

Uncle Rod Ain't Exactly a Refractor Kind of Guy—But...

The William Optics Megrez Fluorite 80

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It's been a wild six months down here, y'all. "The winds have changed" for Uncle Rod and the denizens of Chaos Manor South, that's for sure. Katrina boiled-up out of our beloved Gulf of Mexico, and left heartbreak in her wake. I don't have to tell you that our astronomical activities were basically shut down for a couple of months, with cleanup, both at work and at home, occupying all our attention.

Miss Dorothy and I did make the Deep South Regional Star Gaze (hosted by the hardy amateurs of New Orleans: "ain't gonna wash *us* away") in late October. I think it was very fitting that Deep South was held in Louisiana this year. We got down to Chiefland (the Chiefland Star Party, that is, under the dark skies of central Florida) too, which was therapeutic—being in an area where we didn't have to look at downed trees and "blue roofs" was great. Never heard of a "blue roof"? While waiting to get your roof repaired you cover the holes with blue plastic tarps from FEMA. Anyway, two great star parties, but then it was back to the work of helping put things back in order. Life *is* finally beginning to get back to some semblance of normalcy in Mobile—if not on the Mississippi Gulf Coast where I work, or, for sure, down in New Orleans.

The astronomy side of life *is* getting back in the groove. Oh, you know, things ain't *quite* what they used to be. *Sky and Telescope* and *Astronomy Magazine* mysteriously appear in the front hall, sometimes months after their cover dates. First class mail goes awry too. About the only thing the Postman seems able to deliver with regularity in the post Katrina environment is junk mail. Luckily, however, UPS, FedEx, and the other freight companies don't seem to have been as badly affected as the good old USPS. Packages containing astro-goodies are beginning to flow into these vaunted halls again, anyway, including one big box that came all the way from China. A box filled with *refractors*.

Yeah, just when we thought things couldn't any weirder, the CATs are pushed into the background, and the lens-scopes are taking center stage. When I've mentioned to my SCT-wielding compadres that I've been evaluating some fancy refractors, you'd a-thought I'd said some bad words. No, I've never been one for fancy-dan lens-scopes. I'll admit I did want (mightily) a Unitron Four Inch Photoequatorial back in *the day*, but I outgrew *that* notion. Sure, I own a Synta Short Tube 80, but who doesn't? And that's as far as it's gone till now.

But don't think I had a prejudiced thought in my little noggin as I lugged that big box into the front hall. "Like a kid at Christmas" was more like it. I approached this review with an open *but skeptical* mind. No, I'm not prejudiced against

refractors, but I've still done some extensive head-scratchin' when I've seen folks getting all worked up over AP or TV APOs. Just seems a mite silly to me. Aperture is the thing, right? Why settle for three, four, five, or six inches—no matter how finely made those inches are—when you can have eight, eleven, fourteen, or sixteen? Aperture wins.

Oh, I know what you're thinking: "*But Uncle Rod, why don't we see you totin' around a twenty-five-inch dob, then?*" Well, *all things being equal*, aperture wins. But all things are seldom equal. Having an accurate drive and goto in a portable package makes an eleven more than competitive with a twenty-five in my not so humble opinion. But a three-inch refractor? Until recently, I'd have said that that's where I draw the line. After testing the remarkable Megrez Fluorite 80, though, I'm beginning to wonder whether I was wrong all along. Don't tell anybody I said so, but those refractor nuts may be right about a *few* things.

Anyhoo, it's been a depressing winter, and this three-inch APO was just the kind of distraction I needed. No, there wasn't a 16-inch RCX in the box, but, heck, since this little refractor had traveled all the way from Taiwan to Possum Swamp, it deserved at least a *little* of my attention and consideration.

AS USUAL, I'm gettin' ahead of the blamed story. This saga actually begins quite a ways back, just after The Storm in September of 2005. The folk at *William Optics* contacted me via good buddy Ray York at Anacortes to see if I might review a couple of their refractors. Gentleman Ray gently dissuaded Daniel at WO, telling him that I (and Miss Dorothy) had a *few* other things to occupy our minds and time for a while without adding evaluating scopes to the mix. But things did get better, and I gave WO the "we are go" signal this past February; thus the big box.

