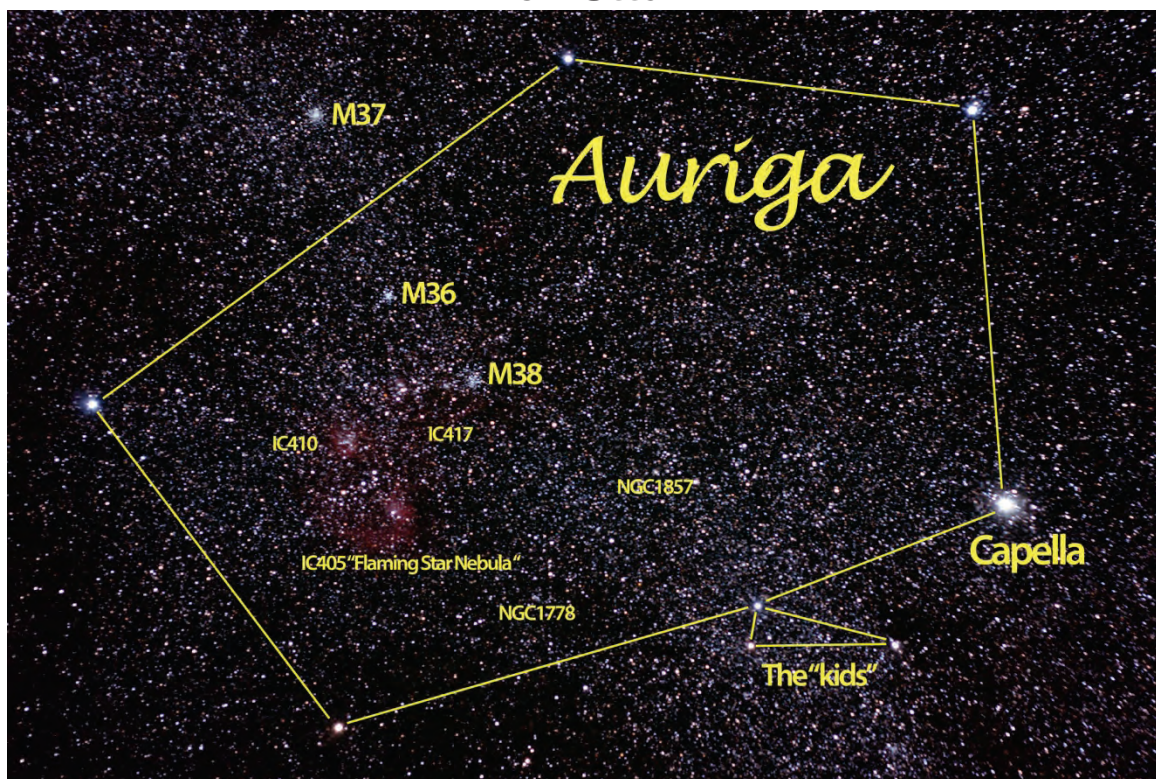


Adventures in Widefield Imaging

by
Brian Ottum



All photos by the author

Back in the 1980's, I was the photographer for my high school yearbook. So I had access to the school's darkroom and supplies. It was natural for me to take the camera outside to try to record the amazing things I was seeing in the sky and through my telescope. However, the result was nearly always a frustrating experience. I'd painstakingly load the camera with a roll of "fast" film, attach it to a mount, use the push-button shutter release, and wait days or weeks to see my results. Even with the "fast" Tri-X black & white film, the pictures were dim and uninspiring. Worse yet, nearly every frame was an exhibition of how you can screw up: bad focus, shaky mount, bad star tracking, kicking the tripod while the shutter was open, too short an exposure, too long an exposure so everything is washed out, object appears too small, etc., etc.

When astronomical CCD cameras came along in the 1990's, I was highly interested. But the price and complexity scared me off. Yes, the experts were getting professional-grade shots, but when I looked into their equipment and time investment, I did not like the equation.

