PAStimes

Phoenix Astronomical Society
www.pasaz.org
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Dr. Alex Vrenios to speak at Feb 2nd Meeting

"The Astronomical League"

The Phoenix Astronomical Society is proud to announce that our own Dr. Alex Vrenios will be our guest lecturer on February 2, 2023, at our meeting starting at 7:00 p.m., via this Zoom link:

https://us02web.zoom.us/j/81193628193?pwd=NlBZN2llU204VnVySk5SZXhtZWc2UT09, or in-person, in room LS-205 on the PVCC Main Campus.

The Astronomical League is our national astronomy club, with over 70 observing programs that offer you a structured approach to learning about the sky and all its wonders. This presentation will introduce you to many of these programs, show you how to document your observations, and teach you the difference between seeing and transparency. Alex will walk you through the steps he took to complete several of them, on the Novice, Intermediate, and the Advanced level. Be sure not to miss the details on how to capture the analemma, or how to "see" objects in the radio frequency spectrum!

Dr. Alex Vrenios first joined PAS in 2008. Since then, he has written several articles for the club's newsletter and made many presentations to the PAS membership. He served as Member-At-Large, Vice-President, and recently as PAS Secretary. He is a Lifetime member of both PAS and the Astronomical League, where he has completed over a dozen observation programs. He is a retired computer scientist with a doctorate in the field, having authored over a dozen technical papers and a book about Linux Cluster computing. He is also a Life Senior Member of the IEEE, an international organization of engineering professionals.

Join us in welcoming Dr. Vrenios as he gives us an extensive and fun look at the Astronomical League.

February PAS Meeting

By Terri Finch, Event Manager

This is a very impressive collection of Awards given to Dr. Vrenios for his participation in various Outreach & Observing activities through PAS and through the Astronomical League. Photo by Dr. Vrenios.

You don't want to miss this presentation. Alex Vrenios has done many presentations for PAS in the past and they have all been packed with great ideas, well thought out and planned information. Bring a friend! Join PAS in person at PVCC in LS-205 or through Zoom. Either way, it will be a talk that will knock your socks off! Hope to see you there!

Here is a previous recorded presentation by Alex Vrenios you may wish to check out on our PASaz.org site at https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations: Aug 19, 2021 "Here Comes the Sun"

Dr. Alex Vrenios, who is not only the author of this article, but also our Guest Speaker for tonight's meeting.
Photo provided by Dr. Vrenios.

Hire PAS for your next event!

By Terri Finch, Event Manager

Have you wanted to hold an event with something really unique that your attending guests will appreciate and enjoy? Why not hire an astronomer with their telescope to show the night sky during your party? PAS Star Tours Team enjoys what they do. They come enthusiastic, well prepared, with lots of knowledge of the night sky and can Wow! the socks off your party attendees. Reach out today to Events@pasaz.org and book your next event with PAS! Fees vary, so contact PAS to get the current rate.

President	Stu Brackney	480-221-5711	President@pasaz.org
Vice President	Paul Facuna	602-246-1554	VicePresident@pasaz.org
Webmaster	Pete Turner		Webmaster@pasaz.org
Acting Secretary	Stu Brackney	602 789-6556	Secretary@pasaz.org
Treasurer	Richard Sauerbrun		Treasurer@pasaz.org
Event Manager	Terri Finch	602-561-5398	Events@pasaz.org
Membership Manager	Joe Sandy		Membership@pasaz.org
Newsletter Editor	Don K. Boyd		Editor@pasaz.org
PAS Host			
Member at Large			
Member at Large/Equipment Manager	Bruce Wurst	602-909-8024	mal1@pasaz.org
Phoenix Astronomical Society 3241 E Shea Blvd #249 Phoenix AZ 85028-3365			

PAST PAS RECORDED PROGRAMS

By Terri Finch, Event Manager

Did you miss a PAS Meeting and wish you could see it? You can get to the link of Past Recorded PAS Meetings with Guest Speakers any time by going to the left hand navigation tool on the PASaz.org website and clicking on "PAS Monthly Meetings." From there a drop down item will appear and please click on "Videos of Speaker Presentations." You will then find recordings of Past PAS Meetings for your viewing pleasure. The collection is in oldest to newest order. Please work your way to the bottom of the collection to find the most recently recorded PAS Guest Speaker Presentation.

As long as PAS can record the PAS Meetings, PAS will continue to add more recordings to this page. Here is the direct link to the recorded PAS Meetings collection: https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations. Enjoy!

TABLE OF CONTENTS

BOLD ITEMS LISTED IN TOC ARE UPCOMING PUBLIC & PRIVATE EVENTS

WHAT'S UP FOR FEBRUARY

Name	Date	Rise	Set
Mercury	02-15-23	06:15	16:28
Venus	**02-15-23**	**08:34**	**20:20**
Mars	02-15-23	08:34	14:53
Jupiter	**02-15-23**	**09:12**	**21:29**
Saturn	02-15-23	07:22	16:13
Uranus	**02-15-23**	**10:51**	**12:26**
Neptune	**02-15-23**	**08:33**	**20:19**
Pluto	02-15-23	05:55	15:53

