University Lowbrow Astronomers
Ann Arbor, Michigan

REFLECTIONS AND REFRACTIONS

OF THE UNIVERSITY ASTRONOMERS

AUGUST 2003

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Upcoming Events

August 2003

- **Saturday, August 2 (Starting at Sunset) Regular Scheduled Open House and Star Party at the Peach Mt. Observatory. Weather Permitting.**
- **Friday, August 15 (Starting at 7:30) Monthly meeting held in either room 130 or 807 in the Dennison Building. Meeting Multiple speakers.**
- **Saturday, August 23 (Starting at Sunset) Regular Scheduled Open House and Star Party at the Peach Mt. Observatory. Weather Permitting.**

A Day Trip to Palomar

By Christopher Sarnecki

I recently found myself in Los Angeles on a trip with a day to spare. I had planned on visiting the Griffith Observatory; but wouldn't you know it, the place was closed for a three year renovation. A quick check of Cal Tech's website and I find the famous Palomar Observatory is open to visitors. Plan on three hours of non-rush hour driving to get from LA to Palomar Observatory. One exits I-15 southeast of LA on to CA76, a two-lane blacktop through a rural mountain valley, and finally up a 3500-foot climb called S6. For a mid-westerner, the trip to the top of Palomar Mountain might as well have been a trip to Mars. With so much foreign flora and scenic overlooks I find myself stopping to admire the views along the roadside and the views miles away to the next mountain ridge. Strange plants, many in full bloom in early July, beckon me to stop and photograph them. I am reminded to put the car into park, set the brake, and turn the wheel to assure the rental car doesn't end up over the side of a cliff. The trip up S6 took twice as long as it could have. Half the fun, after all, is getting there.

Continuing up the south side of Palomar mountain one notices several "Caution Dairy Cow" signs, although none are seen. It's no surprise. The absurdity of having dairy cows on the side of a mountain that requires a 7% white-knuckle switch back road to navigate its summit is lost on me. Perhaps the road commission was out a more appropriate warning signs.

The observatory shares the summit with the Cleveland National Forest. Once on the mountaintop, you notice that the forest has changed from a mostly deciduous forest, on the south side of the mountain, to a tall redwood, cedar, and conifer forest on its north side. About 20% of the trees appear to have succumb to a blight and are standing deadwood, many with their needles still attached. All at once you are face to face with the impending national forest fire dilemma. Around a bend in the road and there it is, shining brightly in the reflected sun light off it¹s titanium white dome. The dome of the Hale 200-inch telescope is just like you imagined it. Named after the astronomer, who promoted, no, perhaps goaded the astronomy community to construct this telescope during the mid 30s; George Ellery Hale never lived to see the observatory completed. Nestled in a high mountain plateau, Palomar Observatory looks smallish until you realize that you are probably still a mile away. Signs to the Palomar property shuffle you to a generous paved parking lot. Off in the distance is the observatory. All of a sudden you begin to take in the size of the signature dome. Those ants around the outside are people!

A sign cautions you to stay on the path or the rattlesnakes will get you. First stop is a nice little museum and gift shop. The museum is designed in the vernacular of the mid century modern with a touch of the southwest that complements the dome nicely. In the center of the one room museum is a terrazzo covered full size mock up of the 200-inch mirror. Man, this mirror is bigger than my first apartment. Around the perimeter of the space are astro photos, many taken through the Hale telescope. I make a mental note to stop by later to visit the gift shop; then I am out the door on the short path to the dome. This amateur has come to Mecca.

A short walk to the observatory is an exercise in proportions. This dome is HUGE! Yet when one approaches the base of the observatory there is a sense of human scale brought on by the strong horizontal line of the catwalk around the outside of the dome. The structure sits on a slightly elevated mound. A set of stairs must be ascended as one would ascend the steps of a cathedral or a classically designed courthouse to enter the building. The architecture of the observatory doesn¹t look dated or out of place when compared to today¹s style. Its simple design compliments the natural site of its mountaintop plateau. One gets the feeling that nothing out of the ordinary was embellished on the observatory design and setting. The half-century design suggests that the mission here is the science of the exploration of the universe. A Herculean task to be performed in a bold and mighty structure. Cal Tech has maintained this 50 year-old structure quite nicely.

The exterior dimensions of the observatory are 135 feet high by 137 feet wide, very similar to the Roman Pantheon. Its 4-foot steel and aluminum double wall construction weighs in at 1,000 tons. Two 125-ton shutters form the slit. The dome rotates on a set of double tracks supported on 32 trucks that remind one of little railroad carriages. Upon entering the observatory¹s front door one sees a ceremonial bust of George Hale sitting in a niche opposing the entrance, almost

as if keeping an eye on all who enter his observatory. A short climb up two flights of stairs (past the toilets that famous observers of the past must have visited. Thanks Fred) and you are standing on the observatory floor along side the famous 200-inch, albeit separated from the scope itself by a glazed curtain walled visitors gallery. The inside of the building is purposely separated from the visitors, not just for reasons of security, but so as to maintain climatic conditions expected for the nighttime observing run. Lighting is kept to a minimum and air conditioning keeps the hot and humid Los Angles basin environment at bay. Observatory staff are busy mounting the night¹s array of electronic detectors aided by a nifty little platform lift that rises from out of nowhere from the observatory floor. All this is available to the visitor as a form of silent entertainment from the gallery.

