

How to Remove a Mirror's Coating

By Tom Ryan

There are lots of reasons to remove a mirror's coating. Maybe you want to turn your telescope into a solar scope, or want to refigure a mirror that isn't performing to your expectations, or maybe you just want to play a trick on a friend at a star party (Hey, look at this! My binoculars can see fainter stars than your eight inch scope!).

In my case, I had refigured the secondary on my beloved 8" Cave reflector, and could get it aluminized for free if I re-coated the primary at the same time. Never one to pass up a free offer, I stripped the original Clausing Beral coating from the mirror (which had held up beautifully for the last forty-one years – Dudley Leroy Clausing knew what he was doing in 1966), and this article explains how I did it.

The first picture shows all of the components you'll need to remove the aluminum coating from a mirror, without removing the glass parts. I took the mirror out of its cell for this operation. I also needed tape (almost any kind will do, as long as it is fairly wide and relatively waterproof) and ferric chloride, also known as Radio Shack's PCB circuit board etchant. It would be smart to wear rubber gloves for this operation because the etchant will turn your skin a bright yellow color, like, right now (I don't know what color it turns your liver), but I didn't, because the etchant is an acid, and fooling around with acids is a regular man-type activity, and real men don't take precautions; they just go to their graves early and don't whine about it. So I didn't.



The etchant is not easy to find. Radio Shack sells kits for about \$16 that have a little bit of etchant in them, along with a plastic tray, but that's not a good deal. I did a web search and found a Radio Shack in Westland that caters to people who still actually do stuff, instead of just talking about it or selling insurance to each other, and they had several industrial size bottles slowly leaking on their shelves, which I instantly bought up. Westland is not easy to find, either. Once I got there, I recognized it from the days of my misspent youth when I worked in the Detroit factories and was sometimes a bit too impaired coming home to use I-94, and instead drove back on the slower US-12. However, this particular trip was made vastly better than my previous ones by the absence of a hangover and the presence of the young woman

who worked in the Radio Shack. Not only was she beautiful (and I'm not talking about beautiful by electronic geek standards), but she demonstrated her intelligence and good judgment by refusing to take the bottles off the shelf for me. For all of you unattached mirror strippers, I left a few bottles behind.



The first step in this operation is to wrap the tape around the mirror and seal the edges so the etchant stays on the mirror's surface. It pays to seal the edges as best you can, and it pays to do this whole operation outdoors, unless, of course, you wanted to replace that rug and refinish the hardwood floor anyway.



Then, you roughly level the mirror with a few of the broken twigs you have lying around (Try finding those in your living room. Hah!) and just pour the etchant onto the mirror. Enough to cover it is enough. An aluminized coating is a lot thinner than the copper on a PC board, and you're gonna have to dispose of this stuff when you're done.



The etchant will get to the aluminum through the pinholes in the mirror's sapphire overcoat, and will make short work of the coating. The original Beral coating was quite bright and had very few pinholes, but it dissolved completely in about five minutes.



When the coating is completely gone, you can pour off the etchant into a plastic container and flush it down the drain. Is this safe, you ask? The engineers who work for Radio Shack have determined that any city whose sewage treatment plant can handle the output of half a dozen Taco Bells will have no trouble with a little ferric chloride that DISSOLVES



METAL and turns your skin bright yellow RIGHT NOW! And they're probably right. So it's OK to do it. They said so.



Rinse the mirror off, remove the tape, rinse again, and VIOLA! You now have a mirror with no coating. Which was, as you will remember, the whole point of doing this.

Tom Ryan has written many articles concern optics and is currently living under an assumed name somewhere in Ann Arbor ... a fugitive of the EPA! Just kidding!

