

Meade 7" LX-50 Maksutov

One Owner's Opinion

This review of the Meade 7" Maksutov-Cassegrain LX-50 was published on Compuserve in March 1996 and later reposted on the USENET newsgroup sci.astro.amateur with my permission. The original review is followed here by some of the discussion which ensued on Compuserve in the next week.

The bottom line conclusion of the review is the Meade Maksutov is a good but by no means perfect telescope for the planetary and double star enthusiast. Like all commercial telescopes, it has both strong and weak points. Read on for details.

March 1996

I recently received my new Meade LX50 7" Maksutov-Cassegrain and thought others here might be interested in my first impressions. This rather long report is presented as my personal observations and opinions only. "Your mileage may vary," of course. I am not a professional reviewer of telescopes. I am an electrical engineer by day and an amateur astronomer by night (as time and energy permits.) I hope to capture a (relatively) unbiased review of this product, but will admit up front to already being a satisfied Meade customer by way of a 2120 LX-3 10" SCT purchased back in 1987. I have tried to present a fair representation of both the good and bad points of my new telescope.

I had been thinking about purchasing a new telescope off and on for about a year now. Over the past few years, I'd noticed that I was not taking my 10" out as often as I once did. The main reasons were set-up time and sheer physical weight of my old scope. I decided that I would like to have something smaller, lighter, easier to set up, and easier to use. (I will hold on to the 10" until I am able to provide it with a permanent mounting and shelter.) Ideally, I thought a 6" SCT or Mak, preferably equipped with digital setting circles, would fit the bill. Unfortunately, I haven't seen scopes fitting that description advertised in a number of years. The Ceravolo's partially fit the bill, but not my pocketbook. Another amateur I know was also looking for a new scope after his C-8 committed suicide on the tiled entryway of his home. He asked if I knew anything about the Meade 7" Mak or had seen any reviews of them. I hadn't. Given my trouble free experiences with my LX-3, I decided to take a chance and order the 7" LX-50. Since there hasn't been a lot of discussion or comment on this new product, I hope the information and opinions I present here are of some use to others.

I ordered the scope from Astronomics in Oklahoma because they were close (I'm in central Texas), had the 7" in stock, and have a good reputation for great service. I also already had some experience with them as that is where I purchased my 2120 LX-3 and accessories years ago. To my surprise, the new scope was delivered 3 days after placing the order. (I will continue to recommend Astronomics as a courteous, reputable supplier.)

The telescope is delivered in three boxes and the optional field tripod comes in another. All parts are well packed and arrived in good shape. Taking my time, unpacking and assembly took about an hour and a half, including reading the assembly sections of the manual as I went. Since most of the components are nearly exactly like my older LX-3, it could take a "first-timer" a bit longer due to unfamiliarity with terms and the final

"look" of the equipment. (The assembly instructions are not as clear as they could be.) Since it was cloudy, only "indoor tests and inspections" could be made the first night. (Isn't it always cloudy when you get a new scope?) The unit I received is Serial Number 563. This may indicate why information on the product is so sketchy - there just aren't many out there yet.

Several sample defects were found during the assembly process. The first, while not a defect per se, could still be considered a minor quality control problem. I was given an extra leg locking "hand wheel" screw in the tripod kit. While not a problem for me, I wondered if someone else out there is going to be short one. (I suppose it's possible that an extra was included as a spare, but the instructions and parts diagrams don't mention it.)

