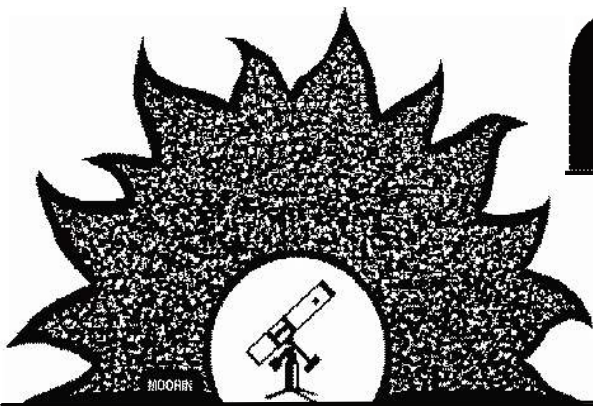




# PAStimes

Phoenix Astronomical Society

[www.pasaz.org](http://www.pasaz.org)

September 2022

Volume 74 Issue 1

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

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## The Ingenuity Helicopter, “Mankind’s WrightBrothers Moment”

Lecture of May 5th review by: Stu Brackney, PAS President

Ted Blank, PAS member and NASA Solar System Ambassador, was guest speaker at our organization’s lecture series meeting this month. His presentation reminded me of a friend of mine, Herman. Herman is a hummingbird that visits my backyard water fountain everyday even while I am servicing it! Ok, we gave him the name Herman, because it sounds good. Herman can fly in all directions, like a helicopter, so Ted’s lecture reminded me of Herman, but Ted’s (NASA’s) helicopter is called Ingenuity, and it lives on Mars!

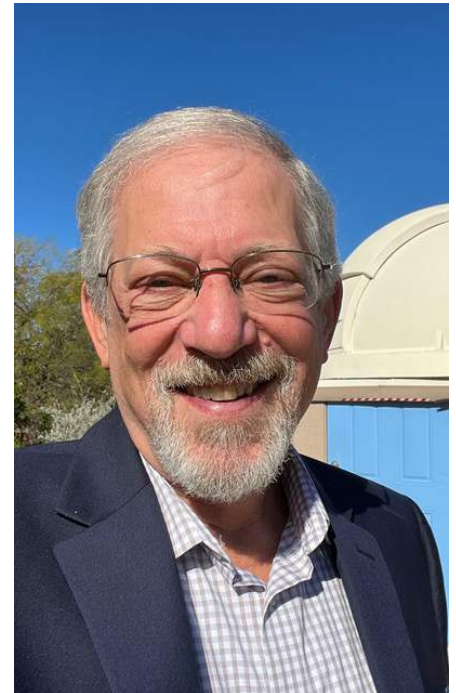
Ted told us a fabulous story with his audio and video presentations. We learned that seven years ago NASA was just asking the question, “could a helicopter fly on Mars?” The challenge was picked up by some young, eager engineers at JPL (Jet Propulsion Laboratory) to get the answer. But as we all know, youth know no boundaries, so these three or four engineers took the question and ran with it, and did they run. Over the six years their group grew to hundreds of engineers, designers and physicists.

These professionals proposed a helicopter that they designed, to hitch a ride with a Mars land rover, called Perseverance. Not only did NASA approve the idea, they booked a flight for Ingenuity in 2021 and, to the joy of all involved, the land rover successfully took this baby helicopter to Mars.

Ted’s lecture was titled “Mankind’s Wright-Brothers Moment on Mars”. The atmosphere on Mars is very, and I mean very thin, (only 1% as dense as Earth’s) consisting of 95% carbon dioxide, 3% nitrogen and 2% Argon. Helicopter blades would have a tough time grabbing enough of this atmosphere to fly, so a second set of rotary blades was added. For over a year since April 3, 2021, Ingenuity has been flying, directing the land rover during its exploration of the Mars surface. Originally, they were thinking of making a single flight or two but she is still flying!

If you missed this excellent lecture, you can watch it on our PASAZ.ORG website at this link: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations> and look for the May 5, 2022 meeting. Enjoy!

See "May 5th Meeting Review" on page 4



*May 5th fantastic Guest Speaker, Ted Blank, sharing intriguing information about Ingenuity on Mars. This presentation was recorded and can be found in the link in the accompanying article. Photo provided by Ted.*

*Image of Ingenuity on Mars. Photo screen captured by Stu during Zoom meeting of this presentation.*



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## Past PAS Recorded Presentations

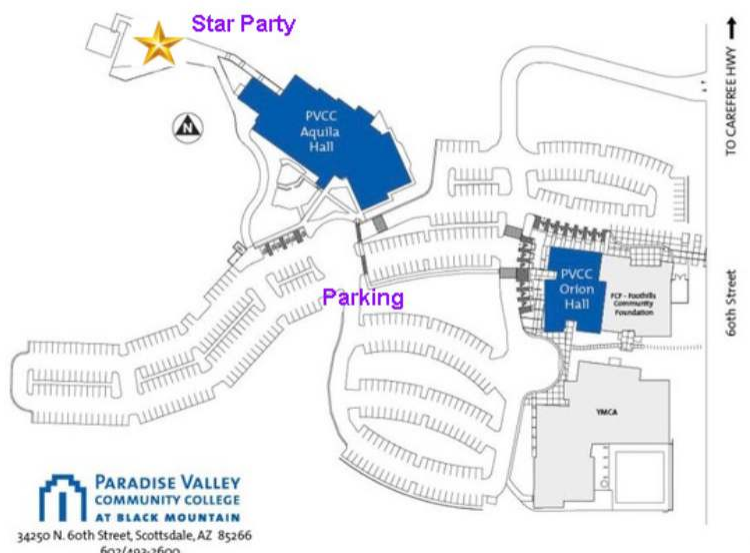
By Terri Finch, Event Manager

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!

## BMC Public Monthly Star Parties

34250 N 60th Street, Scottsdale AZ 85266



To check on the event status, call Black Mountain at 602-493-2600.