All Images in this article were provided by Tom Ryan



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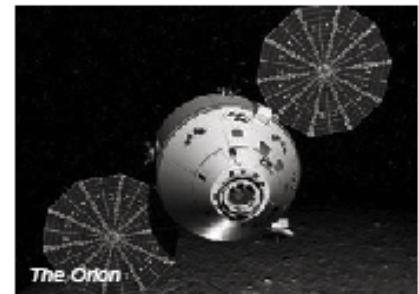


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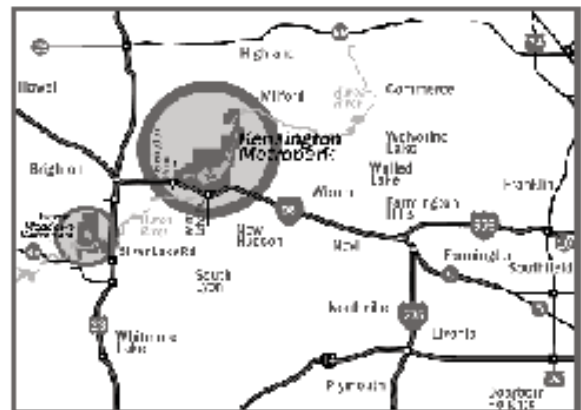
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OBSERVING UNDER ARIZONA'S DARK SKY **& ONLY A 4 HOUR DRIVE. TRY IT!**

By John Causland *Images provided by Yasuharu Inugi & John Causland*

The first thing you need to know about northern Michigan is that it's within a hair of being as dark as darkest Arizona!

Yasu and Yumi have been trying to convince us now for the last 2 summers that we really ought to get our duffs up and off of Peach Mtn., or even Lake Hudson, once in a while and try observing not so far north. Though "new" to observing, our 2 Asian transplants have scoured the state searching out campgrounds to observe from. I have personally had the privilege of using their Michigan county map book and reeled in shock at the endless numbers of highlighted roads that they have traveled in the northern tier of southern Michigan!



Yasu knows the campgrounds by heart and, out of them, has ferreted out only ONE that is really appropriate for observing. But, Tomahawk Creek Flooding is phenomenal! Yasu escorted me there the second weekend of August. In addition, we scouted out a few more campgrounds he hadn't seen, and I got a firsthand look at why 98% of all campgrounds don't work for a Lowbrow's night's pleasure. Invariably, they're all treed in! And Yasu and Yumi have seen practically all of them! There are many campsites around Tomahawk, but some few give horizons matching at least what we get from the observing area near the radio telescopes at Peach, and about as much area. We could easily hold a good size star party there, as Yasu is rather intent on organizing eventually. Additional campsites and observing areas are just adjacent. Though out-houses are the only amenities a few yards away.

Tomahawk lake is quite large, about 10 miles south of Onaway and 15 miles north of Atlanta on Route 33. The quickest way to get there is straight up 75 for 140 miles and then another 90 straight north on Rte. 33. The 230 miles is doable within 4 hours of reasonable driving conditions. My first experience found us arriving at 9:15 with darkness descending. By 11, we were set to camp and observing. Not having gone to Black Forest in 2006 when Lowbrows had to make due with Messiers between the lightning bolts thru Yasu's binocs, it had been 2 summers since I'd had DARK sky. The ever popular objects we always "resort" to became my sole targets, as they seemed like a different class of objects altogether with their splendor revealed. I will only



mention the unforgettable double dark lanes in M31, Andromeda, and the sweep of light extending out to M32! Using the Sky Quality meter, we got a 21.70 reading, within spitting distance of the 21.79 I'd gotten on the rim of the Grand Canyon. By comparison, Leslie Park is 19.5, my driveway is 20.0, Peach is 20.5, Clayton's 20.7, and Lake Hudson 20.9. The dark sky topo maps of northern Michigan use the same system of measurement and no wonder, then, that the skies are rated at about 21.7 (dark gray) for the area largely above Mio and east. Just to note, we got ever so slightly darker readings on the shore of Lake Superior in a brief observing session in 06 after canoeing the Two Hearted River in the UP.

By 4 am, we were zonked. The next day we explored campgrounds and found that 5 miles north of Onaway, a huge campground provided showers, only 20 minutes from Tomahawk. And a really good restaurant for a very small town. Unfortunately, the weather went south for the second night and we headed back home.

And then, there was the following weekend of mid August.



What do you do when obsessive observing is now in your blood, even temporarily, and Peach is rained out?

Head north. Really north! With the new moon just barely in evidence, I felt possessed by thoughts of going back up north again for 2 days this weekend, and extend what Yasu and I had begun the previous week at Tomahawk Creek Flooding. But, Yasu wasn't available, the Lowbrow mtg was Friday night and Krishna Rao expressed some real interest in going too, but only for one night.

