Review: Meade Model 165 Altazimuth Refractor

Recently William Vorce, the entrepreneur who runs a Telescope Warehouse, advertised on the internet some 50 mm beginner's altazimuth refractors at $40 each. I like small telescopes, and I am particularly curious about what is available to beginning astronomers -- especially juniors -- these days, so I sent EMail asking what he had. The response was quite interesting -- Vorce had gotten hold of some low-end Meades, models 155 and 165. He evidently got quite a deal, if he could sell them for $40 -- the 155 retails for $100 at Nature Company. He was selling them without the pretty good 25 mm Kellner eyepiece that originally accompanied them -- that would cost another $15 -- instead, he included a selection of 0.965-inch barrel Huygenians.

I had plenty of 0.965-inch bits and pieces, and I had wondered about Meade's entry-level telescopes, so I ordered one. UPS delivered it in two days.

What the carrier brought was a handsome blue-tube model 165. Perhaps Vorce had gotten hold of a lot remaindered because of a color change -- all the small Meades I have seen recently are white. It was well-packed, and had not suffered any damage in shipping. A label identified it as of Taiwan manufacture.

After my experience last year with the terrible Tasco model 301051F, whose non-achromatic objective, plastic parts, and spindly tripod rendered it completely useless as a telescope, even a toy one, I was prepared to dislike the little Meade. But it was not to be that simple. The model 165 is almost good enough. It is very nearly a respectable beginner's refractor, admittedly a small and simple one, but it is built just a little too lightly. Notwithstanding, it has many virtues, and some of them are utterly unexpected in instruments of this size and class. But I am getting ahead of myself. Let me take things from the bottom up...

Tripod:

The lightweight, all-metal tripod on the Meade 165 is almost a big win. It is about 1.2 meters high. Each leg comprises three telescoping metal tubes, the largest about 25 mm diameter. Threaded collars about the tubes lock the extensions in whatever position you like. On my unit, they are not as precisely fitted as one might wish; it took almost all my strength to tighten some of them sufficiently, and yes, I made sure they were not cross-threaded. I tried some white lithium grease to ease up the motion, and that helped a good deal, but I was still having

to use a great deal of force to tighten the fittings, and that was the root of subsequent problems.

At the lower end of the top telescoping sections, a folding three-legged "spider" is permanently attached to the three tubes, to keep the tripod from collapsing, and to add triangulation to the structure. This spider is rigidly built and quite stiff in its own right -- a far better arrangement than the useless chains or wobbly, loss-prone sheet metal eyepiece tray that usually occupies this position. Furthermore, the center of the spider has a hole through it about 1 cm in diameter, which all but begs for a couple of plywood rounds sandwiched above and below the extended spider with a bolt and wing nut, thereby adding damping and rigidity to the structure.

With all legs fully extended and the greased threaded collars tightened down firmly, the tripod is very stiff and rigid. Vibrations are high in frequency, which means that their amplitudes are small, and that they die off rapidly.

Unhappily, the combination of light metal sections for the legs and poorly-fitting threads for the collars that adjust the telescoping sections proved fatal; one threaded section of a leg broke off the second or third time I adjusted it. It wasn't even stripped -- the tube cracked circumferentially. I can probably repair it, with a dowel and some screws, or maybe I will make new legs, or -- simpler still -- mount the tube on a photographer's tripod. The problem might not have occurred if I had not been using the telescope as a portable unit; that is, if I had been leaving the legs extended and not adjusting them. But even so, the threads need a little more material under them, and probably should be fabricated with more precision. Meade's instruction sheet warns against overtightening the legs, but tight enough is already too tight, and that's bad.

I believe the current Meade 155, sold in Nature Company, has a quite different tripod, with wooden legs. Perhaps that one is better.

