



NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

JUNE 2021

PRESIDENT'S NOTES

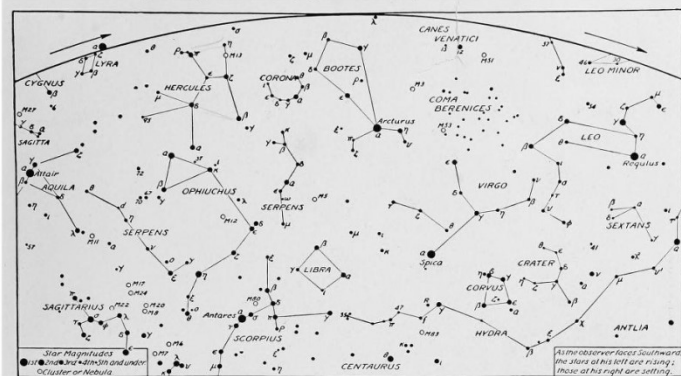
[First off, this month's nightfall banner background was shot by Dave Tannenbaum of May's Lunar Eclipse. He was one of the local few that got a good view of the event, well done Dave.]

And now... Howdie HACers, it's June, we've got a month till the monsoons, if we're lucky, so let's get to it before the clouds start rolling in. So where were we... Oh yes, we've gotten comfortable with the Beginner's Star-Book and started to augment it with outer reference sources. We have wandered around Leo Major, Come Berenices, and Virgo. While they are still viable targets, we should be looking further to the east to the summer constellations rising in the evening. So, turn to pages 52 and 53, the south facing chart pages and let's get started.

THE SKY CHART FOR JUNE AND JULY

For Opera-Glass, Field-Glass, and Telescope

53



KEY-MAP TO THE SKY AS THE OBSERVER FACES SOUTH.
JULY 1, 8 P.M., JUNE 15, 9 P.M., JUNE 1, 10 P.M., MAY 15, 11 P.M., MAY 1, 12 P.M.
FOR NIGHT-CHART TO THIS MAP SEE OPPOSITE PAGE.
FOR THE SKY AS THE OBSERVER FACES NORTH, SEE PP. 50, 51.
For the sky at other Dates and Hours see Time Schedule, p. 35.

Source: A beginner's star-book; an easy guide to the stars and to the astronomical uses of the opera-glass, the field-glass and the telescope, Kelvin McKready, 1912-1929, p 53.

By 9pm, one of the most recognizable constellations is nearly due south, Scorpius. You may know it already. Its claws reach out to the west and the bright stars that make up its deadly tail whips out to the south and then east before coiling back to the west. At its heart is the very bright yellow-red star Antares shining at Mag. 1. If you keep track

of such things, Antares is the eleventh brightest night sky star.

To the west of Scorpius, between its outstretched claws are four stars that roughly form a square, that is Libra, the scale. There are more stars included in the making of the constellation, but they are rather dim, and you need clear, dark skies as the books says. Luckily, we usually have both of those needs covered here in southeast Arizona. You should read the rest of the writeup yourselves, but I'd like to point out some of the more recognizable constellations.

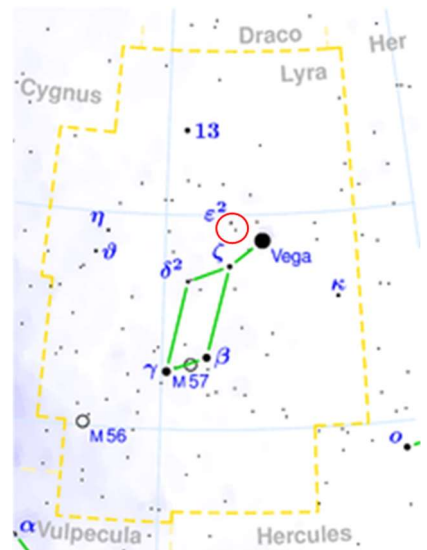
Just to the east of Boötes, a constellation that we touched on last month, is a noticeable tight group of medium brightness? stars in arc that make up Corona Borealis (the Northern Crown), and directly east of it is Hercules. The central portion of Hercules, made up of four bright stars is informally known as the keystone. This is another landmark constellation and home to one of the brightest globular star clusters. It can even be seen naked eye and in low power binoculars, although a telescope with a lower power eyepiece is really the way to go. This is yet another "M" object, M13 to be exact. I don't think you can tire of looking at this magnificent cluster. When you do move on from M13, Hercules is home to another M object, M92. Messier 92 is also one of the brightest globular star clusters in the northern hemisphere and can be seen without binoculars under good conditions. It appears slightly dimmer and smaller but still beautiful in a telescope.

