Nightfall

A Publication of the Huachuca Astronomy Club

January 2016

President's Notes

Looking back on 2015, I don't feel we had enough time at the eyepiece. There were too many cloudy nights and too little organization on those nights when it did clear up. So, what to do for 2016? Well, work on that weather machine for sure, and look a little further into the future to plan our astronomical opportunities. But how to go about that planning? Well, it will take planning.

Some modern astronomy software include observing calendars that take care of a lot of the work, but you're not likely to use them to keep your significant others, family and friends up to date. So, take some time and sit down with a calendar, a pretty one with beautiful astronomical images you just got from the club or one of the many computer-based calendars on your pretty PC. First, make sure it says 2016 on it, and then scratch out those dates you will not be viewing. Whatever calendars you're using try to locate moon phases, sunrise, and sunsets. If you only observe during weekends, your possibilities reduce quickly and your planning task is smaller but more crucial. Next, family occasions, work related mandatories, travel dates, HAC meetings and outreach opportunities should be noted, not fully removed from observing -- but probably curtailed.

OK, now you need some additional information. Pull out your 2016 astronomic almanacs. Both Sky and Telescope and Astronomy have simple ones for quick heads-up and timing approximations. For precise astronomical timings you may consult, The Royal Astronomical Society of Canada's, Observer's 2016 Handbook. Also the, Astronomical Phenomena for the Year 2016, prepared Jointly by The Nautical Almanac Office, United States Naval Observatory, and Her Majesty's Nautical Almanac Office United Kingdom Hydrographic Office is available on-line as a PDF: https://bookstore.gpo.gov/products/sku/008-300-00070-4 .

Now for the planning, the focus of the planning is personal, dependent on your likes and astronomical equipment. There will however be a few major events everyone will probably want to take note of in 2016. The planet Mercury will make a transit across the Sun on the morning of May 9. It will be the only transit of the planet Mercury this decade, so try not to miss it. HAC will have the Patterson observatory open from sunrise (it will already be in transit) through midday, viewing the event. Feel free to drop on by or set up a scope and watch or image. We'll have hot coffee.

Occultations of planets and bright stars by the Moon are cool and we have several in 2016. September 2, Jupiter will be occulted. December 6, Neptune will get the same treatment. The bright star Aldebaran will go dark multiple times in 2016, January 19, April 10, August 25, Oct 18, and December 12. There are also plenty of lunar occultations of minor planets in 2016, but I have no space for all of them here. To get all of these upcoming occultations check out the Astronomical Almanac – Online! Page of "2016: Lunar Occultations of Planets, Minor Planets and Bright Stars" at http://asa.usno.navy.mil/SecA/olist16.html.

What else to put on the calendar? Well, Mars reaches opposition on May 22, so you should start watching it often now, as it will be roaring in. Saturn will also be well placed in spring. There will be lot of double shadow transits occurring across Jupiter throughout the year. Again, there are too many transits to mention here, but you can look them up (in many cases they will be occurring every other night in little clumps (yes, that's a technical term)). Oh, and Comet C/2013 X1 PanSTARRS may reach a maximum brightness of +6th magnitude in late June or early July. Remember, this is just a short list of events but should get you going on filling in your calendar.

Finally, don't forget to post that calendar (electronically or otherwise) for you and yours as a reminder of all the cool events! Moreover, use it, don't depend on long-term memories when getting ready for a clear night, have it written down.

Now, if only I could get my weather machine working.

Oh, our banner this month is cropped from a shot from Bob Gent, thanks Bob.

Our January Speaker

Our speaker this month is Danielle Adams, a PhD student and 2015-2016 NASA Space Grant fellow at the University of Arizona's School of Middle Eastern and North African Studies and the School of Anthropology. Fluent in Arabic, she is translating 1200-year-old Arabic astronomical texts that have never before been accessible to English-speaking scholars. She lived in the Middle East for 3 years and has been an amateur astronomer and astrophotographer for more than 30 years. She has spoken on related topics at international conferences around the world.

Her talk is entitled ***Two Deserts, One Sky: Arab Observational Astronomy and Star Lore***. The desert sky we see here in Tucson, Arizona, is the same desert sky that Arabs have observed for millennia. Two Deserts, One Sky (onesky.arizona.edu) is a new initiative intended to bring the richness and depth of observational astronomy in ancient Arab cultures to modern awareness. Danielle will use ancient poetry and star calendars to show us how various Arab societies constructed the night sky before they adopted Greek astronomy.

