

REFLECTIONS / REFRACTIONS

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University Lowbrow Astronomers Monthly Newsletter

May 2023, Vol 47, Issue 5

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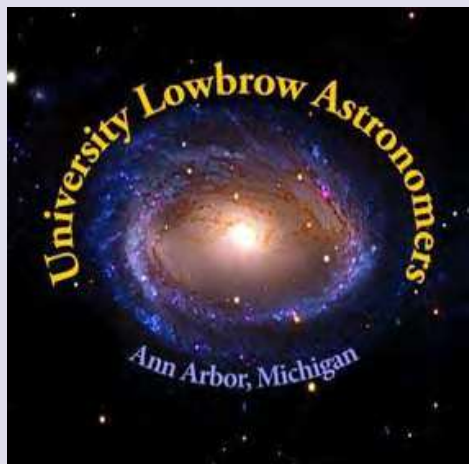
ORION AND FRIENDS

BY ADRIAN BRADLEY

"I was back in the thumb region at the Dark Sky Lodge & Tavern in Port Austin, MI. Not only do they have a good barbeque at the restaurant, but they also have hiking trails and good views of the night sky. The region of the Milky Way that runs near Orion is faint but visible.

In astronomical darkness, the SQM-L readings were 21.24 max, 21.1 average, and 20.7 for the horizons." ■

Orion is just one of our favorite observing partners. This month's Objective Lens features a few more - from family, pets, and colleagues to some notable galactic duos and trios.



THE EXMOUTH ECLIPSE IN WESTERN AUSTRALIA

BY LARRY COATES

My life-long friend and best man invited me to go on a TravelQuest guided tour (travelquesttours.com) to Western Australia to see this year's hybrid solar eclipse on April 20, 2023. He'd been on several eclipse trips over the years and this was a great way to spend some time together and see a total solar eclipse.

This was a big trip. It took me 38 hours door to door to get from our Florida home to my Perth hotel. It's so far away it doesn't matter much whether you fly east or west to get there, and once you are there it's easy to remember the time back home as it's 12 hours behind. Once you are in Perth, getting to Exmouth is a thirteen-hour drive, but thankfully the TravelQuest folks figured that it'd be better to charter a commercial jet. This sounds extravagant but driving simply doesn't work. The town of Exmouth has a population of less than 3,000 people, nearly nothing around it, and it is a mining/fishing/diving/tourist town. So it's not well suited to accept 10,000+ visitors for a multi-day stay.

The Eclipse

As you can see on the maps, most of this eclipse occurred over water. Just a tiny sliver of land in Exmouth had totality. Our trip had as our resident astronomer, Dr. Angela Speck, Professor of Astrophysics and the Chair of the Department of Physics & Astronomy at the University of Texas at San Antonio. She explained the times and rules for viewing our eclipse.

Eclipse Day: We were up at 2:30 am to get to the airport for our 4:30 am charter flight, and 2.5 hours later we landed at Exmouth. It had plenty of engineering talent to set up a viewing pavilion because it is a mining town. And they did a great job: We had tents, bathrooms, water, food, and everything you'd want for a day in the Australian Outback. It was done very well. That said, I learned our site had 16,000 visitors versus the 40,000 visitors they had expected. My guess is that it's just too hard to get to Exmouth. I did meet one family from Perth at the eclipse site but most visitors consisted of people from around the world,

Talk about gear! Oh my, some of the astronomers had amazing gear and I marvel at how dedicated they were to get it there. We met fellow astronomers from all over the world. I was sandwiched between a lovely married couple from Hong Kong and a couple of French men. There was no electricity but everyone was prepared and brought whatever power sources they needed.



THE EXMOUTH ECLIPSE continues, p. 3

I had seen a few eclipses before this one, but I was never in the path of totality. Some of the pictures I took are included. I was pretty happy with the pictures, but you don't want to sell short what it's like to actually witness an eclipse. It is a remarkable experience. The animals are affected, you may see planets in the middle of the day during totality, and it has a deep impact on you.

Taking Pictures of The Eclipse

Practice! I took to heart this advice and set up my camera for shooting the sun. I also practiced shooting both the moon and the sun before this trip. I brought the following equipment to Exmouth:

- Sony a1 mirrorless camera
- Sony 200mm-600mm telephoto lens which has a 95mm lens opening
- Sony 1.4 multiplier - which I did not use
- A remote shutter release
- A solid Benro carbon-fiber tripod
- Haida 100mm x 100mm Red Diamond One Million X Neutral Density 6.0 filter - to cut down the sunlight before it gets into the lens.

This is an f/20 stop reduction, so 1/1,000,000th of the light passes through the filter. I never did figure out what this filter did for infra-red, but I can tell you it worked fine. You need the filter for most of the viewing time. You can remove the filter during totality and the Haida system is excellent for on/off during totality.

- I also had an Arca-Swiss Cube tripod gearhead so that I could easily make subtle adjustments in recentering the sun in the camera's picture frame. This is a nice manual system to make micro adjustments in camera positioning which can be difficult to perform on a standard tripod ball mount. The Sony 200mm-600mm lens only compounds the difficulty. The Arca-Swiss Cube is probably overkill, but it supports up to 88 pounds of load. I've included a picture of my setup. One of the best parts was that it all fit nicely into a thinkTank photo carry-on rolling backpack.



THE EXMOUTH ECLIPSE continues ...

I carried everything but my tripod on board during all flights. This all matters because you have to schlep all of your gear with you halfway around the world. It's even harder than getting up to the top of Peach Mountain -- though some may disagree!