I don't know how much y'all know about William Optics. I knew a little. Primarily, I knew they were producing some really great SCT and refractor diagonals for very reasonable prices. I'd used a few and was impressed by their build quality. I'd also tested one of their SCT Crayford focusers a long time back and been pretty impressed with that as well. What I was *not* aware of was that William Optics is now well on its way to becoming a major player in the astro-gear game, moving from being a small maker of accessories to being a major vendor of quality telescopes—think "Vixen," *not* Synta. I *had* heard about a "Short Tube 80 killer," the company had been producing for a while, the Megrez, an achromat, and was aware people liked it. Another thing I didn't know, though, was that the company's product line has mushroomed to include world-class (I was told) APO refractors, and eyepieces, too. Eyepieces competitive with what's being done by TV, Meade, and Pentax (or so I'd heard)—but for less money.

So what all was in that big cardboard box? Well, first, there was the star of the show: WO's "Megrez FL 80" (fluorite). Accompanying the Megrez was her little sister, the Zenithstar 66 SD APO. Way down in the bottom, revealed when your Ol' Unk dived head first into the box, scattering packing material around the livin'

room like a crazed two-year-old splashing in a wading pool, were three of WO's new widefield oculars, the Uwan 28, 16, and 7. Whooo-hooo....astro junk (er, "stuff;" as we'll discuss shortly, these WO scopes and eyepieces didn't *look anything* like "junk")!

I don't believe in stringin' y'all along—well, maybe a little bit—so I'll say it right now: this equipment is world-class both in appearance and performance, easily competitive with anything on the market in its price range. Based on the obvious care and devotion to quality I saw in this gear, I'm of the opinion that, yes, WO is on its way to being a big player in amateur astronomy. Because of that, I'm not about to attempt to describe, discuss, and test all this stuff in one measly review. This will be the first of a three-parter, beginning with the Megrez FL 80 and continuing with the eyepieces and the little 66mm scope. Here we go, then.



The first thing I've got to say about the Megrez FL (hereafter just referred to as the Megrez)? Just how *pretty* this little (but not light; this f/6.9 "short tube" weighs in at a surprising 6.2 pounds) thing is. Her white tube is a beautifully finished satin white, and her focuser, dew shield, and (striking) gold trim are just, well, SEXY. So much so that I couldn't resist pulling her out of her case. This case is a very nice aluminum affair, rugged with good die-cut foam. With the nicely machined collapsible dew shield extended, the scope measures 18 ½ inches. With dew shield collapsed, however, the whole tube is just 15 ½ inches long, fitting handily into the 18 inch long by 11 inch wide case by 6 ½ inch deep case,

which should easily go into an overhead bin or even under an airline seat for travel to exotic observing locales. I was impressed, yes, and was soon running upstairs to show the new scope off to Miss D., hollering: “Honey, look what the UPS just brought! *Ain’t she cute?*” God knows *what* Dorothy thought I was up to.

But a purty face ain’t everything—leastways that’s what I’ve always been told, though I’ve always ignored that advice—how well made did the scope seem mechanically? Let’s start with the focuser. This is a Crayford, and has a feel similar to that of the WO SCT Crayford I’d reviewed some time ago. Well, sorta, the earlier focuser seemed hard to adjust, and wanted to slip if not carefully tensioned. Not this one. It was easy to adjust via a nice, large knurled setscrew, and never slipped. “Never” as in, “Not ever,” not even with a great big 31 Nagler in place.



In addition to adjustments for focuser feel/tension, one clever feature is the ability to rotate the focuser 360 degrees for comfortable viewing positions (or to adjust a camera’s view). At first I thought this was just a fillip. Why not just loosen the diagonal and rotate that for different viewing angles? It turns out this is a good safety feature. I’ve been known to loosen a diagonal a wee bit too much with a heavy Nagler inserted, and almost drop a 400 buck eyepiece to the ground—not a good outcome. Rotating the whole focuser means the eyepiece stays secure. Despite what’s been reported by some other reviewers, I didn’t find that

tightening down the rotation locking setscrew “too hard” left indentations that would have made focuser rotation unsmooth.