Altazimuth Mount:
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The mount is an "inverted fork" -- that is, two downward-protruding "tines" are attached to the optical tube assembly, and grip between their free ends a stub shaft that sticks up from the center of the tripod head, wherein it swivels. The stub shaft is plastic, and rotates in azimuth within a press-fit metal collar, about 25 mm diameter, inserted into the metal tripod head; perhaps the metal of the collar makes a better bearing surface than that of the tripod head, or can more

accurately be prepared at the right size. A setscrew through the tripod head, above the collar, bears against the plastic of the stub shaft, as a clutch. The tip of that setscrew was a bit rough, so I gave it a few swipes with a fine-toothed file to improve the clutch action and keep it from tearing up the plastic. Motion in azimuth is sufficiently smooth to operate the telescope at 67x. There was a little bit of hysteresis in that motion, likely due to the whole tripod flexing in rotation about this axis.

The tines of the fork are also plastic. Their mating surface against the stub shaft is perhaps 35 mm diameter. A bolt and wing nut goes through both tines and stub shaft, serving to locate the altitude bearing and adjust the torque required to move it. The feel of the altitude bearing was reasonable, and the torque was precisely adjustable. I sometimes worry about plastic-on-plastic bearings, but this one is easily accessible for lubrication, or to insert sheet teflon, if necessary.

The fork tines do not attach directly to the optical tube assembly, but to a plastic sliding collar which fits about the tube and allows the tube to move back and forth for balance, or to rotate. The collar is actually double -- two concentric collars attached together at one end. At the other end, a setscrew threads through the outer collar, so that its tip bears against the inner one. Turning the screw distorts the inner collar to grip the tube.

The altazimuth mount and tube collar are reasonably constructed, and work well. There are no slow motions, but even so, it is easy to acquire and follow an object by hand. The tube is balanced in altitude for only one position, but it weighs so little that it has no tendency to tilt when it is not supposed to.

Optical Tube Assembly:
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The optical tube assembly is composed of an enameled metal tube with plastic fittings. Objective cell and dewcap are black plastic. There is at least one internal baffle. The objective is not stopped down by any internal part -- the full 50 mm aperture is available without vignetting at the center of the field.

The tailpiece and 24.5 mm (0.965-inch) focuser are black and silver plastic, and will not survive heavy use for long. Yet the focuser worked smoothly, and I think a light-duty unit is reasonable for an inexpensive beginner's telescope. Focuser movement is almost too scant -- the focuser is close to the forward limit of travel when focused for

infinity, with the star diagonal and eyepieces that were provided.

The finder uses very simple optics and is stopped somewhat below the objective diameter -- I'd say it actually has about 15 mm aperture. That's a bit small, but would do for finding things at low magnification. However, there is rather too little substance in the plastic mount for the finder to stay aligned for any length of time. I had better luck squinting along the sides of the tube. I may just trash the finder and add push pins, or something similar, as a simple sight. But even a 15 mm finder is better than nothing, so perhaps I will try to think up a way to fix it.

The star diagonal is a mirror-type unit, made of plastic. The telescope's worst mechanical feature is the two metal setscrews that hold the plastic tube of the star diagonal in place in the focuser tube: To overtighten these, or to try to rotate the star diagonal in place, is to chew up the star diagonal so much as to ruin it. Perhaps I will try to find some plastic screws. The limited forward focuser travel prevents me from using a hybrid 1.25-inch / 24.5-mm focuser that I own, that is made of metal; its optical path is too long.

Eyepieces:
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Meade shipped the unit with a 9 mm Huygenian and a 25 mm Kellner. Vorce swapped the Kellner for two more Huygenian eyepieces, a 20 mm and a 6 mm. He did so quite openly and in an above-board manner -- I knew what I was getting when I placed the order. I have a 25 mm Kellner in 24.5 mm size, but I did try out the Huygenian eyepieces.

There is nothing wrong with a well-made Huygenian eyepiece at f/12 except rather limited field of view. The design is some three hundred years old, but gives excellent images across a field of 30 degrees or so, with slow telescopes. The 20 mm and 9 mm Huygenians were quite nice little eyepieces. The 6 mm had a trace of wedge in one of the lenses. The 20 mm seems to have rather less apparent field than 30 degrees. That's par for the course for inexpensive imported eyepieces.