We will be treating Danielle to dinner at the Outback Steakhouse before the meeting. Please RSVP to Ted Forte (tedforte511@gmail.com) if you would like to join us for dinner at 5PM. The meeting starts at 7PM in the community room of the Student Union Building, Cochise College 901 N. Colombo Avenue, Sierra Vista.

Next Patterson Night

We will hold our next public night at the Patterson Observatory tonight, January 14. Doors open to the public at 6PM. All HAC members are invited and encouraged to participate in these fun public observing sessions. Come out and get more involved – you'll enjoy yourself. You don't need to bring a telescope (unless you want to), just bring your love of the night sky and your willingness to share it.

Have You Paid Your Dues for 2016?

Most HAC memberships are set to expire each December. Thank you to all the members that have renewed and are current. If you have not yet renewed your membership, there are now three ways to pay your dues.

You can pay on-line by going to www.hacastronomy.com , pulling down the Membership menu and click on Renew. You can use your Pay Pal account or pay with your credit card.

You can send your check made out to HAC to PO Box 922 Sierra Vista AZ 85636.

You can pay in cash or check at a meeting or event. (See the treasurer or any elected officer of the club).

Dues are $25 individual, $35 family, $20 active duty military, $25 military family, and $10 student.

HAC Swap Meet

Mark your calendars, check your closets and dust off those old eyepieces – HAC will hold an Astro Gear Swap Meet at the Patterson Observatory on Saturday, March 26 starting at 1PM. We will advertise this event and it will be open to the public. Members are invited to bring items for sale or swap. You are also encouraged to bring your scope if you need any help with it. And, oh yeah, bring lots of cash and your checkbook – there will be toys to buy!

What Do Our Dues Do?

Well it is the start of a new year, 2016. You probably already know this so I'm sorry for saying it again but if I don't repeat the facts regularly some may not really know what we do with their dues. The Huachuca Astronomy Club is a not for profit organization. We try to be tight wads frugal. We look to keep ahead of club expenses and only plow the money into outreach, new member packets and, ply our wonderful speakers with a modest dinner before for coming to give us informative talks. That's about it. We try to get freebees for our meeting venues (Cochise College and UA South Foundation) and from astronomy retailers like Starizona and Farpoint to have as door prizes. When we cannot we sometimes, buy something (not for several years) of general interest.

Outreach and general meeting expenses for the last few years have come down to insurance, website costs, speaker dinners, solar viewers, and printing. We never charge for our time, mileage, food, or drinks and we no longer need to print and mail newsletters. The donations for drinks and snacks don't pay for the cookies and drink Katherine and Bill bring each meeting. We have only been able to give them our thanks. When we out at schools and libraries for outreach have a few telescopes that have been given to the club over time and we might use them but mostly we bring our own.

New member packets are a cost we believe in strongly. They give information that is useful immediately new members and items such as the planispheres go right on giving for years.

Our main form of income comes from your yearly membership dues. We tend to just break even on the shirts, calendars, and Handbooks. We do try to solicit donations at outreach events and public nights at the Patterson but we are astronomers and not salespersons so we don't push it. Did I mention you could make tax-deductible donations to the club? We also get a trickle in from Amazon sales through our website portal that wouldn't hurt anyone to use.

Anyway, over the last couple of years, we have just about broken even and that's good. We have some new paying members and that is good for the bank as well as for the general club dynamics. If you want a look at the real numbers, we bring the latest bank statement to the monthly meetings just ask. We, the board worry about budget. That's what we do. And that is why we bug you every year for dues.

Space Place Article
January 2016

How will we finally image the event horizon of a black hole?

By Ethan Siegel

One hundred years ago, Albert Einstein first put forth his theory of General Relativity, which laid out the relationship between space-time and the matter and energy present within it. While it successfully recovered Newtonian gravity and predicted the additional precession of Mercury's orbit, the only exact solution that Einstein himself discovered was the trivial one: that for completely empty space. Less than two months after releasing his theory, however, the German scientist Karl Schwarzschild provided a true exact solution, that of a massive, infinitely dense object, a black hole.