## What's Up For September

By Don K. Boyd, PAStimes Editor

| Name           | Date            | Rise         | Set          |
|----------------|-----------------|--------------|--------------|
| Mercury        | 09-15-22        | 07:25        | 18:53        |
| Venus          | 09-15-22        | 05:27        | 18:12        |
| Mars           | 09-15-22        | 22:36        | 12:43        |
| <b>Jupiter</b> | <b>09-15-22</b> | <b>19:06</b> | <b>07:16</b> |
| <b>Saturn</b>  | <b>09-15-22</b> | <b>17:00</b> | <b>03:40</b> |
| Uranus         | 09-15-22        | 21:04        | 10:45        |
| Neptune        | 09-15-21        | 18:35        | 0624         |
| Pluto          | 09-15-22        | 15:47        | 01:45        |

All Times Arizona Time

Bold means the object is "visible" in the evening

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed via the Internet. All Issues are available for download on our website [www.pasaz.org](http://www.pasaz.org). Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited. All articles and photos are copyright their authors or PAStimes.

## September 15, 2022

Sunrise: 06:12

Sunset: 18:34

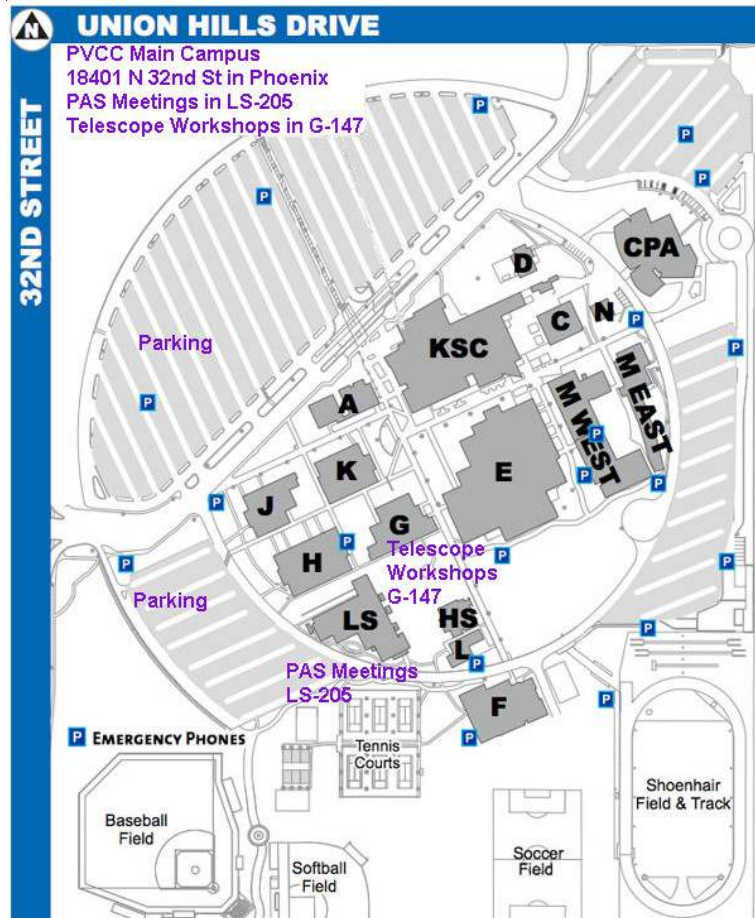
Q3: September 3

Full: September 10

Q1: September 17

New: September 25





# Fall 2022 PAS Guest Speakers

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

PAS has decided to do In Person Meetings! It was discovered that ALL PAS Meetings held at PVCC can be In Person as well as Via Zoom 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 left of this article). If you wish to watch the meeting via Zoom, that option is available and a Zoom link for each meeting shall be added to the website calendar, and the link will be in each newsletter in the article about the next PAS meeting on page 1. Please visit the PAS calendar at 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/1O0-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:

**Oct 6:** Klaus Brasch, "Photo Legacy of Lowell's Great Refractor"

**Nov 3:** Ted Blank, "Zero Gravity Pizza"

**Dec 1:** David Williams, Topic: TBA

## September 2022

More details & more events at [www.pasaz.org](http://www.pasaz.org)

| Sun            | Mon         | Tue | Wed | Thu                                                                                 | Fri | Sat |
|----------------|-------------|-----|-----|-------------------------------------------------------------------------------------|-----|-----|
|                |             |     |     | 1                                                                                   | 2   | 3   |
| 4              | 5 Labor Day | 6   | 7   | 8<br>MOM's: Member's Only Meeting 7pm to 10pm                                       | 9   | 10  |
| 11 Patriot Day | 12          | 13  | 14  | 15                                                                                  | 16  | 17  |
| 18             | 19          | 20  | 21  | 22 Start of Fall (Autumnal Equinox)<br>Free Telescope Workshop 7:30 to 9:30pm G-147 | 23  | 24  |
| 25             | 26          | 27  | 28  | 29                                                                                  | 30  |     |

## May 5th Meeting Review

By Terri, Event Manager

The May 5th PAS meeting was exceptional. The meeting opened with the Annual Elections which were done differently this year. An email was sent out to all PAS members to send their nominations to Secretary Alex Vrenios, to create the voting ballot. About a week later, Alex sent out the ballots to PAS members to have them vote. The Nominations and Votes were tallied and the announcement (instead of an actual election) took place at the PAS meeting. Here are your PAS Officers and Directors for the upcoming year:

Stu Brackney will continue for another year as President of PAS.

Paul Facuna will continue another year as Vice President.

Don Boyd will continue another year as Newsletter Editor.

Eric Steinberg has stepped down as Treasurer and Richard Sauerbrun has graciously taken his place as Treasurer of PAS. Eric is continuing to assist Richard as Bookkeeper in the background.

Alex Vrenios has taken the position of Secretary of PAS.

Pete Turner will continue as Webmaster (an appointed Position).

PAS is seeking an assistant Event Manager, or someone who just wants to help manage events.

Terri Finch will stay on as Accounts Receivable and Assistant Editor.

Bruce Wurst will continue as Member at Large, renewed for another two-year term.

Jenny Newjoy will continue as Member at Large - for her second term.

Bob Ewing will continue as Host of PAS meetings.

After the election announcements, Ted Blank did a fantastic presentation, which can be viewed in the Speaker Presentation Videos section of our website... and then all non-members were asked to depart during a five minute break so that PAS members could get together for a Business Meeting that we call a Meeting of the Minds.