Focus shift? You gotta be kiddin’. This focuser is as far from a Synta glue-grease special as it gets. *Smooth, bubba, smooth*. The knobs make focusing a joy, and not just because of their generous but not too-big size. This ain’t *just* a Cryford, you see, but a *two-speed* Cryford. That’s right. There’s a smaller knob centered on the right-side large focus knob. This imparts 1:10 reduction, and, in addition to delivering a wonderfully smooth feel to the focus action, it’s genuinely useful. One thing that’s always bugged me about shorter focal ratio scopes (hey, I’m an f/10 kinda guy, remember), is the shallow depth of focus: “*Almost there...there she is...WHOOOPS...back up*” and so on. The precision offered by the fine focuser (in both senses of that term) means that I feel like I have real *control* over the focusing process, that I can get the scope to dead-on in focus at very low powers, very high powers, and everything in-between.

The tube? Looks nice. But it’s what’s inside—inside the objective cell, that is--that counts. That’s the important thing, ain’t it? For those of you not entirely up to speed on modern refractors, this is an “APO,” an apochromat. Unlike achromats like the Synta Short Tube 80, APOs, like the Megrez are virtually color free. What that means to you is that the Moon, Venus, Mars, Jupiter, Saturn, and bright stars lose the annoying purple fringe/halo that surrounds any bright object viewed with an achromat. If you’re an imager, the improvement is even more dramatic and important. Looking at an image taken by the Megrez, you’ll immediately notice the difference. Stars are much smaller (and unfringed if you’re shooting color). Some nice wide field shots *are* possible with a short tube achromat, but they are always going to be compromised by this excess color—chromatic aberration.

Just how does this f/7 refractor do away with all that nasty color? Don’t ask me for technical details. I’ll leave those to optical gurus like Tom Back, who, incidentally, designed the objective for this scope. Suffice to say, the objective contains a fluorite element that sends the color purple straight to perdition where it belongs. These lens elements are contained in a CNC machined lens cell, and are “fully multicoated” with what WO refers to as “super-high transmission coatings.” Be that as it may, they show off a lovely mild green color in oblique light. Looking down the front of the tube, the objective didn’t quite seem to disappear as I’ve seen with some top-of-the-line APOs, but the coatings appeared to work well vis-à-vis image brightness, and I didn’t notice much in the way of light scatter or reflections even on bright objects.



Scattered light is further suppressed by a fully baffled tube—this one includes seven separate baffles. OK, but. Baffling is good, sure, but manufacturers, in their quest to suppress stray light sometimes go too far. All too many of the small refractors I've tested have their apertures stepped-down by too-aggressive baffles (too large, that is). With the considerable sum you're paying for every millimeter of APO aperture, you darn sure don't want to be shortchanged. I'm pleased to be able to report that this is one small refractor that appears to deliver every bit of its quoted aperture.

Aiding the baffles is a good coating of flat black paint on the tube interior. Unlike what you'll find in some mass produced scopes, the paint really was FLAT and BLACK and its matte texture appeared to be more than sufficient to help suppress reflections.

And all of this stuff is well and good. Yes, this is a beautiful telescope. There's no plastic, all metal. Nice carrying case. Yadda, yadda, yadda. *But how is it?* How well does it deliver on its potential? That's always the question. The Megrez looked every inch the lady in the living room. But would she be a tiger on the observing field? I intended to find out. Doing so, however, required me to pass two hurdles. The first was what amateurs have come to call "The New Scope Curse." You know...the instant a new scope enters the house, the sky clouds over. Superstition you say? All I know is that after the Megrez arrived, we were treated to a week of foul, cloudy weather.