The construction of the observatory structure was started in 1936 and was completed a short two years later with help from some Cal Tech grads who helped pour the foundations. The telescope structure is a classic split ring, a horseshoe design with the optical tube assembly comprised of opposing serruier trusses. The mirror mount unitizes an oil flotation solution. The 200-inch mirror, that looked so massive in the museum mock up, is almost lost sitting on the telescope assembly while the telescope structure sits on the observatory floor with room to spare inside the massive dome.

The telescope was constructed at east coast shipyards because there was no better place to fabricate and assemble the large steel plates that are used for each component of the scope. The US Navy helped escort the telescope components through the Panama Canal to the coast of California. Rumor has it the paint scheme is battle ship gray because that's the color you find in a shipyard.

Mirror fabrication took place from 1934 to 1936. The primary was to have been made from fused quartz but the caster was unable to make such a large mirror after spending $1M trying. Hale convinced Corning Glass Works to construct the blank from Pyrex, a new low expansion material. After the second attempt an acceptable blank was made. A year was required just to cool the casting down. In 1936 the mirror was shipped across the country by rail car to Pasadena for grinding and figuring. Rough grinding removed 10,000 pounds of material from the blank. From 1941 to 1945 the work stopped as the nation turned its efforts to the war. In September of 1945 mirror figuring began again and by 1948 the observatory became operational.

Upon exiting the dome, it's a quick walk around the observatory, and then it's off to the gift shop for some astronomical shopping therapy. But before that, I noticed, lying rejected on the ground, the spent concrete counterweight used in place of the mirror during construction to tweak the telescope¹s movement. No mention of the contribution of Russell W. Porter to the development of the "Glass Giant," as the 200-inch telescope was known during its development, although poster reproductions of his drawings are on prominent display in the gift shop. Russell Porter was a kind of Renaissance man of his time. Trained as an architect, an experienced artic explorer, machining engineer, and founder of Stelafane, Hale enlisted his help in the development of the 200-inch. His hand drawn cutaway views of the telescope components and dome help decipher the complicated mechanisms that made the telescope buildable in the days before computer aided design.

The last note of interest unfortunately is a sad and familiar one. Light pollution from the San Diego megalopolis has reduced the 200-inch scope light grasp to that of a 140-incher. Prospects for any relief appear limited as the march of new residential developments from LA and San Diego appear to be in the process of colliding with the foothills leading to Palomar Mountain.

While packing up the camera I am already having pleasant memories and I haven't even left the mountain. Perhaps I will need to find myself on another trip to distant city with a day to spare and an observatory to visit. With so many observatories, I just have to make the time

About the University Lowbrow Astronomers

The University Lowbrow Astronomers is a club of Astronomy enthusiasts which meets on the third Friday of each month in the University of Michigan's Physics and Astronomy building (Dennison Hall, Room 130 or 807). Meetings begin at 7:30 PM and are open to the public. Public star parties are held twice a month at the University's Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinckney Road; further directions at the end of the newsletter) on Saturdays before and after the new Moon. The party may be canceled if it's cloudy or very cold at sunset. For further information call (734) 480-4514.

The "Kingfish 8": Rebirth of a Great Scope

By Mark S Deprest

About 10 years ago I bought a Meade 8" Starfinder Dobsonian telescope, and for the better portion of that time it was my favorite scope. However, after ten years of carting the telescope to various observing sites and ten years of dew and bouncing around in the back seat of my car, the optical tube assembly was getting a bit worn and look its age. When I first got the scope I found that I had a very good primary mirror. The 8" f/6 was figured very well and was polished as good as they get from mass production mirrors. Mark Cray said that it was better than 1/12 wave error (whatever that means). He also said that the original mirror cell had to go, because it was completely closed up in the back and the mirror would take forever to cool down. Mark Cray sold me one of his mirror cells and the improvement in stable image quality was immediate. When I bought the scope, I told the salesman at Rider's Hobby shop in Jackson, MI that I did not want the standard 8x30 finder scope; that a Telrad zero power reflex finder was what I wanted. I also talked him into throwing in the Messier Catalog finder charts for the Telrad as compensation for the fact that the store had been using the scope for demo purposes. John Kirchof (yes, the same … he used to work out in Jackson) agreed, and hoped I would be happy with my new scope.

The photo shows the original configuration of my scope before I rebuilt it into the "Kingfish 8." I'll explain the name later. Note that the scope shown is actually Lorna's 8" Meade Starfinder that she stores at the observatory.