Solar Eclipse April 8, 2024

I've included a map (right) for the April 8th USA solar eclipse next year. This eclipse has a much longer duration for totality than Exmouth, approximately 4 minutes versus 1 minute. It will be easy to drive to totality from the Ann Arbor area, but you'll have to decide what you think about the probability of cloud cover in the upper Midwest in April. If you are willing to travel, Texas is a possibility and I see that the University of Michigan Alumni Society has an eclipse trip to Mexico. It's not too early to start planning for this eclipse, I am thinking of going to my friend's home in Austin, TX.

During my Exmouth trip, I learned first-hand that there are people who consider themselves "eclipse chasers" and they let the eclipses dictate where in the world their travel takes them. It's a solid plan. You spend a week somewhere, enjoy the zoos, wineries, gardens, restaurants, etc. and only dedicate a day to the actual eclipse. Most of the people on the TravelQuest tour had been on earlier eclipse trips. One person had been on more than 15 total solar eclipse viewings! If you haven't personally done this, I suggest you get a plan for April 2024. Decide if you just want to watch your first eclipse, or if you're up to it, decide how you'll photograph. And then practice. You're only going to have totality for a short time, so you don't want to miss this special event. ■



REVIEW OF THE AM5

BY BRIAN OTTUM

The ZWO AM5 “direct drive” mount is a wonderful product. There are no gears; instead, it uses “harmonic drives” that are directly attached to the shafts. It's revolutionary, very lightweight, and portable. But it's pricey.

Here are some takeaways:

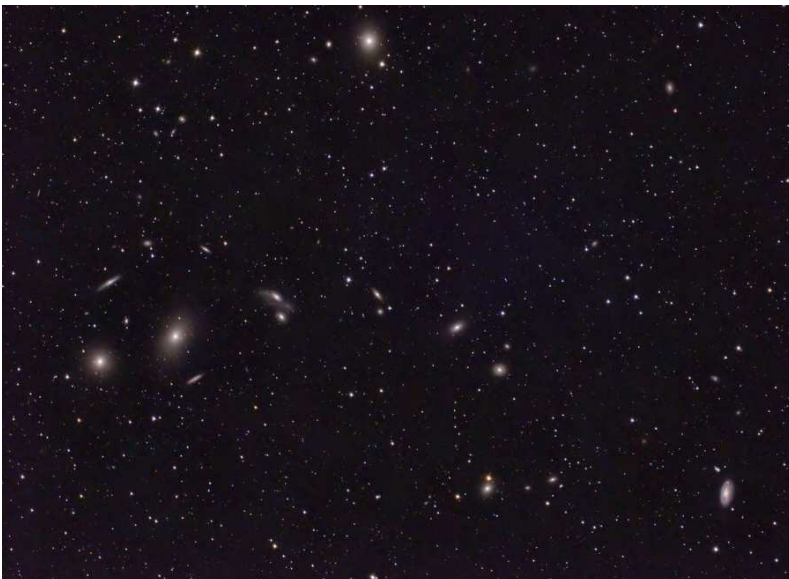
- It tracks well for visual use when setting up before dark by using a compass and trying to point the mount as close as possible to the pole. Just fire up the mount, push the Track button, and use the joystick to manually slew. Easy peasy -- and no computer needed!
- Attaching an 8x50 finderscope is great for better polar alignment once Polaris is visible. Live stacking works well but there will be some drift with longer integration time.
- Using the SharpCap polar alignment helper is MAGIC! Live stacking is better, but there is still some drift seen in bad pixel “worms.” Probably some non-orthogonality that keeps polar alignment from being perfect. (The above illustrates Good/Better/Best polar alignment. I don't have the ASIAir or want the complexity yet.)
- The GOTO works just OK using the ASI app. The first step is to link the phone to the mount's WiFi, then fire up the app and connect to the mount. This is fine, but the scope is usually a degree or two away from what the app thinks. Doing a “1-object” sync with the app helps GOTO to objects in that part of the sky. But far away, another 1-object re-sync is necessary. Putting a red dot finder on the scope really hastened the process of centering an object when the app was inaccurate, so there are two finders on my rig.
- The AM5 will replace three mounts which I will now sell: the iOptron AZPro (solid, simple, great GOTO), the Losmandy Starlapse (my eclipse and widefield rig), and the Astro Tech alt-az (grab-n-go short tripod). ■



Brian's setup with the AM5.



Monkey Head Nebula



Markarian's Chain

Photos taken with AM5 - details:

ZWO ASI2600 Color CMOS camera
SharpStar 6" f/2.8 hyperbolic reflector
ZWO AM5 Mount
No filters, no guiding, no dithering
Bad Bortle 6 Saline backyard
Exposures 10-30sec, 20-60min total
Livestacked with SharpCap, Photoshop tweaks

See more photos taken by Brian with the AM5 in this month's Objective Lens.

OVER THE HORIZON

BY JACK SPRAGUE

A short article this month with the theme “just look up!”

I started this month with only Caldwell and Messier objects which really seem like a wealth of targets right now. However, in the end I remembered the caution from a visual observing friend: “what about the stars? Some of us like stars, too!”

Racked with guilt at my omission, I raided my library for a sprinkling of other interesting objects.

I should say I am becoming rather attracted to carbon stars. Red giants – and what isn’t to like about those? – whose free oxygen has combined with carbon in the outer atmosphere to form carbon monoxide leaving residual carbon atoms to yield a ruby red luster comprise the bulk of the class. There are a few carbon dwarfs and a few more carbon supergiants. The whole history of spectral classification is rather interesting if your bookshelves hold volumes like _Tuna: A Love Story_.

So, this month we have mostly the wealth of Caldwell and Messier objects with a sprinkling of other delights as so many colorful crunchy bits atop a cupcake your daughter might envy.

