



December, 2016

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The highlights of MAS 2016 once again are a result of our members ambition and can-do attitude that continues to make this club the best amateur astronomy club around. The observatory had numerous maintenance and improvements made, public outreach was strong, and several events were held, some of which were new and very unique.

The observatory is open year-round, but the year really kicks off when winter breaks and it's decent enough for people to come out of hiding to help with the spring cleanup. And so began the projects for the year with a focus on modernization. The A-scope was upgraded for improved planetary imaging and had a flurry of use during the year thanks to Paul Borchardt's help with the scope and Lee Keith's Planetary Workshop classes. No doubt that Jupiter, Saturn, and Mars were likely the most imaged objects this year by the membership. Due to the popularity of them and the recent spike in new members, be sure to look for a repeat on the planetary workshop classes in the new year.

Z-dome continued to receive some TLC this year in that the Control Room, formerly known as the Library, was given a facelift with a new floor, fresh paint, new drop ceiling, and new chairs to make comfortable use of remote controlled G, F, and the LX200 scopes. An LCD screen TV was added to better demonstrate the use of G-scope during public nights and to showcase all the great images members have taken. The entryway, as well as the observatory upstairs also received new paint after repair of the water-damaged west wall & floor was made. Z-dome's chain-drive system continued to give us problems and is currently being completely overhauled with all new parts so that when the dome is functional again, autoguiding improvements to G-scope can resume.

The Year of 2016

receive some TLC this year formerly known as the facelift with a new floor, ceiling, and new chairs use of remote controlled scopes. An LCD screen demonstrate the use of G-scope during public nights and to showcase all the great images members have taken. The entryway, as well as the observatory upstairs also received new paint after repair of the water-damaged west wall & floor was made. Z-dome's chain-drive system continued to give us problems and is currently being completely overhauled with all new parts so that when the dome is functional again, autoguiding improvements to G-scope can resume.

The observatory always has maintenance to be done and this year was no exception. Aside from the routine landscaping, the CGEM DX mount on F-scope had to have the DEC motor replaced and new dew zappers and controller were added. The water pump to A-dome was re-primed and several trees that had grown to block the southern sky were cut down. But the biggest project of the year that was completed was the addition of a new solar observatory.

The concrete was laid in May with the assembly of the SkyShed Pod observatory taking place in Summer. After some minor observatory leaks being fixed from when it rained, the white light and H-alpha scopes are now ready to use both visually or with a new imaging camera.

(to be continued on page 3)

Next Meeting is on January 11th

The January combined Board/General Membership Meeting will be held in the New Berlin Public Library's Heritage Room on January 11th at 7PM.

Observatory Report

Work is progressing nicely on the Quonset project with us actually being ahead of where we thought we'd be on this date. The dumpster has been picked up. The plywood floor has been laid and nailed down. The furnace room is complete and the installing of the furnace will begin on November 10th. Putting up the walls has begun. We are also getting estimates from contractors for the electrical replacements needed. The selling of used equipment continues with three 12" mirror blanks being sold in the last month for \$500. There is still a lot of items yet to be sold. The location of the Septic tank has yet to be found, so the Herr Corporation was contacted. They strongly advised us not to have the tank pumped just before winter due to the fact that it's hardly used, so nearly empty, and would freeze causing damage to the system. We will wait until spring to service the septic system which also gives us to find the tank on our own. The second etalon from the Solar Scope has been returned and installed into the scope. Lunt found that the etalon had a leak around a lens inside of it and made the proper repairs. This work and the return shipping was covered by the warranty. The Solar scope is completely usable now and a training session for members interested in using the scope will be scheduled. Gene Hanson has kindly donated a TeleVue 4.8mm Nagler eyepiece to be used on the white light 5" refractor for high power sun spot observing.

Respectfully Submitted,
Paul Borchardt, Observatory Director

Treasurer's Report

\$9,480.40	<i>Starting Balance as of 10/19/2016</i>
	<u>Expenditures</u>
\$3.56	PayPal fees
\$116.48	Z-dome repair
\$67.31	WE Energies
\$39.45	Solar Observatory
\$4,660.10	Quonset project
\$4,847.45	TOTAL Expenditures
	<u>Revenue</u>
\$165.40	Donations
\$430.00	Membership dues
\$595.40	TOTAL Revenue
\$5,232.35	<i>Ending Balance as of 11/07/2016</i>

Respectfully Submitted,
Sue Timlin, Treasurer

Meeting Minutes

Held on November 9th at the New Berlin Public Library. The meeting was called to order at 7:02 PM by President, Tamas Kriska.

Minutes, Treasurer's Report, Observatory Director's Report, and the Membership Report were submitted electronically.

Old Business - Solar Observatory: The second etalon came back from the Lunt. New insulation material was bought and will be installed to stop the water leak of the Dome.

G-scope: The chain is still broken. Paul machined a new part. The CP4 won't be ordered until the chain is back and the slit is functioning.