The Meeting of the Minds started with a quick review of the Financial status of PAS. This report was given by Richard, acting as Secretary. Then Richard talked about the new options that will come with membership in the next year. There was much talk about automating PAS more and there will be more meetings to get this accomplished. It was a very good meeting. Prior to the five minute break, there were twenty individuals attending and thirteen of those were current PAS Members.

## September's Change in Schedule Sept 1 & Sept 8

By Terri Finch, Event Manager

Exciting News!!! PVCC is starting the school year with a Public Star Party 7:30 - 9:30PM. The destination is Black Mountain Campus. These events are NOT PAS hosted but PVCC has requested attendance by PAS members as Guests, not participants. The first star party will happen on **Sept 1st** instead of a PAS General Meeting with Guest Speaker. The fun thing about this is that there is another BMC star party on **Sept 29th**, same location, different time. See the BMC map on page 2 in this newsletter. For more info or to check the status of this event, call BMC at 602-493-2600.

Then on **Sept 8th**, there will be a very important PAS Meeting for PAS Members only from 7pm to 10pm on the PVCC Main Campus. PAS Members please find

the room number in the MS365 site or in the email you may receive before Sept. This meeting will be to discuss and vote on changes to the By-laws. We ask that NO children attend. You can bring your spouse but only the main member of PAS will be counted for the voting.

**Sept 22** we will have our first "Back to Normal" Free Telescope Workshop at PVCC Main Campus in G-147. RSVP is required and we expect a large turnout!

The Map page of the PAStimes Newsletter has returned with In-Person Meetings on page 3. Check out the new maps for parking locations, room locations, and more info. It is always good to review a map before attending an event just in case something changed over the last three years of the Covid Blur.

The Monthly Calendar has also returned to the Newsletter on page 3. Remember, all updated data for events will be online. See Secretary Alex's article about the fantastic NEW PAS websites and where to find the info you are seeking on page 7 of this issue. Alex's article is named "The New PAS Leadership has been BUSY!"

It is exciting to be somewhat Back to Normal and have In-Person events again. I must let you know that PVCC is requesting that for ALL Indoor events, masks are highly recommended. Bring your masks just in case you are asked to wear it. I hope to see everyone at the September events! Let's enjoy a year of Observing, Learning, and just having an Astronomical Time with PAS!!

## My Journey in Astronomy Outreach

By Mark Johnston, PAS Member

On July 8th, I was the featured speaker for the Saguaro Astronomy Club. My talk was on my journey in astronomy outreach. I covered everything from humble

beginnings showing the Moon in parks, to night vision, NASA Solar System Ambassador, Master of Outreach from the Astronomical League, and EAA. If you include this talk as an outreach event it

was the 60th such event I've done in 2022.

Note: Mark is scheduled to give this talk to PAS at the April 6, 2023 PAS Meeting. See you there!

## Deep Sky Astroimaging Cert from RASC

By Mark Johnston, PAS Member, Solar System Ambassador & Astrophotographer

I just earned a Deep Sky Astroimaging certification from the RASC. Here are the images I submitted: <https://rascastroimaging.zenfolio.com/p952452698>

In addition to PAS, I am also a member of the RASC (Royal Astronomical Society of Canada). They

publish the annual Observers Handbook and have their own remote observatory in California. They also have awards available for Wide Field Astrophotography, Solar System Astrophotography, and Deep Sky Astrophotography. To earn the Deep Sky Imaging Certification you must provide 14 Deep sky photos: 2 spiral galaxies, 2 planetary nebulae, 2 emission nebulae, 2 globular clusters, 2 open clusters, and 1

each of a dark nebula and a comet. They are very particular about tracking, focus, noise, vignetting, and clipping. You must take the images and process them yourself. I submitted M31, the Leo Triplet with Ceres in the same field, the Monkeyhead nebula, M20/M8, Jones Emberton 1, the Helix nebula, Omega Centauri, M13, NGC 2301, Kembles Cascade, Barnard 33, and Comet Leonard. I was awarded the certificate on July 30th.

# STU'S VIEWS



## President's Corner

By PAS President Stuart Brackney

As promised, your Phoenix Astronomical Society is on the move. After almost two years of COVID restrictions we are returning to our main mission, promoting the fun side of astronomy. To do this, we are continuing

our lecture series meetings, which will begin on October 6th at Paradise Valley Community College ( 32nd Street and Union Hills ). See the events calendar on our website for details.

Members of PAS and the public are invited to the Paradise Valley Community College Black Mountain Campus Star Party on September 1, 2022. . These events are a time for stargazing, learning and of course exploring the cosmos. Bring a friend. See the news item in this publication for details.

On another issue, we need your help filling three volunteer positions that are critical for our organization to keep its promise, educating the public about our cosmos. The three positions are: Membership Manager, Events Manager,

and Star Tours Manager. Email me Stuartbrackney@pasaz.org for details and or to volunteer.

Did you know PAS has a Facebook page, website ( pasaz.org ) and is an active member of Meetup.com? All three locations enable us to reach out to the public about our organization and what we do. Check us out and tell a friend.

In May of this year you elected your 2022-2023 Board of Directors. In our upcoming monthly PAStimes you will learn more about each member and why they love PAS.

Finally great news. Your Board of Directors has been working over these hot summer months to improve our website and make some updates to our Bylaws. Our goal is to allow everyone to join our organization using our website as opposed to sending a check and application in the mail. We are almost there. Keep an eye out for future announcements.

## Meet the PAS Leaders

By Terri Finch, Assistant Editor

As a result of the PAS meeting elections on May 5th, a few changes were made to those who are now your Club Leaders. I wish to congratulate all who are assuming the vacant positions and thank those who are staying another year to manage and provide a super Club experience in PAS!

President Stu Brackney has agreed to stay for another year in this position. He has done a fantastic job managing the club. Thank you Stu.

Vice President Paul Facuna is returning again for another year. Paul has been instrumental in finding really awesome Guest Speakers for our monthly meetings. Thank you Paul.

The position of Secretary was assumed by Alex Vrenios. Alex is a long-time member of PAS and has been involved in other ways. Since May, when he took the position, he has been valuable to PAS by organizing agendas for meetings, and advertising events, and taking the minutes of the business meetings. Many thanks go to Alex for taking on this rather large task.