One month, we’ll have to just focus on the sprinkles. We can always slip the cake-y part of the cupcake to a beagle. They don’t mind at all. Trust me.

Oh! The minor planet Ceres is nicely visible in the middle of the month around 11hr 58’ x 14° 19’. It has a magnitude of 7.9 and is well worth a look for a view as a lagniappe bite here with the dessert discourse theme.

Get out. Look up. Have fun!

The Moon Phases:

05 May	Friday	Full Moon	Rise 19:01 (4 th)	Set 05:32
12 May	Friday	3 rd Quarter	Rise 02:16	Set 12:08
19 May	Friday	New Moon	Rise 05:13	Set 20:35
27 May	Saturday	1 st Quarter	Rise 11:11 (26 th)	Set 01:49

Planetary Outlook May 15 (shamelessly borrowed from timeanddate.com).

Mercury – visible only before dawn. meridian 11:32 (rise 04:50 set 06:13).

Venus – meridian 15:57 (rise 08:09 set 23:44) good viewing.

Mars – meridian 17:15 (rise 09:46 set 00:45) average viewing.

Jupiter – meridian 11:07 (rise 04:26 set 17:47) extremely difficult viewing.

Saturn – meridian 07:49 (rise 02:25 set 13:13) average viewing.

Uranus – meridian 12:21 (rise 05:14 set 19:28) extremely difficult viewing.

Neptune – meridian 09:05 (rise 03:11 set 14:59) extremely difficult viewing.

Meridian Constellations as of 15 May – 22:00 hours.

(-), (--) represent a positional modifier to constellations and objects east of the meridian by less than an hour and more than an hour. (+), (++) represent a positional modifier to objects west of the meridian by less than an hour and more than an hour, respectively.

I mention here a few objects contained in the constellations which I find meaningful. The list is in no way comprehensive!

-- Southern Horizon --

Hydra

M68 – globular cluster. Full, compressed, and surprisingly “tight.” 11’ in diameter. (12hr 39.5’ x -26° 45’).
M83/ NGC 5236 – mixed spiral galaxy. “Southern Pinwheel.” Significant dust lanes toward the core makes this large face-on spiral distinctive. 15.5’ x 13.0’. (13hr 37’ x -29° 52’).

Y Hydra – carbon star. Mag variance 6.2 – 7.4. (9hr 51.1 x -23° 01’.8’).

OVER THE HORIZON continues, p. 7

V Hydra – carbon star. Mag variance 6.0 – 12.3. (10hr 51.6' x -21° 15').

Virgo

M104 / NGC 4594 – spiral edge-on galaxy. “The Sombrero Galaxy.” Stunning. 7.1' x 4.4'. Lovely object. (12hr 40' x -11° 37').

M61 / NGC 4303 – spiral galaxy. “Swelling Spiral.” Another showpiece this month. You need to see this. 6.0' x 5.9'. (12hr 21.9' x 4° 28').

M49 / NGC 4472 – elliptical galaxy. 8.1' x 7.1'. (12hr 29.8' x 8° 0').

M60 / NGC 4649 – elliptical galaxy. ALSO M59. Same FOV. 2 for 1. (12hr 43.7' x 11° 33').

M61 / NGC 4303 – mixed spiral galaxy. Smallish but face-on. 6.0' x 5.9'. (12hr 21.9' x 4° 28').

M58 / NGC 4579 – mixed spiral. 5.9' x 4.7'. Nice bar in the center. (12hr 37.7' x 11° 49').

M89 / NGC 4552 and M90 / NGC 4569. An elliptical and a spiral separated by 40' in Virgo. (12hr 35.7' x 12° 33').

M87 / NGC 4486 – elliptical galaxy. 7.1' x 7.1'. (12hr 30.8' x 12° 24').

M84 / NGC 4374 and M86 NGC 4406 – elliptical galaxies. These two are separated by 20' and make a nice pair. (12hr 25.1' x 12° 53').

SS Virgo – carbon star. Mag variance 6.0 – 12.3. (12hr 25.2' x 0° 46').

Coma Berenices

M99 / NGC 4254 – spiral galaxy. Smallish but lovely. 4.6' x 4.3'. (12hr 18.8' x 14° 25').

M98 / NGC 4192 – mixed spiral galaxy. 9.1' x 2.1'. (12hr 13.8' x 14° 54').

M100 / NGC 4321 – mixed spiral galaxy. A showpiece under magnification at mag 9.3. 6.2' x 5.3'. (12hr 22.9' x 15° 49').

M85 / NGC 4382 – lenticular galaxy. 7.5' x 5.7'. (12hr 25.4' x 18° 11').

M64 / NGC 4826 – spiral galaxy. “The Black Eye Galaxy.” Has a distinctive shadow comma enveloping ½ the core. Distinctive. 9.2' x 4.6'. (12hr 56.7' x 21° 41').

C36 / NGC 4559 – mixed spiral galaxy. Lovely spiral. 11.3' x 5.0'. (12hr 36' x 27° 58').

Canes Venatici

M3 / NGC 5272 – globular cluster. Brilliant, dense, amazingly concentrated ball of stars. 19' in diameter. (13hr 42.2' x 28° 23').

C32 / NGC 4631 – barred spiral galaxy. “Whale Galaxy.” Largish edge-on galaxy that very much resembles a Fin whale in profile. 14.7' x 3.5'. (12hr 42.1' x 32° 32').

C26 / NGC 4244 – spiral galaxy. “The Silver Needle Galaxy.” Edge-on spiral. Famous. 15.8' x 1.7'. (12hr 17.5' x 37° 48').

C21 / NGC 4449 – irregular dwarf. “Box Galaxy.” A distinctive little beast that does indeed appear rectangular. Aptly named but smallish. 5.4' x 4.2'. (12hr 28.2' x 44° 06').