But all that has changed! With the rapid advancement of digital cameras, astrophotography is now something that everyone can do. The main reason? The TRASH BUTTON! You get instant feedback on your screw ups, and can simply toss them and try again. This is a miracle. A fast learning cycle. Mess up, try something different, and try again. Wow.

So I progressed through the Canon 10D, 20D, 30D and now 5D. Along the way, I even tried a webcam. Of course, many point-and-shoot digitals. All have been a total blast.

If you have a digital camera of any type that is less than a few years old, I highly recommend that you try widefield imaging. By widefield, I mean wide angle shots of the sky that approximate how we see things with our eyes. The opposite of widefield is attaching the camera to a big telescope. What is great about widefield is that it is easier and more satisfying than imaging with a telescope. The shorter focal lengths are MUCH more forgiving of star tracking shortcomings.

If you have a point-and-shoot digital camera, the best way to start is to get a tripod and take some landscape shots (wide angle) of the moon and an attractive foreground (like trees, water, buildings, people). As with nearly all astronomical imaging, you need to set the camera to its maximum ISO (sensitivity of the sensor). ISO 800 is good, but the newer cameras can go much higher (my 5D mk III is usable at ISO 10,000). Put the camera on a manual setting, if possible, and open up the lens (lowest aperture or f-stop setting possible). Otherwise choose the auto setting for "twilight" "moon" or "night." Be sure to take the camera off of auto focusing. That's one thing cameras are NOT good at yet – they have trouble focusing on stars or the moon. So you need to manually focus. Alternatively, when the camera won't manually focus, you can press the shutter halfway down while pointing to something bright and distant and it will correctly lock in the autofocus.

A challenge is the shutter release button. You need to press the button but not shake the camera. One way is to simply rest your hand gently on the camera (which is on a solid tripod). Take a breath, stand/sit comfortably, tuck your elbows to your sides, and DO NOT MOVE as you squeeze and keep pressing the button. With practice, you will succeed. A second technique is the rubber band or bungee cord on the button (use a hat or card to be your shutter so you don't capture the jiggle).



Now the exposure time will be something you need to play with. Thus, the beauty of the TRASH BUTTON. If it's the moon setting over a lake, you may only need a second exposure. However, if you want to capture stars, you want to go as long as possible. The limitation is light pollution – so you will take longer shots and then see that everything gets washed out eventually.

So the second step up is taking the tripod and camera to a dark sky site. Lake Hudson State Recreation Area is an hour from Ann Arbor and is the world's first legislated "Dark Sky Preserve." It's a great place, and has a picturesque lake. Out there, you can get great shots of constellations with 30 second shots. Half a minute is

roughly the longest exposure that will show point stars with a normal or wide angle lens. [But play with exposure and that trash button to find out for yourself.] Again, the foreground matters so choose carefully. A DSLR generally has more flexibility and sensitivity, so you can begin to capture the Milky Way with just a tripod.

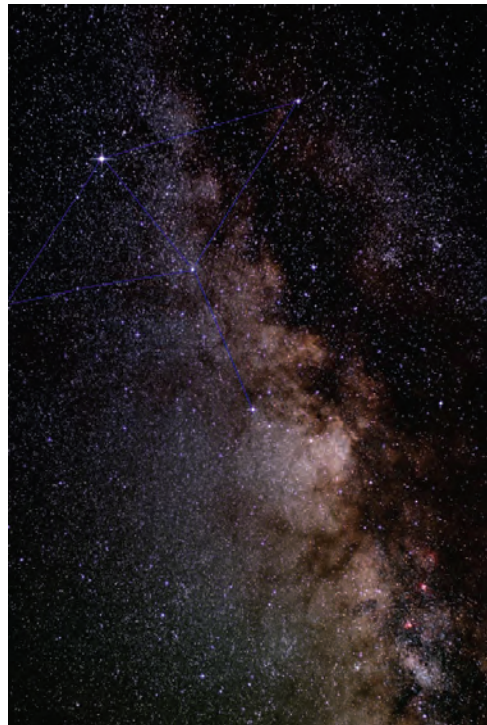
If you proceed through these two steps, then you will get the itch for longer exposures so you can capture detail in the Milky Way such as nebulae and star clouds – and maybe even other galaxies. Unfortunately, this requires a step up in cost & complexity. You need a mount with a drive that can follow the stars. Traditionally, this is a German equatorial mount that is rather costly, heavy and difficult to use. However, manufacturers have responded to the digital revolution with lower cost trackers. Several years ago, I bought an AstroTrac TT 320. It is