So, Krishna and I jumped aboard the red Albireo brother's Aztek (Kingfish has the grey one) and hauled the 61 and the 14 up north Saturday at noon. With Friday traffic behind us, we assumed a quick trip to Tomahawk with an early arrival. But, what we got was an immediate traffic jam/stop on 23 north of Ann Arbor and snaked our way up to Brighton via dirt roads. The "partly cloudy"

sky didn't budge from mostly cloudy the entire trip north, and we regularly wondered what possessed us to go! And we recalled the various web sites promises of mostly clear skies in Onaway, over and over. Onaway, we've got to get to Tomahawk Creek Flooding.

Ok, with most of the 90 miles up Rt. 33 behind us and Tomahawk Creek Flooding dead ahead (230 from AA) what we've gotten depressingly used to seeing, in fact, was heavy clouds above us, as usual, but now a precise line of absolutely blue sky lies just ahead, but just not at Tomahawk! Since Krishna hadn't seen Yasu's dark sky gold mine yet, we veered off the road just long enough to prove to Krishna that the promised land existed and then quickly decided that since we couldn't know if the clouds would settle southwards, that we MUST continue north. But where???

With Krishna's copiloting and a new, more detailed map of campgrounds, we first headed up the remaining 10 miles north of Onaway, and sure enough, the blue sky line was more or less above us. Vindicate the



weather services. On to the west for some campground scouting, but heck it's only 6 pm and we have hours to go before dark. There must be somewhere to go...or so we figured. Even though Yasu had learned months ago the hard way that campgrounds of any kind are invariably treed in.



Our first foray and a lost half hour took us onto a sand trail in search of a trail camp. After kissing wheels with a horse trailer passing us, we gave up, as the sand deepened. Try two, another 20 miles north of Onaway, and we're at Aloha for another lost half hour. 300 campsites, but, but, but, a big parking area for boat trailers, away from the campsites. We really debated this one, but with the clouds pushing in on us, only 20 miles north of Tomahawk, we reluctantly moved on. This forced us past Cheboygan onto the Huron coastline on 23. Heading northwest now, the sky really is clear! Yes! And our next site to check is a small private site, Roberts Landing, on the lake. Just a couple dozen, mostly unoccupied permanent looking trailers, and practically no one to be seen, and no one to take our money. But look at that HUGE lakefront lawn (twice the size of "the Hill" by the radio dishes) with no obstructions!!!

And look at those mercury vapor globes along the small roadways. Eeek. So, reluctantly, we continue on down the road to within a couple of miles of Mackinac city, and stop at Mill Creek campground. 300 more campsites and they guarantee us they have lots of lights to "protect the children" and no open field spaces. They won't let us even drive in to look!

It's now 8:30 and we're friggng desperate! Do we do a banzai run for some campsites just over the Mackinac bridge in the UP with no hope of setting up? Or, and this we do, go back down the road to the place we just left, Roberts Landing, with sparse trailers and globe lights and beg and plead to stay. Back we go and some very few campers, a family, tell us that, yes, the best of all sites down by the lake are rented to tenters periodically and assure us, the woman who owns the place might well let us stay. We're directed to the oldest of the permanent trailers, and Pastor Hooker, a sweet retired old guy and his wife, look us in the eye, and smile and say go right ahead, they'll take responsibility for letting us stay. Yee Haaaa! We've arrived and it's about 9 pm. About the globe lights, only a couple come on and rather dimly. We later cover the only one that affects us with a blanket. This is vastly better than any state campground and god knows how anyone really gets permission to camp here, as it feels like you've invaded some extended family campground, where only word of mouth could ever get you in.

We begin setting up camp and scopes and are quickly joined by 3 of the camper family group, who make conversation and help bolt together the 61. The 14 goes together fast with a few recent mods, and Krishna shows them some sights while I vainly struggle with



the 61, finally realizing a screw fell out of one of the secondary vanes, and the assembly is looser than a goose. By 11 pm, we're happy campers/observers. The sky is clear and dark, but the transparency isn't as good as it looks it should be. Periodically, the Sky Quality Meter comes out and we get a consistent 21.45 compared to 21.70 at Tomahawk, but this place really is dark though only 10 miles from Mackinac. The double dark lanes in M31 appear but not as distinctly as the week before with Yasu. This is true for most objects, but heck, this place is more than as much darker than Lake Hudson is to Peach by the meter numbers. Krishna's pretty thrilled with views in the 14 and the 61 teases out some good details. But, the dew thickens finally creaming the 14 altogether, dew shield left behind. We struggle with this all night and by 4 am, most of every horizon is dark as can be, but no stars can be seen. The zenith is still clear - we have seen stars and we gratefully crash.