M94 / NGC 4736 – spiral galaxy. “Croc’s Eye Galaxy.” Dramatic flocculant galaxy. Long exposure AP brings out a tightly woven expanse and a bright distinctive core or “eye.” 13.2' x 1.4'. (12hr 50.9' x 41° 07').

M63 / NGC 5055 – spiral galaxy. “Sunflower Galaxy.” Famous. Tightly wound arms. 13.5' x 8.3'. (13hr 15.8' x 42° 02').

M51 / NGC 5194 – spiral galaxy. “Whirlpool Galaxy.” Showpiece. Perhaps the greatest of all galactic showpieces. Certainly, in the running on anyone’s list. 11.2' x 6.9'. (13hr 30' x 47° 16').

M106 / NGC 4258 – spiral galaxy. Large. Pleasing. Inclined. 20.0' x 8.4'. (12hr 19' x 47° 18').

Y Canes Venatici – carbon star. Mag variance 4.9 – 5.9. (12hr 45.1' x 45° 26').

TT Canes Venatici – carbon star. Mag variance 8.0 – 8.6. (12hr 59.4' x 37° 49').

2 Canes Venatici 44097 – colored double. Mags 5.9 – 8.7. 11" separation. Gold and blue. (12hr 16' x 40° 40').

Alpha Canes Venatici 63257 – colored double. Especially nice. Mags 2.9 – 5.6. 19" separation. Blue and gold. (12hr 56' x 38° 19').

Ursa Major

M109 / NGC 3992 – barred spiral galaxy. Distinctive. 7.6' x 4.3'. (11hr 57.6' x 53° 23').

M97 / NGC 3587 – planetary nebula. “Owl Nebula.” Large for a planetary nebula and quite famous. Favors long exposures and integrations. 020" in size. (11hr 14.8' x 55° 01').

M108 / NGC 3556 – spiral galaxy. A wonderful edge-on galaxy. Your science fiction spaceship would have a print of this one on the bulkhead outside the galley. 8.1' x 2.1'. (11hr 11.5' x 55° 40').

M40 / Winnecke 4 – double star! Using crude optics, this pair of stars resembles a comet and of course, identifying false comets is the purpose of the Messier list. Mag 9.0 and 9.6. Separation is close to 53". (12hr 22.4' x 58° 05').

M101 / NGC 4321 – mixed spiral galaxy. 6.2' x 5.3'. (12hr 22.9' x 15° 49').

M81 / NGC 3034 – spiral galaxy. Showpiece. Stunning. Bright. 24' x 13'. (9hr 55.6' x 69° 04').

M82 / NGC 3034 – irregular galaxy. The cigar-shaped member of the M81/M82 pair. 12.0' x 5.6'. (9hr 55.8' x 69° 41').

Draco

Caldwell 6 / NGC 6543 – planetary nebula. “Cat’s Eye Nebula.” This is a surprisingly large and bright planetary nebula. It is a prime imaging target for objects of this type and shows surprisingly complex details of its inner structure. 23” x 17”. (17hr 33.4’ x 66° 38’).

M102 / NGC 5866 – lenticular galaxy. The odd duck of the Messier list. Maybe a duplicate of M101. Maybe not. I’m putting it in Ursa Major here. M101 is a wonderful face-on spiral. M102 in the O’Meara reference is a lenticular “smudge” at size 6.6’ x 3.2’. For all the fame, Messier’s specificity could use a little attention but I’m willing to get notes from the 1780’s a little slack. (15hr 6.5’ x 55° 46’).

UX Draco – carbon star. Mag variance 5.9 – 7.1. (19hr 21.6’ x 76° 34’).

Cephus

Caldwell 1 / NGC 188 – open cluster. 6 – 7 billion years in age making this one of the oldest open clusters in our galaxy. 15’ diameter. (0hr 47.5’ x 85° 14.5’).

Caldwell 4 / NGC 7023 – reflection nebula. “Iris Nebula.” A perfect target for spring (Iris still count as “spring”-ish flowers). It is a little faint for me. Try some HII filter frames. 10’ x 8’. (21hr 1.6’ x 68° 10’).

Caldwell 12 / NGC 6946 – mixed spiral galaxy. “Firecracker Galaxy.” Worth a look for sure as this is a supernova factory producing 9 in the past 100 years or so. 11.2’ x 8.8’. (20hr 35’ x 60° 09’).

Caldwell 9 / Sharpless 2 – 155 – emission nebula. “Cave Nebula.” A distinctly formed nebula famous in photographs. Huge. 50’ x 30’. Magnitude 10. (22hr 56.8’ x 62° 37’).

S Cephus – carbon star. Mag variance 7.4 – 12.9. (21hr 35.2’ x 78° 37’).

-- Northern Horizon -- ■

MINI OBSERVING REPORT

BY BRIAN OTTUM

Thursday, April 27, 2023 was such a pleasant evening that I want to document it.

9-10:30 pm, Saline, MI.
48F, passing high clouds, slightly above average seeing, 1st quarter moon. Telescope: 7” f/15 maksutov (purchased from Lowbrow Awni), at 216X and 562X Mount: ZWO AM5 GOTO using its crude app (not as good as SkySafari)

MOON

Sabine and Ritter twin craters point the way to the Apollo 11 landing site. Going too far is the very bright little Motke crater. I could barely see the dots for the Armstrong, Aldrin, and Collins craters.

Triesnecker Rille is cool with that crater in the middle (and the dark hills/lava outcroppings nearby). Sun is just coming up on the Alpine Valley. So cool to see that big cut (fault line).

At 562X, if you stare at the terminator, the craters invert and look like round plateaus (or maybe that’s just my tired brain).