The position of Treasurer was previously held by Eric Steinberg and recently shared by Eric Steinberg and incoming treasurer Richard Sauerbrun.

Between the two, they have done a marvelous job transitioning between the old and the new treasurer, upgrading the way PAS takes in new members, tracking the membership, making sure emails go out to all members when needed, and more. There's a lot to do as Treasurer, and PAS appreciates having Richard join as Treasurer as Eric exits. Eric, thank you for your many years of service to PAS as Treasurer!

Terri Finch will continue to handle Accounts Receivable for PAS for the upcoming year.

The Newsletter Editor position has four important people creating the newsletter. The Editor, Don Boyd, is returning for another year. Don is doing so well with the newsletter, the vote was unanimous. Alongside Don we have Terri Finch as Assistant Editor and Cheryl White as Proofer. New to the team this year is Alex Vrenios as Proofer. It's a team effort and that's why PAS has the best newsletter in the world!

Pete Turner is staying on as Webmaster. Pete has made a fantastic public site on Google Suite which houses all the public data needed to reach out to the world with upcoming events and more. Thank you Pete for taking this position for another year. There's a private side to PAS and that is managed on the

MS365 site by Richard Sauerbrun and Terri Finch.

The PAS Host of the in-person meetings will continue to be Bob Ewing. Due to Covid the past couple of years, Bob has been the PAS Host but hasn't had to do much as we haven't had any in-person meetings for him to Host. Starting in September, PAS is planning to get back to in-person meetings at PVCC. The schedule is set and arranged with Jenny Neujoy who is the PAS / PVCC Liaison.

We have two Members at Large, Jenny Neujoy and Bruce Wurst, and they are both returning for another year. Together they help with the voting at the meetings.

Bruce Wurst continues as Equipment Manager for the next year as well.

Even though Stu has tried many times to get someone to replace Terri Finch as Event Manager, no one has come forward to fill the position, so Terri will continue for another year as Event Manager, managing both the Star Tours events and the Public PAS Events.

Congrats to all the new and returning PAS Officers, Directors, and Managers. This year marks a return to near-normal activities at PAS after two years of restrictions. Let's make it Astronomical!

# The New PAS Leadership has been BUSY!

By Alex Vrenios, PAS Secretary

Your Board of Directors and appointed Managers made the most of electronic communication over the summer months. A flurry of ideas got refined into an even flurrer flow of emails. (Is flurrer actually a word?) As ideas solidified into plans, plans were formulated into motions. After much discussion, they got honed into tasks that got assigned to the member or members with the most expertise in their appropriate area. We met three separate times via Zoom; we worked well together and got quite a lot done.

Eric, our long-time Treasurer turned over his responsibilities and the financial database to Richard Sauerbrun, our newly elected Treasurer as of May 5th this year. This is a complicated task so the turnover took some time, but Richard has complete control of it now, and the complete confidence of the Board.

We split the PAS website into two distinct parts: a members-only private section and a public section for anyone who may be interested in what PAS can offer as an astronomical society. The private side is based on a Microsoft SharePoint product that Richard has been working with professionally for quite some time now. The Google-based public site continues to be under the control of our webmaster, Pete Turner. Both sites are undergoing an evolutionary process, but have a look at our new website, [www.PASAZ.org](http://www.PASAZ.org).

We automated the membership application and renewal process, and

decided to raise the annual dues to \$30 (\$12 for students with a valid ID). We also have plans for a “shopping cart” for PAS related items, like tee shirts, hoodies and some others to be determined.

The COVID threat began to wane in the early summer months, then it rose again. Now it seems Maricopa County is in the GREEN region, removing all the mask mandates and distancing requirements. We voted to immediately resume all in-person outreach events, including star parties, telescope workshops, and monthly meetings. Of course, anyone may still wear a mask if that makes you comfortable. We'll begin the season with “hybrid” meetings, allowing anyone to join us via Zoom.

PAS still includes a reduced-fee membership to the Astronomical League (ASTROLEAGUE.org), but to distinguish between a Single and a Family membership: only the primary member of a Family will have nominating and voting rights. If another family member is also active enough to want to exercise these privileges, they must acquire a separate Single membership. We proposed a few subparagraphs to Article 1 of our Bylaws to clarify.

Along those lines, there was some confusion about the meaning of the words quorum and majority as they are used in our Bylaws. We proposed changes to Article 5 (Meetings) to clarify. Also, we extended the terms of office to include the summer months. Elected and Appointed officials will assume their duties at the May annual elections meeting, or

whenever the votes are certified. Article 3 (Terms of Office) was reworded to clarify.

Note that any amendments to our Bylaws must be approved by a 2/3 vote of the Membership. The September 8th General PAS meeting will be a Meeting of the Minds (MOM) where Bylaws changes will be presented to the Membership and opened up for discussion before calling for a vote. If a 2/3 majority of the members in attendance agree, the changes will be adopted and the Bylaws changed to reflect them.

Last, but certainly not least, we noted that three PAS positions need to be filled: Membership Manager, Events Manager, and a Star Tour Manager. Star Tours is the revenue generating arm of our society, manning telescopes, interfacing with schools and other organizations who pay us for our time, equipment, and expertise in presenting the wonders of the night sky to a semi-private gathering. We finalized the planning implementation surrounding the “PAS Sam Insana Memorial Scholarship,” in the form of a grant to a PVCC student who intends to pursue a career in astronomy. Finally, we organized and approved our fall event schedule: monthly meetings, telescope workshops, public (free) star parties, and the revenue generating Star Tours events.

Whew...

Given the accomplishments of our leadership in Washington, maybe we ought to convert Congress into an all-volunteer force!

## PAS Meeting of the Minds (Business Meeting of May 5th)

By Alex Vrenios, PAS Secretary

This was the annual business meeting and held after the main PAS Meeting on May 5, 2022 via Zoom.

Meeting began at 8:40 pm, after guest speaker Ted Blank finished his presentation and ended at 9:40 pm.

PAS Election Results:

President: Stuart Brackney

Vice President: Paul Facuna

Treasurer: Richard Sauerbrun

Secretary: Alex Vrenios

Editor: Don Boyd

Host: Robert Ewing

Member-at-Large: Bruce Wurst

Voting was by email. Ballots were sent to every PAS member.

