

Gemini

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June 2013 Volume 38 Number 3 In the pages of the Gemini

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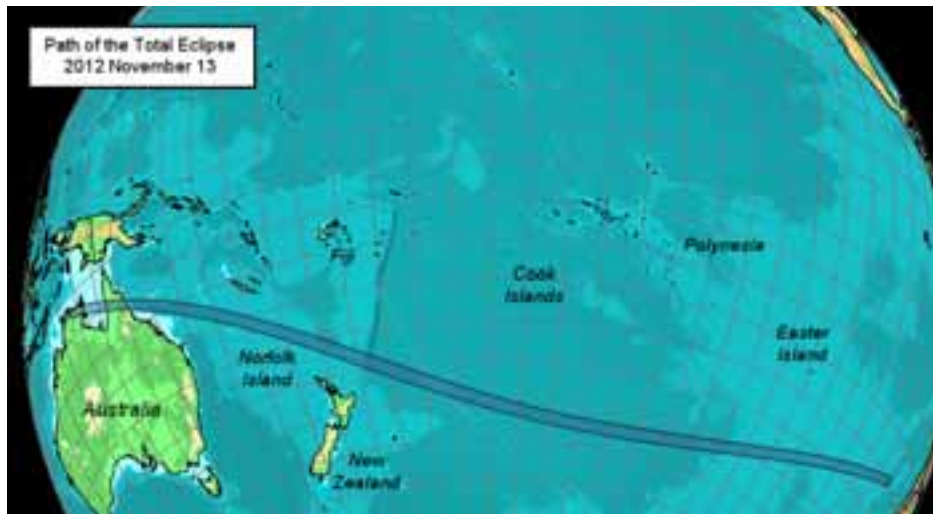
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Chasing the Shadow: Chapter 15

by Bill Glass

For over 30 years, I've enjoyed observing total eclipses of the Sun. It's been a great excuse to travel the world and meet lots of interesting people. Last November I journeyed to Australia in pursuit of my 15th eclipse. In this article I will summarize the preparations and highlights of the trip.

There were two solar eclipses in 2012. The first occurred on May 20; it was an annular eclipse. The second occurred on November 13; it was a total eclipse. The path of that eclipse is shown in Figure 1. It began in the Northern Territory of Australia, crossed the Gulf of Carpentaria, and proceeded onto the Cape York Peninsula of Queensland. After leaving Australia, the shadow crossed the Pacific Ocean and did not pass over any land for the remaining three hours. The eclipse path ended at a point about 800 km west of Chile. This eclipse managed to generate a lot of confusion about the date it occurred. It was November 13 UTC, but because the local time in Australia is 10 hours ahead of UTC, it was November 14 there. Since the only land-based observing was in Australia, many people use November 14 as the date of the eclipse.



Path of the total eclipse. Map courtesy of Jay Anderson.

When planning a trip to see a solar eclipse, one of the first tasks is to select an observing site. Since I prefer to observe from land, as opposed to on board a ship or an airplane, there were not many options for this eclipse. There were two possible areas—the Northern Territory or Queensland. The Northern Territory wasn't very promising because totality would already be in progress at sunrise. That left Queensland and, in particular, the east coast, which has the best combination of roads and accommodations for tourists.

Figure 2 shows the path of the eclipse across Queensland. Looking at this map helps one to understand some of the other problems in selecting an observing site. Since totality would occur early in the morning, about an hour after sunrise, with the Sun only 14 degrees above the horizon, it was essential to pick a site with a clean horizon to the southeast. This eliminated the coastal city of Cairns (too many tall buildings) as well as the beach at Cairns (a mountain to the southeast would interfere). There is a road that heads north from Cairns along the coast, but it turned out that it wasn't very useful. First, it is a two-lane road without any shoulders, so it would be hard to find a place to park. Second, even if you did find a place, access to the beach would be difficult—this is a rainforest, after all. There are few sandy

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beaches, and the eclipse would happen during high tide. Adding to the difficulty would be the challenge of getting to the observing site and setting up equipment in the dark to prepare for an eclipse beginning at sunrise.



Path of the total eclipse across Queensland, Australia. Amaroo is located near Kuranda to the northwest of Cairns. Map courtesy of Jay Anderson.

so they decided to get involved with astronomy groups that were looking for a place to watch the eclipse.

The Freemans did a wonderful job of preparing for this event. Approximately 180 people spent two days at Amaroo. A large tent had been erected to serve as our dining hall; meals were catered by one of the best restaurants in Cairns. There was an auditorium for live entertainment after dinner, and we had wireless Internet access. We slept in tents with air mattresses on wood platforms. Nighttime temperatures were warm enough that a light blanket was all that was needed. There were portable toilets and showers.



Some of the two-person tents at Amaroo. Approximately 180 people stayed at the eclipse viewing-site for two days.

In addition to the people who stayed at Amaroo, the Freemans also provided facilities for “several” friends who were to arrive in the predawn hours just before the eclipse and leave immediately afterwards. When we asked Judy how many people were invited, she said “Oh, about a thousand.” A separate viewing area was set up for them, about a hundred yards away; there wasn’t much interaction between the two groups. I was impressed that the buses were able to bring in a large number of people before dawn and navigate the narrow dirt road and bridges that led to the viewing site.