The second sample defect was much more serious and made my heart sink when I ran into it. Once the scope was fully assembled, I connected all the cables, loaded the batteries, and turned the unit on. It went through its diagnostic tests, flashing the LEDs on the control pad in sequence as expected and then started slewing in R.A. at 32x speed. The control pad could not stop the forward motion. I turned the unit off and back on several times with the same result. I began to think of having to repack everything for return repair/exchange. I unplugged all the cables, checked the battery insertion and carefully reconnected the cables. This time, nothing functioned when I turned power on. Thinking the internal fuse in the control panel might have blown, I followed the manual to check it out. Upon opening the unit, I found the cause. The fuse was good but one of the internal cables from the control board to the R.A. motor was pinched by having been compressed between an electronic component (DIP) pin and the mounting plate tang to which the control cover is screwed. The insulation was clearly pricked by the pin. I was able to reroute the cable wires and reassemble the control panel. Now when powered on, the unit functioned flawlessly. I consider this problem serious since the average user would probably not have been able to isolate or correct it. In all fairness, it is likely that the unit was properly inspected and did work before it left the factory since shipping shock and vibration could have caused the pinched wire's insulation to puncture in transit. Nevertheless, I believe the cable routing and DIP pin proximity to the metal mounting flange represent a possible design flaw that could cause others the same or similar problems.

A third sample defect was discovered in the 25mm MA eyepiece supplied with the scope. The bottom field lens retaining ring in the eyepiece was not completely screwed into position. This resulted in the field lens being loose and rattling when the assembly is handled. The eyepiece worked as well as an MA can after securing the ring. This was not a big concern to me as the eyepiece immediately went into "mothballs" with my Kelners, and older Orthoscopes. This defect would cause more problems for a first time buyer without a collection of other eyepieces to draw from.

In looking at the overall design of the scope, there are several things I like a lot. The low power operation from internal batteries is a big plus over my LX-3's external motorcycle battery, especially for short sessions in the back yard. This additional ease of set-up was one of the features that made the newer scope appealing to me. I also like the latitude fine adjustment mechanism on the new wedge much better than that supplied back in 1987. The new one is actually usable. The final feature I really like is the ventilation fan in the tube assembly of the 7" Mak. I have heard that it was added primarily because of the added thermal mass of the thick corrector plate. It's intended to help bring the scope more rapidly into thermal equilibrium (I guess). After using it, I now want one retrofitted onto my 10". (The 10" seems to take a very long time to stabilize, detracting from the usability of the instrument for short observing sessions.) The instruction manual does not explain the fan's proper use (more on that later) but I found that it was remarkably quick at eliminating tube currents seen in the star tests. (More on the star tests below.)

Just as there are things I like about the design and feature package of the LX-50 7" Mak, there are some things that could be improved. The most annoying item I ran into was the user's manual. Hopefully, it is being rewritten for the 7" Mak, but the version I got was basically the 8"/10" SCT LX-50 manual with a few

comments concerning the 7" crudely inserted into strategic places. The 7" is sufficiently different that it really needs its own manual. Omissions abound. For instance, there is no mention of the tube ventilation fan and its proper cabling or use and a dimensioned optical system diagram shows only the SCT models. A number of operational questions are not covered at all in the manual. Some of these common questions are listed later on. (If any other users have answers, please let me know.)

The second design problem is caused by the use of the basic 8" SCT fork assembly with the longer tube of the 7" Mak. The telescope's tube is not able to swing through the fork arms. This limits the lowest elevation you can reach in the southern sky. At my latitude (30 deg.) only about 15 deg. of the southern horizon is unreachable. This is not a big problem for me but others at even lower latitudes should beware of the limitations and consider an LX-200 version of the Mak in alt-az mode. The biggest problem this causes for me is one of storage size and portability. The 7" Mak must be stored with the eyepiece end between the fork arms rather than the corrector end. This means that the overall length of the stored instrument is nearly the same as my 10". So much for improved portability (one of my considerations for purchase.) Another mechanical interference problem is that the power cords for the various accessories can interfere with operation very near the east or west horizons due to the closeness of the fork arms. This problem could be easily eliminated if Meade used right angle connectors for the plugs that attach to the control panel of the drive base.

One feature which Meade should consider adding to future versions is a switch on the auxiliary power outlet of the control panel. They caution the user to never "hot plug" the accessories that attach to the front panel. This becomes an inconvenience for the tube fan and would also apply to a CCD. You must turn power off, plug/unplug the accessory, then turn power back on. A simple switch on the AUX output could alleviate this inconvenient procedure.

