The Meade Series 5000 4.7mm UWA with comparisons to the 5mm Nagler Type 6

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The 5mm focal length is one of my most heavily used in my 10" f/5 Teleport for lunar and planetary viewing as well as for viewing globular clusters at high magnification. Since these are my main observing interests, I was very interested to try the new 4.7mm Meade Series 5000 Ultrawide, especially since its eye relief was listed at 13.6mm. I have used a 5mm Nagler Type 6 almost since its introduction and have sometimes wished for just one or two more millimeters of eye relief. The 5mm Nagler Type 6 is quite a good all-around eyepiece, good enough for me that it was able to supplant one of my all time favorites, the 5.2mm Pentax XL, so I knew the bar was set high for the Meade. Let's see how it fares.

Physical Examination

The new Meade eyepiece has an attractive cosmetic design. The adjustable rubber eyeguard extends easily, probably too easily, and it fits into my eye socket fairly well, although its squared-off shape at top is not exactly comfortable. Also, the mechanism employs grease to facilitate smooth motion. I would have preferred neither the grease nor the smooth motion. The rubber eyeguard is not round, rather a slightly triangular "pinched" shape. It may be just an artistic flair or an innovation to make the eyepiece easier to grip. This focal length is small enough that getting a grip on the eyepiece is not an issue, but it may be a useful innovation on the larger, heavier models (or maybe not—you tell me).

On the other hand, the plain rubber eyeguard on the Nagler is quite ordinary and not adjustable at all except for the possibility of folding it back for use with glasses. The stylish new Meade makes the still relatively new Type 6 Nagler look a little, well, old fashioned. I point this out as a reviewer. Personally, I am completely utilitarian about the casing design. If anything, the lack of a moving eyeguard makes the Type 6 feel more solid, and in practice the eye relief is not long enough to take very much advantage of the adjustable eyeguard on the Meade, anyway. With both eyepieces I find it necessary to use a shroud or to shield my eye with my hand to block any troublesome ambient light. Even with the Meade eyeguard extended and pressed into my eye socket, it is marginally effective for me due to a gap between the eyeguard and my face at the corner of my eye. Your mileage may vary with different bone structure.

Curiously, both eyepieces suffer from the slight design flaw of exposing a metal ring that is about even with the fully retracted eyeguards. With both eyepieces it is possible to touch this metal surface with an eyeglass lens, possibly scratching the lens of the eyeglasses. The continuous range of adjustment on the Meade eyeguard mitigates this, but unfortunately, and despite the published specifications, the Meade seems to have slightly less eye relief. It is not greatly different, and probably within a millimeter or so of the Nagler's, but it feels tighter, and one needs the eyeguard fully retracted in either case to have a chance of seeing the entire 82 degrees with glasses on. Doing so requires that my thin eyeglasses be pressed to the fully retracted eyeguard. This was a significant disappointment to me. Both are comfortable without glasses. Although some people have complained of getting eyelash oil on the Type 6 Naglers, this happens for me only when I accidentally allow my eye to get too close to the lens.

The coatings on the Meade look quite good, almost as good as the coatings on the Nagler and probably within a normal range of variation for being of the same efficiency. Figures 1 and 2 show that when looking straight on there is no significant difference in reflectivity.

As long as we are examining the coatings, I suppose it is my duty to nitpick a little. Figure 3 shows a coating flaw as seen on the field lens surface of the Meade. It does not resemble a sleek or scratch from mishandling, rather a defect in the coating application, possibly from inadequate cleaning of the lens prior to the application of coatings. To be fair, Tele Vue replaced my first 5mm Nagler Type 6 due to a defect that apparently had slipped through QC, so whichever eyepiece you might buy, it is always a good idea to give it a thorough examination.

Figure 1: Eye lens coatings.

Figure 2: Field lens coatings.

Blackening looks very good. No obvious reflective surfaces were seen in the eyepiece initially, except for a very thin circle around the exit pupil in the Meade. Some dust was seen in the Meade when looking through the eyepiece, but it was a simple matter to unscrew the barrel and blow out this dust with puffs of clean air from a plastic air pump.