One thing that the Freemans could not control was the weather. Although Amaroo is on the edge of the rainforest, November is not normally a wet time of the year. However, we had been at the site for only a short time before we got the first rainstorm. The second day brought some more rain and an almost continual overcast. The site quickly became rather muddy, and the floors of our tents were covered in mud. People were still hopeful, but everyone was concerned about the clouds and overcast skies.

Because of these problems, the group that I was travelling with elected to use an observing site about a 45-minute drive inland from Cairns at a location called Amaroo—“a beautiful place” in the Aboriginal language. Totality at this location would last just under two minutes. The property is owned by Don and Judy Freeman, who have lived in the area for over 20 years. Don and Judy have been very active in promoting events for Aboriginal culture and have frequently used their property to hold conferences and festivals at which people learn about the Aborigines. A large, open area on their property faces in just the right direction to see the sunrise, that were looking for a place to

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Rows of chairs were set up to accommodate the people who arrived at the viewing site on the morning of the eclipse.

November 14 was eclipse day, and we had to rise well before dawn. First contact would be at 5:44 a.m., just a few minutes after sunrise. As soon as I stuck my head outside the tent, I suspected that the weather was not going to cooperate. Not only was there a complete and solid overcast, but the air was hazy from the high humidity. Still, I set up my equipment, which consisted of a Nikon DSLR with a 1000mm lens on a tripod with a geared head for manual tracking. The camera was connected to a computer running Eclipse Orchestrator to control the sequence and timing of the photographs. By sunrise I was ready, but the overcast was so thick that we couldn't determine the location of the Sun. No spot in the sky seemed to be brighter than any other.



My equipment for the eclipse. I used a Nikon D7000 DSLR with a 1000mm mirror lens controlled by a computer running Eclipse Orchestrator and connected to GPS to ensure accurate timing.

For almost an hour, the overcast continued unbroken. There was still no hint of the Sun; we even had a short period of light rain. Like most of the people there, I had reached the conclusion that we weren't going to see anything of this eclipse. Then, with less than three minutes before totality, a hole suddenly appeared in the clouds and the Sun came into view. If I could get my camera pointed in the right direction, I might get some pictures. Those of you who have never tried it probably think that pointing a camera at the Sun is a simple operation. How could you miss such a large and bright object? Believe me, when you're looking through what is effectively a 30-power scope whose field of view is only about twice the size of the Sun, it can be pretty difficult. Worse yet, the front element of my lens was covered with mist from the brief rain shower. After a minute or so, I gave up trying to point my camera and decided to watch the eclipse visually. The computer continued to operate the Nikon, but all it got was pictures of clouds.



My fellow eclipse chasers gathered for a group photo shortly after fourth contact. The tour was organized by Gary Spears of Spears Travel (front row on the right), and the technical leader was Fred Espenak (front row second from the left). Photo courtesy of Fred Espenak.

We saw Bailey's Beads at second contact and the chromosphere, but thin clouds made it difficult to see much of the dimmer corona. Partway through the eclipse, I remembered my small "point and shoot" camera, so I used it to capture a short video of a portion of the eclipse. By mid eclipse, the hole in the clouds moved on and the Sun was again obscured. The only evidence of third contact was a brightening of some of the nearby clouds.



Some of the disappointed eclipse chasers hoping for an improvement in the weather. Note the equipment wrapped in plastic or covered by jackets to provide protection from the rain.

Between third and fourth contact there were some breaks in the clouds, and I was able to get some photos of the partial phases showing some sunspots, but those aren't very exciting when I had hoped to capture a glorious, total eclipse. A couple of hours after fourth contact, the skies cleared and it became a fairly nice day. As we found out later, there was a wide range in the degree of success that various observing groups had. Many people saw nothing or had only a few brief glimpses of the eclipse. Others—some as close as 20 miles from our site—had very good luck and got to see almost the entire eclipse. As for our group, most of us were disappointed, but since we saw a portion of totality, we still get to record this one in the win column.

As with most eclipses, after all the equipment is packed up, people begin to talk about the next one. The next solar eclipse is a hybrid eclipse that will occur on November 3 of this year. A hybrid eclipse is one where the apparent size of the Moon is barely big enough to cover the Sun. During the beginning and end of the eclipse path, the eclipse is annular; only during the middle portion is the eclipse total. As a result, hybrid eclipses are typically quite short. This one will cross the African continent, and the group that I travel with has selected a site in Kenya for our observations. With luck, we'll get to see 14 seconds of totality. I hope that this time the weather cooperates. 📷

Minnesota Finds its Apollo 11 Moon Rocks

by Kristin Harley

In 1969, after the first successful Moon landing, President Nixon made a gift to every state in the U.S. and to every nation in the world: a small amount of the 22 kilograms of Moon rocks that astronauts Armstrong, Aldrin, and Collins had brought back to Earth. Encased in a Lucite globe and attached to a plaque bearing the Minnesota flag, the Goodwill Moon Rocks given to our state were meant to be enjoyed by the people of Minnesota. Unfortunately, as with so many of the Apollo 11 and Apollo 17 Moon rocks, they went missing.