Quonset Hut remodeling: The new furnace has been installed and will be paid from the checking account since the requested \$10,000 transfer from the Endowment Fund is still pending. As the work progressed new issues came up. The messenger line, which is zip tied to the building is unsafe. The breaker box in the A building is obsolete and should be replaced. An upgrade to a 200 Amp service is suggested. We have a quote for \$1,950. Some members felt that the remodeling goes too fast and we spend too much. They wanted more detailed discussions before decision making. The general opinion, however, was that this is a big project that part of the major reconstruction of the past 4-5 years. This cost money, but the return comes in terms of fast growing membership, successful Open Houses and Observatory tours. The modernization of the current location is important, since the Club won't pursue the move to a new darker sky location. The Quonset project has to be viewed as part of the investment into equipment. The fundraising goal was set at \$25,000. Half of that goal has already been reached, but mainly from selling old equipment. We need to improve our fundraising efficiency. The meeting was adjourned at 8:35PM.

Respectfully Submitted,
Agnes Keszler, Secretary

Membership Report

Since the last Report we received 19 renewals and 8 new membership applications and would like to welcome Brandon Antlfinger, Nathan Kopka, Emily Rabe and Nickolas Roeder, Edward Petty & Family, Ryan and Lindsay Corder, Todd and Peggy Stair, Logan Bezold & Family, and George Glocka & Family. We now have 142 active members.

Respectfully Submitted,
Jeff Kraehnke, Committee Chair

The Year 2016 (continued from the front page)

Some very special thanks go out to Sue Timlin, Tamas Kriska & Agnes Keszler, Gene Hanson, and Paul Borchardt for the generous donations that helped make this project be so successful. We now have a very nice solar observatory and we've only begun to skim the surface of the capabilities this brings to the club.

Last, but certainly not least of improvements this year was remodeling of the Quonset Hut attached to the A-dome building. Just started following the October public night, this project will likely last well into the Spring of 2017. The building's ceiling & floor has been completely gutted to the metal frame and is in the process of being built back up. So far, insulation, new flooring, and a new furnace (with the addition of air conditioning) were installed. The walls are just beginning to go up and when complete, the new and modernized lecture hall will better serve us during public nights, board meetings, general membership meetings, as well as other activities like classes and the Christmas party. Thanks to everyone that has had a hand in this project thus far. Your help and support will be needed in the future.

This year all but one of the seven public nights had exceptional weather which led to a great turnout such that it wasn't unusual for the speaker to have to repeat the lecture due to seating capacity in the Quonset Hut. Numerous private tours were given of which one included a wedding proposal under the super moon (she said yes!). We also participated in Science Fiction Day down at Discovery World. While not directly related to Astronomy, it did give awareness to MAS and the kids had exposure to real science. Lastly, a first for this year was MAS setting up a booth at the New Berlin 4th of July Festival & Parade. Despite the 3-day commitment, huge awareness was gained as was evident by the spike in website traffic, public night attendance, and number of new memberships. To date, there have been 61 new memberships added in 2016. The memberships were a mixture of individual, family, and student with the current total memberships standing at 142.

A significant accomplishment was that our webmaster, Gene Hanson was presented with the 2016 Astronomical League Webmaster Award for his outstanding job of website design and administration.

This year was also filled with annual, new, and even very unique events. The usual events like Yerkes Star Party, MAS Picnic, Board & General meetings, and the Christmas party all took place like years past. Aside from the super moon, one of the other major astronomical events that took place was the Mercury transit. Despite the overcast skies that day, the clouds did part for 30 minutes to allow observing of the transit with the new solar scope. Several members took a trip up to the Sheboygan Astronomical Society's Swap 'n Sell event with the intent of fund raising for the Quonset Remodel Project. Overall, it was worthwhile making a connection with their members as well as having fun and raising a little money too. But one of the strangest events to occur at the observatory this year was the request of a local filmmaker to use the MAS grounds as a film set for a commercial. The film crew was there most of one day and contributed a sizeable donation to the club for its use. The director promised a copy of the commercial to the club once it was done so stay tuned for an update on the Google Group in 2017.

All-in-all, 2016 was a pretty good and active year for MAS. Thanks to everyone that took part. As mentioned, the strength of MAS is its membership and we need to protect and grow that in the future. As we look ahead to 2017, we have the Quonset remodel project to finish along with some other planned maintenance to complete the modernization of MAS. We hope you enjoy your holiday with your family this season and hope for clear skies in 2017. Merry Christmas and Happy New Year!

Christmas Party 2016

Due to the ongoing Quonset remodeling project the Annual Christmas party was held in the Heritage room of the New Berlin Public Library on Saturday, December 3rd. 23 members attended the event. We had pizza and lots of delicious dishes brought to share. Also, the memorable moments of 2016 were shared in an entertaining slideshow presentation. Everybody had a great time.