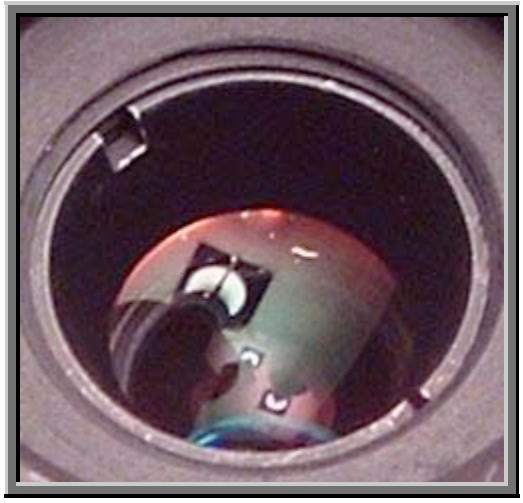

Figure 3: A coating flaw on the Meade field lens at 1 o'clock.

Performance Testing

Performance testing was carried out on my 10" f/5 Teleport, a superb Newtonian. Further tests were performed using my other Newtonians, which are slower in focal ratio. Fortunately, the results are considerably simplified by noting the very good optical performance of both eyepieces in the 10" f/5. Neither eyepiece exhibited measurable field curvature or notable loss of sharpness across the field. Naturally the edge was not as sharp as the center, but sharpness was comparable between the two on a degree-for-degree basis and among the best I have seen. In the slower scopes both eyepieces performed in similar fashion.

Lateral color was present in both eyepieces to about the same degree anywhere in the field, although it took on a slightly different appearance. In the Nagler the lateral color seemed more yellow on the one side and purple on the other side of a bright object, whereas the Meade showed a more greenish fringe on the one side and violet on the other. I did not prefer one over the other on this account.

Rectilinear distortion was not obtrusive in either eyepiece while panning, but it just slightly less in the Meade, and a slight edge in keeping visible angular magnification distortion low goes to the Meade as well. Jupiter appears to stretch slightly at the edge of the Nagler's field while no shape change is apparent in the Meade. Drift testing revealed that the true field of the Meade is actually slightly greater than one would expect from a 4.7mm eyepiece with an 82 degree apparent field, probably indicating a small amount of barrel distortion.

I found the exit pupil a little touchier on the Meade. In other words, I had a little harder time finding and holding the optimal eye position to take in the entire view without getting an occasional blackout. I think the Nagler's exit pupil is better formed (less spherical aberration of the exit pupil), but of course the Meade's exit pupil was slightly smaller, and it could just be that I am used to the Nagler. I remember with my first Type 6 Nagler that

there was a little bit of "learning curve" as I trained myself to position my eye properly for them. Mostly this is about finding the proper distance.

Both eyepieces performed well in an examination of Jupiter's disk with no apparent internal reflections. External reflections (which I always see with long eye relief oculars) were observed in both eyepieces to a similar degree. No difference in resolving ability was observed with a close examination of the lunar terminator. Both eyepieces were delightfully sharp across the field, albeit with some lateral color near the edges as previously noted.

In testing the baffling however, a significant difference was easily seen. Before proceeding, I should note in fairness that the Type 6 Naglers are not the best-baffled eyepieces I have ever seen. When I first got them I suddenly found it necessary to install the extension light shield on the cage of my Newtonian due to an intrusion of ambient light directly into the eyepiece field lens. Fortunately, the problem was completely corrected for my by the light shield, which simply denies ambient light a direct path into the eyepiece. Strictly speaking, the problem was not the eyepiece's fault, but we do want our eyepieces to be as forgiving as possible.