a small and lightweight tracking device that attaches to a sturdy tripod and accurately follows the stars for over 90 minutes (until rewinding is required).

The AstroTrac has a polar alignment scope to help you orient the mount towards Polaris. Anything close is OK for shots less than a minute with a wide angle lens. But at the other end of the difficulty scale, you have to take about 15 minutes to very carefully place Polaris in the illuminated reticle – if you want to use a 200mm telephoto lens.

What sellers don't tell you about these low cost trackers is that you don't just bolt them to a flimsy camera tripod and go. First, you have to have a sturdy tripod that can handle at least a few pounds. Then, you need a tripod "head" that can offer the LOCKED 43 degree tilt necessary to get the AstroTrac pointed at Polaris.



My Manfrotto tripod head cost \$120. Then you also need a "ball" head to attach your camera to the AstroTrac. Luckily, I found a \$20 one that is undersized but works.

The AstroTrack can be powered by a pack of 8 AA's or a cigarette lighter plug into a rechargeable 12V power supply available anywhere. Operation is simple and intuitive.

I used the AstroTrac to take the pictures in the article, using a Canon 20Da DSLR. "Auriga" is about an hour's worth of 30 second exposures with a 50mm lens – taken in the southern New Mexico desert. The North American Nebula and Andromeda Galaxy were also about an hour's worth of 30 second exposures with a 200mm lens – taken at the Great Lakes Star Gaze near Gladwin, MI (a highly recommended star party). Finally, the summer Milky Way shot is 45 minutes' worth of 30 second exposures, 28mm lens – taken in Fairview, MI.

Astroscan or Astroblast: The Results

by Paul J. Etzler

After doing mostly naked eye and binocular astronomy for several years, I decided that I wanted a closer look at the heavens. There were a few objects that I couldn't find with the binoculars and my big refractor is in storage with most of the rest of my stuff while I'm looking for a home. Objects like M78 in Orion, and M57 in Lyra escaped my searches. Saturn was just a tiny oval, and Mars was a spot. You might say I got aperture fever.



I was looking for a small scope, something quick to set up. Sort of a super-binocular, more aperture, a steady mount, but still easily portable, and having wide-field capability like hand-held binoculars.

I had decided on an Edmund Scientific Astroscan® as it was very portable and maintenance-free and a telescope I was familiar with. I was intrigued with the ball mount. There were two concerns. I have heard that there were problems balancing the scope with accessories, such as the supplied dew shield, or a solar filter. The second problem was the fixed collimation. If it was bad I was stuck with it. I looked at the Orion Starblast®, which was obviously designed as competitor. The Starblast was more traditional, and flexible design. Both the Astroscan and Starblast had good write-ups in Sky & Telescope magazine.

What to do? Which was best for me? I decided to turn to a great source of practical astronomical information, the Lowbrows; they would have experience with these instruments. I formulated my question over the internet as "Astroscan or Astroblast?" (Somehow I got the Starblast's name confused as Astroblast.) I got many opinions from the members some pro-Astroscan, but most were pro-Starblast. The members testimonies tied in with my fears about the Astroscan. The Sky & Telescope article "Low Cost Starter Scopes", from

December 2005, while it liked both scopes, seemed to agree. So I changed my mind and decided to go with the more traditional and flexible Starblast.

I ordered the Starblast from Orion® along with a glass solar filter. [Using this filter I viewed the May 20 annular eclipse almost at its sweet spot. On June 5th Venus transit the Sun], a 13% transmission, Moon filter, and a 25mm Plossl eyepiece. Sky and Telescope suggested a 25mm eyepiece with this scope, and I thought it would be great as a wide-field 'finder' which the Starblast lacks, only having a reflex red-dot finder.