One of the curious things that popped out of Schwarzschild's solution was the existence of an event horizon, or a region of space that was so severely curved that nothing, not even light, could escape from it. The size of this event horizon would be directly proportional to the mass of the black hole. A black hole the mass of Earth would have an event horizon less than a centimeter in radius; a black hole the mass of the sun would have an

event horizon just a few kilometers in radius; and a supermassive black hole would have an event horizon the size of a planetary orbit.

Our galaxy has since been discovered to house a black hole about four million solar masses in size, with an event horizon about 23.6 million kilometers across, or about 40 percent the size of Mercury's orbit around the sun. At a distance of 26,000 light years, it's the largest event horizon in angular size visible from Earth, but at just 19 micro-arc-seconds, it would take a telescope the size of Earth to resolve it – a practical impossibility.

But all hope isn't lost! If instead of a single telescope, we built an array of telescopes located all over Earth, we could simultaneously image the galactic center, and use the technique of VLBI (very long-baseline interferometry) to resolve the black hole's event horizon. The array would only have the light-gathering power of the individual telescopes, meaning the black hole (in the radio) will appear very faint, but they can obtain the resolution of a telescope that's the distance between the farthest telescopes in the array! The planned Event Horizon Telescope, spanning four different continents (including Antarctica), should be able to resolve under 10 micro-arc-seconds, imaging a black hole directly for the first time and answering the question of whether or not they truly contain an event horizon. What began as a mere mathematical solution is now just a few years away from being observed and known for certain!

Note: This month's article describes a project that is not related to NASA and does not suggest any relationship or endorsement. Its coverage is for general interest and educational purposes.

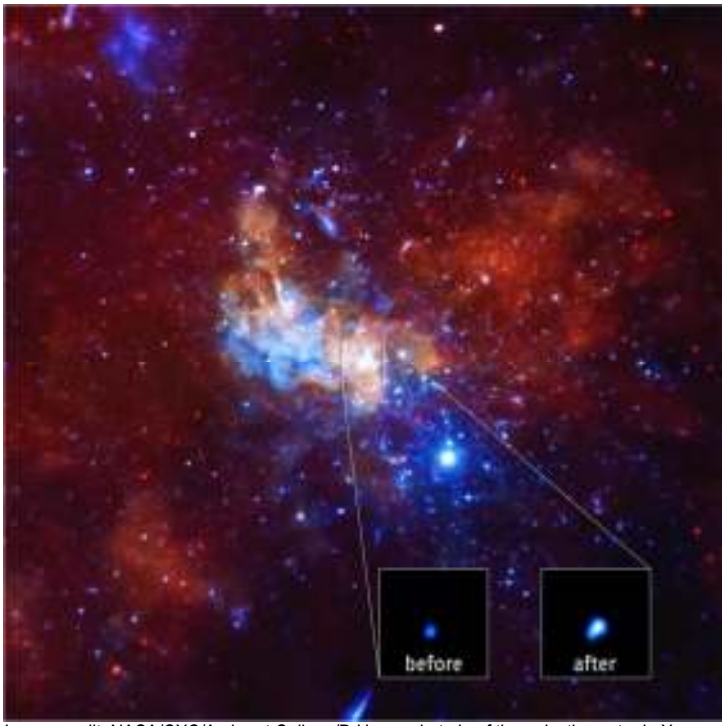

Image credit: NASA/CXC/Amherst College/D.Haggard et al., of the galactic center in X-rays. Sagittarius A* is the supermassive black hole at our Milky Way's center, which normally emits X-ray light of a particular brightness. However, 2013 saw a flare increase its luminosity by a factor of many hundreds, as the black hole devoured matter. The event horizon has yet to be revealed.

The Astronomical League Outreach Award

Recognizing that outreach is simply paramount to the survival of our hobby, the Astronomical League offers recognition and encouragement to do outreach in the form of the Outreach Award. To qualify for a certificate and pin, you need document only five, two-hour outreach events. Many, many HAC members would qualify with the outreach efforts they have already completed. Outreach is easy, fun, and rewarding – qualifying for the Outreach Award is well within the grasp of any HAC member. There are also additional levels of recognition – Stellar and Master Outreach, to encourage continued participation.