Minnesota's Apollo 11 Goodwill Rocks were found in a storage area among military artifacts in the Veterans' Service Building in St. Paul. The Minnesota National Guard does not know how the rocks came into their possession. Army Major Blane R. Iffert, former state historian for the Minnesota National Guard, researched the history of the Moon rock bequests and decided that the rocks needed to be displayed. On November 28, 2012, at a ceremony at the Starbase, a math and science program for schoolchildren, on the base of the 133rd Airlift Wing, custody of the Moon rocks was formally transferred to the Minnesota Historical Society (MHS).



The Apollo 11 Moon Rocks on display.

As an archivist for the Minnesota Air National Guard Museum, which is kitty-corner from the Starbase, I had the privilege of attending the ceremony and taking photographs of the Moon rocks. I recognized colleagues from MHS, for which I have also been a volunteer, and I chatted with Pat Gaarder, MHS deputy director, whom I had not yet met. The ceremony was attended by throngs of rapt schoolchildren and by the local media and included a large-screen Skype interview with Joseph Gutheinz, a former senior special agent with the NASA office of the inspector general. He is now a Texas-based attorney who is leading the search for unaccounted-for Moon rocks.

Popular Astronomy Lectures

Silicon Valley astronomy lectures, featuring noted scientists giving nontechnical illustrated lectures on recent developments in astronomy, are now available on YouTube: <http://www.youtube.com/SVAstronomyLectures/>

The talks include: Frank Drake discussing his modern view of the Drake Equation; Michael Brown explaining how his discovery of Eris led to the demotion of Pluto; Alex Filippenko talking about the latest ideas and observations of black holes; Natalie Batalha sharing the latest planet discoveries from the Kepler mission; Anthony Aguirre discussing how it is possible to



The Apollo 17 Moon rocks and a newspaper that MHS staff brought to the ceremony.

MHS staff had brought its Apollo 11 Moon rocks to show the audience, along with the Apollo 17 Moon rocks, which had never been lost. Staff members were standing by to answer questions. As I snapped photos of the rocks, one photojournalist asked to take a photo of my hands holding the camera over the Lucite ball, while another asked to get a shot of me taking my photo, and I obliged them both. (I have yet to see these photos published anywhere.) The children were very well behaved and curious, seeming to grasp the importance of the occasion as they eagerly asked questions.



Adam Scher of the Minnesota Historical Society explaining the Apollo 17 Moon rocks to the audience.

Gutheinz's worldwide effort to recover all of the lost Moon rocks, called "The Moon Rock Project," is ongoing. So far, he and his team have recovered 79 Moon rocks; approximately 180 are still unaccounted for. Gutheinz also plans to teach a class on the Moon Rock Project at the College of the Mainland in League City, Texas, from July 10 to August 28 this year. ■

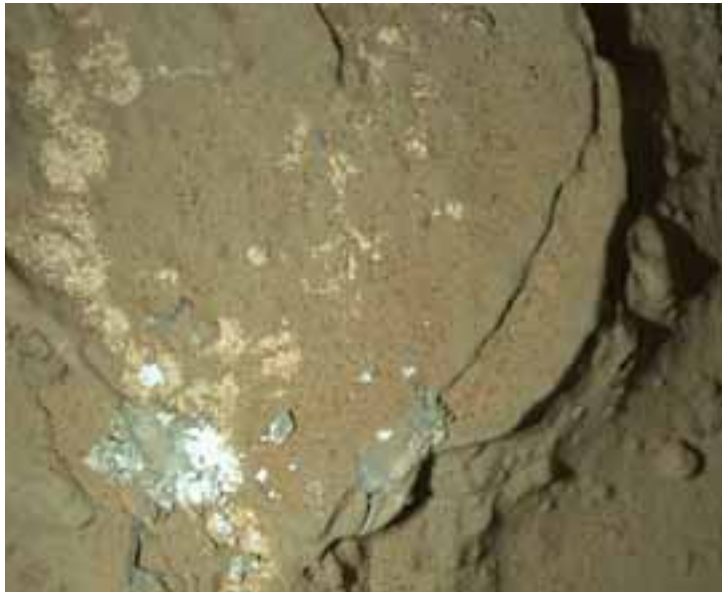
have multiple universes; and Chris McKay updating the Cassini discoveries about Saturn's moon Titan.

The lectures are taped at Foothill College near San Francisco and co-sponsored by NASA's Ames Research Center, the SETI Institute, and the Astronomical Society of the Pacific. Note that the top page of the channel shows the lectures in the order they happened to be uploaded to YouTube. If you want to see them in chronological order, select the Playlist option. Both new and older talks in the series will be added to the channel as time goes by. Many noted astronomers have given talks in this series since its founding in 1999. Recent lectures are being recorded so that people around the world can tune in. Share this information with colleagues, students, and interested astronomy enthusiasts. ■

Our Understanding of the Universe: The Next Leap

by William Clark

The purpose of this article is to give a flyover of how 21st century technology is providing new answers as well as new questions about our universe. However, before I begin, let me give you a brief history of my involvement with astronomy. Then on to the meat and potatoes of how inventions are changing how we view our universe.