4 hours later, Krishna is up and ready to bolt south. Our closest "neighbor" has heard us stirring and comes over with a full pot of coffee!! At 9 am, the sun has burned off the fog, and we're on the road. As we get to Gaylord, the blue sky has long disappeared, the heavy clouds are back and light rain follows all the way back and by 1:30 we're in Ann Arbor.

OK, 2 weekends in a row, one nighters under really really dark sky, 250 plus miles up and back on back to back days.

Would we do this again? You betcha. We KNEW stars could be found up north. And our mutual good company made the extra 3 hours drive meandering to Mackinac a fun, decision filled adventure. Here's the best part: When we left the campground, the owner still wasn't around. so we later called her and thanked her for her tenant's tacit agreement to let us stay mentioning how we enjoyed her regular year in and year out campers who came over to see the stars. They must have told her of us, and as hung up, she said that the next time we come up north - if she's not around, that we should just "make ourselves at home"! Hey, there's room on that lakefront for two dozen Lowbrows. So, we now have an alternative to Tomahawk if ever need be!



Here's a composite of eighteen images I took the morning of August 28, 2007, starting at 4:47 and ending at 5:58. I used my Canon PowerShot A620 with 1.75x teleconverter, mounted on a tripod. Exposures ranged from 1/640 second to two seconds, all at an effective f/12.6. I used Paint Shop Pro version 8.0 to assemble the composite.

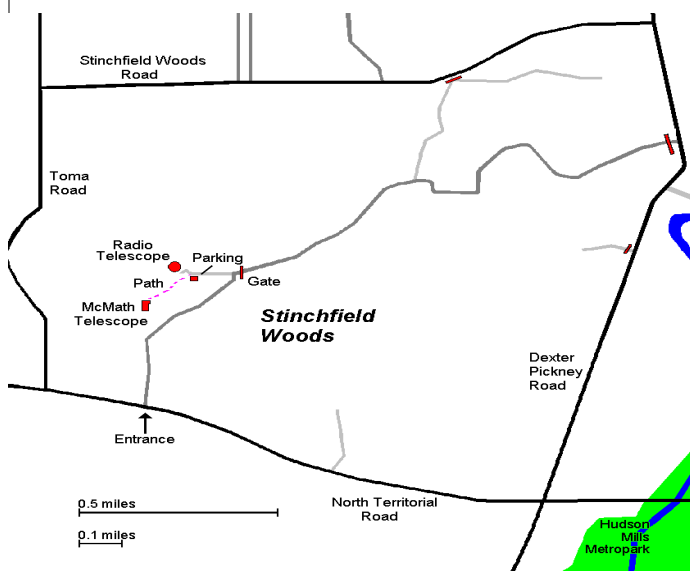
Hope you all got to see the show, it sure was purdy!

Doug Scobel

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. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomer c/o Yasuharu Inugi

**1515 Natalie Lane #205
Ann Arbor, MI 48105**

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. Members renewing their subscriptions are reminded to provide the renewal notice along with your check to the club Treasurer. Please make your check out to: "University Lowbrow Astronomers"

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call or Email the Newsletter Editor: **Mark S Deprest (734)223-0262** or msdeprest@comcast.net to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

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Lowbrow's Home Page

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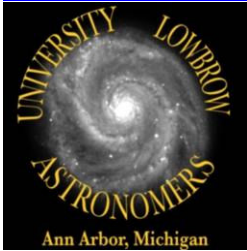


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Reflections & Refractions

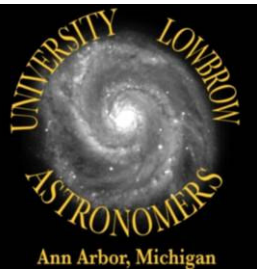


Website

www.umich.edu/~lowbrows/



Image By Norb Vance—Total Lunar Eclipse—August 28, 2007



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