Twenty-three ballots were returned. (One was a duplicate.)

All candidates were elected to the office for which they applied.

President Stuart appointed two Managers:

Event Chair: Terri Finch

Webmaster: Pete Turner

Both appointees accepted their positions.

Treasurer Richard gave a financial report and presented our new cloud-based

Microsoft 365 SharePoint system (at no cost to us!). This product will also be made available to the membership at a steep discount of \$60 per year for up to 5 PCs/Macs Per subscription.

President Stuart presented the status of some of our current projects. The Automated elections project is complete. Automated online membership Join/Renew is in progress.

A motion to accept the PAS Election Results was moved, seconded and accepted.

President Stuart closed the meeting at 9:40 pm.

# Check Out The PAS Schedule Of Events!

By Terri Finch, PAS Event Manager

## PAS Monthly Meetings with Guest Speakers:

PVCC Main Campus: 32nd Street & Union Hills Rd in Phoenix Room: Life Sciences Building 205 from 7pm to 10pm.

**Oct 6 2022:** Speaker: Klaus Brasch "Photo Legacy of Lowell's Great Reflector" Meeting via Zoom.

**Nov 3 2022:** Speaker: Ted Blank "Zero Gravity Pizza"

Dec 1 2022: Speaker: David Williams

**Jan 19 2023**

**Feb 2 2023**

**Mar 2 2023**

**Apr 6 2023**

**May 4 2023**

**Free Telescope Workshops & Highlights** to focus your telescope on, for each night...these are scheduled to be in G-147 from 7:30pm to 9:30pm. RSVP is Required at [Events@pasaz.org](mailto:Events@pasaz.org).

**Sept 22:** Jupiter, Saturn

**Oct 20:** Jupiter, Saturn

**Nov 10:** Jupiter, Saturn, Mars, Moon lit at 92%

**Dec 8:** Jupiter, Saturn, Mars, Moon at 98% lit

**Feb 9:** Mars, Jupiter, Venus

**Mar 16:** Mars, Jupiter, Venus

**Apr 13:** Venus, Mars, Orion Nebula

More details for all our events and more events can be found on the PAS Online Calendar at <https://www.pasaz.org/public-calendar>.

## PVCC Black Mountain Campus

Public Star Parties Update:

Free to attend, public star parties at Black Mountain Campus: 34250 N 60th Street, Scottsdale for which you may wish to attend and bring your whole family! Start times vary depending on the time of Sunset. Follow signs on campus to "Star Party"

**Sept 1 2022:** 7:30 - 9:30PM Planets are too low

**Sept 29 2022:** 7:00 - 9:00PM Moon, Saturn, Jupiter, Sagittarius

**Oct 27 2022:** 7:00 - 9:00PM Jupiter, Neptune, Saturn, Vesta, M 31

**Nov 17 2022:** 7:00 - 9:00PM Jupiter, Saturn, Uranus

**Jan 26 2023:** 7:00 - 9:00PM Jupiter, Orion, Waxing crescent Moon

**Feb 23 2023:** 7:00 - 9:00PM Jupiter, Venus, Mars, Moon

**Mar 23 2023:** 7:30 - 9:30PM Venus/Moon low, Mars, Orion

**Apr 27 2023:** 8:00 - 9:30PM Venus, Mars, Moon 1 st quarter

These are NOT PAS Hosted star parties. Do not bring your telescopes, but instead come enjoy the night sky with PVCC.

Schedule subject to change. Please contact venue to assure accuracy.

## September 8<sup>th</sup> Meeting to Amend Bylaws

By Alex Vrenios, PAS Secretary

This will be the first PAS meeting for the fall, a **members-only** business meeting, in-person on the PVCC Paradise Valley campus and broadcasting live via Zoom for our first "Hybrid" meeting. We will present amendments to the Bylaws for your consideration, and a 2/3 majority vote to accept.

When: Thursday, September 8, 2022 7:00 PM – 9:00 PM

Category: MOM: Meeting of the Minds

Details: See [https://](https://phoenixastronomicalsociety.sharepoint.com/sites/PASAZORG)

[phoenixastronomicalsociety.sharepoint.com/sites/PASAZORG](https://phoenixastronomicalsociety.sharepoint.com/sites/PASAZORG)

Here is a brief summary of the changes:

1. We proposed a few changes to the subparagraphs to Article 1 of our Bylaws to eliminate the family membership, and sustaining membership. If these changes are approved every member of a family would have to purchase a membership to have voting privileges, all other privileges would be retained.

2. Along those lines, there was some

confusion about the meaning of the words quorum and majority as they are used in our Bylaws. We proposed changes to Article 5 (Meetings) to clarify.

3. Also, we extended the terms of office to include the summer months. Elected and Appointed officials will assume their duties at the May annual elections meeting, or whenever the votes are certified. Article 3 (Terms of Office) was reworded to clarify.

## For Sale

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 to [Editor@pasaz.org](mailto: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](mailto: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.

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

Brand new, unused (Cost \$249 preTax currently, online.)

- Celestron 24mm Ultra Flat Field eyepiece \$150
- 1.25" eyepiece mounting barrel is able to accept standard 1.25" filters and adapters and is compatible with 1.25" star diagonals and focusers
- Beautiful 65 degree field of view
- Multi-coated 8-element lens design for enhanced light transmission
- 29mm eye relief and fold-down rubber eyeguard

Huetech IDAS LPS-D1 Light Pollution clip-in Filter for Canon EOS APC, I'll sell for \$100, another good deal. Hardly used, as I bought a QHY 268 camera.

Contact Greg [gmeyer28@cox.net](mailto:gmeyer28@cox.net).