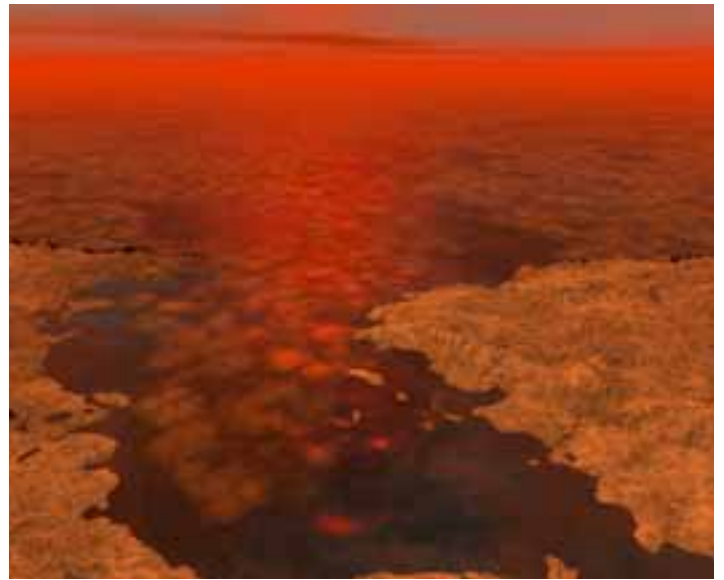


Another photograph taken on Mars by Curiosity.

Like most humans, I have been fascinated when I look up into the sky, causing me to ask questions, some big, some small. Why am I here and do I have a purpose for living? Are we alone? We all have this desire to figure out what is going on — on Earth and up in the sky. Some of our ideas that were considered fact are being proved not factual, with many being challenged as to their authenticity today. In the early days, when people couldn't figure something out, many times they attributed what was happening to spirits that they couldn't see or hear.

Do you remember when Edmund Scientific offered kits for making reflector telescopes? I made 6" and 8" Newtonians in the early 1960s. I mowed lawns and shoveled snow, and with the help of my parents I was able to scrape up enough money to build a 6" telescope. I found a 55-gallon empty drum, made a wooden

template, and began grinding my first lens. I believe it was E&W Optical in St. Paul that made the coating on the lens. I built the case from plywood. I tried to take a few photographs through the telescope, but I didn't have any type of connector from the telescope to the camera. It was expensive and my budget was limited.

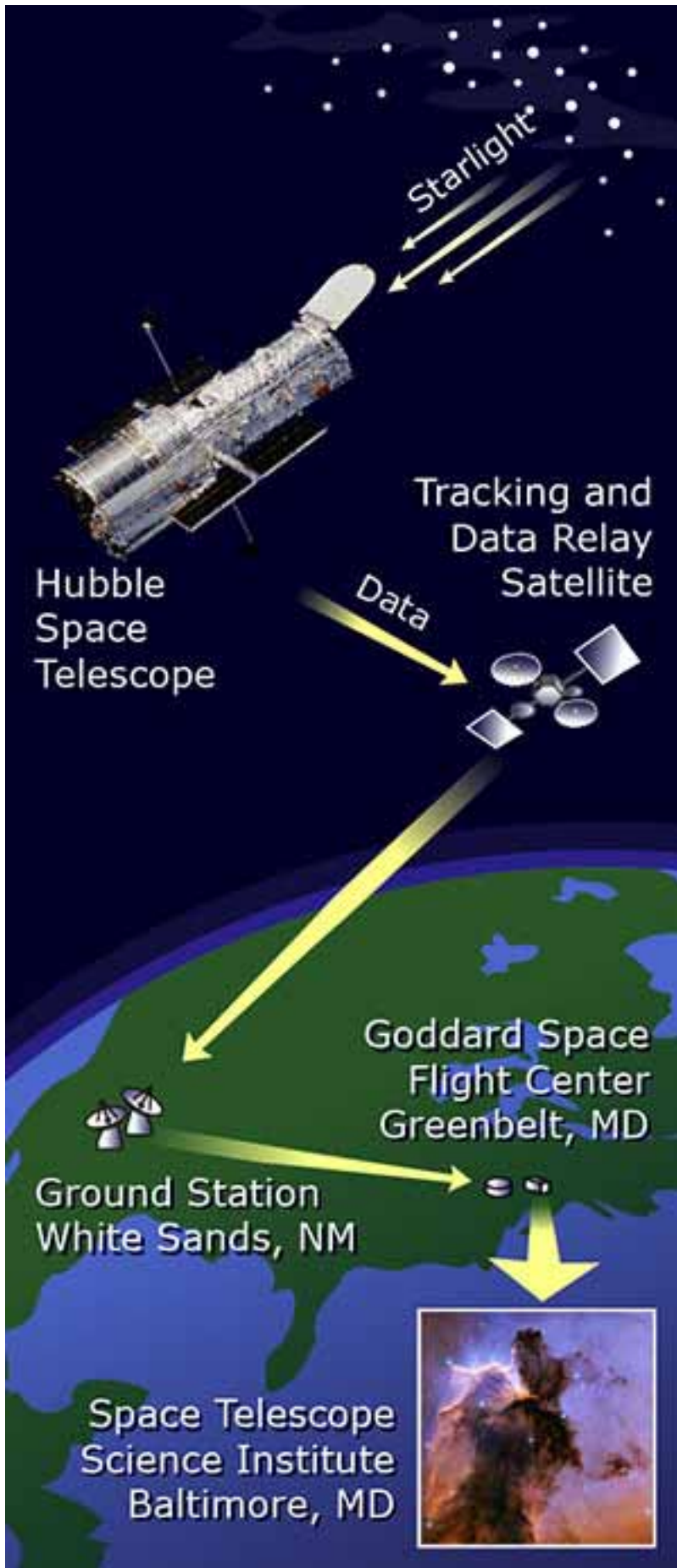


One of the many methane lakes on Titan.