The telescope arrived quickly thanks to Orion®'s excellent service. It came almost completely assembled, with the telescope, the reflex finder, two Kellner eyepieces, a collimation cap, instructions, a planetarium program, and a cheesy phillips screwdriver

My first impression of the Starblast was "They packed that cheap Japanese telescope factory from when I was a kid and sent it to China." The steel tube was identical except for color and length with a circa 1970, department-store 3" f/10 (spherical mirror) Newtonian scope I used as a large finder years ago. [The Lowbrows have that fine scope with rings somewhere.] That tube was white, the Starblast's is a metal-flake blue-green, similar to the seat vinyl in the old Wolverine Den restaurant in Ann Arbor. The hardware (spider knobs, collimation, knobs, etc) are also identical as I recall. Same design, same finish. The Starblast has real, vane type spider, rather than three skinny screws

The Sky & Telescope Starblast arrived de-not so mine. When I ticed a round chunk hole in the middle, the package. I think it port the secondary, way. My secondary were way out of line. the whole objective. ary requires a 2mm apparent wasn't there wasn't a list of I don't know if one rather have had that



the cheesy phillips screwdriver, as I have access to lots of screwdrivers, no tiny allen wrenches. I'll bet most folks are situated the same way. I'll also bet that the vanes of that screwdriver will part company as soon as it is given some serious torque. First light had to wait until after I bought a 2mm wrench at the local Ace hardware the next day.

After I collimated the Starblast, I attached the finder and took it outside. I tried to line up the red-dot, reflex finder, using a light atop a near by radio tower. I ran out adjustment travel. A closer examination showed that the finder was not parallel to the telescope axis. So much for self-aligning. After realigning the finder base using a square, and bringing the adjustment back toward center, aligning the finder proved easy. The Starblast instructions are incomplete concerning the finder battery. The battery is called a '3-volt lithium battery', failing to mention the kind (it is a CR2032), as there are more than one kind of 3-volt lithium batteries. The instruction say that the battery should be placed in the finder with the positive side 'down'. I have yet to discover which side of a finder is 'down'. To end my confusion, I removed the battery door and examined the battery orientation. 'Down' means facing the door. When I removed the battery the retention clip (and positive contact) became loose, and couldn't be tightened so it would no longer make contact. I fixed it by placing a piece of plastic foam between the door, pressing the contact to the battery. It works great now. The foam was an antique; one of those little foam blocks that were used in olden days to hold the end of a 9-track tape in its reel.

of the department-very important, the focuser, rather than earlier scope.

article noted that their cently collimated, was unpacking, I no-of cardboard with a floating around inside was supposed to sup-as it was shaped that and objective mirrors I was not even seeing Aligning the second-allen wrench, which included. [Since what was included, was] I would much 2mm wrench than

I had a great night. I liked the telescope and had wonderful views. The mount was steady and easy to manoeuvre. The wide views were wonderful. I even liked the red-dot finder. It allowed me to find my place in the sky, in case I wandered off in the wrong direction, trying to translate between my correct-view binoculars, and the upside down Newtonian image.

One feature did bug me. The Plossl has a retention groove in the barrel, while the Kelners had smooth barrels. Combined with two eyepiece-securing thumbscrews, the groove was driving me nuts, as I was always not loosening one thumbscrew enough. I am glad that spring-tab eyepiece retention is no longer part of my observing experience, but one thumbscrew is enough, and grooves are unnecessary, at least for regular-sized eyepieces.