In order to reduce overall costs (I suppose), Meade no longer supplies a hard packing case with the instrument. It does come in a rather sturdy, well padded cardboard box which doubles for storage, but I will eventually invest in a more durable storage container to better protect the scope. I'm afraid the cardboard wouldn't last long being routinely transported for observing.

The final design feature which I don't like at all is the leg spreader lock mechanism on the new field tripod. In order to collapse the tripod legs for easy transport, the wedge assembly must be completely removed also. The older field tripod supplied with my LX-3 had no such restrictions. The tripod has obviously been changed to accommodate the mounting of LX-200's in alt-az mode to the detriment of wedge users. Fortunately, in comparing my old tripod to the new, I see that I can [make some easy modifications](#) to gain back the convenience that has been lost. (I find it easier to leave the wedge attached to the tripod at all times.)

Some features of the design give me an uneasy feeling for the future. The most worrisome of these is the attachment of the secondary baffle to the corrector plate. In the photographs of the product I have seen, the secondary baffle is not even visible. You generally see only the aluminized spot on the corrector. On my unit there is a substantial baffle surrounding the secondary spot. It is glued to the corrector. Being a worrier, I wonder about the long term strength of that glue bond and whether at some point years down the road it will fail, dropping the baffle onto the primary mirror. The baffle does its job very well, though, I must admit. Contrast is excellent even relatively near a bright object. (More on that later.) The second minor worry is that I can detect some image shift while focusing. While this is to be expected in a primary focused design, I worry that I can detect any at all in the new 7" while my 9 year old 10" is just now showing the first signs of it. The shift was noticed at high power (445x) and amounted to about 30" of arc. I'm not into CCDs so I don't know if this amount of shift would be a problem but it isn't too bad for my visual use. The last worry is that I also noticed some backlash in the R.A. drive when playing with the control pad. I didn't actually try to measure it, but I would "guesstimate" that it was on the order of a minute or two of arc. I will try to take a closer look at this during my next checkout outing. For now, I have no idea if this is excessive or not. My LX-3 drive

wasn't able to slew "backwards" so I've never encountered R.A. backlash before.

As mentioned above, I had several questions that I could not answer from either past experiences or consultation of the manual (such as it is.) (Ron Ezra, if you are reading through this long, boring account please see if you can answer these questions. If anyone else knows the answers, please feel free to chime in.)

1. If the unit is being run from an external power source such as a motorcycle battery, should the internal battery pack be disconnected? I assume it should but haven't looked at the control card to see if the two power sources are diode isolated from one another. The manual makes no mention of this situation. [There are no problems connecting both - they are isolated in the design.]

2. When will the Magellan II controllers be available? I ordered one with the scope and was told that they were back-ordered without an availability date. Astronemics has yet to see even the first sample of this unit. [The Magellan II controllers became available in June 1996.]

3. If the tracking rate adjustment feature of the drive is used, is it supposed to remember the setting after a power off/on cycle. The manual isn't clear on this point but it doesn't seem to hold the programming during power off. This is a bit of a nuisance since power must be turned off to plug or unplug the fan, CCD, etc. This same question applies to all the programmable settings such as N/S hemisphere, controller direction, etc. These did not seem to "stick", so unless I am doing something wrong, I assume that the functions must be reprogrammed each time power is applied. That's very tedious and bothersome. [This is operating as designed. These parameters are not held in permanent memory and must be reprogrammed each time power is removed -- nuisance as it is.]

For those of you who have hung in this long, now we get to the real question everyone always wants to know -- "how does it perform optically?" The short answer is very well! I am quite pleased with the optical components of the scope. I have heard the words "refractor-like" to describe the images in the 7" Mak, but having had no experience with refractors, I can't use those words. The images are quite sharp and pleasantly high in contrast, though. Below, I will relate my observations during the first outing with the 7" Mak.