I put astronomy aside for a while when I was growing up. But I never lost the desire; I visited telescope sites in California while I was going to school to serve in the military in the early 1970s. After the military, getting married and raising a family took precedence for quite a few years. Now our children are grown, married and successfully contributing to society. My wife and I are grandparents. I will be 65 in June and can get back to my never-ending thirst for knowledge about our universe. I don't have any telescopes yet and, since I live in Hopkins, I receive quite a bit of light pollution from Minneapolis. (Which reminds me, did you hear about the astronomer who attended a party and left shortly after arriving because he did not like the atmosphere?) I'm beginning to quench my thirst for knowledge with the aid of 21st-century technology. There are benefits to utilizing these tools, but they do present some constraints, such as the inability to control these devices and do our own investigating. The purpose of this article is to open our eyes to new discoveries we are making and



A recent photograph on the surface of Mars taken by the rover Curiosity.



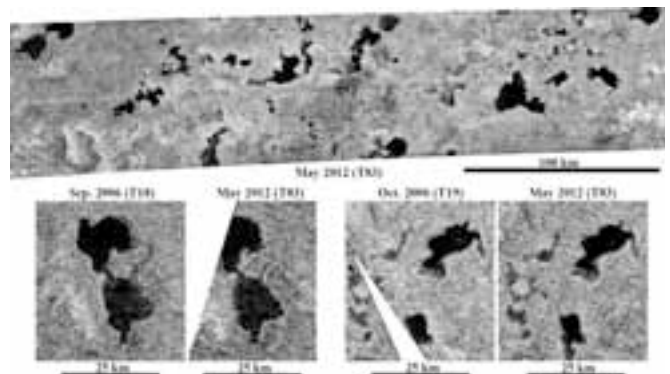
A sketch of the Webb telescope, the successor to the Hubble.

to offer something in addition to what is currently taking place within our Minnesota Astronomical Society.



The Voyager 1 spacecraft.

Human beings have managed to travel to our Moon and are considering going to other places. For now, at least, we don't have a way of having people roam around our universe. What to do? The desire is still there. How about sending satellites that could be used for viewing as well as landing on objects in our solar system? We can do it because of modern technology with items such as computers, the Internet, and digital photography. Much of the mathematics used to make these systems work has been around quite a while. It is only recently that the math can be applied to help us make discoveries about our universe. All of these devices work together to help us learn. Let's begin with the Hubble telescope.



Photographs of methane lakes on Titan, taken at different times. Note the changes.

The Hubble has a wonderful Web site. Check it out here: <http://hubblesite.org/>

There are many others. When I type in Google search the word "astronomy," 124 million results come up. Let me mention a few:

Curiosity Web site: <http://www.jpl.nasa.gov/msl>

Successor to Hubble:

http://webbtelescope.org/webb_telescope

What the Webb is being designed to accomplish:

<http://www.spitzer.caltech.edu>

The Science channel, number 284 with DirecTV
The History channel, number 269 with DirecTV
PBS offers many programs about our universe.

Curiosity is the latest of many successful landings on Mars. Titan, a moon of Saturn, has been explored. I've heard it said that the hydrocarbons on Earth came from plants and animals. How did hydrocarbons get on Titan? It has lakes, rivers, streams and rain of methane. We've been to Jupiter and some of its moons, up close, and have produced marvelous photographs. And now, with the Kepler satellite, we are searching for and discovering planets outside of our solar system.



In this photograph by Voyager 1, Earth is the pale blue dot with a circle around it.

I have barely scratched the surface of what these and other satellites have accomplished; new satellites will answer more questions. More in-depth articles could be written about each satellite mentioned in this article and others as well. MAS could schedule an interactive seminar with an LCD projector and screen; folks could bring their smart phones, tablet and laptop computers. This would be in addition to what is currently offered for members and guests. We could discuss black holes, dark matter and dark energy. What was the composition of the universe at the beginning? Was it something other than three dimensions? Are there other planets like Earth?