All Times Arizona Time
Bold means the object is "visible" in the evening

FEBRUARY 15, 2022

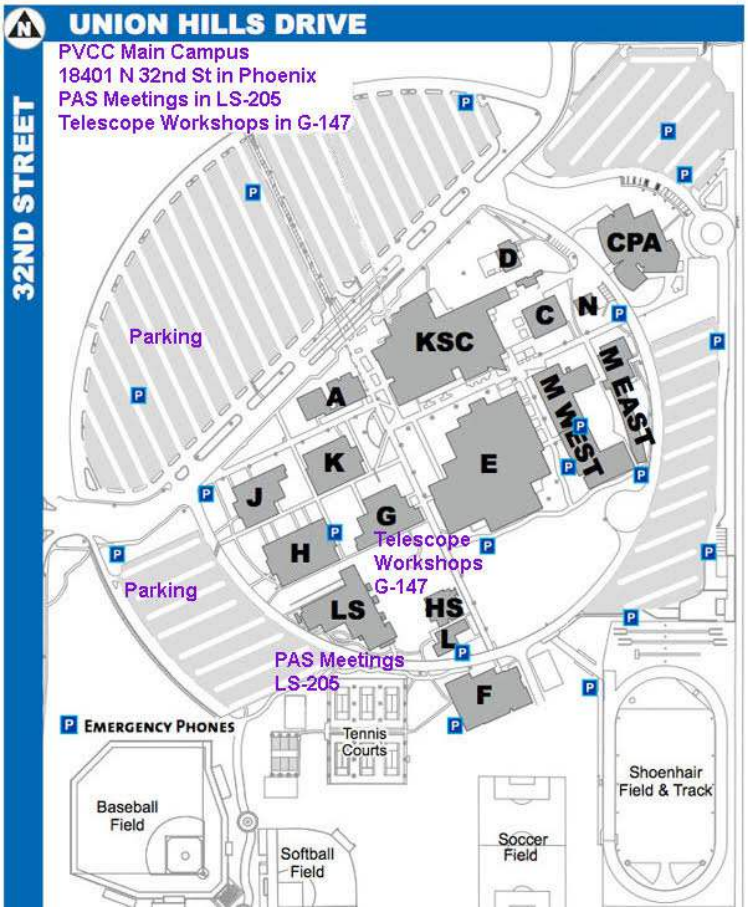
Sunrise: 07:13
Sunset: 18:13

Full: February 5

Q3: February 13

New: February 20

Q1: February 27



2023 PAS Guest Speakers at Hybrid Meetings

By Terri Finch, Event Manager - Events@pasaz.org

All PAS Meetings with a Guest Speaker held at PVCC can be attended in-person as well as via Zoom at the same time in a hybrid meeting. Those of you wishing to attend the meeting in person, please meet in LS-205 at PVCC Main Campus (map to the left of this article). If you wish to watch the meeting via Zoom, that option is available. For the 2022-2023 school year, PAS is using the same Zoom Meeting Link: https://us02web.zoom.us/j/81193628193?pwd=NlBZN2llU204VnVySk5SZXhtZWc2UT09 Please visit the PAS calendar at www.PASaz.org to find out more about these upcoming meetings and guest speakers. For a complete list of guest speakers visit: https://docs.google.com/document/d/1OO-UpaYNvw3p7JCRXCKSjDcbsK60DnvWOoifbqPrNp8/edit?usp=sharing

Do you have an idea for a guest speaker? Email the details and contact info for the possible guest speaker to Paul Facuna at VicePresident@pasaz.org.

Here are the next scheduled guest speakers at PAS:

Mar 2: Tom Klare “Photographing Stars Using a Digital Camera”

Apr 6: Mark Johnston “My Journey in Astronomy Outreach”

May 4: Tom Sharp " "Shock effects in meteorites"

The Histories of Astronomical Objects are Recorded in Their Plasma Tails

By Michael Marron

PowerPoint presentations by past president Michael Marron are available free at the Phoenix Astronomical Society website PASAZ.org at this link: https://www.pasaz.org/mike-marron-presentations.

Astronomy is a short, basic concepts astronomy class. The other lectures are much more advanced.

1. “The Solar System’s Tails of Plasma" covers how magnetohydrodynamic plasma jets are made by the gravitational and magnetic focusing of solar winds passing Lagrangian points, asteroids, comets, moons, and planets. It teaches how to unravel detailed information entrained in magnetotails. The interstellar wind passing our solar system makes our heliosphere into a jet but the neutral interstellar particles, unaffected by magnetic fields, are gravitationally focused into a jet that Earth closely passes once a year. Jets can be ridden to the stars while being mined for materials and power.

2. “Stellar Tails of Plasma” covers circumpolar stellar fusion and polar jets. The nova and supernova sequence of ignition events are often asymmetrical. Clearly recorded in surrounding shells are the ’exploded diagram’ of stellar engines. Ancient asymmetric blasts kicked dying stellar embers into our now massive dark matter galactic halo. Shells impacting knots of dust rich gas are gravitationally focused into jets that condense open cluster Population I stars, planets, moons, asteroids and comets as seen in the Pillars of Creation. There are major differences between a weak neutron star's polar jets and the powerful black hole's equatorial jets. Objects entering an accretion disk explode but the part of the blast that passes the black hole becomes tightly focused into powerful relativistic jets.

3. “Galactic Tails of Plasma” describes how new hot Giant Molecular Cloud (GMC) complexes and old cold dust filled clouds are some of the thousands of jets in spiral galactic arms that recorded the stellar feeding history of the central black hole. At the centers of giant elliptical galaxies the much bigger black holes eats globular clusters and farts out massive relativistic jets that are impact-enriched with that elliptical’s old globular cluster Population II stars. Outside of the giant elliptical the jet flattens to a galactic disk and quickly collapses a central black hole that erupts its own jets of hot GMC's. GMC's carve spiral arms of young Population I open cluster stars out of the gas and Population II rich disk. Most of the spiral galaxies of superclusters are found arranged in spiraling arms patterns around a central giant elliptical galaxy. The same physics that made spiral galaxies made bigger look-alikes.

The Big Bang radiation is one of the youngest things to be found at great distances. While there are very metallic galaxies at great distances still being born they are constructed from ancient giant elliptical galaxies where Population I & II stars can be trillions of years old. Even

See "Plasma Tails" on page 9.

Stu's Views February 2023

President Stu Brackney

Hi everyone. It appears our new online membership system that we designed and installed on our website is working and making it a lot easier for everyone to renew or join our society. Next time you see Pete Turner or Richard Sauerbrun and of course, Terri Finch, remember to thank them because they made it happen.

Before I share any updates, I need to remind everyone we are still looking for a volunteer from our membership to assume the duties of the Event Manager. Duties??...well think of the "cruise line activities director with some good computer skills." If you are interested contact me… president@pasaz.org.

Your board of directors has also been busy. As you already know, we spent months revising our bylaws for the membership to review and vote on last month. At the January Meeting, you will get the chance to vote on those changes. Nice job everyone.

By the way, the PAS Secretary position is open. Computer skills and some creative writing. Again, contact me.

We do have a new Membership Manager, Joe Sandy. Joe is a new member. He jumped right in when he heard of our need. With his thorough background skills with computers together with Richard Sauerbrun and Terri Finch he has acclimated to the job rather quickly. Welcome Joe. And thank you for taking this position.

So back to updates, your current Event Manager Terri Finch has been busy scheduling our monthly meetings, Star Tour outings, and of course Telescope Workshops. I hear that with a lot of weather cancellations in December, February is getting busy. Notifications of our events are emailed to all members, so remember…if you change your email, let us know. You don't want to miss out on any of the fun events we have been planning for Spring 2023.

Did you know, your Board of Directors meets once a month online via ZOOM (listed on the Microsoft 365 in the "members only calendar") and all PAS members are invited to attend to see what they are working on and provide input. The board is inserting into their agenda an agenda item that allows members to provide comments or ask questions. Called "Members Input" this agenda item will generally limit speakers to three minutes. We need your input, and I am sure some of you have lots to share. Happy Valentine's Day everyone!

Meet Your Board Members
President Stu Brackney

By Stu Brackney

Stu grew up on a farm in Pennsylvania. After graduating from Florida Southern College, Lakeland, FL, he entered the United States Army as a Second Lieutenant. He served in Vietnam for one year. Captain, Airborne.

He obtained his Masters Degree in Counseling the Deaf from the University of Arizona, Tucson.

Moving to Phoenix in 1974, he worked for the State of Arizona for 25 years, during which time he helped create two nonprofit service organizations for the deaf and then helped create a state agency for the deaf, which he later served as the director of that agency.

Stu has been responsible for the passage of numerous laws in Arizona helping to improve the lives of deaf and hard of hearing people. After leaving state service, he continued working as a City Manager in two cities in Arizona.

Since his retirement, besides traveling around the world with his wife Mary, he has been serving the school that he loves and calls "home" CFS (Church Farm School, Exton, Pennsylvania) as a member of the CFS Alumni Executive Committee.

"Four years ago, I decided to look up at our cosmos and learn, and was led to PAS where I have been a member since. COVID put a two-year damper on my and the society's activities, but I am happy to see things returning to normal."

Stu Brackney with his wife Mary and dog Murphy.
Photo provided by Stu.

PAS Needs a New Event Manager

By Terri, Current Event Manager

At the end of May 2023, I plan to step down and turn my duties as Event Manager over to a successor. I have been the PAS Event Manager since 2008. I created the position so that someone could be in charge of all upcoming events, know the data about them, put them on the website, and get the announcements out. I was appointed by the "then" President of PAS.