The Quonset Hut Remodeling



Great progress has been made on the Quonset remodeling project. During several well attended work parties one third of the new fiberglass-reinforced plastic wall panels were installed. The installation of different components of the electrical and audio-visual systems is underway. Everything has to be in

place and tested before the wall panel installation can be continued. The spray-foam insulation and the new furnace provided pleasant conditions for the work even at subzero temperatures. Information on future work parties will be posted on the MAS Google Group.



In the Astronomical News

Betelgeuse May Have Swallowed a Companion 100,000 Years Ago

For such a well-known star, Betelgeuse is mysterious. Astronomers know that it's a red supergiant, a massive star that is nearing the end of its life and so has bloated up to many times its original size. Someday it will explode as a supernova, but no one knows when. "It might be ten thousand years from now, or it might be tomorrow night", J. Craig Wheeler of The University of Texas, a supernova expert, said.

A new clue to the future of Betelgeuse involves its rotation. When a star inflates to become a supergiant, its rotation should slow down. "It's like the classic spinning ice skater—not bringing her arms in, but opening her arms up," Wheeler said. As the skater opens her arms, she slows down. So, too, should Betelgeuse's rotation have slowed as the star expanded. But that is not what Wheeler's team found. "We cannot account for the rotation of Betelgeuse, it's spinning 150 times faster than any plausible single star just rotating and doing its thing", Wheeler said.

He directed a team of undergraduates including Sarafina Nance, Manuel Diaz, and James Sullivan of The University of Texas at Austin, as well as visiting students from China and Greece, to study Betelgeuse with a computer modeling program called MESA. The students used MESA to model Betelgeuse's rotation for the first time. Wheeler said in contemplating the star's puzzlingly fast rotation, he began to speculate. "Suppose Betelgeuse had a companion when it was first born? And let's just suppose it is orbiting around Betelgeuse at an orbit about the size that Betelgeuse is now. And then Betelgeuse turns into a red supergiant and absorbs it—swallows it."

He explained that the companion star, once swallowed, would transfer the angular momentum of its orbit around Betelgeuse to that star's outer envelope, speeding Betelgeuse's rotation. Wheeler estimates that the companion star would have had about the same mass as the Sun, in order

to account for Betelgeuse's current spin rate of 15 km/sec. While an interesting idea, is there any evidence for this swallowed-companion theory? In a word: perhaps. If Betelgeuse did swallow a companion star, it's likely that the interaction between the two would cause the supergiant to shoot some matter out into space, Wheeler said.

Knowing how fast matter comes off of a red giant star, about 10 km/sec, Wheeler said he was able to roughly estimate how far from Betelgeuse this matter should be today. "And then I went to the literature, in my naiveté, and read about Betelgeuse, and it turns out there's a shell of matter sitting beyond Betelgeuse only a little closer than what I had guessed," Wheeler said.

Infrared images taken of Betelgeuse in 2012 by Leen Decin of the University of Leuven in Belgium with the orbiting Herschel telescope show two shells of interacting matter on one side of Betelgeuse. Various interpretations exist; some say that this matter is a bow shock created as Betelgeuse's atmosphere pushes through the interstellar medium as it races through the galaxy.

No one knows the origin with certainty. But "the fact is," Wheeler said, "there is evidence that

Betelgeuse had some kind of commotion on roughly this timescale"—that is, 100,000 years ago when the star expanded into a red supergiant. The swallowed companion theory could explain both Betelgeuse's rapid rotation and this nearby matter.

Wheeler and his team of students are continuing their investigations into this enigmatic star. Next, he says, they hope to probe Betelgeuse using a technique called "asteroseismology"—looking for sound waves impacting the surface of the star, to get clues to what's happening deep inside its obscuring cocoon. They will also use the MESA code to better understand what would happen if Betelgeuse ate a companion star.

by Phys.org/news



Infrared image of Betelgeuse by the orbiting Herschel telescope shows two shells of interacting matter on one side of the star. Credit: L. Decin/University of Leuven/ESA

Adopt a Telescope Program - Signup Sheet

Adopter	Scope	Location
1 Sue Timlin/John Hammetter	18" F/4.5 Obsession	Wiesen Observatory
2 Steve Volp	12.5" F/7.4 Buckstaff	B Dome
3 Robert Burgess	12.5" F/9 Halbach	A Dome (Armfield)
4 Mike Smiley	18" F/4.5 Obsession	Albrecht Observatory
5 Jeff Kraehnke	14" F/7.4 G-scope	Z Dome
6 Lee Keith/Tom Kraus	12" F/10 LX200 EMC	Tangney Observatory
7 Herman Restrepo/Matt Mattioli	8" F/11 Celestron EdgeHD	Ray Zit Observatory
8 Tamas Kriska	14" F/1.9 F-scope	Jim Toeller Observatory
9 Paul Borchardt	Solar scope	SkyShed POD



MAS Observatory

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At Your Service

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December/February

12/31	No Keyholder	Happy New Year!
01/07	Scott Berg	262-893-7268
01/14	Steve Volp	414-751-8334
01/21	Paul Borchardt	262-781-0169
01/28	Susan Timlin	414-460-4886
02/04	Jeff Kraehnke	414-333-4656