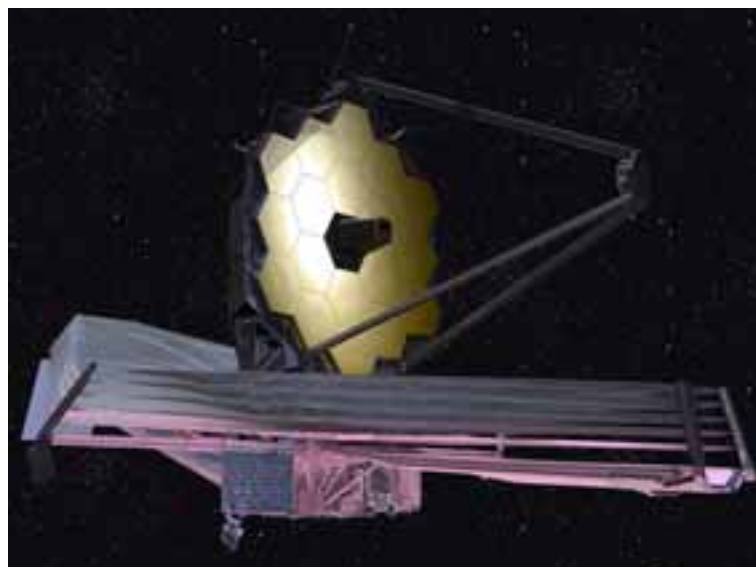
Voyager I is moving into interstellar space. Just before it left our solar system it took a photograph of Earth. It's that little dot that has a circle drawn around it for identification. See the Wikipedia Article on Voyager I: http://en.wikipedia.org/wiki/Voyager_1

In this article I have mentioned some of the Web sites I frequently visit. I hope you visit some of these and others as well. With our computers and television we can reach out to our universe, using the Internet from home, available 24/7.

With our membership in MAS we all learn together. What makes astronomy so fascinating to me is that with each discovery, each answer, more questions arise that we can research for possible answers. I hope you take the leap. 🐘



The Hubble space telescope in orbit.



A sketch of the Webb telescope, the successor to the Hubble.

Astronomy Day—April 20

by Merle Hiltner, Eagle Lake Observatory chair

The day started warm, calm and sunny. Guests began arriving shortly after noon and were treated to views of the Sun, using the Onan Observatory visual platform H-Alpha scope and the SV152 with the white-light filter. A large group of sunspots and several large solar prominences were visible. For the first time, the Sylvia A. Casby Observatory was open to the public, utilizing the 8" TMB scope for viewing the planets Venus, Mercury and Jupiter throughout the day as well solar viewing using the Baader "Herschel Wedge" solar prism. Even with the thickening haze, the views through the 8" refractor were amazing.

At 2:00 p.m. the scheduled presentations began. Thanks to the last-minute efforts of Dave O., Steve B., Marcus T., Clayton L. and all those who answered the call to bring additional chairs, we were able to have the presentations in the new HotSpot classroom.

This year's event seemed to be more of a challenge than any other I can remember. Our goal all along was to have the new buildings operational for Astronomy Day, but it seemed that Mother Nature and the winter that refused to end were conspiring against us. Despite having another 12 inches of snow the day before the event, we were determined to see that things were ready to go. Although we eyed the worsening sky conditions as the day wore on, it was a huge success with many milestones. I can't

thank everyone enough who pitched in to get things ready, manned the telescopes, and gave their presentations throughout the day.

Schedule of Events

- 12:00 noon Solar observation, daytime viewing of the Moon, Venus and Jupiter.
- 2:00 Bill Arden, "The Sun (the star we live with)." Astronomers look at stars, and we've got one right down the block. We take a closer look at the star we live with. We see its place in the solar system, how it compares to other stars, ways to watch it, and some things to look for through the observatory's telescopes.
- 3:00 Michael Kauper, "Planisphere Demonstration." Make your own star wheel and learn how to use it to find your way through the night sky.
- 4:00 Bob Kerr, "Things That Go Flash in the Night: All About Meteors." Every year our planet is bombarded by thousands of meteors or "shooting stars." These space rocks can originate close-by as well as from the farthest reaches of the solar system. Some arrivals are anticipated while others startle us. They come singly or in showers. Join us and hold a four-billion-year-old meteorite in your hand.



5:00 Merle Hiltner, "Current Construction Projects." Video presentation of the construction of the Sylvia A. Casby Observatory and the HotSpot classroom. It's been nearly one year since funding became available to begin what may well be the final construction project of MAS for years to come. See the project progress in this photographic presentation spanning the past eight months as we worked through one of the worst winters in recent years. 8:30

7:30 Ron Schmit, "Robots in Space." Although you would not mistake them for R2 or C3PO, they are robots—our intrepid space probes. Setting sail from Earth, this fleet of automatons continues to explore 9:00

the far reaches of our solar system, sending back never-before-seen images from the unique vantage point that they provide. We've had robots visit every planet of the solar system, and we even have one on the way for a historic visit to the dwarf planet, Pluto. Get the latest on our robotic reconnaissance of the solar system. There is so much to explore!

Door Prize Drawings

Ron Schmit's live constellation tour was canceled due to overcast skies, but we were still able to show our guests the Moon and Jupiter.

Photographs by Merle Hiltner 📷



MAS Patron Members

MAS offers a patron membership to those members who wish to contribute a little extra to help support MAS activities. Patron memberships are established by constitution at 2-1/2 times the regular membership rate—currently \$70 annually for a patron membership. The \$42 additional contribution is tax-deductible. It is used to fund equipment acquisitions, facility improvements, further outreach activities and more. We would like to thank the following patron members as of April 28. 📷

Tom Alm	Alex Danzberger	Jonathan Hayman	Clayton Lindsey	Dan Siers, Sr.
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Directions to the Star Party Locations

For maps and further details about the sites, please go to our website at www.mnastro.org/facilities.