For a long time I have wanted to redo my scope and make it a little more portable. I looked at and studied a lot of different designs, from ultra-light weight to Sonotube designs. All of them had good points and drawbacks. The ultra-lights were very portable but not very sturdy and the full Sonotubes were sturdy but not very portable. If I could get the scope sized down to a 15" cube or smaller without losing any stability and not adding a lot of extra weight …. I would have something close to my goal. The 12.5" Red Scope that John Causland lets me use all the time was my biggest inspiration for the design I settled on.

The mirror box nests inside the rocker box and the secondary cage nests inside the mirror box and the truss tubes are separate. The whole scope (when collapsed) is 15"x15"x12" plus a 30" long bag containing telescoping truss tubes. I thought that I could make something similar to this. The 12.5" Red Scope had its main components made out of aluminum, I would be making mine out of plywood. Now, you must remember that I am no Bob Vila or Norm from the New Yankee Workshop and my knowledge and woodworking abilities are limited to minor repairs on existing items and the occasional prefabricated Sauder desk or bookcase. My tools are limited to a circular saw, a power drill, a skill saw, an orbital sander and a Black & Decker Workmate workbench, but I am always willing to try and my dad taught me a few things and I have enough confidence in my own abilities that I was reasonably sure I could do what I needed to do.

My first step was to decide on the type of wood and its thickness. I went to Fingerle Lumber and talked to a couple of sales consultants and they suggested either Maple or Red Oak. Both were hardwoods and both came in the ½ inch thickness I had decided on. I had already calculated that even with a couple of screwed up cuts, a half sheet would be plenty of wood for my needs. They had a half sheet of Red Oak in their leftovers bin and it was priced right and ready for my project, wasn't that nice! Through conversations with others I had learned the Red Oak has very long grains and tends to splinter a lot when it's cut with anything other than a very sharp saw blade, so I also bought a couple of new saw blades for my saws.

I had worked up some plans and decided that I would cut all the pieces of wood that I would need at one time and then assemble the whole thing. I decided not to try making 45 degree angles on all of my corners because I only had enough wood for a couple of screw

ups and fancy cutting would increase that number substantially. My solution was something I had seen and done before, ½ inch quarter round molding glued to the edges of the plywood to form nicely rounded corners. I had also decided to use Sonotube for the secondary cage mounted to a piece of ½" plywood. Here was my first problem.

How do I cut a perfect 10 ½" diameter round hole in my plywood to accommodate the 10" inside diameter Sonotube? I was also going to need the same size hole cut out of the bottom of my mirror box to accommodate the mirror cell.

The answer was a Router with a router compass attachment. This would give me two 10" diameter cut outs that would be used for my altitude bearings. Clayton Kessler was the first to volunteer his services and router to the rescue. (Thank you, Clay) The next problem came when I realized the existing secondary four vane spider was going to be too small for the 10" Sonotube. (Meade makes their own Sonotubes) The spider was designed for a tube that was 9 ½" outside diameter and the connecting screws at the end of the vanes wouldn't reach the outside of a 10" tube.

The solution was a type of "T" nut used in the prefabricated furniture that you buy and assemble yourself. The ones I used extended a ¼" past the inside of my Sonotube and worked perfectly. While I was buying the "T" nuts, I also found some threaded inserts that looked perfect for attaching my 1 ¼" diameter aluminum truss tubes to the mirror box and secondary cage. That might have been my third little problem, but turned out to work better than I had hoped. In fact everything I tried on this project worked as planned or better.

I used wood grained contact paper on the outside of the Sonotube for looks. Now besides duct tape, I found that Industrial grade Velcro to be an all purpose fastening device and I use it liberally. I think even Red Green would be impressed.

It was time to attach the "Ebony Star" Formica to the base of the rocker box and the edges of the altitude bearings. I had never done any Formica before and was a little leery of trying something like this on my own. I had heard that it could be tricky and that contact cement was unforgiving. I had a few conversations with some other people who had done this kind of thing before and they all said the same thing. "Preparation and confidence were key to success." Heeding their advice I proceeded to cut my Formica very carefully with a high quality utility knife, and I prepared all surfaces according to the directions and without incident I was successful.

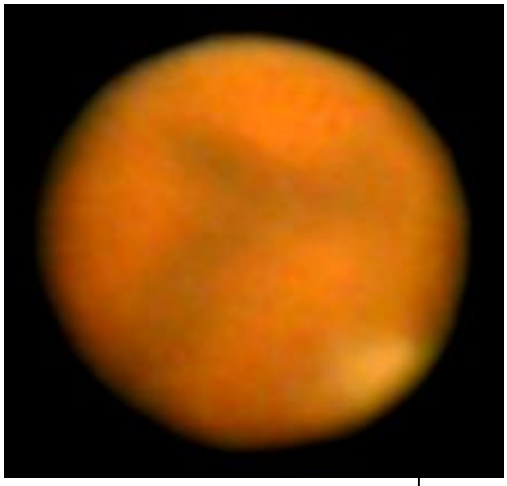
I bought a new low profile 2" focuser and with the aid of my laser collimator with the holographic cross hatch projections, I was able to line up the secondary mirror as accurately as possible. The truss tube lengths were determined on the first clear night and I was ready for painting and finishing. After sewing a shroud out of black "Rip Stop" nylon and attaching it with industrial grade Velcro, the "Kingfish 8" was ready for first light.