Now I realize I have been saying to use a low power to look at these clusters and that's true but let me rephrase that. Begin your viewing with a low power before increasing your power. Unlike nebula and far off galaxies, globular star clusters hold up well to higher powers because they are composed of bright point sources not emitted or reflected gas and dust.

Again, just to the east of Hercules is the small constellation of Lyra, the harp. You'll find it covered on pages 56, 57 in the Star-Book. For such a small constellation there is a lot to look at Lyra. We've mentioned double stars and the Star-Book devotes much of its writeups to them. Well Lyra includes the number one double star telescopic target.

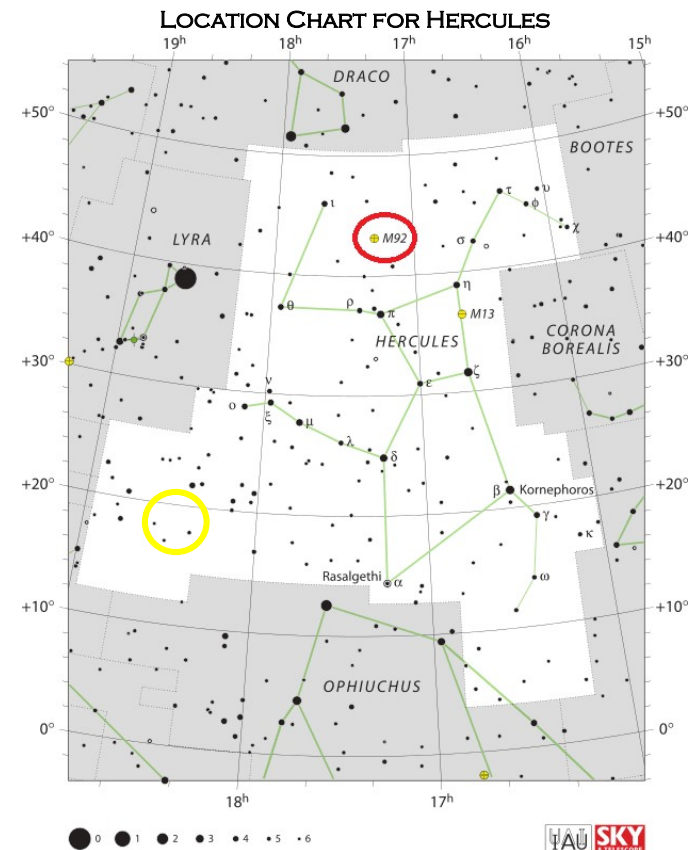
Epsilon Lyrae, also known as the Double-Double, is easy to locate due to its nearness to Vega, the brightest star in the northern sky.

CONSTELLATION OF LYRA SHOWING LOCATION OF DOUBLE-DOUBLE STAR SYSTEM AND PLANETARY NEBULA M57



Source: https://en.wikipedia.org/wiki/Epsilon_Lyrae

You can feel free to look for all those faint fuzzies you've been reading about in Sky and Telescope. However, in an urban setting with a quality scope and good eyepieces you may need to forgo lower power eyepieces and low surface brightness objects. For example, don't look for that dim comet no one has been talking about and instead go for glimpsing fine detail in Jupiter's bright belts and bands or tease out the divisions in Saturn's rings. Well it's getting dark out so it's time for me to go and its time for you to get out there and stare.