CLOSE BINARIES

Such a fun activity, splitting close binaries under light pollution+moon, if good seeing. Found a printed list of close binaries from 15 years ago.

Zeta Cancer (“Tegmen”) is a FANTASTIC triple star! The closest are one arc second apart, but easily split in the scope that Awni so carefully collimated.

Omega Leo is another close binary, easily split but dancing around at 562X, separation 0.9”. The toughest test was Gamma Sextans, 0.4” apart but I could see them both during fleeting moments of good seeing (562X). Amazing.

After the above toughies, you could drive a truck between the two brightest members of Castor (Alpha Gem, 4” apart. 562X).

MOMENTARY EXCITEMENT

That crude ZWO phone app that runs its mount shows the Chinese satellites in real-time. I clicked on one and hit “GOTO.” I had a rush of adrenaline when the scope started slewing. Alas, the scope stopped at the spot where the satellite was back when I clicked. No satellite tracking in the app (yet). I don’t believe SkySafari has it yet, either.

EPILOGUE

Since the Dawes Limit for my Mak is 0.5”, splitting the 0.4” Gamma Sextans was quite a feat! Was the seeing excellent? Was I just using averted imagination? I’ll have to confirm the observation on another good night. Also, I must kick myself for not trying to split Dubhe that special night since this has been a decades-long quest for me. ■

INTRO TO ASTROPHOTOGRAPHY: MOUNTS

BY JEFF KOPMANIS

So, you got yourself a telescope! Unlike Captain Ahab, you probably won't want to hold it out with your arms. They'll get tired, and you probably can't hold it very still anyway.

The solution is to mount the telescope on top of a tripod, or if you have your own observatory, some kind of super-stable pier. But just how does the telescope attach to the tripod and rotate smoothly in two directions to let you see all of the neat stuff in the sky?

Simple Solution

The obvious solution is a simple pivot much like you use with a camera or spotter scope. This is known as an altitude-azimuth mount. It rotates up and down, and around a center axis. Here's a picture that'll look very familiar:

You've probably seen one of these camera tripods. They rotate around the center post (azimuth) and the telescope or camera can swivel up and down (altitude). Simple and inexpensive.



These kinds of mounts work well, but as the size of your telescope increases, you will start to have balancing issues, stability (wobbly views if it moves too much), and other mechanical issues related to increased weight and size.

Here's a large telescope in a fork-type alt-az mount (Planewave CDK 700), that weighs some 1200 pounds -- and costs about \$175,000! But fundamentally, it moves up and down and around on its axis. I'm not that familiar with the



Planewave mount. I suspect that it is highly accurate and can be controlled remotely, but at a price that might just be out of range for many of us.

To address that cost problem and the complexity of the big mounts used in larger aperture telescopes, John Dobson came up with an inexpensive alt-az mount that is very simple and nearly anyone can use it -- the Dobsonian mount. The advantage is that it can easily hold large Newtonian telescopes. Here's a typical example, with a 16" truss-type Newtonian telescope.

The "box" allows the telescope to swivel up and down, while it rotates around. There are more elaborate designs, but the basics are all here.

For objects on Earth, it doesn't seem like a big deal that the mount sits on the ground, but when you start to look at objects in space, you'll quickly notice that they float by in your field of view and you have to keep correcting the mount to keep the object in view. This is because Earth is spinning at roughly 1000

miles per hour (460 meters/second)! If you're on the ground and looking at a bird sitting in a tree, it means that you, your telescope, the bird, and the tree are all traveling at roughly 1000 mph. They just appear to be sitting still because they're all going 1000mph! So what are you to do if you want to keep your target galaxy or planet centered in your view?

Tracking

The answer to that question is to mount electric motors to move them at the same rate that the objects in the sky move so that your target stays centered. For an alt-az mount, you need one motor for the altitude axis and one motor for the azimuth, and they should move in a coordinated fashion so that your target object stays consistently in the middle. This means adding electronics, computers, and GPS: A whole load of gear you never planned on needing.

MOUNTS continues, p. 10

But wait. Astronomers have used tracking telescopes for over 150 years and they didn't have all that electronic mumbo-jumbo and coordinated stuff. So what did they do!?

The Equatorial Mount

In 1824, a clever German optical lens manufacturer named Joseph von Fraunhofer invented the equatorial mount, now known as the German Equatorial Mount (GEM). Instead of aligning itself to the ground (by leveling), the equatorial mount has one axis aligned with the Earth's axis. By pointing this axis at the North star, Polaris, the telescope can now rotate around only one axis to follow an object across the sky. When photographing objects, this dramatically improves the steadiness of your photos since you have motion in one direction. Equatorial mounts will almost always have a counterweight to balance the weight of the telescope on the mount. There are some minor variations in how the counterweight is implemented.



These are the two major variants of equatorial mounts: the center-balanced equatorial mount (left), and the traditional "German" equatorial mount (right).



If you look at the spot where the telescope mounts in relation to its rotational axis, the German type is very "straight through" while the center-balanced has a more "Z" type design. The center-balanced design puts the center of gravity lower and closer to the center of the tripod, steadying and stabilizing the load -- a subtle advantage for photographers.

Size Matters

The last thing to consider is how much weight a mount is able to carry and move with precision and steadiness. If you overload your mount, it will have difficulty accurately tracking objects in the sky and will present shaky views and blurry camera images. Generally, we try to load our mounts to about 50-60% of their rated capacity so that extra accessories or windy conditions won't affect your gear.

Conversely, you indeed can put any scope on a super-heavy-duty mount for steady, accurate tracking, but you'll also have to carry/haul/lug that mount and its heavy tripod to your viewing spot.