The problem is worse in the Meade, however, and not so easily solved. When a bright object like Jupiter was panned into the view, a glowing area over most of the field telegraphed its arrival. Closer inspection revealed the cause. Light was reflecting off the inside surface of the retaining ring of the field doublet and possibly to a lesser extent off other internal casing surfaces near the field group. The retaining ring is quite tall, as seen in Figures 3 and 5. Although it is finished in flat black, any smooth flat black finish is susceptible to bright reflections at shallow angles. When painting the truss tubes of my 7" scope with flat black paint, for example, I observed that when looking down them at a shallow angle the flat black surface appeared nearly as shiny and metallic as the unfinished aluminum, just a bit more yellow in color. Although my digital camera does not have manual focus capability, I was able to capture a photograph (Figure 4) that shows the effect of light reflecting off the retaining ring and inner surfaces of the eyepiece.

Figure 4: Nagler exit pupil left, Meade right.

Why is this not also a problem in the Type 6 Nagler? Figures 6 and 7 show the mechanical field end structures of the two eyepieces. Note the nonstandard retaining ring of the Nagler, which makes it quite impossible for reflections off the retaining ring surface to enter the eyepiece. One suspects that this unconventional design might have arisen in order to avoid the very glare problem that is seen in the Meade.

Figure 5: Field lens structure of the Meade.

Figure 6: Field lens structure of the Nagler.

The retaining ring issue is noteworthy, but it does not actually render the Meade useless for planetary observation. I found it objectionable when viewing the lunar terminator since there was a noticeable "washing out" effect due to the abundance of light presented by the moon, and the glare was a distraction in the area off the lunar surface. However, as one would expect, it was not seen when observing Jupiter on-axis. For most planetary targets there might be a slight reduction in contrast due to the background sky glow reflecting off the field lens retaining ring, but overall the performance on Jupiter was very good and not much different from that of the Nagler.

Although both eyepieces serve up quite a lot of magnification in my 10" f/5 for most DSOs, globular clusters benefit greatly from high magnification. If you have never observed a globular like M13 or M3 at over 250x in an 8" or larger telescope, I highly recommend that you try it, especially if you have wide-angle eyepieces like these. I viewed both of these globulars with the eyepieces. The views were close in quality, but I have to give the edge to the Nagler. The slightly shorter focal length should have aided the Meade, but instead I had the impression that it was actually slightly less contrasty. My guess is that the retaining ring, in combination with my suburban sky glow, was to blame.

I did some experiments with flocking and baffling of the field lens of the Meade, on the one hand installing a strip of Protostar flocked paper around the end of the retaining ring and on the other preparing a paper baffle which was just pressed into place. Unfortunately the field lens is not much oversized for an f/5 light cone, so the opportunity for improving its baffling without introducing some vignetting is very limited. Although the glare problem was attenuated somewhat by these measures, it was not eliminated. My suggestion to Meade would be, at a minimum, to shorten the retaining ring and cut anti-reflection threads into its inside surface.

Conclusions

Generally, I was pleasantly surprised with new 4.7mm Series 5000 UWA, especially with its optical design. A coating flaw notwithstanding, it has coatings that appear to be of comparable reflectivity to the Nagler, and it held up in most other ways as well. Both eyepieces are sharp with very low levels of astigmatism at the edge of field at f/5, and both are and free of internal reflections and field curvature. Although lateral color presents itself in slightly different hues, they are comparable in this matter as well.

There were, however, some differentiating points. Although it must be understood that both eyepieces exhibit low levels of distortion for their field sizes, the Meade exhibits less rectilinear and angular magnification distortion. The Nagler, on the other hand, has noticeably more contrast and is free from glare in a properly baffled telescope, while the Meade suffers from the retaining ring glare issue. In addition, the Nagler is, in my opinion, a little more comfortable to use. That is to say, it is easier for me to avoid blackouts with the Nagler, and despite the published eye relief specification for the Meade, the Nagler seems to have slightly better eye relief as well.

Of course the Meade has the new, stylish casing design and a black, velvet-lined box (double-boxed, in fact, or at least this one was). It also has the extending rubber eyeguard. Unfortunately, the retaining ring glare issue leaves me with the impression that the Meade's excellent optical design has not quite reached its potential in its current casing.

At present, I will be staying with the Nagler and recommending it, even at the higher price.

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