I'd like to turn this position over with enough time to advise the new successor of what I know about event management, what I've learned, what you can expect as the new Event Manager, and other details that a new Event Manager would need to learn from square one, if I wasn't around to coach. I am departing this position at the end of May. If you are interested in taking over as the Next and Super important Event Manager for PAS, then I highly suggest you make it known now, so I can help you learn what I already know, so you can avoid the mistakes I made. No one trained me, but PAS should continue to be run as it is, and any changes the new Event Manager wishes to make can come down the line, maybe at the beginning of 2024, to give the members time to adjust. Reach out to President Stu at President@pasaz.org and let him know you are interested in this position. I plan to help you learn it up to the end of May with no extensions. Help PAS stay as active and organized as I made it, all those years ago!

PAStimes Star Tours

By Terri Finch, Event Manager

What is the PAStimes Star Tours? It's a group of PAS Members who love showing the night sky to the public and would like to get paid to do so. If you are interested in joining our group, drop me an email with the make and model of your telescope (minimum 8" SCT or Dob, or 5" Refractor) and see if you qualify. We have a lot of fun providing star parties to anyone and everyone, but our criteria for joining this team has to be met. There is a dress code and requirements, but what you get back from doing these events is wonderful and well worth your time. Get in touch with me today at Events@pasaz.org.

Why is it called PAStimes Star Tours? PAStimes is the name of the club Newsletter standing for "Phoenix Astronomical Society" times. When I formed this group I thought it would be great to tie the Star Tours group to our Newsletter so that anyone looking up PAS online, puts in PAStimes and gets the newsletter which then has contact info for them to reach out and hire PAS to do an event for them. Just thought you might want to know the history of the name.

Public Star Party at N. Mtn Park Visitor Center Feb 3

Combined info from Jeff Geyer, PAS Member, and Terri Finch

Location: North Mountain Visitor Center,12950 N 7th St, Phoenix, AZ 85022 (Near 7th street and Thunderbird)

Time: 6pm to 8:30pm

Location: North Mt. Park Visitor Center (VC) is arranging a star/planet viewing event that will be open to the public.

Date: Feb 3 Friday.

Plenty of parking. RSVP is highly recommended in case weather, attendance, or other factors cancel the event. There are bathrooms to use, and possibly Mike can give a presentation indoors in one of the class rooms on PowerPoint about Meteorites.

This is NOT currently a PAS event but PAS Members, family and friends are welcome to attend, all ages. RSVP with Terri at Events@pasaz.org. If weather or some other factor cancels this event, you will be notified by about 3pm the day of the event by email or phone text if you leave your cell number with me.

Place your Astronomy Equipment Ad in this Newsletter

Do you have some astronomy-related items you'd like to sell? Prepare an ad and send it my way so that Don and I can help you sell it through the club newsletter. Items you may wish to sell: Books, Star Charts, Telescopes, Eyepieces, Finder Scopes, and more. As long as it is astronomy-related, I will happily add it to the newsletter. Please include all items you wish to sell, and what is included with those items. Price them, and provide contact info for the way you wish to be notified, such as email or phone number. I await your submissions. Send them to Editor@pasaz.org.

Ads for items for sale listed in PAStimes Newsletter are written by the seller. PAS is not responsible for the ads and does not guarantee the quality of the items for sale. PAS reminds everyone, you purchase at your own risk, so do your research beforehand.

Ads in PAStimes run for one month and may be renewed on a month-to-month basis, space permitting, as long as the request to run the ad again is submitted by deadline (10th of month). Ads in PAStimes are FREE for PAS members. Non-members are asked to make a small donation to PAS. Non-members may email Terri, Assistant Editor at Starstuff@gmail.com to place their ad and get details on where to send a donation, via check or money order, made out to Phoenix Astronomical Society. Donations can also be sent via Paypal, Credit Card, or Debit Card.

The deadline for the next issue will be the 10th of the month. These items and more can also be seen with photos on the PASaz.org website here: https://www.pasaz.org/items-for-sale

Celestron Focus Motor for SCT, EdgeHD & RASA $175 used, but in excellent working condition. Contact Richard at 480-766-2814 or richard@sauerbrun.com

A Remembrance of Things PAS

by Alex Vrenios, PhD, PAS Lifetime Member

I've been hearing a lot lately about what PAS can be. Talking face-to-face with some old friends for the first time in over three years, some I've known for more than a decade, got me thinking about what PAS once was.

The first meeting I attended was in the PVCC Library. (When the powers that be heard how loud we were, future meetings were relocated to the G Building!) It seemed a long time before we started meeting in the Physical Sciences classroom, a much cleaner, well-lit place to meet. But room G-147 offered a few subtle benefits.

There were astronomy-related posters on all the walls, a huge telescope in one corner, and a faint reminder of miniature Christmas lights arranged as constellations, embedded in the ceiling tiles. Instead of desks, there were stools around lab tables, forcing people to sit facing one another, inducing and facilitating conversation – about astronomy, of course. There were old copies of astronomy magazines, and some astronomy books on the shelves. G-147 was a little too small for the members we drew, forcing us all to meet-and-greet.

The President and VP would welcome newcomers, pass out any honors and kudos to some old timers, and introduce the guest speaker. On occasion, a bunch of us would meet later for dinner at a nearby restaurant where one of the waiters, who knew many of us by name, would provide excellent service, and maybe provide each of us with a little more of what we ordered than ordinary customers got. Sometimes dessert included a lecture on how they actually made it.

Much more interesting, and easier on my waistline, were the impromptu afterward gatherings at the Village Inn on Bell Road. Not nearly the same sized crowd, but those who attended came to talk about astronomy: theory, practical observing, equipment, and all manner of other, related topics, many of which were sure to help a newcomer like me understand what this hobby was all about. Sometimes I learned more from listening to these discussions than I did at the meeting!

If all that wasn't enough social gathering, there were official PAS Socials. Bring your scopes if you like, but inside there are Space Trivia games, beanbag toss events, dart boards (outside), and at certain times of the year a prize for best costume. Christmas meant anyone who wanted to be a part of the "gift exchange" game brought one. I can't remember too many of the details of how this was played, but I mostly played without concerning myself with the rules. And there was usually an old space movie playing on the TV.

Potluck food covered the kitchen island with fried chicken, hot spicy things that I ate and enjoyed, without actually knowing what they were. Soda, chips, and all kinds of sweets. We ate, and we laughed, and we talked some more about the hobby that bound us all together.

We were family.

Free Telescope Workshop Feb 16

By Terri Finch, Event Manager

Telescope Workshops are held at PVCC Main Campus, 32nd Street and Union Hills Road, Phoenix, in Room G-147 and are FREE to attend.

RSVP is required as seating is limited, and this event is weather dependent. Bad weather or not, NO Public RSVP's cancels this event, so be sure you drop an RSVP to Events@pasaz.org with the Make and Model of your telescope you need help with, and the number in your party. If you don't own a telescope yet, and are seeking to find out what type of telescope to purchase, come for advice, and in your RSVP mention you want to know what scope to buy.