I liked the spring method of counter weighting a scope and after seeing a few examples I thought I'd give it a try. The main components nest neatly inside each other and make for a compact, manageable weight, yet sturdy and functional telescope.

Oh, the name is a John Causland creation and comes from the old Amos and Andy radio shows. One of the characters (Amos) has a nickname of "Kingfish" and I like to do my own version of that character, so logically John dubbed my scope the "Kingfish 8". By the way, John is also known as "Andy" and Mike Radwick is "Lightnin".

MARS

Sketches and photography by various Lowbrows



BRIAN WOODCOCK

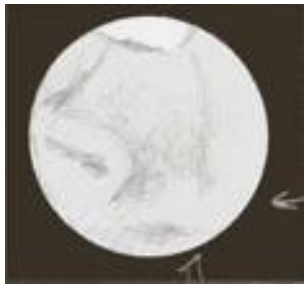
Taken on Friday, August 8 with a Nikon Coolpix 4500 mounted on a Nexstar 8i with a 14mm Scopetronix eye-piece.

PETER ALWAY

Viewed with 8" Dobsonian, 12mm Eyepiece.

July 24, 2003
6:25 a.m.

July 30, 2003
6:20 a.m.



MARK DEPREST

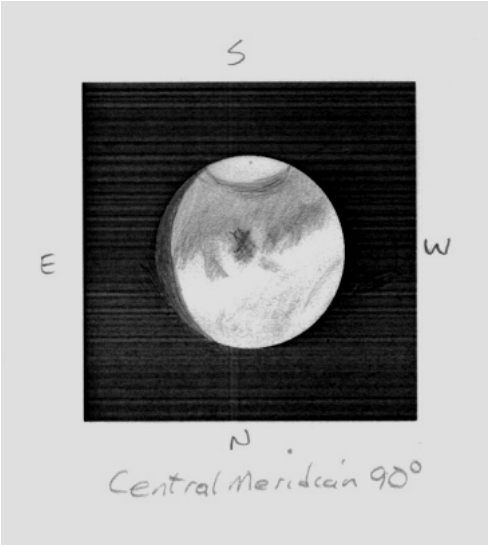
August 10, 2003
7:30 p.m.
Viewed from backyard in Ann, Arbor, Michigan
Seeing: 8 Transparency: 5
Telescope: 5" f/6.5 Refractor
Eyepieces: 9mm, 7mm, 6mm
Filter: Red

Central Meridian: 235.8
Axial Tilt: -19.4 Martian Date: 143
R.A. 22h, 53.0m Dec S 14d, 9.3m
Magnitude: -2.5 Size 23.8"

Description and Notes

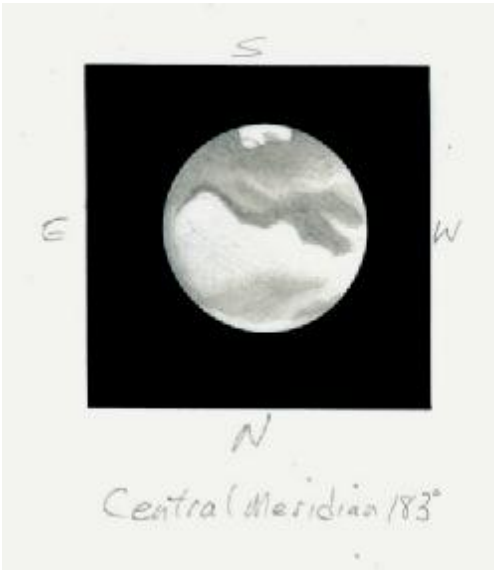
Prominent features were, from left to right, Mare Sirenum; Mare Ommerium (running diagonally SW-NE on North quarter of face); Nesperia (almost dead center of face); Tritonis Sinus (just North of center, very dark spot); Xanthus (would be just barely visible as a little appendage in the Southwest quarter); Ausonia (was also just barely visible as a parallel line to Mare Ommerium); Mare Tyrrhenium (was rather fain without the red filter, covered east-most quarter of face); Syrtis Major (was a very pale spot in the Northeast corner); Mare Australis (was very evident and large, near the South Pole. Very nice 2.5 hours of observing Mars as it crossed the meridian.