Once again, it's important to know your needs and capabilities and balance those with your abilities as a "pack mule" (and possibly the quality of your health care insurance).

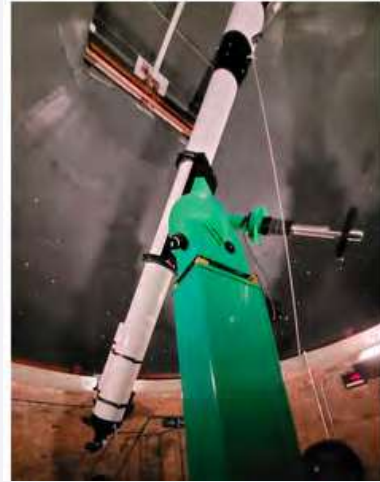
This hefty two-story mount (top right) is appropriate for the 10" refractor at Eastern Michigan University's Sherzer Observatory, but it's likely overkill for a 60mm Lunt MT refractor.

Likewise, this iOptron SkyHunter mount (bottom right) and tripod fit that Lunt 60MT quite nicely, but would probably wobble and shake if the Sherzer 10" were placed on it!

Naturally, a smaller, lighter, less capable mount is going to cost only a few hundred dollars (iOptron SkyHunter \$650), while something heavy-duty and capable of handling tens if not hundreds of pounds will run into the thousands (Planewave L-600 direct drive mounts go for \$33,500).

Conclusions

Choosing the right mount for your telescope depends on what type of viewing or imaging you might be doing, the weight of your equipment, your willingness to transport the mount and your other equipment to your viewing site, and -- as always -- the size of your bank account. ■



UPCOMING TOPICS FOR THE OBJECTIVE LENS

BY JACK SPRAGUE

All images are welcome and while we have a monthly theme, we love any submission. Images submitted will be included in "The Objective Lens" and in the annual **Backfocus** compilation without any rights transfer beyond your permission to allow The University Lowbrow Astronomers use of your image for inclusion in these two documents.

Backfocus, our collection of images from the "Objective Lens" photo roll, is in production. For size and distribution ease, it is being produced in quarterly increments and will be released as each quarter's volume is complete. While it was intended to release all 4 volumes for the '22-'23 year in April, vocational and real-life concerns have made that schedule a little ambitious. The four volumes should be all completed here "this spring" using the Michigan spring season as a guide.

Thanks to the membership for the indulgence in this first production schedule which turned out to be a little more demanding than anticipated. Then, aren't all new product releases in that same boat?

June – Planetary nebula images. These tend to be small and are notoriously demanding to bring to full "Hubble" quality showpieces. For the Lowbrows?

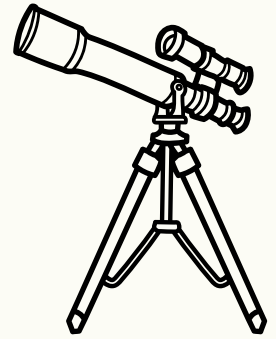
July – Skyscapes of Michigan. Daytime -- clouds and weather appreciated – or nightscapes. Stellar objects are also welcome.

August – It is time to celebrate ... the clusters. Balls of stars, either globular (the senior citizens of the near-Milky Way environs) or open. I enjoy the billiard-ball / black velvet sort effect from those of uniform star sizes; but, the open clusters with stars

of differing magnitudes across the whole FOV are interesting to parse into concealed asterisms.

More than one trace sailboats in my eyes. Nevertheless, let's

show our fine focus and capture the conglomeration of stellar lightning bugs from summer (late spring?) nights. ■



UPCOMING MEETING SPEAKER SCHEDULE

May 19: Buddy Stark, Planetarium Manager, U-M Museum of Natural History.

Topic: *Visit to the U-M Museum of Natural History Museum Planetarium*

June 16: Jim Shedlowski.

Topic: *Orbital Light Pollution*

July 21: Norbert Vance, Director of Sherzer Observatory @ EMU.

Topic: *The updated planetarium*

August 18: Tamas Gombosi, UM Center for Space Environment Modeling

Topic: *TBA, about solar wind*

September 15: Avital Keeley-Polston, EMU Physics.

Topic: *TBD, likely about the Oort Cloud*

October 20: Dr. Brian Ottum, club VP.

Topic: *Preparing for Next Year's Eclipse*

General Meeting of the University Lowbrow Astronomers April 21, 2023, 7:30pm, UM Detroit Observatory

Charlie Nielsen (President): This is the first club meeting at the Detroit Observatory in many years.

Austin Edmister (Assistant Director for Astronomy, Judy & Stanley Frankel Detroit Observatory): The Detroit Observatory has been a part of UM history from its construction in 1854 to the present. For a while the Lowbrows met at the Detroit Observatory. Unfortunately, that didn't continue.

Originally there was a long stairway to get to the observatory, now people can enter at ground level pass by a new state of the art classroom (where we are currently located) to stairs and an elevator that go to the old observatory building. We are excited to have the Lowbrows return.

Charlie: Introduced the speaker, Dr. Jeff Morgenthaler, Planetary Science Institute.

His talk was "Studying Volcanic Activity on Jupiter's Moon Io Using Equipment You Can Buy at a Camera Shop." He covered the role of Robert McMath, Jupiter's Moon IO, the IO Plasma Torus, Sodium Nebula and the Io Input/Output Observatory.

Charlie: Officer Elections. All Current officers willing to serve for another year. All Officers have been nominated and seconded. However, Bryan Ottum has not been able to do much as Vice President but he does a lot with AATB. If someone else is willing to be VP he is willing to step down. Is anyone interested in that or any other position?

No one responds.

Charlie: Motion to support slate as proposed?