PAS has nothing to sell to you at these FREE Telescope Workshops. The classes are 7:30pm to 9:30pm on these dates: Feb 16, 2023, Mar 16, 2023, Apr 13, 2023. Get your RSVP in soon as you know you can attend so you get a seat and get the advice you are seeking. There will be no telescope workshops during May, June, July, Aug, and September. Hope to see you soon!

Exciting Line-up of Upcoming Events

By Terri Finch, Event Manager

PAS is putting together some great Public events for Spring 2023. Watch the calendar www.pasaz.org. Some events that you may watch for are:

Jan 28: Public Star Party in Carefree

Feb 2: PAS Meeting "The Astronomical League"

Feb 3: Public Star Party at N Mt. Pk V.C. (See page 5 for more details).

Feb 16: Free Telescope Workshop

Mar 2: "Photographing Stars with Digital Camera"

Mar 9: Free Telescope Workshop

Apr 6: "My Journey in Public Outreach"

Apr 13: Free Telescope Workshop

May 4: "Shock effects in meteorites"

For PAS Members, PAS has also been putting together several private events for members and their families to attend. Private Events like:

Mar 18: NSTS - Night Sky Training Session

Apr 22: PAS Members Awards Ceremony

There are many events in the planning stages. Keep an eye on the public calendar and the private calendar for more exciting events and the details about those events. Hope to see you soon!

Museum Of The Moon At Desert Botanical Garden

Pieced together by Terri, Event Manager

DATE: Feb. 7 – 14

TIME: 8 a.m. – 8 p.m.

Prepare to be moonstruck at the Garden for a limited time only. Museum of the Moon by UK artist Luke Jerram inspires awe with a 23-foot diameter glowing moon that provides detailed views of the lunar surface fused with a stellar soundtrack by composer Dan Jones. More details can be found here: https://dbg.org/events/museum-of-the-moon-at-desert-botanical-garden/2023-02-07/

The Phoenix Astronomical Society will be at DBG on February 7, 13, and 14, with telescopes and meteorites (weather permitting) to enhance your visit to DBG to see this fantastic Moon display by providing an opportunity to look through telescopes while you are there. We hope to be able to show you Jupiter, Mars, and the Orion Nebula. Come see the Museum of the Moon and more.

Total Lunar Eclipse Nov 8 2022

The Last Total Lunar Eclipse For Years!

By President Stu Brackney

On November 8, stargazers in most of North America , including Phoenix, and across the Pacific can watch the Moon turn deep red during the last total lunar eclipse until March 2025. Over the last two years we have been able to watch total (or near total) lunar eclipses every six months, spoiling us for views. You might think lunar eclipses occur every six months every year. Well, they do!

However, many semi-annual lunar eclipses are just partial, where only a portion of the Moon's disk enters Earth's dark umbral shadow. Or many can be merely penumbral eclipses, where the Moon misses the umbra completely and passes through only the outer penumbral shadow of our planet. Detecting any darkening from the penumbra is difficult. But November 8th was a total lunar eclipse, where the Full Moon entered fully into the dark umbral shadow of Earth, turning deep red…

Many of our members were able to capture the beautiful eclipsed Moon. This eclipse was from about 1 am Tuesday morning to about 7am, with totality happening about 4 am.

By Mark Johnston, Solar System Ambassador

I photographed the full moon prior to the eclipse and processed it as a 'mineral moon'. This technique pulls out the subtle natural colors. Brown hues are areas with higher amounts of iron on the surface, while bluish tones represent higher amounts of titanium. Then later I photographed the total eclipse.

Full Moon: 1500 frames Nov 7 by Mark Johnston

SEDONA LUNAR ECLIPSE Nov. 8th-Party

By Dennis Young, President of Sirius Lookers, astronomy club in Sedona,

Our Eclipse mini-Star Party went pretty well up here in Northern Arizona, considering the cold weather and time of morning of the celestial event. We had about fifteen people here, which is a good turn out for our small group, Sirius Lookers, and I had four instruments at hand for enhanced viewing of the eclipse.

Sky conditions were about 95% clear. We had four instruments running at the same time, by me: 1. ultra wide military binos 6x42 Sard, 2. 10x50 ultra Wide Sears, 3. Tak 90mm refractor, and 4. custom made 150mm 6in F-5 binos with Morpheus 17.5mm lens. All binos did very well, respectively giving such a 3D effect during the event. The 6x42 Sard gave the Most 3D effect with such a wide view of 12.5 degrees showing so many stars in the star field around the moon as it appeared to “float” above them! For those in tune, it was also a nice treat to See Uranus in the same field of view, only a degree or so away to the north east of the Moon. We were also treated to a number of Meteors from the Taurids Meteor Shower while the eclipse was in play! Even near the Moon! Then we gazed at Orion Nebula at its highest, and Mars straight overhead! Too bad Mars was not at this height when we had its closest encounter in 2003 and at that time, it was as big as the MOON!! (pun intended)

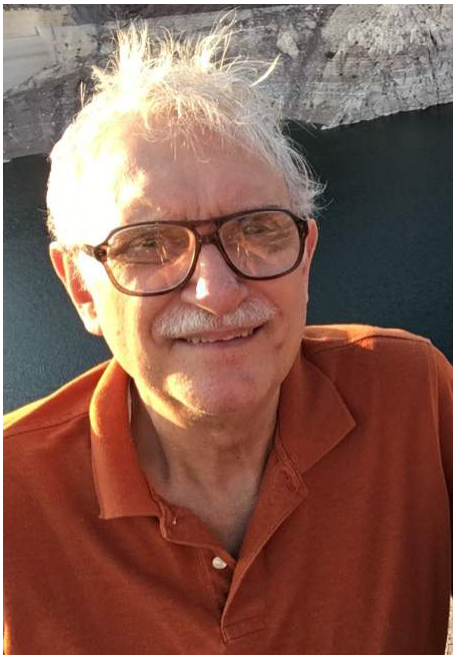
This image of the lunar eclipse is by Matt Chase thru his cell phone and thru my 150mm Binos. Photo provided by Matt to Dennis Young with permission to use in PAStimes Newsletter.

All in all, we had many happy smiling faces at hand. Many of the attendees went home with personal photos like the one attached here, through their cell phones. Looking forward to the next Eclipse: An annular eclipse next Nov. 2023 at Four Corners!

And here we have the total lunar eclipse of November 8th. Photo by Mark Johnston.

Blood Moon of Nov 8th by Damon Finell. Photo data: Stellarvue SVA130T with a .7 flattener/reducer coming in at an F/4.9 and 637mm. Mount is an iOptron CEM120. Camera is an unmodified Canon 80D.

The Blue Earth



By Alex Vrenios, PhD, PAS Lifetime Member

The eastern sky is just starting to get light as I round the corner. The road dips a little toward the beach, next to a nearly full parking lot. It was a calm and clear Monday morning at the Cape, absolutely perfect weather for a launch. I pull into my reserved spot and kill the lights. There it stands, off in the distance, fully lit to heighten one's anticipation: the Blue Earth.