DOUG SCOBEL



Planet Name Mars
Date/Time 19-JUL-2003 04:15 EDT
Location Saline, Mi.
Telescope 13.1" f/4.5
Eyepiece 4.8mm Nagler
Magnification 311
Filter W21 Orange
Disk Dia (") ≈20
Steadiness 5-7/10
Transparency
Object Altitude ≈35°
Notes Central meridian 90°
Poor seeing - 5/10 or worse for most of the observation. Short periods where it would settle down for split second or two, but not long enough to remember what I saw. Polar cap sharply outlined. Solis Lacus, dark spot near center was most prominant feature. Could also see Tithonius Lacus to its NE, Mare Sirenum to W. Small, ft. spot to NW of S.L., visible only momentarily when air would settle down. Not much visible in N. hemi.

Planet Name Mars
Date/Time 15-AUG-2003 02:45 EDT 06:45 UT
Location Saline, MI
Telescope 8" f/8 Newtonian reflector
Eyepiece 4.8mm Nagler
Magnification 341x
Filter W21 orange, W25 red
Disk Dia (") 24.4
Steadiness 8/10 - no dew!
Transparency Some haze, moon 3 days past full
Object Altitude ≈32°
Notes SPC still very bright, brighter spot to NE (outlined), darker along N edge. Limb brightening along N limb. Don't notice it being gibbous, but E. limb looks darker than W limb. Dark area to E is Mare Sirenum. Dark area to W is Mare Cimmerium, w/ Mare Tyrrhenum "split off" to the W. limb. To N have Trivium directly N of M. Tyrrh., w/ some of Utopia sneaking in from NNW limb. "Split" to S of M. Sirenum not identified. "Projection" on SE end of SPC is Thyles Mons. & dark rift near meridian is Rima Australis.



Phoenix Selected for 2007 Launch Opportunity

by Roger Tanner

In case you haven't heard, the Phoenix project proposed by Peter Smith (my boss) was selected for the 2007 Mars launch window. This mission will fly the revised 2001 lander which was canceled after the Mars Polar Lander (MPL) crash on Mars in 1999. The lander was about 80% done, they were about 1 month away from installing the science instruments. The lander will have some of the instruments from the MPL mission and the 2001 mission. The object is to land at about 70 deg north latitude and dig down and find and analyze the ice they think is only a few tens of centimeters below the surface. The lander has a Robotic Arm (RA) that will do the digging. This mission is different than most in that it is a PI lead mission, meaning Peter (the Prime Investigator) is responsible for everything, launch, lander, science instruments, everything. The whole contract comes to 318 million, and of that, almost forty-five million will be spent in Tucson. Also the science operations center will be in Tucson, with all the instrument teams here. Lander ops will be from Lockheed Martin in Denver. The University has acquired a building for this. As you might expect this has gotten a lot of attention from the U. The last time I was at the club, I gave a talk on the Pascal microlander camera I built. This proposal as well as the other six I worked on didn't make the first cut from twenty-two to four proposals. Phoenix made the final four and then won.

At the time the 2001 mission was canceled, we had just delivered a Robotic Arm Camera (RAC) and a Optical Microscope (OM) to JPL. Both of these instruments will be on the new Phoenix lander. In addition the Surface Stereo Imager (SSI) that was on the MPL will be flown in a revised form. I will be the camera manager for these three cameras. The revisions to the SSI are to use larger CCD's from the MER rover flight spares to give each eye 4X the resolution, about one-quarter mrad/pixel. So for something on the ground, about two meters away, the camera will see about one-half mm/pixel, where as the Mars Pathfinder would see two mm/pixel. The RAC camera can focus from eleven mm in front of its window to infinity. At infinity it is about two mrad/pixel, about eight times lower resolution than the SSI. But at close focus, it can image particles on the tip of the scoop at twenty-three microns/pixel. On Earth this would be good, particles of dirt are typically several hundred microns across. But on Mars, the typical dust particle is about one to two microns. We won't resolve them, just the clumps. The OM is inside the MECA instrument. For a sample put into the MECA instrument, we can look at it with the OM at a resolution of 4 microns/pixel. Still will just see clumps of dust.

There will be two other cameras on this space craft, a descent camera built by Michael Malin Space Science Systems. So we will have images all the way down to the surface. The other camera is a Atomic Force Microscope that will operate on a corner of the optical microscope field. The field of view of the AFM is very small but the resolution is around ten nm/pixel. This will clearly resolve the dust and even smaller stuff on the dust. So this mission will have imaging from km during descent, down to ten's of nm for the MECA samples.