Sky conditions were not very conducive to a detailed star test, but I quickly got a pretty good feel for the capabilities of the scope. I would rate seeing this night informally about a 5 -- an average night in the suburbs. The transparency was pretty good, but there was considerable turbulence in the air. Being in town with houses all around didn't help any. The outside temperature during the outing dropped from about 55 F to about 45 F during the four hours I was set up. The moon was 5 days past first quarter and dominated the sky. Immediately after setting the scope up, the images were mediocre. Looking over my house roof at Venus showed the effects of extreme heat turbulence as would be expected. After a quick look at the writhing terminator of the gibbous moon, I decided to hook up the fan and let the temperature stabilize for a while.

I let the fan run for about 15 minutes and went back to look again. The scope now performed much better. Over the next hour, the images improved even more. Focusing was crisp and the star images looked quite clean. The Trapezium was as good a view as I remember ever seeing. I looked at a variety of objects for a while and then took a break for a while. After the scope had been out for about 2 hours, I took a stab at the star test. The fan had been off for about an hour at this point and the star test showed atmospheric turbulence and a very strong tube temperature stratification. The out of focus star image was strongly "pinched" and distorted on one side. Moving to another star elsewhere in the sky made the "pinch point" slide around the image and settle in a new spot. I quickly cut power, connected the fan, and resumed power while trying to watch the image. Within a few seconds of turning the fan on, the out of focus image cleaned up beautifully! Within minutes, the fan could be turned off without the distortion returning. (It did come back slowly over the next hour, though, as temperatures continued to stabilize.)

Surprisingly, at low to medium power (90x - 215x) the fan's vibration was barely noticeable. For deep sky observing, you could leave the fan running, but then you don't normally need it at lower powers anyway. All in all, though, the fan is a very useful feature of this scope. I like it a lot! While the air was still too turbulent to fully evaluate the optics with a star test, they looked pretty good. A slight difference in the inside/outside focus images may tend to indicate some spherical aberration but I didn't attempt to isolate it to the scope or eyepiece since the turbulence made the differences difficult to see well. I have not yet attempted a "star-Foucault" or "star-Ronchi" test on the scope. I will try these at my next opportunity. (I don't know if there is a better term for these tests, but they consist of replacing the eyepiece with a homemade knife edge or Ronchi grating mounted in a 1.25" holder to be placed at focus. I then look at a northern star and use the slow motion controls to cut into the focus beam as in a null test. This seems to best show the signs of any zones in the optics.)

As mentioned above, the scope's baffling seems to be very effective. Other than sky glow from the 85% illuminated moon, deep sky objects had very good contrast. Bright stars like Sirius and Betelgeuse were seen to pop into and out of the field using the hand controller for slewing without a lot of glow preceding their entrance into the field of view.

One point that greatly impressed me was the scope's ability to deliver very good images even at high power. I was able to use an older 6mm Orthoscopic eyepiece giving 445x and get remarkably clean, crisp, detailed images of the moon. This was a big surprise given the seeing conditions and was something that is quite rare with my 10" SCT. On nights of very steady seeing, I expect planetary images to be spectacular.

Approaching full moon and a stretch of cloudy weather this next week will prevent a more detailed test of the optics, but at this point I am very pleased and optimistic that my new scope is going to prove to be quite good. Is it perfect? No. Is it just the right scope given my initial requirements? No. Will I keep it? You better believe it! I would have liked a smaller physical package; it's not as light as I would have liked (though it is very noticeably lighter and easier to set up than my 10"); not all accessories are available yet (Magellan II); it suffers from some mechanical limitations that are outweighed in my own use by an otherwise strong feature list; and it should give me many years of viewing pleasure. All in all, I think the Meade LX-50 7" Maksutov is a worthwhile scope, especially for those interested in planetary (as I am) and double star observing.