A dozen passengers will gear up and board her for a trip of a lifetime: one complete orbit around the Earth! Eleven of them are paying hundreds of thousands of dollars each for the thrill. I won my seat in a national lottery. I'd never won anything of substance before. The odds of winning against such odds were so high that I felt foolish handing over my hard-earned cash for a ticket, just a piece of paper. But the launch was set for January 23rd at 4:56 am, and I had this gut feeling about the numeric progression of 1-23 at 4:56, so I picked the numbers 1 2 3 4 5 6 and added a zero to represent the orbit itself. Nonsense, I thought, a complete waste of money. But the excitement of it all, grasping my ticket hard, while the whole nation watched the drawing, savoring every number drawn. It was almost worth the price. In a minute or so we would all go back to our daily grind…

It took me at least a full minute to comprehend what had just happened – a minute that seemed like a lifetime. I checked and rechecked the numbers, then sat down hard on my couch. Staring at the ceiling, my mind started racing. Should I hire a guard? Do I put the ticket in a safe deposit box? I can't just keep it in my wallet, can I? Where do I go to establish myself as the winner? So many questions! I finally started to read the surprisingly clear instructions printed on the back.

The next two months went by quickly. There were briefings on the whole process, physical exams, and psychological evaluations. We had to take a stress test on a treadmill, timed squats, sit-ups, pull-ups, and push-ups. One of the three written tests lasted the whole morning. And after those tests were scored, we had a one-on-one interview with the psychologist, to see if our attitudes, feelings, and goals matched up with the test results. All the while I was rubbing elbows with celebrities that I never expected to see, let alone actually meet and share lunch with. My excitement was at a peak from the moment I realized I won, all the way through to the final preparations for flight. Stunned disbelief.

Later I wondered if a lot of the pressure they put us under was to keep us from realizing what we were about to do, over-scrutinizing it, and maybe reconsidering our sign-on agreement. Let's face it, orbiting the Earth is not an everyday occurrence, and it is certainly fraught with danger.

Finally, the day arrives. I put on my photo ID badge and carry my luggage to the counter, where an overly friendly lady trades them for a boarding pass that I slip into a pocket behind my badge. I found a seat near a window in the VIP waiting lounge. Others start to filter in.

Friendly, familiar faces now, we nervously greet one another, sit, and stare out through the huge windows at the distant rocket. The morning sunlight just catches the nose cone, our communal home to be, for the upcoming two-hour trip. The shuttle bus arrives and we file aboard.

Shuttles are laboriously slow, "For safety," they said. But soon we arrive, at the foot of a rocket that seems bigger than life itself. I nearly lose my balance bending over backward, trying to see the top. On the elevator ride, we are each privately dealing with the fact that we will be at the top of a device that is more powerful than we can ever imagine, and over which we have absolutely no control. All the minutely detailed protocols are now a welcome distraction. Our order in line, the final ID check, the PIN number we had to memorize, and so on. Finally, we're strapped in.

Once we are settled, a steady hiss is the only recognizable sound, muffling the faint radio chatter between our pilots and Ground Control. The common area is completely pressurized, eliminating the need for space suits. The "theater" as we called it, is a semi-circle of individually sculpted seats for blastoff and reentry. A perfect fit, and very comfortable.

We couldn't hear the countdown, but we all knew that buzzing and whirring of electric motors meant less than a minute remained, and that the engines start at about T-5 seconds. The six rocket engines, arranged in a hexagon, are probably the loudest noise any human will ever hear. The old Space Shuttle used three RS-25 engines; we had six! The deep-throated rumbling at liftoff, the jostling and jarring, and the punishing increase in weight due to the huge G-forces, commanded our full attention during liftoff. Space travel is a lesson in extremes.

The sunlight played on the walls as we hurled upward and rolled when we found our trajectory. The sudden blackness as we entered space was a surprise – nothing else I ever experienced was so dark. The stars sparkled like

The Blue Earth Image Courtesy NASA

diamonds on velvet. I spent a lot of time observing the heavens through a telescope, but it was never like this! There was a jolt as we let loose the boosters, and a sudden silence to match the darkness as we left our homes behind. We were in outer space!

We unhooked our straps to discover that we were weightless. Getting up from our chairs seemed to be a challenge, since we didn't have any gravity to push against. But some of the passengers seemed to know instinctively that if you just let it happen, you'll float out of your chair. My ID badge was hovering in front of my eyes. And the handkerchief that I left on my lap was on its way to an air return vent above the theater.

Weightlessness became a familiar state sooner than I expected. I was quick to discover the handholds mounted on the walls almost everywhere throughout the ship. We were all "flying" around within minutes of being released from our chairs.

Mother Earth was below us, then above us as we rolled to the final viewing attitude. The Earth was the purest blue I could ever imagine, almost liquid. The photos, the live shots from the ISS, none of it compared to the real thing.

Then it hit me: That planet above us was where our whole existence took place, where countless generations of our species were born, grew up, grew old, and died. It was a "home" that was passed down to each of us, one that we had to pass along to our survivors. My sudden sense of responsibility to maintain this planet was overwhelming. I sat silently as I watched the Blue Earth pass slowly and steadily above me.

Plasma Tails

(Continued from page 3.)

older ghost galaxies, Malin galaxies, or low surface brightness galaxies (LSBG) are found nearby but they are difficult to see because they are darker than the intergalactic background. Having lived perhaps quintillions of years these dark matter galaxies long ago reached a gravitational apex and are returning to the center of the universe to be eventually recycled. A few of them are currently near the Milky Way. Galactic collisions with LSBG's enrich a bright galaxy's dark halo with burnt out stars.

Only 411 Mly away supergiant elliptical galaxy NeVe 1 has a gargantuan black hole with the most energetic explosion found (WISEA J171227.81-232210.7). NeVe 1 lies at the center of the massive Ophiuchus supercluster. NeVe 1's supermassive black hole should also prove to be the center of the universe. It swallowed a dwarf galaxy 240 Mya while making a jet equivalent to a billion supernovas so this event was only a recent Microbang event. Our 13.8 Gya Big Bang jet evolved into the fast, vast Vela Supercluster that is now ~1.3 Gly from the center of the universe. About half the original mass of the Vela Supercluster has been ejected clear of it's gravity well to become coiling strings of trailing supergiant elliptical protogalaxies that evolved into galactic superclusters such as the Coma, Shapley Attractor, Hercules, Lepus, Great Attractor, Perseus-Pieces, Virgo, etc. Summarizing our galactic ancestry, the universe's central black hole (at the center of NeVe 1) ~13.8 Gya begat the Vela supercluster with a gargantuan elliptical at the center, whose central black hole begat the giant elliptical M87 ~13 Gya now the center of our Virgo Supercluster, whose black hole ~8 Gya begat Andromeda and the Milky way galaxies plus their dwarf galaxies. The Milky Way is on the outer edge of a spiraled disk made of strings of elliptical, spiral, and dwarf galaxies with M87 at the center. The Hubble Constant isn't, even within each Bang jet. Older faster Big Bang events is how ancient distant galaxies had the time and momentum to get out there at a fraction of c.

4. "Earth Shattering Evolution" covers the specific origins of our planets and moons and the subsequent bombardment history that increased their initial mass. Earth is the largest solid object because it suffered the largest impacts. One of the first very large impacts, 4.5 Gya, was about the size and mass of Mercury and the glancing impact spun up the new Earth while making a rocky belt that quickly condensed into our Moon. Since then the Moon's orbital altitude has increased at the expense of Earth's rapid rotation. The ballistically emplaced dense FeNi and other molten metals slowly descend, feeding into the liquid outer core while melted mantel lavas erupt as hotspot volcanics above these FeNi drain impact markers. The Moon Maker's impact 4.5 Gya made the Marion to Reunion Island hotspots that are still erupting. Hotspot volcanic chains show how far and how fast the crust has drifted after being damaged from each of Earth's 50 largest impacts. Deeply buried missing crustal pieces are identified and reassembled. PAS meeting video lecture of 5/20/21.