The other instruments are the Thermal Evolved Gas Analyzer (TEGA) from the MPL and the Robotic Arm from the 2001 lander. The TEGA will get a mass spectrometer to replace its diode laser gas unit to be able to detect many more molecules. The TEGA is designed and built at LPL/UofA as well. The arm will be revised with longer segments to allow it to dig 1 meter below the surface. The arm is designed and built at JPL. Another instrument is the Mars Environmental Compatibility Assessment, MECA. It has a sample wheel that will have samples dropped on to it and then the wheel turns 180 degrees and the samples

will be vertical, where we will look at them with the OM an AFM. Also in the MECA are four water-analysis cells. Each cell has a drawer that opens, a sample drops in and then it closes. After that water is added to the sample and the many chemical potentials for various ions are measured. Also the ph and oxidation/reduction potential will be measured. The MECA is designed and built at JPL. The last instrument is a weather station and LIDAR unit to detect dust in the atmosphere. One observation we hope to make is have the LIDAR range for dust devils and then image them with the SSI.

So now I have to do all the things in the proposal I said I could, on time and under budget. There is a saying the only thing worse than not getting the proposal is getting the proposal. Anyway, I will be hiring some engineers and students. The major task is the modification to the SSI and its electronics to accommodate the new CCD's. The other two cameras will fly as is, we will just recalibrate to make sure they are still working as they should. We will deliver our flight camera and software by Feb of 2006. Integration on the lander and lander testing will take a year, with a 2007 launch. Landing is early 2008 and the mission will last for ninety days, with an extended mission that will last another sixty days with just the cameras and weather station operating. Data analysis and archiving will last another year so I will be busy until 2009 if things go well. After the extended mission, we will be unable to gather enough power to keep the electronics warm at night and we will loose the lander, similar to Pathfinder.

As if this wasn't exciting enough, there is a very real possibility that we may discover more than just permafrost under the soil there. We are landing where the top meter of soil is more than 50% water by weight according to the GRS, that means more than 70% by volume. They know the surface layers are very dry, so that means the most of the water must be in the bottom 3/4 meter. This is more like dirty ice rather than icy dirt. So they expect to only dig twenty cm or so and then they will hit ice. Scraping up samples of ice for the TEGA and MECA will allow analysis of the composition. Two recent papers have added some more information about that ice. A paper about soil grains in ice has found that the soil grains can have a thin layer of liquid water at a temperature of -20C, twenty degrees below the freezing point. Also another paper has done a dynamics analysis of Mars orbit eccentricity and polar axis tilt. Both of these things vary on time scales of one hundred thousand years. The result is for some combination of polar tilt and eccentricity, the solar irradiance at the landing site may have been three to four times what it is now. Also, liquid water is stable for short periods at the low elevations where we are landing because of the higher atmospheric pressure. So a picture emerges where this ice will periodically melt for ten thousand years at a time and then refreeze. They have found bacterial colonies in Antarctica that have thrived in these very conditions.

So if you believe life is a natural occurrence of planet formation, and that the life on Mars could adapt from a warm wet climate to the present permafrost one, as some life forms on Earth have done, then we might possibly find some bacteria or something frozen in the ice. We could see small stuff with the OM or AFM. We can see color with the OM. Even if don't find something we will have the soil chemistry to figure out why. The mass spectrometer on the TEGA will be able to detect organic molecules easily.

So we are following the water, a major NASA Mars Exploration Theme. And at the end we might find more than just an answer to where has all of Mars's water gone. We will find a tremendous resource for future exploration, particularly manned exploration. And if we find life, this will certainly galvanize the whole Mars exploration to go look at it in more detail. And figure out if it is different or the same as the stuff like it on Earth. It would also make a dent in question of is there other life in the Universe, or even in just in our solar system. And having two data points for some of the bacterial life forms instead of one, would probably be a real thought starter for the biologists.

So these are really interesting times. I’m glad I am living in them.

Minutes of the July 18, 2003 meeting of the University Lowbrow Astronomers

as submitted by Dave Snyder

1. The meeting was held at Peach Mountain (partly to avoid Art Fair, and partly as a venue for John Kirchhoff to give his "goodies show)."

2. President Charlie Nielsen — brought the meeting to order.

   There was a proposal to donate $52 to the clear sky clock. Many club members use this service to get predictions of cloud cover and atmospheric conditions. If the club gave $52, the Peach Mountain entry would be updated earlier, which could benefit club members.This proposal passed.

   Before the meeting John Kirchhoff had mentioned the GLAAC meeting (GLAAC is in the process of planning the annual "Astronomy at the Beach" event at Kensington Metropark). GLAAC had arranged for the astronaut Jerry Ross to speak at Kensington. Since John was temporarily absent (he would return later), Charlie explained this to the club.

   Jerry had been on 7 space flights (a record). However to bring Jerry here, GLAAC needs to reimburse NASA for the cost, and GLAAC wanted to have the four big astronomy clubs as well as Rider's Hobby Shop to each contribute money for this purpose. They suggested the Lowbrows contribute $250. Charlie asked if the club would approve this expense.

   D. C. Moons asked if we had any plan on how money would be spent over the next few years, as we would need to have money to recoat the mirror eventually.