Source: Messier 92 location. Image: IAU and Sky & Telescope magazine (Roger Sinnott & Rick Fienberg) <https://www.messier-objects.com/messier-92/>

Through binoculars, what appears as one star to the naked eye can be broken (resolved) into two. With a telescope and higher power, each star in that pair breaks further into two, making four stars. And yes, they are a part of a multi star system, bound together by gravity. I've circled the double-double in the chart below. Also, in Lyra on the chart and not to be missed is M57. Generally known as the Ring Nebula, this planetary nebula a favorite with everyone. It is a small object with a high surface brightness that can be glimpsed in large binoculars and shows beautifully in 4"-8" telescopes.

WELCOME OUR NEW MEMBERS

We would like to welcome Laurie and Gary Giangregorio of Hereford, David and Gloria Miller of Sierra Vista, Dr. Aaron Tesch of Tucson and Wendee and Gene Grinde of Sierra Vista to the club. All of these were awarded complimentary HAC membership for their support of the Patterson Observatory. Marion Goode of Hereford also joined the club in May. Welcome, we are glad you joined!

While we are on the subject of what power to use when, that is a personal matter but here are a few generally agreed on guidelines. Go from low power to high power eyepieces then settle on what power gives the best view. Low power help condense low surface brightness objects like emission nebulae and comets. Higher power help darken background sky and raise contrast. Size and quality of the scope and eyepieces limit possible power range. Both high and low limits. While conditions of the local sky limit all telescopes no matter their quality. In dark clear skies with a well-tuned quality telescope and good eyepieces you are free to use a wide range of power.

CONGRATULATIONS TO TOM KAYE

After twenty years of planning, designing and building, Tom's 1.1 meter (44-inch) reflecting telescope is finally (mostly) assembled! The finishing touches will be completed



in the fall. We anxiously await first light and extend our congratulations to Tom for this remarkable achievement!

PATTERSON OBSERVATORY PUBLIC NIGHT

May's Patterson Public Night went forward, even under cloudy skies. We were unable to use the scopes at Patterson although David Roemer was able to share a couple of star clusters over Zoom from his home observatory. Altogether, 14 HAC members and 26 guests participated in the event. A special thanks to Wendee Grinde from the University South Foundation for hosting the Zoom portion of the event and to Penny and Thomas

Brondum who each delivered talks in the classroom.

June's Patterson Public Night will be held on Thursday June 17. We will again hold a hybrid event with David



Roemer and Vince Sempronio participating from their home observatories and sharing views via Zoom. Other HAC members will be at the observatory. Guests must register on line and we are still limiting attendance.

HAC SUPPORT FOR SCHOLARSHIPS

The club donated \$600 to the "Golfing Fore Scholarships" golf tournament held by the University South Foundation at Mountain View Golf Course on Ft. Huachuca on May 22. \$500 was applied to the BOT NET Sponsorship



and \$100 to sponsor a hole. We had our club logo displayed on the tournament's webpage, on other promotional media, and on a sign at our sponsored hole. Our banner was displayed at the club house in recognition of our Bot Net (lunch) sponsorship. The money we donated will be applied to scholarships awarded to local students attending classes in CAST's Cyber Program.

To quote the thank you letter from the foundation: "It is only through this kind of donor commitment that we can continue to invest in University of Arizona student's futures and our local workforce. We appreciate your commitment to improving educational opportunities and making it possible for students to achieve their educational and career goals."