When things improved weather-wise, I had one more challenge to face before I could actually use this cute scope: how to mount it? Like most top-of-the-line refractors, the Megrez is sold as an optical tube only. You furnish the mounting. Luckily, we had a couple of EQ4 German equatorial mounts in the house which would provide a steady perch for the M80. Actually, I chose to mount the scope on Celestron's goto version of the Synta EQ4, the CG5. I wanted to view a lot of stuff, maybe even take some pictures, and having a driven goto mount would save a lot of time.

But how to get the Megrez onto the CG5? Like WO's other recent scopes, the Megrez is equipped with an "L" shaped mounting bracket. I'd requested the WO folks ship the scope with Vixen compatible tube rings, and I assumed the "L" bracket was that. It was. Sort of. The bracket is the correct width to fit the CG5's Vixen-style saddle. But there are a couple of big, BIG caveats. The first is that the bracket is rather short to provide a secure and adjustable interface to the mount. More problematical is that the bracket's sides are straight rather than tapered like a normal Vixen style bracket. I assumed the "L" bracket would be *good enough* if I tightened down the mount's dovetail setscrews, though. Gosh, was I wrong. Mounted the scope, cranked the setscrews down as tight as I could, began the alignment, and, just as the CG5 began slewing to the first star, the Megrez fell off the mount!

Talk about heart-stopping! I was alert enough that I managed to break the scope's fall if not catch it. Despite acquiring a nice black and blue bruise on my forearm, I was not able to prevent the scope's front end (luckily I had the dew shield extended) from hitting the floor with a good, loud THUNK. I was almost afraid to look, but other than some marring of the dew shield (which may now not be quite a beautifully round as it was before the Fall), there was no damage. Heck, a collimation check revealed that the scope's alignment was still perfect.

Despite scaring a few of your Old Uncle's remaining nine lives out of him, this accident, if nothing else, proved how well-made and sturdy this little sucker is. In the interests of safety, however, I rigged a short Vixen dovetail to the "L" bracket. I'm told that the most recent WO scopes are equipped with tapered brackets which should hold the scope more securely on a Vixen compatible mount. Oh, by the way, the bracket also features a couple of $\frac{1}{4}20$ holes that would allow you to use the scope on a standard video/camera tripod. Keep in mind, though, that this is a heavy scope, and that you'll need a very heavy duty photo tripod if you go that route.

With all the alarms and excursions over, I got the scope—which was rock-solid on the CG5--pointed at the sky. All my testing was done, by the way, with Nagler and Panoptic eyepieces in the interests of giving the Megrez the best chance to show-off its ultimate potential. The two oculars I used the most were a 22mm Panoptic and a 12mm Nagler Type 2. While I occasionally put a 27 Pan in play, the substantially light-polluted skies visible from Chaos Manor South's backyard meant really low powers were problematical. Even the 23X (approximately)

delivered by the 22 often yielded a too-bright sky background. Naturally, from a dark location, a scope of this focal length can deliver all that wonderful wide field you lust after. Oh, one common gotcha with refractors is arranging things so you can come to focus with both 1.25-inch and 2-inch diagonals and eyepieces. How did I manage my collection of 2-inch and 1.25-inch eyepieces with this scope?

The easiest way is via a 2-inch diagonal and the included 2-inch “extender tube.” With the extender in place to lengthen the Megrez’s focus tube, all the eyepieces I tried, both 2 inch and 1.25-inch, came to focus in my 2-inch diagonal with plenty of travel to spare. I experimented with a 1.25-inch diagonal, but it appeared that I’d need a longer extension tube to allow eyepieces to reach focus in that configuration. When taking pictures, you’ll probably need to remove the extension tube and attach the camera directly to the focuser. The extension tube and the focuser and the included 1.25-inch adapter are all equipped with brass compression rings to hold heavy eyepieces and cameras securely in place.