Earning your Outreach Award will help to inspire and motivate other HAC members to get interested in outreach activities. Having a large number of outreach award recipients could also be a significant source of pride for the club and earn us bragging rights. We already do a lot of outreach, why not advertise our efforts? We may not only inspire other HAC members, but other clubs as well.

Whether or not you submit logs for an A.L. award, outreach is something you should do and encourage others to do. There is no better way to get the most out of amateur astronomy and club membership than by doing outreach. I've seen it time and time again – club members that come out and participate become enthralled with sharing the sky. They get more active, have more fun with astronomy, and attract new people to the hobby. And you'll get as much as you give. Next to maybe, a comet discovery, I can't imagine anything more rewarding than changing someone's life. If you think I exaggerate, just show someone Saturn for the first time and you'll see what I mean. Ted Forte, HAC Awards Coordinator

Want Ads

FOR SALE: Meade Starfinder 8" Reflector Telescope

at a very reasonable price. Included are a Telrad Finder, Filters, and additional Lenses.

Contact Mr. Jim Moses at (520) 803-0913 or by email jjmoses2@gmail.com

FOR SALE: Celestron Celestar 8 inch S/C Deluxe - $1200.

Will also sell pieces individually

Contact Rhonda and Terry Taylor at (520) 366-2378 or by email at twrl2@yahoo.com. Alternatively, See Craigslist at http://sierravista.craigslist.org/bar/4523742100.html

FOR SALE: Older Optical Guidance Systems 12.5" f/9 Ritchey-Chretian telescope

Very good Paul Jones ceramic optics, Robofocus secondary focuser, will include Takahashi collimating telescope. Some of the images through the scope are at Mshadephotography.com.

Contact Mike J. Shade at mshade@q.com

FOR SALE: 8" Celestron Nex Star

In good condition with all original accessories.

Contact Mae Childs at maechilds2014@aol.com

FOR SALE: Celestron 8" OTA

with additional HyperStar III Optics from Starizona. Both for 1000.00

Contact Max Mirot at galiloeo@yahoo.com

Please Support Our Sponsors

Our sponsors have been keeping us supplied in door prizes for some years. If you have not contacted them lately, please consider this. They have a lot of great astronomical products that we all need.

For more information on products and contact information, their websites are:

Farpoint Astronomy	http://www.farpointastro.com/
Starizona	http://starizona.com/

Club Officers and Contacts

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Vice President: Chris Ubing
Secretary: Rick Burke
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Past President: Bob Gent

Board Members-at-Large

Gary Grue | Ken Kirchner | Bert Kelher | Ken Duncan

***Nightfall* Editor:** Cindy Lund alund@juno.com
Webmaster: Ken Kirchner
Facebook Editors: Bert Kelher and Craig Gundy

Website: http://www.hacastronomy.com
Facebook: http://www.facebook.com/HuachucaAstronomyClub

The Biscuit. Mike J. Shade: mshade@q.com Mike J. Shade Photography: mshadephotography.com

HAC Jan/Feb Calendar of Events

SU	MO	TU	WE	TH	FR	SA
10 Jan	**11**	**12**	**13**	**14** Patterson Public Night 6PM	**15** HAC Meeting Student Union Danielle Adams	**16** **6:26PM**
17	**18**	**19**	**20**	**21**	**22**	**23** **8:46PM**
24	**25**	**26**	**27** Jupiter 1.4°N of moon	**28**	**29**	**30**
31	**1 Feb**	**2** 	**3** Saturn 3° S of Moon	**4** Lowell Jr. High Bisbee 6:30PM	**5**	**6** Member Star party
7	**8** **9:39AM** 5:30P Stem Night Coronado K-8 School	**9**	**10**	**11** Patterson Public Night 6:30PM	**12**	**13**
14	**15** **2:46AM**	**16** Bisbee B&G Club Vista Park 6PM	**17**	**18**	**19** HAC Meeting Student Union Steph Sallum	**20**
21	**22** **1:20PM**	**23**	**24** Zodiacal Light visible after sunset next two months	**25**	**26** Double shadow Transit 2:37AM	**27**
28	**29**	**March 1** **6:11PM**	**2**	**3**	**4**	**5** Member Star party
6	**7**	**8** **8:54PM** **Jupiter at Opposition**	**9**	**10** Patterson Public Night 7 PM	**11**	

All event times MST. Join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email to: haclist-subscribe@yahoogroups.com