# Find Hercules and His Mighty Globular Clusters

By David Prosper

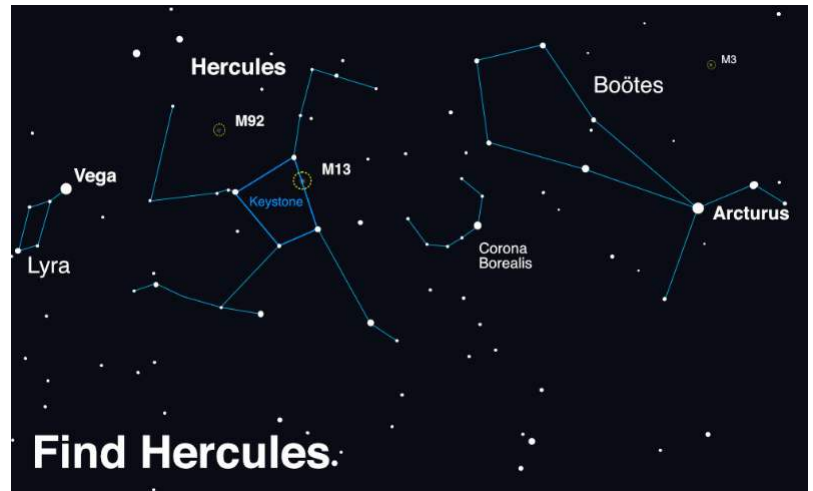
Hercules is one of the standout heroes of Greek mythology, but his namesake constellation can be surprisingly hard to find - despite being one of the largest star patterns in our night skies! Once you find the stars of Hercules, look deeper; barely hidden in the space around his massive limbs and “Keystone” asterism are two beautiful globular star clusters: M13 and M92!

Since the constellation itself is relatively dim but bordered by brighter constellations, you can find the stars of Hercules by looking between the bright stars Vega and Arcturus. They are fairly easy to identify, and we have tips on how to do so in previous articles. Vega is the brightest star in the constellation Lyra and one of the three stars that make up the Summer Triangle (June 2020: Summer Triangle Corner: Vega). Arcturus is the brightest star in the constellation Boötes, and can be found by “arc-ing to Arcturus” from the handle of the Big Dipper (May 2021: Virgo’s Galactic Harvest). You may be able to see Hercules’s “Keystone” asterism first; this distinct pattern of four stars is traditionally shown as the torso of the great hero, though some illustrators prefer marking the Keystone as the head of Hercules. What pattern do you see in the stars of Hercules?

Globular star clusters appear “fluffy,” round, and dense with stars, similar to a dandelion gone to seed, in contrast to the more scattered and decentralized patterns of open clusters. Open clusters are generally made up of young stars that are gradually spreading apart and found inside our Milky Way galaxy, while globular clusters are ancient clusters of stars that are compact, billions of years old, bound to each other and orbit around our galaxy. Due to their considerable distance, globular clusters are usually only visible in telescopes, but one notable exception is M13, also known as the Great Cluster or Hercules Cluster. During very clear dark nights, skilled observers may be able to spot M13 without optical aid along the border of the Keystone, in between the stars Zeta and Eta Herculis - and a bit closer to Eta. Readily visible as a fuzzy “star” in binoculars, in telescopes M13 explodes with stars and can fill up an eyepiece view with its sparkling stars, measuring a little over half the diameter of a full Moon in appearance! When viewed through small telescopes, globular clusters can appear orblike and without discernible member stars, similar in appearance to the fuzzy comae of distant comets. That’s why comet hunters Edmund Halley and Charles Messier discovered and then cataloged M13, in 1714 and 1764 respectively, marking this faint fuzzy as a “not-comet” so as to avoid future confusion.

While enjoying your view of M13, don’t forget to also look for M92! This is another bright and bold globular cluster, and if M13 wasn’t so spectacular, M92 would be known as the top celestial sight in Hercules. M92 also lies on the edge of naked-eye visibility, but again, binoculars and especially a telescope are needed to really make it “pop.” Even though M92 and M13 appear fairly close together in the sky, in actuality they are rather far apart: M13’s distance is estimated at about 25,000 light years from Earth, and M92’s at approximately 27,000 light years distant. Since M13 and M92 appear so close together in our skies and relatively easy to spot, switching between these two clusters in your scope makes for excellent star-hopping practice. Can you observe any differences between these two ancient clusters of stars?

Globular clusters are closely studied by astronomers for hints about the formation of stars and galaxies. The clusters of Hercules have even been studied by NASA’s space telescopes to reveal the secrets of their dense cores of hundreds of thousands of stars. Find their latest observations of globular clusters - and the universe - at [nasa.gov](https://nasa.gov).



**Find Hercules.**  
*Composite image of the dense starry core of M92 imaged in multiple wavelengths. While your own views of these globular clusters won't be nearly as crisp and detailed, you might be able to count some of its member stars. How far into their dense cores can you count individual stars? Credits: ESA/Hubble & NASA; Acknowledgment: Gilles Chapdelaine. Source: <https://www.nasa.gov/feature/goddard/2017/messier-92>*



Look up after sunset during summer months to find Hercules! Scan between Vega and Arcturus, near the distinct pattern of Corona Borealis. Once you find its stars, use binoculars or a telescope to hunt down the globular clusters M13 and M92. If you enjoy your views of these globular clusters, you’re in luck - look for another great globular, M3, in the nearby constellation of Boötes. Image created with assistance from Stellarium: [stellarium.org](https://stellarium.org)



# The Summer Triangle's Hidden Treasures

David Prosper

September skies bring the lovely Summer Triangle asterism into prime position after nightfall for observers in the Northern Hemisphere. Its position high in the sky may make it difficult for some to observe its member stars comfortably, since looking straight up while standing can be hard on one's neck! While that isn't much of a problem for those that just want to quickly spot its brightest stars and member constellations, this difficulty can prevent folks from seeing some of the lesser known and dimmer star patterns scattered around its informal borders. The solution? Lie down on the ground with a comfortable blanket or mat, or grab a lawn or gravity chair and sit luxuriously while facing up. You'll quickly spot the major constellations about the Summer Triangle's three corner stars: Lyra with bright star Vega, Cygnus with brilliant star Deneb, and Aquila with its blazing star, Altair. As you get comfortable and your eyes adjust, you'll soon find yourself able to spot a few constellations hidden in plain sight in the region around the Summer Triangle: Vulpecula the Fox, Sagitta the Arrow, and Delphinus the Dolphin! You could call these the Summer Triangle's "hidden treasures" – and they are hidden in plain

sight for those that know where to look!