Baylor Regional Park and Onan Observatory

To reach Baylor Regional Park, head west on Minnesota Highway 5, through Chanhassen and Waconia, to the town of Norwood-Young America. Turn right onto Carver County Road 33 and continue approximately two miles north. Baylor Regional Park is on the right side of the road, marked with a prominent sign. When entering the park, stay to the right and follow the road approx 1/4 mile.

When visiting the Baylor Regional Park, MAS members are requested NOT TO PARK OR DRIVE on the grass. There is a drive up to the observatory which can be used for loading or unloading or handicapped parking only.

For an alternate route from the southern suburbs, take U.S. Highway 212 west to Norwood-Young America. Turn right at the second traffic light onto Carver County Road 33. Continue two miles north to the park entrance.

Cherry Grove

Cherry Grove is located south of the Twin Cities, in Goodhue County, about 20 miles south of Cannon Falls. To reach Cherry Grove, head south on Highway 52. On 52 about six miles south of Cannon Falls, and just past the Edgewood Inn, is a large green highway sign for Goodhue County Rd. 1 "WEST". Turn right, and follow County 1 straight south for about sixteen miles until you arrive at a "T" intersection with County A. The observatory is immediately at your right, nestled in the shoulder of the "T". Parking is permitted on the site, or along the road, preferably County A.

Metcalf

Head east from St. Paul along Hwy. 94. Exit at Manning Avenue (exit #253) Turn south (right turn) and then almost immediately turn left onto the frontage road (Hudson Road S). Continue east on the frontage road for about 1.5 miles. Turn right onto Indian Trail, checking the odometer as you turn. Follow Indian Trail south for just about 1.1 miles, where you'll see an unmarked chain-link gate on the right, opening onto a dirt driveway with slight up-slope. This is the entrance to Metcalf.

Belwin / Joseph J Casby Observatory

Head east from St. Paul along Hwy. 94. Exit at Manning Avenue (exit #253). Turn south (right turn) and then almost immediately turn left onto the frontage road (Hudson Road S). Continue east on the frontage road about 3.4 miles until Stagecoach Trail South, then turn right onto Stagecoach Trail and go east about 2 miles until reaching Belwin Conservancy on your left at 1553 Stagecoach Trail South. From the Belwin driveway entrance, travel about 500 feet and turn left at the gate. Travel about 1/4 mile through the woods until you emerge at the parking area near the classroom building and the Joseph Casby Observatory.

Long Lake Conservation Center

From Western Twin cities

Take I-94 west to Rogers/MN 101. Go north/right on MN 101 through Elk River, where MN 101 becomes USA 169. Continue north on US 169 approximately 90 miles to Aitkin. At stoplight in Aitkin, turn east/right onto US 169/MN 210 and go out of town eight miles. Then turn east/right, following MN 210 toward Duluth. Proceed seven miles. A large green highway sign marks the turn off 210 to Long Lake Conservation Center. Turn north/left on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate. Follow signs to parking and unloading areas.

From Eastern Twin cities

Go north on I-35 to Finlayson/Exit 195. Turn west/left and go one mile to County Rd. 61 and MN 18. At stop sign turn right/north and go two miles. Follow MN 18 west/left and continue 19 miles to MN 65. Turn north/right on MN 65 and proceed 30 miles to McGregor. Intersect with MN 210 and follow 210 west/left (through McGregor) for seven miles. A large green highway sign marks the turn off MN 210 to Long Lake Conservation Center. Turn north/right on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate. Follow signs to parking and unloading areas.

MAS Board Minutes for March and April

By Roxanne Kuerschner, secretary

March

Cherry Grove Observatory Update: Vic was present to update the Cherry Grove progress. There are still expenses to cover, mainly the roll-off roof. The Cherry Grove committee will explore options for the roof. The suggestion is to get something that will last and be sturdy. **Sylvia A. Casby Observatory and classroom:** The work is progressing on the Sylvia A. Casby Observatory and HotSpot classroom. The telescopes are installed and balanced. The classroom will not be completed by Astronomy Day, but it will be usable for events. As the cost nears completion, there will need to be frequent reconciliation with the books to make sure it does not go over budget. **Color brochure printing:** Mark is taking care of this. Steve needs more copies of the membership letter; we need the PDF of the form. **Update on budget/accounting:** We will start providing quarterly updates of the budget at board meetings. **Insurance for all new equipment at ELO:** The insurance carrier approved all construction and

equipment. Merle provided a breakdown for insurance. **Astronomy magazine:** Greg is organizing the *Astronomy* renewals. He will take the renewals twice a year. **Explore Minnesota:** Dave contacted Explore Minnesota. Greg will go to their website and put our activities on it. **Open Forum:** Dave has suggestions from Merle about changes to be made to the forums. There is concern for what non-members as well as members can see. We will table this until Clayton has time to look at the list. **Gemini:** Since *Gemini* is the biggest expenditure, the question has been brought up if there are cheaper or more cost-effective options to printing the newsletter. Mark will investigate the price breaks and see what can be done. **Observing list:** Greg and Clayton will work on an observing list of things to see for each observatory that is tied to the equipment that is there. It could be a "Passport club" or "MAS Passport to the Stars." For example, Onan would have a book with stamps/pins to put in it, with a list for members and a list for non-members. Pins are expensive; maybe we can get stamps instead. We hope this will generate more incentive for people to return to the observatories.

