diagonal with eyepiece can be moved to a convenient viewing position by rotating the entire focuser. No more fiddling with tiny setscrews in the dark. The V-Power focuser rotates easily and very smoothly without affecting the focus.

I visually tested the WO132 from a magnitude-6 dark-sky site atop my Celestron CGEM II mount. The views were phenomenal. After twilight, both Jupiter and Saturn were high in the sky. I detected no hint of false color with either planet, attesting to the great color correc-

Image 9 – For CCD imaging, the author placed the Fluorostar 132 on a Paramount MyT mount in his club's roll-off roof observatory. The telescope can be ordered with red trim instead of blue for Paramount users who want matching colors.

tion of the telescope. With a 5-mm Nagler eyepiece (185x), Jupiter's belt, zones and the Great Red Spot clearly stood out. Saturn's rings were equally impressive. Not only could I see Saturn's brown-orange moon Titan, but also four smaller moons were visible closer to the rings.

Next, I viewed several star clusters, including my favorites M13 and M22. The stars were much sharper than any other refractor I have ever used. For observing planets and double stars, the telescope will outperform most six- to eight-inch reflectors and probably many larger instruments.

The WO132 was designed for imaging, so I subsequently installed it on my Paramount MyT German equatorial mount in my club's roll-off roof observatory (**Image 9**). This telescope and mount are a perfect match for CCD imaging! My main CCD camera is an SBIG ST-2000XCM. I added a Tele Vue 0.8x FR/FF designed for 800- to 1000-mm focal length refractors. Guiding was done with the CDD camera's internal guide chip.

The first object I imaged was M13 (**Image 10**). The exposure was 30 minutes, and the stars are sharp and pinpoint across the entire frame. Individual stars are resolved all the way to the center of the star cluster. Notice the magnitude 11.3-magnitude galaxy (NGC6209) visible north of the cluster. This galaxy is only 3.5 x 1.6 arcmin in size.

Next, I shot the Trifid Nebula, a/k/a M20 (**Image 11**). This 90-minute exposure captured the brilliant red and blue colors of the nebula. I wanted to shoot M31 next, but my CCD chip is too small to capture the entire galaxy with this telescope. However, it is perfect for galaxy M33 (**Image 12**). With only a one-hour exposure, I was able to capture impressive detail in the spiral arms and myriad red HII gas regions.

The longest exposure I have taken to date with the WO132 was of M16, the Eagle Nebula (**Image 13**). The exposure was two hours. The stars in the cluster, imbedded in the nebula, are jewel-like. Many dark nebulae are found within the nebula, itself awash in red-glowing hydrogen gas.

In conclusion, the performance of the WO132 is excellent, both visually and for CCD imaging. The quality and workmanship are superb. Except for requiring an extender tube for some of my eyepieces, the telescopes met and exceeded all my expectations. I have decided this telescope is going to stay with me for many years! ATT

Image 10 – This 30-minute exposure of Globular Cluster M13 was taken with the Fluorostar 132 and an SBIG ST-2000XCM single-shot color CCD camera.

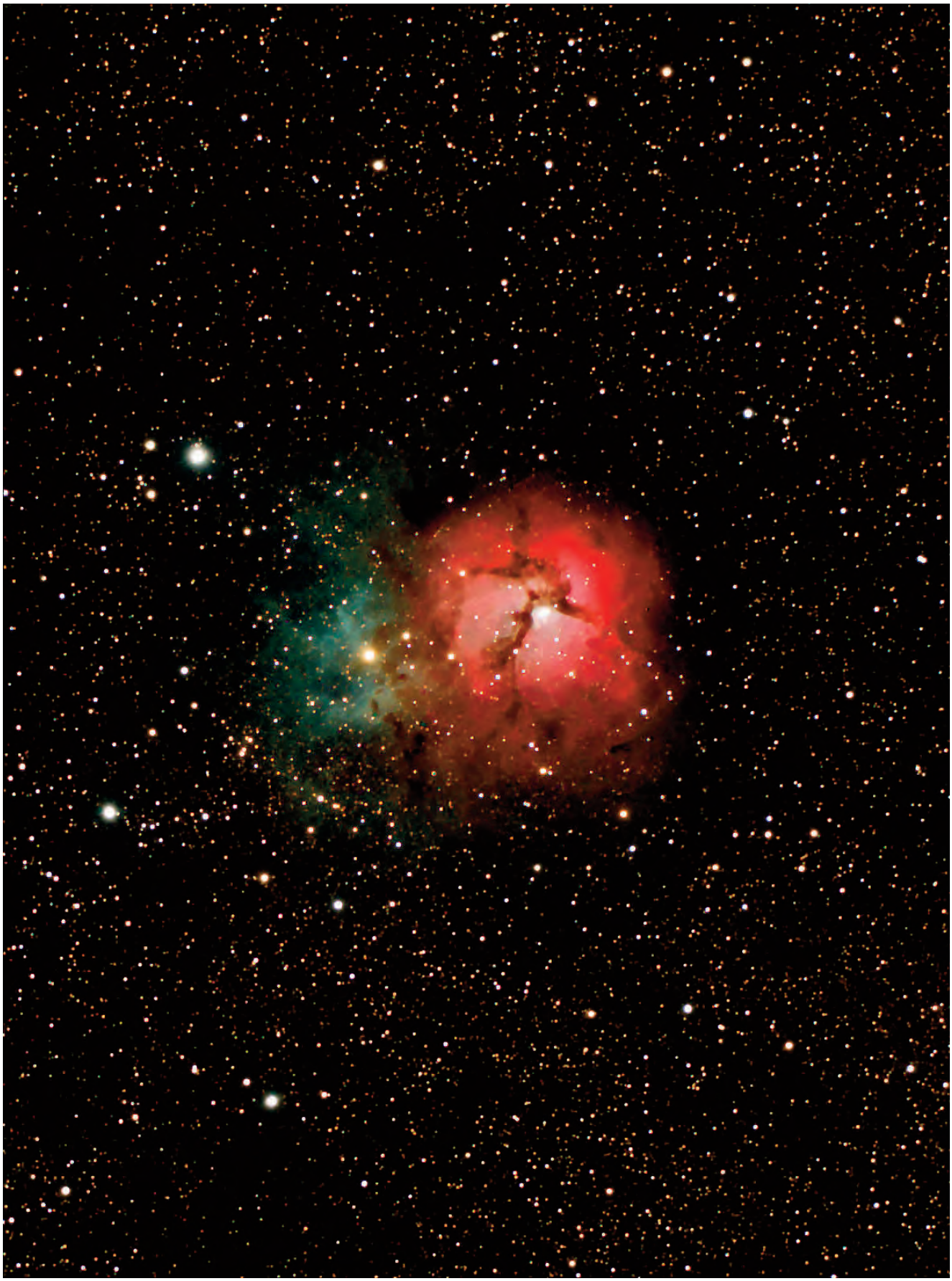

Image 11 – The author captured this colorful image of the Trifid Nebula, M20, with a 90-minute exposure.

Image 12 – A mere one-hour exposure shows significant detail in the Pinwheel Galaxy, M33.

Image 13 – As with the other three CCD images, the Eagle Nebula is captured beautifully with the Fluorostar 132, a 0.8x focal reducer/field flattener, and the author's CCD camera.