After that wonderful night, I had a few nights of cloudiness. With the moon waxing I couldn't look at nebula so I decided to check out the Sun, Moon, and Planets. The Sun, through the Orion® objective filter, was nice, the moon was respectable as the K-17mm eyepiece frames the full disk of each nicely. The 13% moon filter helped a lot, but I found the view still a bit bright. When I turned the Starblast to the planets, I was horrified. The views were awful, especially with the K-6mm. I couldn't focus on Jupiter or see any detail on the disk, Venus was a blinding blob. Mars was a blob and Saturn was OK, but fuzzy. All planetary images showed a lot of scattering, including spikes scattered off the spider. I know that the Starblast is not a planetary scope, but I was expecting at least decent images. I looked at the metal-halide lamps of a nearby loading dock. These lights give scattering trouble to my binoculars, but the Starblast view was quite good, much less scattering than in my binoculars. I also looked at the planets with the moon filter (at first by accident) and the views were much better, the scattered light being filtered out.. Still I thought something was terribly wrong with the Starblast.

I wrote to Bobby G, a Lowbrow who commented when I asked my 'Astroblast or Astroscan' question. Bobby had a Starblast. He would know. I asked whether the supplied eyepieces, especially the K-6mm were that bad. I was wondering if my Starblast was a turkey. He told me that his scope was "completely misaligned" like mine when he received it. He also told me he "threw out" the Kellner eyepieces that came with the Starblast. He looked through them and didn't like them at all. He suggested Orion® Expanse eyepieces as a good choice. He used them on his Starblast and thought that the Starblast/Expanse combination was a good one.

I hesitated as I only paid \$180 for the Starblast and new eyepieces would cost more than that. Kind of like my printer that cost \$75, and a refill of ink costs \$85. I do think the K-17mm was good, but not special. I did think that the jump from 17mm to 6mm was a bit large. It would be nice to have a selection in the middle. After several nights of observing, I decided the K-6mm eyepiece was worthless and I would be happier by trying other eyepieces. I have had better views with Ramsden eyepieces, I looked at the new Orion® Long eye-relief eyepieces at \$100 each and at several others manufactures and settled on the Orion® Expanse set that Bobbie recommended. At \$215 for a foursome 6, 9, 15, and 20mm (75X, 50X, 30X, and 22.5X) the set was biggest bang for the buck. Besides, I knew they worked well in Bobbie's Starblast, so they should work well in mine. When I received my Expanse set I tried them out, and Bobbie was right, the views were much better. Eye relief is better but I still need to remove my glasses for the 6 and 9mm. eyepieces. That's OK as at these magnifications I have already found my object, and no longer have to switch my view between eyepiece and sky. Jupiter is gone, but Venus looks good, same with Saturn, Mars is still hard to focus, but much better. Thanks Bobbie G. Another good reason to belong to the Lowbrows. But it makes me wonder how S&T could say the Starblast came with decent eyepieces, especially considering the K-6mm. All 5 of my eyepieces now have retention grooves so at least changing eyepieces is now consistent. All the caps are now identical, which is nice.

I now had a problem, I had 5 eyepieces and only 3 holes in the Starblast's aluminum eyepiece rack. I thought about buying another rack (\$12) and attaching it somewhere, but I couldn't figure where to attach it. Besides finding black eyepieces, in a black rack, attached to a black mount in the dark got to be a bit ridiculous. So I took a scrap of 1/8" plywood and using the rack itself as a template marked and bored 6, 1/4" holes in the plywood. Locating the holes must be very precise as three of the holes must align exactly with holes in the bracket. I painted the bottom of the plywood black to match the mount and the top red to contrast with the eyepieces. White would probably have been even better. I attached the plywood to the original bracket, using four short sheet-metal screws, which went into pre-drilled holes in the bracket. Now I have 6 holes where I had three, and they are all convenient. The whole thing worked out wonderfully. See photos.

I must remember in my evaluation that the Starblast cost only \$180. It is also a rich-field scope, so planetary and other high-magnification views will not be the best. If I only had one scope, I would be better off with the more traditional Orion® SkyQuest XT4.5 Classic Dobsonian for \$210. The Starblast does, however, nicely fill the niche I wanted and I am quite happy with it, I have used it many nights now. Here is my review.