What about a finder scope? The picture doesn't show one. Does this low power refractor even *need* a finder? The Megrez OTA I received did not include a finder of any kind, and initially I thought that using the scope on my goto mount would pretty much eliminate the need for one. With a 35mm eyepiece, I could get the scope down to 16X. Who needs a finder at that magnification? Me. Though I only needed to sight three initial goto alignment stars, I found that I sorely missed a finder. Even at 16X, I it was annoyingly difficult to get targets into the eyepiece

(with a fairly short tripod on the GEM, I was on my knees contorting my body much of the time while trying to zero-in on those pesky stars). I finally got used to sighting along the tube, but that's not a good long-term solution. WO offers several finder options, including a red-dot "BB gun" style sight. Do yourself a favor and order one with the scope.

First target? M42 was riding high, but this was a refractor. An APO refractor. As much as I longed to see the expanse of The Great Nebula I knew this short focal length scope could deliver, I pointed it at Rigel first. *The question was color*, or the lack of it. I'm pleased to say that the Megrez passed this first test with <ahem> "flying colors. Color is very well controlled in this scope. That's as it should be with a fluorite element and an f/7 focal ratio, but I've heard so many questionable claims of "color free refractor" over the years, that it was wonderful to see a scope that actually delivered. Rigel and Regulus were dead white (Sirius was behind a tree). I mean no color fringes whatsoever in focus with the star centered in the field. I *thought* that when I defocused I could detect a very faint tinge of green, but it was quite subtle. Was there any in-focus color at all? When I positioned the star well off axis, I thought I could occasionally note the faintest tinge of violet with, but this was very subtle indeed. I was never really sure whether what I was seeing was the scope or the eyepiece.

OK so far. But how would the Megrez do on Saturn? Although refractors are often thought of as "planetary scopes," a planet can be a huge challenge for them. Even Saturn is bright enough to bring out plenty of color in chromatically-challenged scopes. And at three inches in aperture, a small short focal length scope like the Megrez really has to deliver on high-magnification-handling, contrast, and resolution if there's to be any hope of seeing much detail.

All it took with this scope was one glance at Saturn to reassure me about color. The planet was completely colorless as far as the violet goes. The actual color of Saturn seemed very "true." The disk was a cream color, while the rings appeared to have more of a subtle bluish-gray tint.

How much power will the Megrez II take on a planet? I ran it up to 200x with barlows and short focal length eyepieces, and was rewarded with a nice view of not only Cassini's division, but very contrasty-looking cloud features on the disk. While 200X is about at the oft-quoted magnification "limit" for a three inch, I thought I could have gone even higher under good seeing conditions. Actually, the limitation didn't seem to be the optics, but the physics of producing high powers with such a small-aperture telescope. Even at f/7 with an 80mm, it's hard to produce really large magnifications. High power Barlows are *de rigueur*, floaters in your eyes become annoying at such small exit pupils, and stars begin to look bloated due to the size of an 80's Airy disks.

While Saturn (or any planet) is, in my opinion, the best test of optical quality, I did attempt a star test despite the less than good seeing conditions. With diffraction rings dancing all over the place, it was hard to be exactly sure what was going on, but the outer diffraction rings—from what I could tell--looked very similar on

both sides of focus, indicating good correction for spherical aberration. Despite the scope's tumble, as mentioned earlier, collimation was spot on.

Being able to use high powers with what is essentially a wide-field short tube is handy and impressive, but, hey, let's face it. That's not what this scope is for. What most people will want it for is to open up those wide, wide vistas of deep space. And, strangely, many of these wide field fans will be more concerned with what stars at the edge of the field look like than how those in the center of the field appear. A flat, wide field is really the holy grail of deep sky refractor users. I'm pleased to report, then, that the edge of field quality of the Megrez Fluorite is pretty impressive. Using high quality eyepieces--Naglers, Pentaxes, Panoptics, and UWANs (more on those soon)--stars at the edge of the field, if not quite the tiny pinpoints found at the field center, were decently small. Certainly, they were not the "seagulls" of a Short Tube 80. I'd rate star quality as "excellent" out to about 80% of the field width. I wish I could invite y'all over for a look through the Megrez, but Miss D. might get a little finicky with hordes of gear-hungry amateurs descending en masse on the ol' manse. So I'll do the next best thing, and show you a picture.