Vulpecula the Fox is located near the middle of the Summer Triangle, and is relatively small, like its namesake. Despite its size, it features the largest planetary nebula in our skies: M27, aka the Dumbbell Nebula! It's visible in binoculars as a fuzzy "star" and when seen through telescopes, its distinctive shape can be observed more readily - especially with larger telescopes. Planetary nebulae, named such because their round fuzzy appearances were initially thought to resemble the disc of a planet by early telescopic observers, form when stars similar to our Sun begin to die. The star will expand into a massive red giant, and its gasses drift off into space, forming a nebula. Eventually the star collapses into a white dwarf – as seen with M27 - and eventually the colorful shell of gasses will dissipate throughout the galaxy, leaving behind a solitary, tiny, dense, white dwarf star. You are getting a peek into our Sun's far-distant future when you observe this object!

Sagitta the Arrow is even smaller than Vulpecula – it's the third smallest constellation in the sky! Located between the stars of Vulpecula and Aquila the Eagle, Sagitta's stars resemble its

namesake arrow. It too contains an interesting deep-sky object: M71, an unusually small and young globular cluster whose lack of a strong central core has long confused and intrigued astronomers. It's visible in binoculars, and a larger telescope will enable you to separate its stars a bit more easily than most globulars; you'll certainly see why it was thought to be an open cluster!

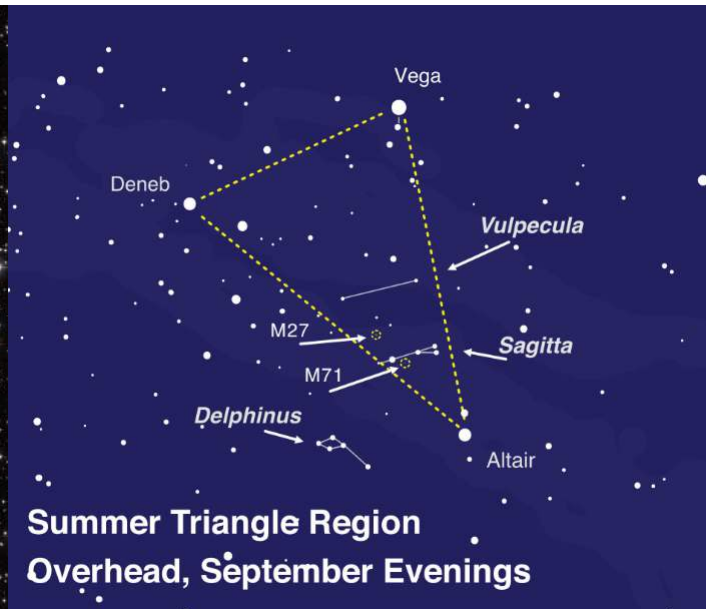
Delicate Delphinus the Dolphin appears to dive in and out of the Milky Way near Aquila and Sagitta! Many stargazers identify Delphinus as a herald of the fainter water constellations, rising in the east after sunset as fall approaches. The starry dolphin appears to leap out of the great celestial ocean, announcing the arrival of more wonderful sights later in the evening.

Want to hunt for more treasures? You'll need a treasure map, and the Night Sky Network's "Trip Around the Triangle" handout is the perfect guide for your quest! Download one before your observing session at [bit.ly/TriangleTrip](https://bit.ly/TriangleTrip). And of course, while you wait for the Sun to set - or skies to clear - you can always find out more about the objects and science hidden inside these treasures by checking out NASA's latest at [nasa.gov](https://nasa.gov).



M71 as seen by Hubble. Your own views very likely won't be as sharp or close as this. However, this photo does show the cluster's lack of a bright, concentrated core, which led astronomers until fairly recently to classify this unusual cluster as an "open cluster" rather than as a "globular cluster." Studies in the 1970s proved it to be a globular cluster after all – though an unusually young and small one! Credit ESA/Hubble and NASA.