Optics:
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I haven't seen excellent seeing since I got the Meade 165, but I think I can say with confidence that the objective is pretty good. I don't believe it is as fine as the 60 mm ex-Meade unit that I bought to replace the flawed objective of my Monolux refractor, but it's a nice coated achromat with decent performance.

I gave the instrument first astronomical light a few days past new moon. With the 20 mm or 9 mm Huygenian eyepiece, there was only a hint of color at the edge of the Moon, and that might have been from the eyepieces. At f/12, a 50 mm achromat can be virtually color free. The telescope showed a reasonable amount of lunar detail, including the Petavius Rille.

Jupiter was close enough to the horizon to show colored fringes from atmospheric refraction. Nevertheless, the 9 mm Huygenian showed a couple of belts at 67x, and of course the Galilean satellites. Saturn showed the rings and perhaps a moon or two, but no surface detail that I could notice. Both pairs of the double-double, epsilon Lyrae, seemed to be split. I say "seemed to be", because at only 67x and with so-so seeing, it was hard to say whether the phenomenon I was seeing occasionally was a clear split or just two adjacent Airy discs with dark minima between them. Whichever the case, the images met Dawes's criterion for separation, of a thin dark line between the discs. All this is not bad at all for only 50 mm.

Later that night I took the telescope to Fremont Peak and looked at some deep-sky objects at 24x, with a 25 mm Orion multicoated Kellner -- likely a somewhat better eyepiece than whatever Meade originally shipped. I started with M76 and M74, and found both pretty quickly. They are likely the toughest two Messier objects -- M76 was tougher in this telescope, on this night, with this observer -- so the fact that the Meade found both of them almost certainly means that it is capable of showing all the Messier objects.

I looked at a bunch more. The Orion Nebula showed a good deal of detail, including the "wings" of the nebula. M78 was its familiar comet-like shape. I caught a glimpse of NGC 2024, the Tank Tracks, northeast of zeta Orionis. M31 was long and tenuous, perhaps three or four degrees in total length, and with averted vision I suspect I could see the big star cloud, NGC 206, that lies within it. I found M32 and M110. A bit of sweeping turned up M33, which was noticeably elongated. M81 and M82 were both elongated. M1 and M77 were visible, without much detail. Several of the wintertime galactic clusters were resolved to the core. With averted vision, I could detect the Merope nebula in the Pleiades. We easily forget just how much even a tiny telescope is capable of doing, or perhaps some of us have never learned.

Conditions were very dewy, and cold. At such times, tiny telescopes have one great advantage: I left the engine and heater of my car running, and every few minutes I brought both observer and instrument inside to warm up and toast off the damp. It worked for both of us.

Documentation:
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Meade provided a few pages of set-up and operating instructions, including a prominent notice not to look at the Sun, but nothing as nice as the Moon Map, solar system chart, and short booklet on basic astronomy, that accompanied the Tasco 301051F. A few such words to get the beginner started would have been a good idea.

The Bottom Line:
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If you are warned that the instrument is not robust, and are careful to baby its flimsier components, the Meade 165 is a satisfactory beginner's telescope. If not, you will probably break something before you figure out what needs coddling. I suspect that many kids will not treat the telescope as carefully as it needs to be treated, even with warning, so I would not be prepared to make an across-the-board recommendation of the Meade 165 as a junior's telescope. But it might do for some kids, particularly if it could be stored with the tripod legs extended, and if someone has sense enough to scrap the finder and substitute a peep sight. With a 25 mm Kellner and a 9 mm Huygenian, it will provide a good introduction to Moon, planets, double stars and faint fuzzies.

One notable bright side is, that for all that a few flaws remain, the Meade 165 shows that the folks who make cheap imported telescopes are capable of making good ones. The Taiwan firm that manufactured the Meade 165 has given it good optics in a mechanical package that shows great thought and ingenuity; its best features are a long step up from the beginner refractors that Japan used to export for the same market. It would only take a little more beef to make the tripod robust, and possibly something as simple as a press-on metal collar would eliminate the problem of setscrews chewing up the star diagonal.

Meade is a big buyer; I hope they have sense enough to take their OEM manufacturers by the hand and show them the way. This one is close enough to give us hope.

-- Jay Freeman
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