The image in of the Horsehead Nebula was taken with an SBIG ST2000. While I'll admit that its chip is not huge in today's terms, I think it takes in enough field to show that the Megrez does a pretty good job edge-wise. If ol' Horsey looks a little ragged, don't blame the scope, blame somebody—me—who's still tryin' to

figure out just how you take a picture with one of these gull-derned new-fangled CCD cameras (for one thing, I forgot to use an IR blocking filter, which would have kept the stars smaller).

So I liked this little bitty refractor. Are there any pitfalls involved in small-APOdom? And gotchas? Any “darned-I-shoulda-knoweds”? Maybe. You will be pleased to hear, though, that for once price is *not* one of these. Yep, small APOs are known for their astronomical prices. That is not me trying to be funny in my down-home fashion, either. Several makers’ 80mm class APOs go for as much as *three thousand dollars*. That’s right, gang, *a thousand dollars an inch*. A finely made three-inch refractor has multitudes of uses from imaging, to wide field viewing, to guiding at high power, but these—you’ll pardon me—*crazy* prices are one of the big reasons I’ve been a small-apo-fence-sitter. In this regard, the Megrez II fluorite is a tremendous breakthrough. It sells, you see, for 898 US\$. Yes, that’s still a fair amount for a three-inch, even in today’s inflated bucks, but considering the scope’s usefulness, I think it’s doable—considerable, anyway—for many amateurs.

But, yes, there is one gotcha. Despite the fineness of the Megrez Fluorite, I found myself occasionally feeling a little *let down*. I wasn’t sure why. Optics? Great. Build quality? Amazing for the price. What? Then it hit me. This small scope is so well-made that I tended to forget that it is “just” an 80mm. That’s it, you see: an 80 is an 80 is an 80 no matter how well made. Instead of expecting the Megrez to do the impossible, I needed to remember that there’s no violating those stern ol’ laws of physics. A little cold water in the face would probably be a good thing. How about a shootout between Miss Megrez and my Meade ETX125?

The ETX costs just a little more than the Megrez, but is blessed with two extra inches of aperture—and an included goto fork mount. No, the Meade is not heirloom quality build-wise, but I wasn’t interested in that. What I wanted to know was how the images offered by a mass produced Ford/Chevy/Dodge of an MCT would fare against those of this Porsche of a refractor. It didn’t take long to find out. The Megrez’s images—of both planets and deep sky objects--were inferior to those yielded by the ETX125 in terms of resolution and detail, which is just what I’d expected. M15, for example, gave up a star or three to the ETX at high power. At all magnifications it was just a round fuzzball in the Megrez. Two inches of extra aperture were just too much for the little 80 to keep up with.

But...this “shootout” was comparing apples to oranges to some extent. The ETX125 is a long focal length narrow-field instrument, the 80 just the opposite. For what it was designed to do: produce stunning wide field views and images, the Megrez left the Meade *in the dust*. The bottom line is that the Megrez produced images as beautiful as I’ve ever seen in any 80mm scope of *any* design. It’s just important for the new owner to realize that this scope is not a miracle worker. Enjoy it for what it can do well, but realize that there will be many times when three inches will not be enough.

What mattered *to me* was that the Megrez Fluorite 80mm was well made and capable of doing several things well. It appealed *to me*, given the types of observing I do. I'd find this telescope constantly useful, and don't mind saying that for this level of quality and usability I consider the Megrez a bargain.

Addendum: The Megrez II Fluorite Doublet is currently available, but I note that it is referred to as a "Special Edition." That leads me to believe that it may not be around forever. If you want one (and you should), I advise you to get off the fence I sat on for so long and offer up your credit card to the good folk at Anacortes. If you somehow miss out, William Optics is also selling a similarly configured "Zenithstar Anniversary Edition" with a red tube (not as pretty as the Megrez Fluorite's nice white one if you ask me) for a similar price.

Megrez 80 Fluorite

The Bullets:

- Excellent Optics
- Impressive and beautiful build quality.
- Smooth two-speed focuser.
- Reasonable price.
- Good imaging potential.
- Limited aperture.
- "Dangerous" mounting bracket.