5. "The Arizona Shattering Impact" describes 11.6 Mya, the last of the giant impacts. Arizona appears to have interrupted an asteroid's perigee because the southbound impact angle was very shallow. At the Grand Canyon over a vertical mile of geology was blasted away. The next big blast over the Verde Valley shattered the American Southwest such as making the Rio Grande Rift and removed over two vertical miles of Arizona geology. The third blast blew away over three miles of overburden but left an excellent crater in Cave Creek that suffered less erosion damage than the other craters. The fourth and biggest vaporization event excavated the Phoenix/Tucson crater ejecting over four miles of geological layering. This landed atop the same geological sequences outside the crater, doubling or tripling thick local geologic records. Most of the ejecta and impact forces of the blasts were directed towards Mexico's Pacific coast resulting in extinctions in California and Mexican coastal waters. Traces of uranium worn off the impacting asteroid explains why it acted so much like the extremely penetrating Depleted Uranium (DU) munitions. The spinning asteroid drilled through the AZ crust and into the mantle under the Mexican Pacific coast until geo breaking stopped it at the Socorro Island hotspot. A line of individual hotspots marks the underground vaporization events that failed to make deeper craters. Each of these hotspots have volcanic chains that began 11.6 Mya and plagues Mexico today as Mexico has continentally drifted over this line of fire. Baja California broke from Mexico after this impact because the Gulf of California was opened by floods of underground impact melts.

Send comments or questions to PrimeFactorY@q.com

Coming soon "The Electromagnetic (EM) Universe." Shadows cast by omnidirectional EM radiation is gravity. All particle classes are constructed from just electron and positron neutrinos.

The Galactic Gavel

As recounted by Dan Heim

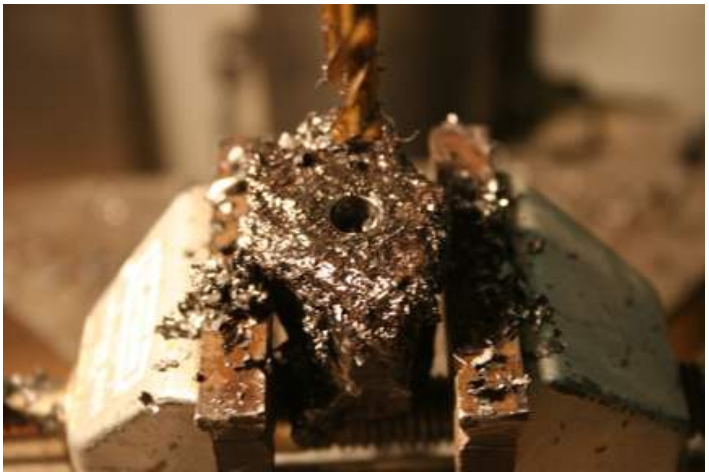
Back in 1995 Dan Heim was moderator of the Brophy College Prep Astronomy Club and a longtime member of PAS. He purchased a nickel-iron meteorite from the Canyon Diablo fall from Robert Haag, a prominent Tucson collector and uncle of a Brophy student. Heim decided to donate the meteorite for use as a "galactic gavel" that would be used to start and end Astronomy Club meetings. The Galactic Gavel was created by drilling the meteorite, cutting a brass rod for the handle, and epoxying the two together. Woodworking guru Roger Serrato constructed the carrying case from kingwood and the sound block from ebony. Interior plaques were fashioned to record the names of club Presidents, as well as info about the Gavel and Astronomy Club founder Jack Mitchell, S.J. The original Galactic Gavel is pictured below. It is still in use at Brophy.

The original Galactic Gavel.

In 2006, after 20+ years in PAS, Dan and Roger started the Desert Foothills Astronomy Club (DFAC) to serve the North Valley. Population growth in this area was strong, enough to support a club, and our first meeting drew a crowd of around 30. At our March 28th, 2007 meeting, Bob Holmes, Meteorite Man and guest lecturer for the evening, presented DFAC with a meteorite from his collection. The 166.3 gram specimen is from the Campo de Cielo fall in Argentina, dated around 3000 BC. After some discussion regarding its disposition, we decided to incorporate it into our own Galactic Gavel. The gavel would represent the authority of the President and be passed to successors. The raw meteorite is seen below.

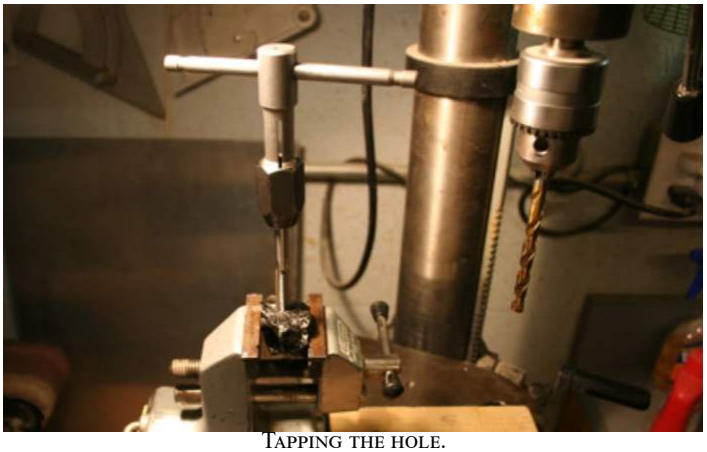
A Campo de Cielo meteorite was used for this project.

The first step was to drill a hole that could be tapped to accept a handle. With the Canyon Diablo meteorite this was an arduous task. Whatever the nickel-iron ratio, it was a very hard specimen. We wore out three titanium bits drilling a 1"-deep hole. With our Campo de Cielo specimen drilling went more easily. Though still a nickel-iron, it turned out to be a much softer alloy. A single titanium bit did the trick.



We wore out three titanium bits.

After the hole was drilled it had to be tapped to secure the handle. We had decided on a 5/16" brass handle so that dictated the drilling, tapping, and threading specs. Again, due to the softer alloy, tapping went well with no stripped threads or broken taps.



Tapping the hole.

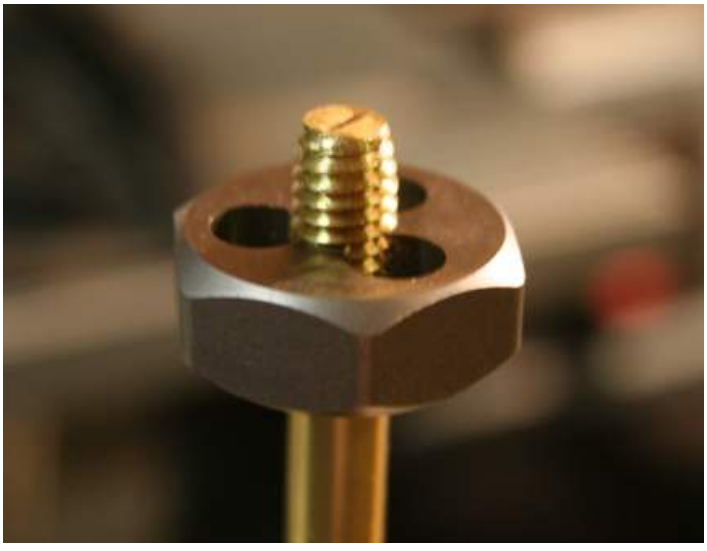
After cleaning up all the metal shavings the threads looked pretty nice. Unfortunately, the specimen was now 14 grams lighter. Rather than tossing those "shavings from space" in the trash, they were sprinkled around the base of a large saguaro. Over time, some of the shavings' atoms will be assimilated by what we now call our "space cactus."