I think the mount is great for this telescope. It is steady, easy to point, and very portable. Balance is not critical with this mount and only needs adjustment when unusually heavy accessories, such as the solar filter are attached. The tensions of both axes are adjustable, The Starblast can also be bought with a equatorial mount and tripod for \$200. First I wonder how good equatorial mount can be if it is only \$20 more. Secondly I think the Starblast is not an equatorial type scope. The equatorial mount allows my Refractor to track at high magnifications, something the Starblast is not designed for. A lot of bother for nothing. I do think it would be fun to combine the Starblast with one of those computerized alt-azimuth mounts like the iOptron.

The optics are good, maybe great. Too bad it was saddled with less than optimum eyepieces, Orion® could at least offer an eyepiece delete option, The secondary mirror is slightly too large, but that is better than too small. The Objective is easily adjusted, the diagonal not so much. But collimation is not hard, especially with the included collimation cap (a plastic cap with a hole in the center and a reflective underside, that fits in the focuser). The center marking on the objective is a welcome feature.

The steel tube is solid and sturdy. I do have some problem with changing temperature. A carbon-fiber tube would be great but at what extra cost? I wish there were an objective access port so I could use canned air to dust off the objective, perhaps a hole with a rubber plug. (SEE EDITOR'S NOTE AT THE END OF THIS ARTICLE)

The cradle allows the position of tube assembly to be adjusted or easily removed. It's large knob allows the cradle to be loosened for adjustment without the tube sliding out of control. It's lining keeps the cradle from scratching the tube assembly. There is a very fine line in adjustment between allowing the tube to rotate and allowing the tube to slide fore and aft. In fact it may be that one type of movement cannot be controlled without controlling the other. Fortunately this scope has an alt-azimuth mount and tube rotation is not as important as if the mount were equatorial..

I like the reflex finder, I think it works great, especially when I compare it to those 4X24mm finders often found on inexpensive scopes. The finder could be better made, but it works and keeps the cost down.

The focuser is OK. It is 1/4" so I don't have to bother with .965" eyepieces. The focuser has a straight-cut rack and pinion which is a bit coarse for the focusing needs of the fast f/4 Starblast. A helical rack and pinion with a fine motion knob would be a big improvement. Another possibility is a helical focuser. Besides the Expanse

The 3-hole eyepiece rack was handy,. The 6-hole eyepiece rack is handier. I store one eyepiece in the focuser, and the remaining four in the rack. The rear caps keep all in place when I am carrying the scope. Every eyepiece has its own spot. Easy to select in the dark.

The Starblast sure is a handy scope. While it is not quite grab-n-go, it is so easy to set up that I will do so when the weather is iffy. There are nights where the clouds clear off after sunset. If they don't, it's no big deal, in a few minutes and all is inside and stored away. The Starblast is big enough to show detail in the brighter objects, and steady enough to examine rich-field objects in detail. The five eyepieces I now have, give me great control over contrast. All eyepieces, even the 6mm, offer a field of view larger than the moon's disk. The Starblast is truly fun to use.

The most memorable view I had so far was watching a very slender crescent moon setting behind the mountains to the West. Now that it has risen, I have found M57 - easily. The scope was ideal for watching the May 20 Solar eclipse. I look forward to many more views. Thanks for your help Lowbrows.

Editor's Note: Paul talks about cleaning telescope mirrors with canned air. BE VERY CAREFUL. Many canned air products have chemicals in their accelerants that can DISSOLVE mirror coatings!!!--JF

SEPTEMBER CLUB CALENDAR

Saturday, September 15, 2012. May be cancelled if it's cloudy. (Starting at Sunset). Open House at Peach Mountain [follow this link for up to date information].

Friday, September 21, 2012. (6-12 PM). The 16th Annual Astronomy at the Beach (hosted by Kensington Metropark and the Great Lakes Association of Astronomy Clubs (GLAAC)).

Saturday, September 22, 2012. (6-12 PM). The 16th Annual Astronomy at the Beach (hosted by Kensington Metropark and the Great Lakes Association of Astronomy Clubs (GLAAC)).