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Minnesota Astronomical Society 2013 Star Party Schedule

Friday Date	Sunset:	Twilight at:	Completely dark from:	Completely dark to:	Moon % Illuminated	Onan Public Night (Sat.)	Cherry Grove	LLCC Weekend	Notes
Jun 07	21:00	23:38	23:38	02:43	0%		X	X	
Jun 14	21:04	23:46	00:21	02:38	35%	Jun 15			
Jun 28	21:06	23:48	23:48	00:13	71%	Jun 29			
Jul 05	21:05	23:41	23:41	02:52	4%		X	X	July 4-6 at LLCC - 3 nights
Jul 12	21:01	23:30	23:30	03:04	22%	Jul 12-14	X	X	Camping with the Stars, at Onan, July 12-14.
Jul 26	20:48	23:03	never	never	75%	Jun 27			
Aug 02	20:39	22:47	22:47	03:05	12%		X	X	
Aug 09	20:29	22:31	22:31	04:03	11%	Aug 10	X		
Aug 23	20:06	21:58	never	never	87%	Aug 24			
Sep 06	19:40	21:25	21:25	04:55	3%	Sep 07	X	X	Northern Nights Starfest #5: Sep 4-8
Sep 13	19:26	21:09	01:07	05:06	67%	Sep 14			
Sep 27	18:59	20:39	20:39	00:38	40%	Sep 28	X	*	
Oct 04	18:45	20:25	20:25	05:36	0%		X	X	Fall Mini-Messier Marathon at CG and LLCC
Oct 11	18:32	20:11	00:08	05:45	53%	Oct 10			Fall Astronomy Day
Oct 25	18:08	19:48	19:48	23:24	57%	Oct 26			
Nov 01	17:57	19:38	19:38	06:12	2%		X	X	
Nov 08	16:48	18:30	22:10	05:21	39%	Nov 09			
Nov 29	16:29	18:16	18:16	04:37	27%	Nov 30			Special Event - Comet ISON
Dec 06	16:26	18:14	21:08	05:52	24%	Dec 07			Special Event - Comet ISON
Dec 20	16:28	18:18	18:18	20:00	87%	Dec 21			Special Event - Comet ISON

LLCC nights indicated with an "*" instead of an "X". We will be sharing the facility with other groups. Not all of the lights will be extinguished.

This schedule is subject to change. Please check the MAS online calendar at www.mnastro.org for a complete schedule of all MAS events. Cherry Grove Star Parties are held on Friday nights, with Saturday reserved as the backup night if Friday is cloudy. LLCC Star parties are held on both Friday and Saturday night. Onan Public nights are held on Saturday nights only.

The **Casby Observatory at Belwin** is available to MAS members who have completed the Belwin Orientation and training to use at any time. We will not have scheduled star parties at Casby. To reserve the observatory for yourself, please post your request on the Casby Observatory Keyholders discussion forum.

The **Metcalf Observing Site** is available to MAS members at any time. We do not have organized, scheduled star parties at Metcalf. Feel free to head out there whenever you wish.

The **Onan Observatory** holds regularly scheduled Public nights. You are welcome and encouraged to bring your own observing equipment to these events. All other nights the observatory is available for trained members use. To reserve the observatory, go to the Onan reservation calendar at <http://www.mnastro.org/onankey/reservations/reserve.php> Before heading out, Please check the Onan reservation calendar to verify if there is a outreach event scheduled.

In 2013 daylight saving time begins March 10 and ends on Nov 3.

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Facebook: So far it seems to be a nice page; people are "liking" the site and sharing the pages. **The Nerdery:** Dave will look into being considered for a webpage overhaul by The Nerdery. They choose an organization once a year to do a makeover of their website.

April

Update on budget/accounting: There was a discussion related to the adoption of Quickbooks as the account software for the club. Small adjustments were suggested to Chris after reviewing the first-quarter transactions. The report looked good. **Cherry Grove Observatory update:** No update was given, as no further

work has been completed since last meeting due to unfriendly weather conditions. **Sylvia A. Casby Observatory and classroom:** No formal report was provided, but the forums have been updated periodically to keep us informed. **Astronomy Day:** Chris reported that Radio City needs to order the binoculars we plan as a giveaway at Astronomy Day. **LLCC 25" cart:** The board agreed that funds are available and already approved to go forward to obtain the scope cart. Greg is communicating with the LLCC committee. **Ad cost:** Greg brought up the cost to run ads in *The Reflector* for the summer events (LLCC, NNSF, ELO, CWTS) in the next issue. Motion made and approved. ■



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How to pay your dues

June 2013 Volume 38 Number 3

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New subscriptions to *Sky and Telescope* at the MAS member discount must be sent to the MAS for group membership subscription processing. Send new subscriptions with your MAS membership to the attention of the Membership Coordinator at the MAS at the Post Office box address shown on the back cover of the *Gemini* newsletter.

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There is a general list (MAS), several Special Interest Group (SIG) lists and other lists for special purposes. Archives of the lists are also available by visiting the listinfo page for a specific list.