"Shavings from Space" were given to the "Space Cactus."

The next step was threading the brass handle. Brass is much softer than nickel-iron, so the only challenge here was securing the brass handle against the threading torque without scratching it. A couple of wood blocks inside a bench vice worked well. The wad of tape around the handle was needed to prevent the lubricating oil used on the die from running down to the vice. On the first attempt, that's exactly what happened. Of course, when the oil reached the wood blocks, the handle started rotating from the torque of the die. After taping, there were no more slips.

Threading the brass handle.

The handle was threaded along the first inch of its length to match the tapped hole in the meteorite. Brass is a joy to work with compared to nickel-iron, and it was easy to go 1/4 turn at a time as the threads were cut. In contrast, tapping the meteorite required about 1/8 turn before it was necessary to back off and release the shavings.



Now threaded.

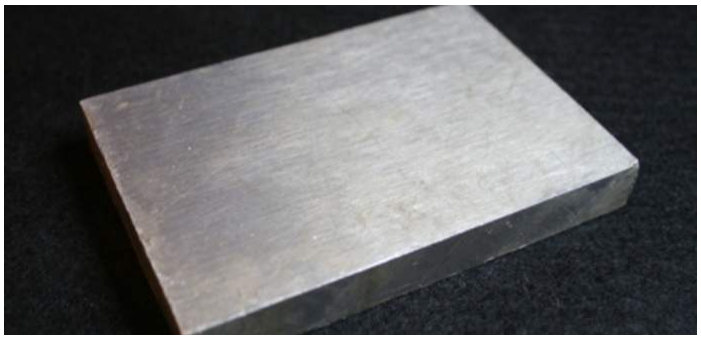
The handle was then screwed into the meteorite and secured with Red ProLok™. After a buffing with some #0000 steel wool, the DFAC Galactic Gavel was born!

The Galactic Gavel was born!

Of course, every gavel needs a sound block. We first tried a scrap of walnut. Walnut is a tough hardwood but just doesn't stand up to a metallic gavel. Notice the deep dents in its surface after just one meeting.

Walnut sound block.

So it was decided that, rather than waiting for the inevitable cracking and splitting of the walnut block, we'd fabricate a new sound block out of a slab of 1/2" aluminum we had left over from an earlier telescope project. Aluminum will still dent when hit by nickel-iron, but it'll never crack. In fact, it will accumulate a record of sorts over the years, with several dents from each meeting. Eventually, the pattern will begin to resemble a globular cluster of dents in a Gaussian distribution around the center. The block started out as a rectangular slab and it could've stayed that shape, but that was too easy. We wanted something truly unique, and a circle just seemed right for an astronomy club.



Slab of aluminum.

After some work with the band saw and bench grinder we had a nice aluminum disc about 2.75" in diameter. That's a good size target, not likely to be missed by the gavel.

Aluminum sound block.

The block needed a wood base to protect whatever it sits on. That was made from a scrap of ebony and epoxied to the aluminum disc. We put a gentle round-over on the edge to prevent chipping.

Ebony wood base.

The DFAC Galactic Gavel was first used at the May 30th, 2007 business meeting after the formal election of Dan Heim as President. Left to right: Bob Dosindoffer, Ron Walker, Heim, George Kantarges, VP Jim Renn.

Desert Foothills Astronomy Club (DFAC) first meeting using the newly made Galactic Gavel.

Alas, DFAC never grew much beyond 30 members. We had a great 15 year run but fizzled in 2020 from member attrition and the pandemic shutdown. And so it goes. Over those 15 years the aluminum surface acquired a nice oxidation patina, and several hundred impact craters. You can't count them because they overlap. They do, as expected, form a nice 2D Gaussian distribution of craters with a few extreme outliers. Not shown: the very extreme outlier that left a crater in the lectern.

Impact craters on the sound block.

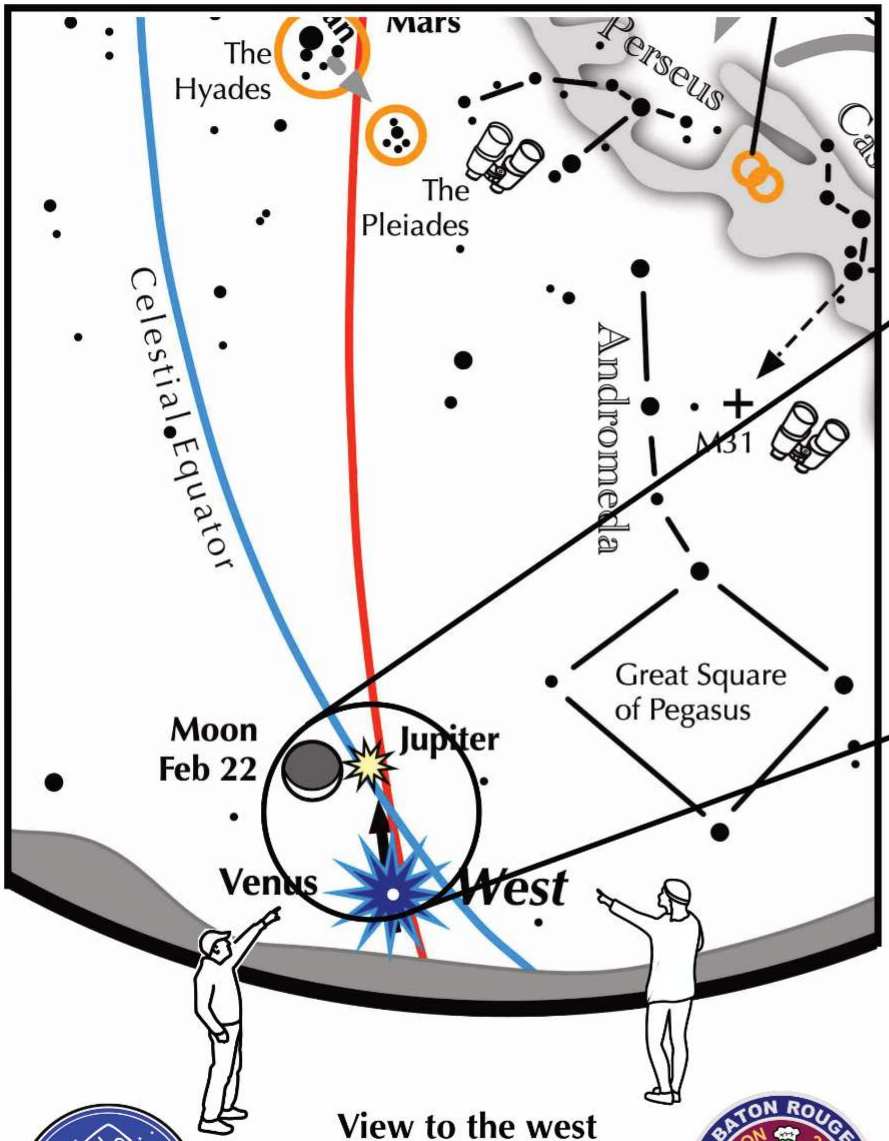
On December 10, 2022 Dan Heim relinquished control of the Galactic Gavel to PAS, his original astronomy club. The formal transfer was done at Heimhenge, Dan's casa in New River where DFAC and PAS held several joint astronomy nights. He presented it to PAS Event Manager Terri Finch. Construction of a carrying case for the Galactic Gavel would be a nice final touch, but I leave that now to PAS.