Source: <https://www.nasa.gov/feature/goddard/2017/messier-71>

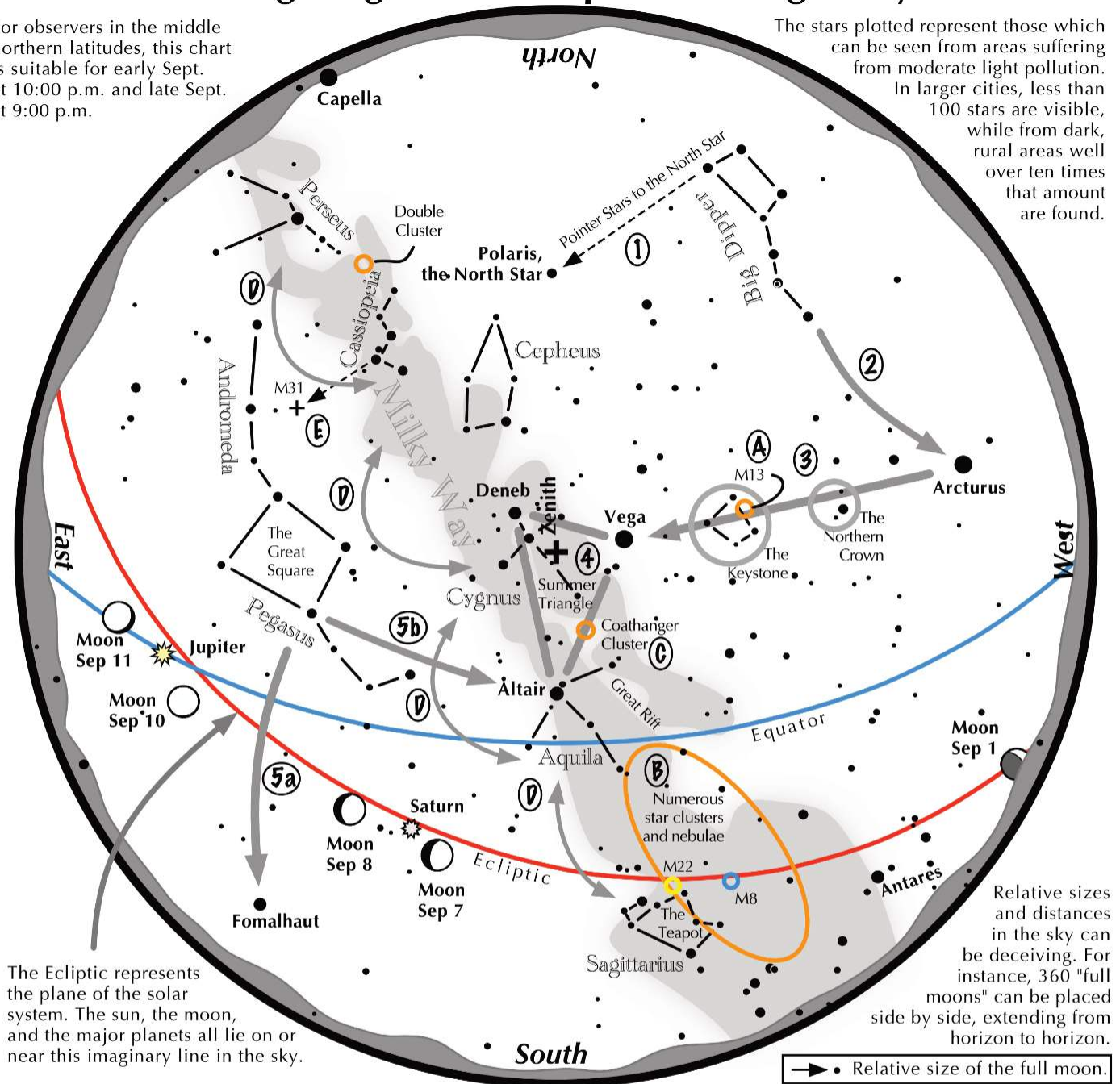


Search around the Summer Triangle to spot some of its hidden treasures! To improve readability, the lines for the constellations of Aquila, Lyra, and Cygnus have been removed, but you can find a map which includes them in our previous article, *Spot the Stars of the Summer Triangle*, from August 2019. These aren't the only wonderful celestial sights found around its borders; since the Milky Way passes through this region, it's littered with many incredible deep-sky objects for those using binoculars or a telescope to scan the heavens. Image created with assistance from *Stellarium: [stellarium.org](https://stellarium.org)*

# Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 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 mid September night sky: Simply start with what you know or with what you can easily find.

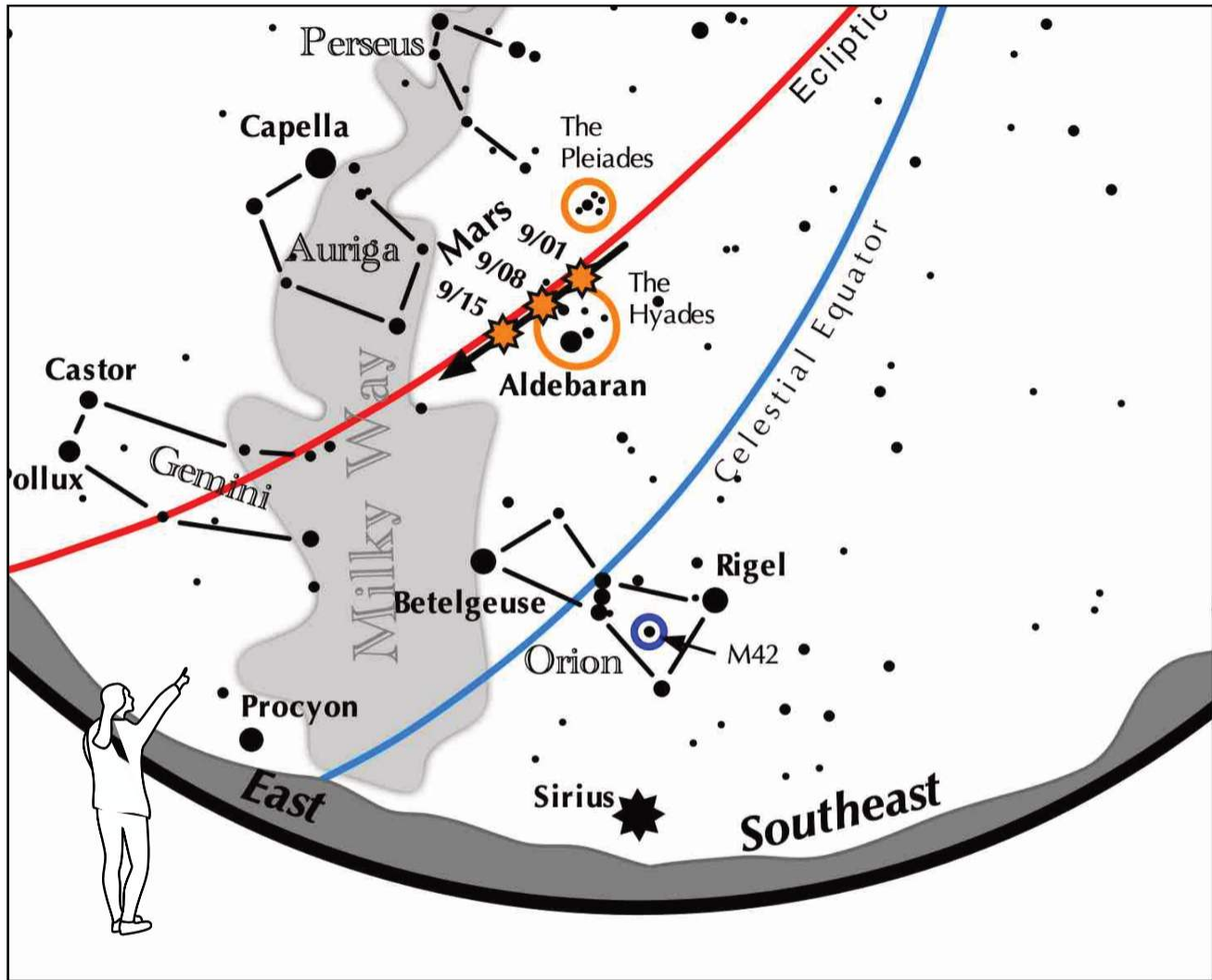
- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

### Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.



**If you can see only one celestial event in the morning this September, see this one.**



## **Mars Slides Between the Pleiades and the Hyades**

On the first few mornings of September, look high in the east–southeast 90 minutes before sunrise.

- Bright, red Mars brightly shines to the upper right of Orion.
- From September 1 through September 8, the Red Planet slides between the Pleiades and Hyades star clusters.
- Compare Mars' hue and brightness with those of nearby Aldebaran.