3. Treasurer Mike Garrahan — To answer this concern, Mike Garrahan said that after removing the $52, there was $2541 in the treasury.

   Also *Sky and Telescope* had raised their subscription rates. It will now cost $32.95 for Lowbrows to get a *Sky and Telescope* subscription through the club.

4. Continue discussion of $250 — After some more discussion, the proposal to give $250 to GLAAC passed.

5. Webmaster Dave Snyder — At the last meeting the club was asked to select a 16x16 pixel logo to be used on the club web site. The club decided to go with a yellow L on a blue background. Dave Snyder mentioned that we are now using a logo made from the Mike Garrahan's version (a reduced version of the blue and yellow club logo) with a yellow "L" added.

   Minutes of club meetings are now stored in the private section of the club web site.

6. Vice President Bernard Friberg — proposed that the next club meeting be a collage. In the past some club meetings have been collages. Typically a group of club members (perhaps five or so) would each talk on a subject for a short period of time (say 10-20 minutes or so). Sometimes the subjects would all be different aspects of the same topic, other times the talks would be on unrelated topics.

   Club members who want to give a talk should contact Bernard.

7. Observatory Directory Mike Radwick — mentioned there were a number of upcoming events: The July 26 open house at Peach Mountain, the Perseid Meteor shower August 13, the Black Forest Star Party, Kensington "Astronomy at the Beach" (September 5-6), Island Lake Star Party (October 4). There was some discussion whether the club should do anything for the Perseid Meteor shower.

8. Paul Walkowski — described the Kensington "Astronomy at the Beach" for the benefit of club members who hadn't been there.

9. John Kirchhoff — started his "goodies show." He showed us some assorted Celestron binoculars that ranged from 10x50's to a 25x100. There were assorted eyepieces (including a Televue 41mm Panoptic), a Spanish language planisphere, some astronomy books, an observing plate for Meade telescopes, a focus kit for Meade telescopes, some filters. He also had three telescopes, a Meade LXD55 EMC (f/9 refractor), a Mead LX200 GPS (10 inch reflector) and a Orion Starblast Altazimuth Reflecting Tabletop Telescope (4 1/2", f/4).

   With the exception of the telescopes, each item was passed around for club members to look at.

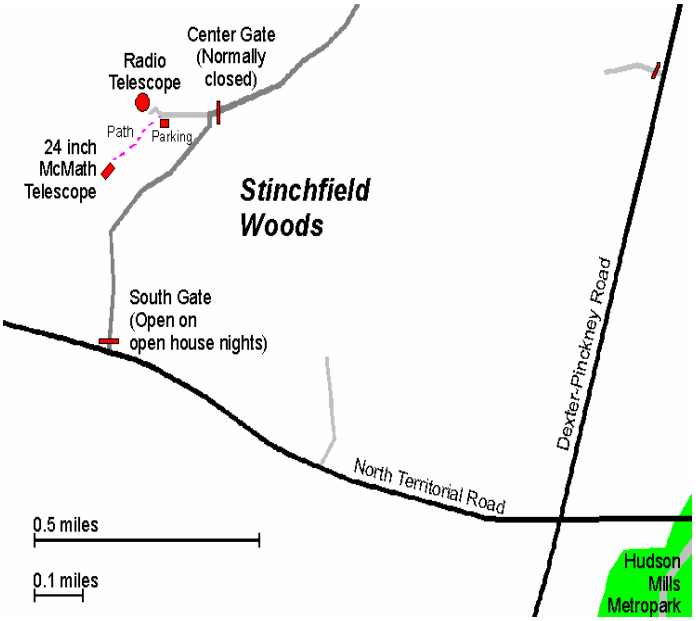
10. Michael Fisher — (who was a customer of John Kirchhoff) brought his own personal Celestron C14 for the club to look at.

11. At this point the meeting adjourned, and club members proceeded to look at some of the toys John had brought.

12. A few club members had brought their own telescopes. As it got dark, people looked through the telescopes. It was quite clear and there was less sky glow in the south than was typical. Club members who stayed saw an Iridium flare and around 12:30 or so, Mars was just high enough to be seen above the tree line. (John had said he needed to leave at midnight, but was kind enough to stay around so the telescopes he brought could be used). A few telescopes were pointed at Mars allowing some comparisons between scopes.

Places and Times

Dennison Hall, also known as The University of Michigan's Physics and Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. It is found in Ann Arbor on Church Street about one block north of South University Avenue. The meeting is held in room 130. Monthly meetings of the Lowbrows are held on the 3rd Friday of each month at 7:30 PM. During the summer months, and when weather permits, a club observing session at Peach Mountain 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 inch telescope which is maintained by the Lowbrows. The observatory is located northwest of Dexter. The entrance is on North Territorial Road, 1.1 miles west of Dexter-Pinckney Road. A small maize-and-blue sign marks the gate. Follow the gravel road one mile to a parking area near the radio telescopes. Walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.