The passing of the Galactic Gavel from Dan Heim to Terri Finch.

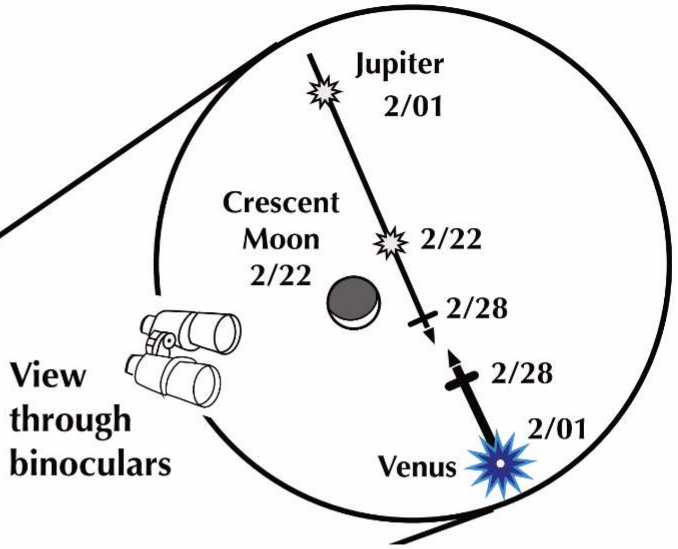
By Terri Finch, Event Manager

At the February PAS Meeting the Transfer of the Galactic Gavel will go from Terri Finch to President Stuart Brackney (on behalf of Dan Heim) at the start of the meeting. Dan Heim will be present via Zoom. Many thanks to Dan for donating this fantastic item to PAS! You might not want to miss seeing this historic event! This article and photos will be added to the PAS History pages after the February 2023 Newsletter issue has gone live on the PAS website.

In the early evenings during the second half of February, try this challenge:



View to the west
in Late February
40 minutes after sunset



Venus approaches Jupiter

On February 1, Venus appears low above the western horizon 40 minutes after sunset. As the month proceeds, the bright planet climbs higher each evening. Jupiter, on the otherhand, begins the month much higher than Venus, and drops closer to the horizon each evening.

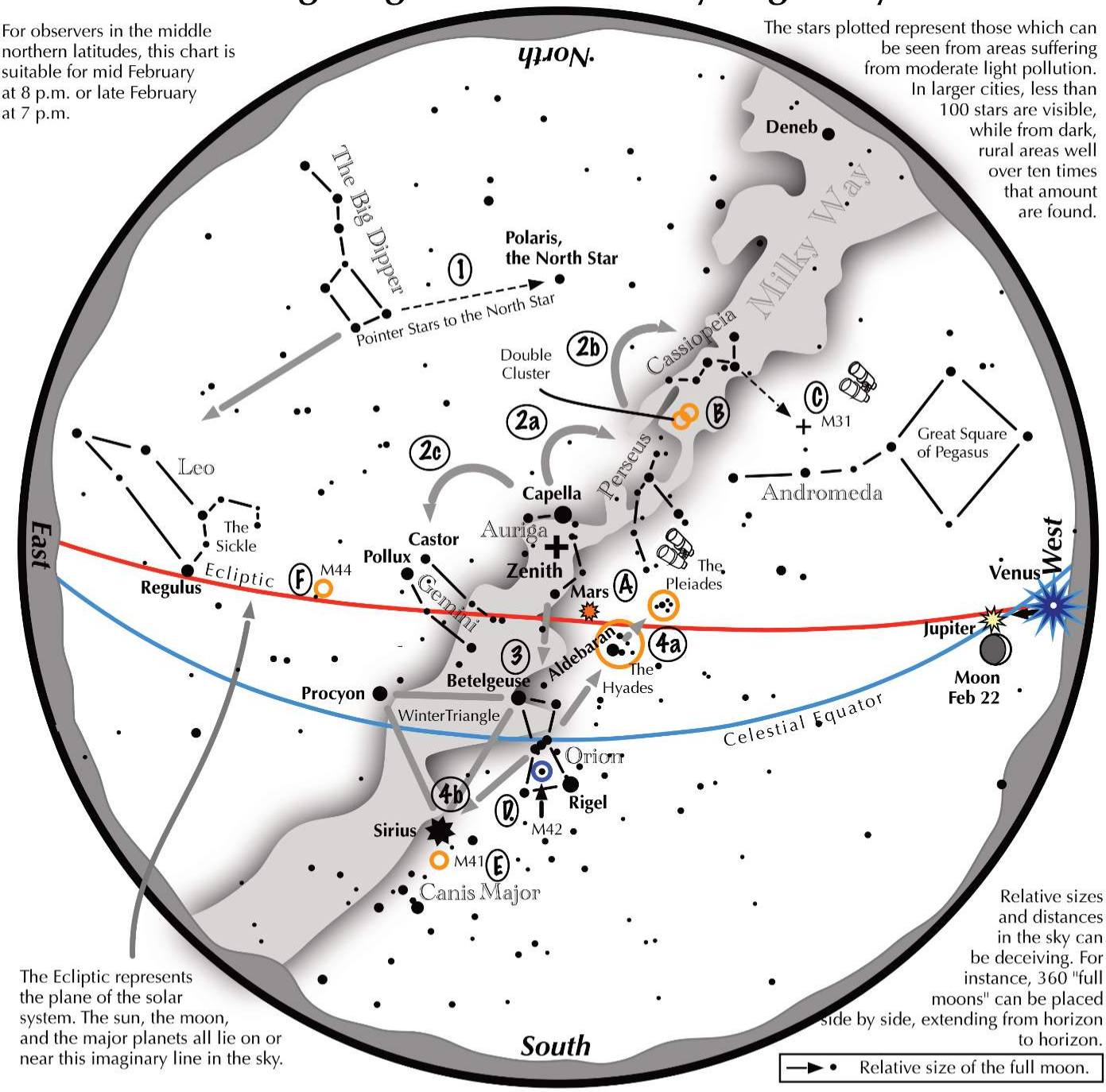
On February 22, the crescent moon joins the scene as it floats left of Jupiter. Look to the west 40 minutes after sunset for the pair. Binoculars allows you to admire the softly glowing earthshine on the night side of the moon. Almost magical!

For the rest of the month, Jupiter approaches Venus. Watch their gap narrow each evening. Finally, on March 1, they nearly bump into each other.

Navigating the mid February Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid February at 8 p.m. or late February at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Relative size of the full moon.

Navigating the February night sky: Simply start with what you know or with what you can easily find.

1. Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
2. Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.
3. Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.
4. Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.

Binocular Highlights

A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.
B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
D: M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.