Friday, September 28, 2012. (7:30PM). Monthly Club Meeting.



M 31, M 23 and M 110 by Brian Ottum

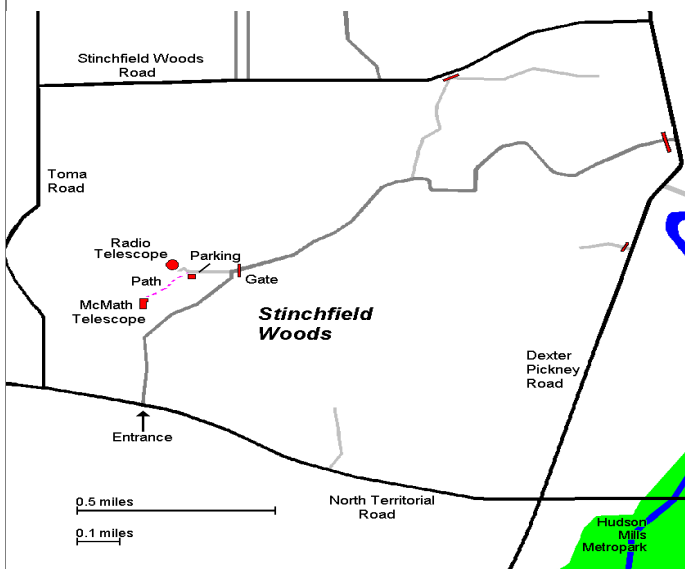
Another terrific astrophoto with the AstroTrac TT 320.

Your Editor is happy to run classified advertising for members free of charge if an article and photographs are included. The rest of you should try Ebay.

Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory will follow the meeting.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope as well as the University's McMath 24" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.

Membership

Membership dues in the University Lowbrow Astronomers are \$20 per year for individuals or families, \$12 per year for students and seniors (age 55+) and \$5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional \$12 annual fee to cover printing and postage.

(See the website

<http://www.umich.edu/~lowbrows/theclub/>

for more information on joining the club).

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - \$32.95 / year

Astronomy - \$34.00 / year or \$60.00 for 2 years

For more information contact the club Treasurer.

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.



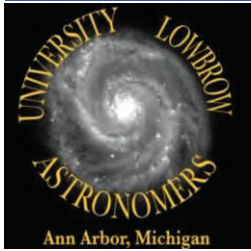
Lowbrow's Home Page

<http://www.umich.edu/~lowbrows/>



University Lowbrow Astronomers

Reflections & Refractions



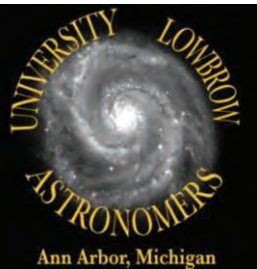
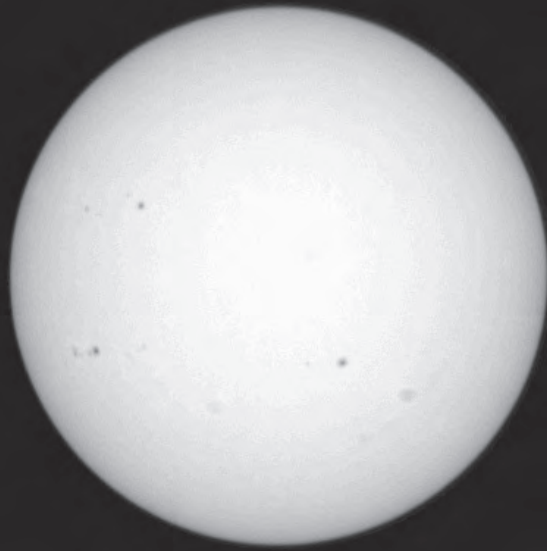
Ann Arbor, Michigan

Website

www.umich.edu/~lowbrows/

George Ferrier took this photograph of the sun, hand held, through his 4.5 inch Galileo reflector.

NICE SHOOTIN' GEORGE!



Ann Arbor, Michigan