Public Star Parties

Public Open House/Star Parties are held on the Saturday before and after each new Moon at the Peach Mountain Observatory. Star Parties are canceled if the sky is cloudy at sunset or the temperature is below 10 degrees F. Call 332-9132 for a recorded message on the afternoon of a scheduled Star Party to check on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitoes - bring insect repellent, and it does get cold at night so dress warmly !

Amateur Telescope Making Group meets monthly, with the location rotating among member's houses. See the calendar on the front cover page for the time and location of next meeting.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students and seniors (age 55/+). This entitles you to the monthly REFLECTIONS newsletter and the use of the 24" McMath telescope (after some training).

Dues can be paid to the club treasurer at the monthly meeting or by mail at this address:

University Lowbrow Astronomers
c/o Michael Garrahan
7676 Grand Street
Dexter, Michigan
48103-1327

Magazines

Members of the University Lowbrow Astronomers can get a discount on these magazine subscriptions:

Sky and Telescope: $32.95 / year
Astronomy: $29.00 / year

For more information contact the club Treasurer. Members renewing subscriptions are reminded to send your renewal notice along with your check when applying through the club Treasurer. Make the check payable to "University Lowbrow Astronomers".

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call or Email to Newsletter Editor at: John Ryan (734) 662-4188 john_edward_ryan@hotmail.com to discuss length and format. Announcements and articles are due by the first Friday of each month.

Telephone Numbers

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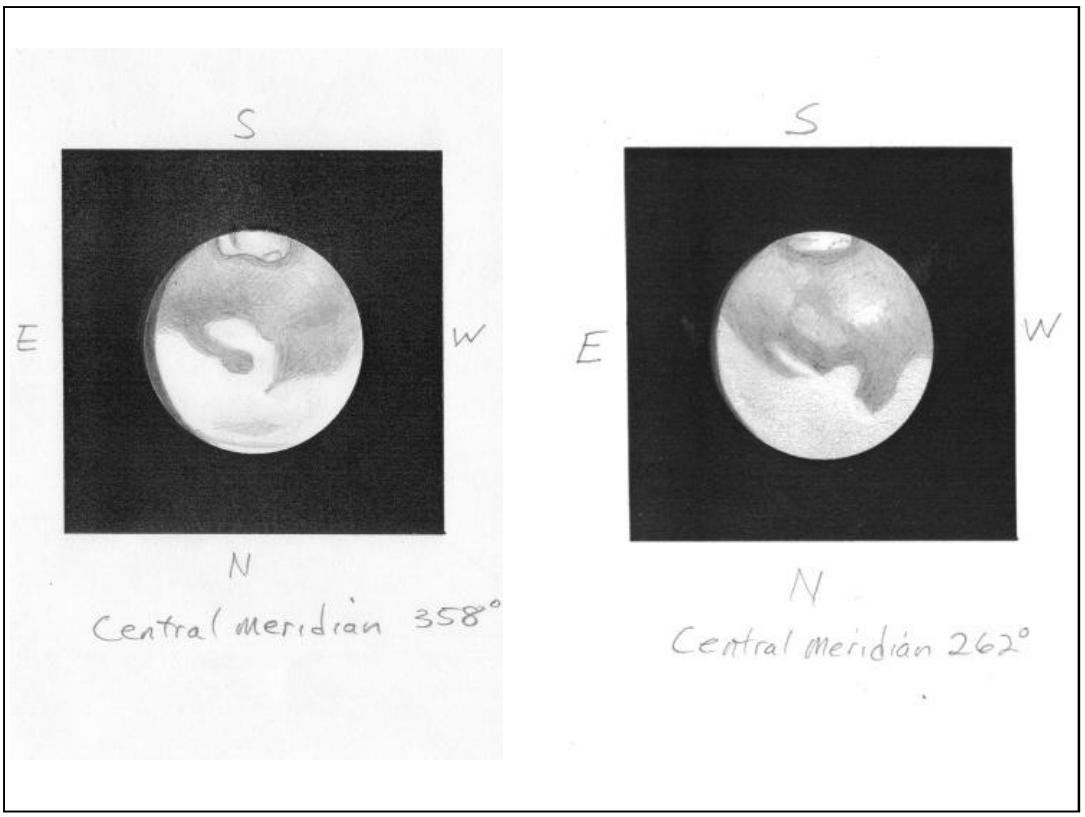
Lowbrow's Home Page

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



Doug Scobel's sketches of Mars. The sketch on the left was drawn at 4:30 a.m. on July 29, 2003 and the sketch on the right was drawn at 3:15 a.m. on August 7, 2003 from Saline, Michigan. Equipment used included a 13.1" f/4.5 with 12.5mm eyepiece, an 8" f/8 with 4.8mm Nagler eyepiece, W21 Orange filter, and W25 Red filter.

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ASTRONOMERS

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Check your membership expiration date on the mailing label.