All Ayes, no Noes and the motion passes.

Charlie: Next Month our meeting will be at the UM Museum of Natural History.

Jim Forrester (Vice President): We've had a couple successful member nights. There is a scheduled open house tomorrow, but it is questionable if the weather will be favorable. Jim will send out an email by 4:00PM or earlier stating the status of said open house.

Open houses are on the Saturdays that bracket the new moon. Member nights are open to members and their guests. If you know of a friend or relative with an interest in astronomy, bring them along. They may become a Lowbrow.

Dave Snyder (Vice President): For next month's club meeting, the Palmer Parking Structure is probably the best place to park. The Dental School parking lot would be closed by 7:30, so is not an option.

We were thinking of having events with either the Ann Arbor Hands On Museum, the Leslie Science Center, the Detroit Observatory and/or the UM Museum of Natural History. Such events depend on volunteers from the club and Dave wanted to know if there was interest. Such events are likely to be daytime events.

Amy Cantu (Newsletter Editor): Nothing except for "Thanks for the submissions."

Jack Brisbin (Observatory Director): Each year the Michigan Math Scholars meets for a night session on Peach Mountain. This is organized by Shannon Murphy of the UM Astronomy Department. This year there will be two sections: The first will meet Monday July 3, with a rain date of Thursday July 6. The second will meet Monday July 31 with a rain date of Wednesday Aug 2.

A number of items have been bought for the observatory. There was a weather forecaster, but it had died. Jack purchased a replacement. It is wireless and can forecast temperature and humidity. This may be useful for knowing when to turn on your dew heater. Also, a new surge protector was purchased.

The total for all the purchases was \$123.

Jeff Kopmanis (Online Coordinator): Tonight, there were 25 in person and 18 on Zoom. This is a reversal of the normal pattern, there were more people in person than on Zoom. This could be because of the new venue or some other factor.

The new website is coming along. Jeff has been adding content and making adjustments to the categories.

Brian Ottum (Vice President): Astronomy at the Beach is proceeding. We have a potential keynote speaker, Paul Gross, retired weatherman. The next AATB will be held in September 22 and 23, 2023.

Fundraising for the event is slow. We are waiting for the IRS to come through with our 501C3. We need to appear on the official list. This is helpful for companies who are considering donating money if they know we are an official 501C3 organization.

Will have more later when we get closer to September.

Charlie: Don't see Doug Scobel (Treasurer) or Krishna Rao (Webmaster).

Brian: We are doing a "Big Moon" event on Tuesday April 25 at the Ann Arbor District Library.

Amy: If its cloudy, we will try the 26, 27 or 28.

Brian: We did a successful test where an image was displayed from a nearby building. This generated a lot of interest from people walking by.

Amy: This event will be 8:30-9:00PM, Brian will be out on the sidewalk and the screen will be just inside the front doors.

A new member, Zach, introduced himself.

Charlie: Charlie thought Zach was our 200th member.

Jeff: We might be at 202 members. Across the board, our club as long other clubs in the area have seen an increase in members over the past year as COVID restrictions have eased up.

Charlie: Meeting Adjourned.

After the meeting, there was a tour of the old observatory building.

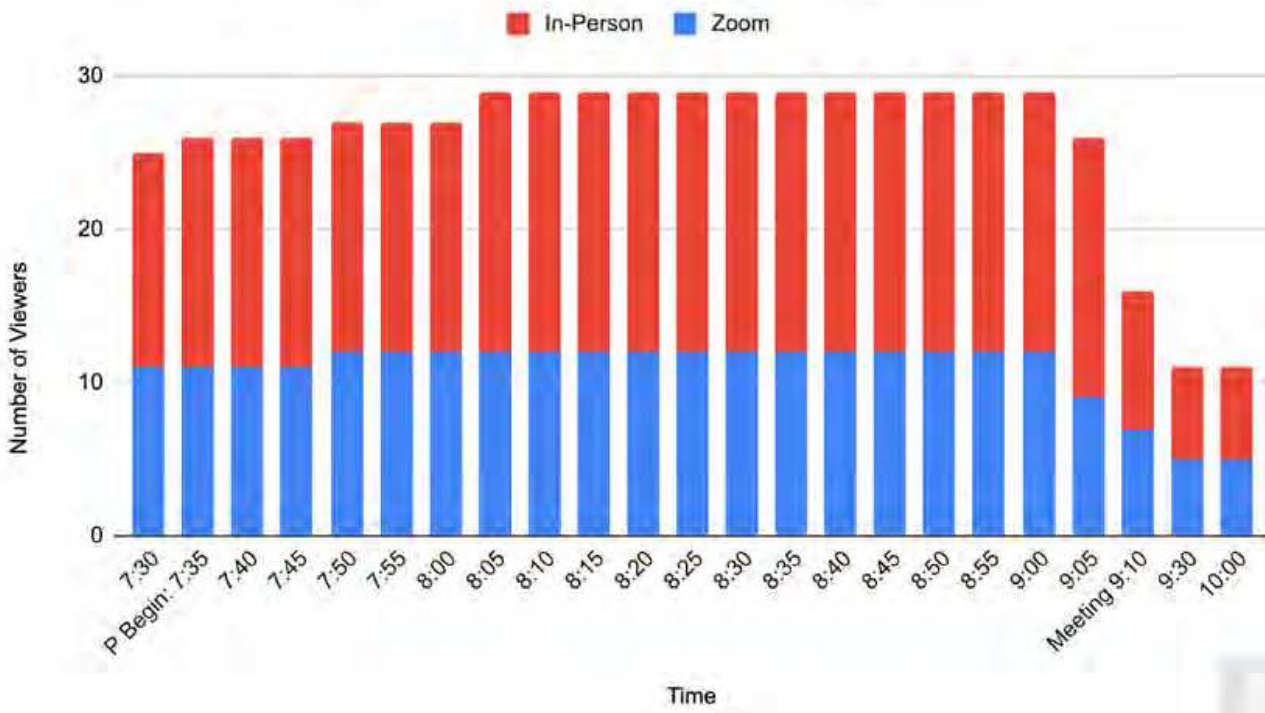
Doug Scobel had submitted his report via email:

- We have 198 memberships and \$13,839.11 in the treasury.
- Besides our usual monthly costs for the Open House "hotline" and printed newsletter printing and mailing costs, our recent expenditures were:
 - o \$200.00 to the Vatican Observatory Foundation in honor of Brother Guy Consolmagno for his presentation to us in January.
 - o \$194.00 for annual rental of our post office box at the Green Road USPS branch.
 - o \$60.00 to renew our sponsorship of the Clear Sky Chart for Peach Mountain.
- I will send a size large T-shirt to the March meeting's guest speaker Dr. Mojtaba Akhavan-Tafti when I get home.

Submitted by Dave Snyder.

Meeting Attendance

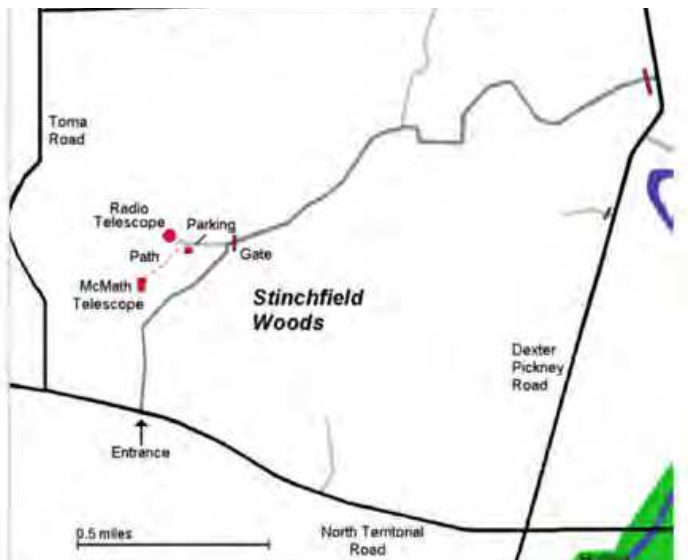
March 17, 2023 - Dr. Mojtaba Akhavan-Tafti, UIM Astronomy - Parker Space Probe



PLACES & TIMES

Monthly meetings of the University Lowbrow Astronomers are held on the third Friday of each month at 7:30 p.m. The location is usually the Judy & Stanley Frankel Detroit Observatory. The Observatory is located at 1398 E. Ann St., Ann Arbor. The Ann Street Parking Structure (M86), the Catherine Street Structure (M5), the Glen Street Structure (M61), and the School of Public Health II Lot are usually open after 6:00 p.m. Mon-Fri. The M86 structure is closest to the Detroit Observatory.

Peach Mountain Observatory is the home of the University of Michigan's 25-meter radio telescope and McMath 24" telescope, which is maintained and operated by the Lowbrows. The entrance is addressed at 10280 North Territorial Road, Dexter MI, which is 1.1 miles west of Dexter-Pinckney Rd. A maize and blue sign marks the gate. Follow the gravel road to the top of the hill to a parking area south of the radiotelescope, then walk about 100 yards along the path west of the fence to reach the McMath Observatory.



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 Mt. Observatory but are usually canceled if the forecast is for clouds or temperatures below 10 degrees F. For the most up-to-date info on the Open House / Star Party status call: (734) 975-3248 after 4 pm. Many members bring their telescope to share with the public and visitors are welcome to do the same. Mosquitoes can be numerous, so be prepared with bug repellent. Evenings can be cold so dress accordingly.

Lowbrow's Home Page
<http://www.umich.edu/~lowbrows/>

MEMBERSHIP

Annual dues are \$30 for individuals and families, or \$20 for full time students and seniors age 55+. If you live outside of Michigan's Lower Peninsula then dues are just \$5.00. Membership lets you access our monthly newsletter online and use the 24" McMath telescope (after some training). Dues can be paid by PayPal or by mailing a check. For details about joining the Lowbrows, contact the club treasurer at: lowbrowdoug@gmail.com

Lowbrow members can obtain a discount on these magazine subscriptions:

Sky & Telescope - \$43.95/year

Astronomy - \$34.00/year, \$60.00/2 years or \$83.00/3 years

Newsletter Contributions:

Members and non-members are encouraged to write about any astronomy-related topic. Contact the Newsletter Editor: Amy Cantu cantu.amy@gmail.com to discuss format. Announcements, article, and images are due by the 1st day of the month as publication is the 7th.

Telephone Numbers:

President:	Charlie Nielsen (734) 747-6585
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	Jim Forrester
	Brian Ottum
	Dave Snyder
Treasurer:	Doug Scobel (734) 277-7908
Observatory Director:	Jack Brisbin
Newsletter Editor:	Amy Cantu
Key-holders:	Jim Forrester
	Jack Brisbin
	Charlie Nielsen
Webmaster:	Krishna Rao
Online Coordinator:	Jeff Kopmanis

A NOTE ON KEYS: The Club currently has three keys to the Observatory and the North Territorial Road gate to Peach Mountain. University policy limits possession of keys to those whom they are issued. If you desire access to the property at an unscheduled time, contact one of the key-holders. Lowbrow policy is to provide as much member access as possible.

Email to all members
Lowbrow-members@umich.edu



University Lowbrow Astronomers