[Subj] #264337-#Meade LX50 7" First Look

I had the scope out for a while last night in spite of the (nearly) full moon and rapidly increasing clouds. A fellow club member came over to take a look at and through the scope. He brought his collection of Naglers to evaluate the scope himself. (He is the owner whose C-8 leaped to its death on his home's tile entryway. Nobody was home when it did this otherwise they would have tried to talk it out of its suicidal mood <grin>.) The air was not quite as still as last weekend when I first tried the scope out. We did make some rather "interesting" observations concerning the optics, though.

He carefully inspected the field of view's quality with several different eyepieces. We found that there is a small amount of color visible at the very edge of the field. No coma was seen. The field seemed very flat with good focus all the way to the edge. There did not seem to be any evidence of vignetting towards the edge. The star test still seemed to show a small amount of spherical aberration as I had seen last weekend (under correction -- it's interesting that one of yours showed the same). The most interesting part is that when he tried his coma corrector, the images cleaned up and the spherical aberration visible in the star test cleaned up completely. Neither of us could explain why the coma corrector seemed to correct this. The images were much improved by its use, though. Have you ever heard of anything that would explain this? Could it be a happy coincidence?

[Subj] #264469-Meade LX50 7" First Look

[This message was in answer to questions about the brand of coma corrector and comments concerning the common occurrence of rolled edge at both inner and outer portions of the main mirror.]

I don't know what brand the coma corrector was, but will find out. I suspected exactly what you referred to -- the coma corrector may have had a small amount of spherical aberration itself that just happened to be equal to and opposite from that in my scope. That was the "happy coincidence" possibility I mentioned in my message.

I had the scope out again for a couple of hours tonight. The seeing was just a bit better than last weekend. I am convinced that the scope has a small amount of under-correction, but it doesn't seem to be much. I did get a chance to try a Ronchi grating and null test tonight. The null test showed a very smooth figure with little roughness. As you observed, I also saw a bit of roll-off at the inner and outer edges (presumably the mirror.) The null also showed a subtle deviation from flatness. While I couldn't tell in the null if it was over or under correction, the star test shows it to be under correction. There was no sign of any zoning at all. The Ronchi bands (using a 133/inch grating) showed a slight bowing again pointing to an under correction. Overall, the optics seem to be quite good. I am also pleased with the performance of the scope on doubles. It's going to be pretty cold here this weekend (at least central Texas standards), but I hope to try the scope out on Jupiter and Saturn Saturday morning.

I also did a little investigation of the drive electronics last night. I found that it is indeed safe to use an external power source while there are batteries loaded into the internal pack of the LX50. (I was worried about accidentally charging non-rechargeable batteries by connecting and external source.) I haven't completely reverse engineered the design, but discovered that the two power sources are not wired directly together. I found that when the external power plug has something plugged into it, the internal batteries are isolated from the drive system. This is good news in the ease of use category and shows that some good thought went into the engineering of the drive system.

[Subj] #264712-Meade LX50 7" First Look

[This message is in response to a comment that one reason the coma corrector may have helped the spherical aberration is that it forced a new focus point for the scope. Since these telescopes focus by moving the primary mirror, spherical aberration is a function of focal plane position. Indeed, the residual spherical aberration is better with a camera extension tube installed.]

Thanks for the explanations. You may have hit on exactly the explanation as to why the coma corrector improved the images. I guess it is possible that the addition of the corrector forced the primary focus movement to a point that was very near the optimum spacing. I had not considered that possibility. I had completely forgotten that the system will have a "sweet spot" in the focusing movement of the primary. This gives me yet another experiment to try. On my next outing, I will try the star test again by moving the eyepiece in and out at several fixed "focus positions" of the primary. This should prove interesting.

There indeed a "sweet spot" in the focus travel. While it could be detected in the star test, it was not obvious during general observations. My conclusion is that for most purposes, it is not worth worrying about.

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