RETURN TO IN-PERSON MEETINGS

In-person meetings will resume in September. By then, we hope that life will be pretty much back to non-pandemic normal. We will meet:

Friday, September 17 at 7pm in the Community Room, Student Union Building at Cochise College

Friday, October 22 at 7pm in the Community Room, Student Union Building at Cochise College

Friday, November 19 at 7pm in the Library Commons at Cochise College

Friday, December 17 at 7pm in the Community Room, Student Union Building at Cochise College

Our June 25th, July 23rd and August 20 meetings will be conducted over Zoom. Watch for connection instructions in your ema At the May meeting, I was reminded that there are HAC members that are unaware of the Astronomical League's Planetary Nebula Program. As the creator and coordinator of that program I feel compelled to correct that circumstance.

THE AL'S PLANETARY NEBULA OBSERVING PROGRAM

BY TED FORTE

The planetary nebula program is alive and well. It's rather challenging and appeals to a "niche" group, so it's not a tremendously popular program, but I've awarded 91 advanced visual awards and 19 imaging awards. Only three HAC members have completed the program (not counting myself because I was a member of a different club when I did the program), but I know of a few members that are currently working on it.

If you are interested in the history of the program, read on.

As planetary nebulae have always been a favorite target for me, I was disappointed that there wasn't an A.L. program (at that time they were called "clubs") devoted to these objects. I approached then A.L. President Bob Gent at the Mason Dixon Star Party in 2005 and inquired of him why the league didn't have a planetary nebula club. He responded that it was because I hadn't created one yet.

I took up the challenge, and thought it would be a fun endeavor to make the creation of an AL observing program a club project. We enlisted members of my Virginia astronomy club (Back Bay Amateur Astronomers) to work on it. We formed two committees consisting of six members each. One committee was tasked with establishing the rules and procedures and a second committee was responsible for selecting the objects. Other members contributed object recommendations. Both committees reported to me, but I wasn't on either.

The rules committee decided to mimic the very popular Messier program and have two levels, a “basic” level for 60 objects and an “advanced” level for 110. The basic would earn a certificate and the advanced would earn a certificate and lapel pin. We then decided to include an imaging award that would require imaging 90 objects and would earn a certificate and pin and be equivalent to the advanced observing award. It was the first A.L. program to acknowledge and allow “negative observations”. I have always believed that negative observations are as valid a result as actually detecting on object and concluding that an object isn’t detectable takes as much and often more effort than a successful detection.

The object selection committee was tasked with creating both a basic program that could be accomplished with an 8-inch telescope in mediocre skies, and an advanced program that would challenge observers no matter what their circumstances. The only absolute requirement was that the objects be true planetaries (based on the knowledge of the day). We tried to incorporate all of the best showpieces, and the most scientifically or culturally important objects of the genre.

The program allows the use of pointing aids (digital setting circles and such) but recognizes those observers that use traditional star hopping methods on the certificate.

It was my responsibility to write the observers guide. I enlisted three other members to contribute sections of the guide and collected images from our members to use on the cover and in the object descriptions.

We conducted a club-wide poll to determine what to use as the subject of the award pin. Messier 27, the Dumbbell Nebula (and the first planetary nebula discovered) was selected. Then our BBAA imagers submitted their photos of the Dumbbell for popular selection – another club-wide poll selected an image submitted by BBAA member Richard Dickson. My son used that image and designed the pin for us. I have a cache of pins all polished up and waiting for HAC members to earn them!



The program was approved in early 2006 and I remain the coordinator.

In 2012, we incorporated “alternate” objects that observers at higher latitudes could substitute for the objects that don’t clear their horizon. Shortly afterward, a southern hemisphere version of the program was incorporated and a new observing guide published:



A GUIDE TO EYEPIECES

BY TED FORTE

I intended this as a follow up to a question I got last night at our telescope clinic. Then, I thought it might have value to others on this list so I decided to make it a public post. It’s just some info/advice on eyepieces for our newer astronomers on the list.

First, some formulas to keep in mind:

The magnification you get from an eyepiece is determined by dividing the telescope focal length (in mm) by the eyepiece focal length (in mm). So a 20mm eyepiece in an 8-inch f/10 scope (FL=2030mm) yields 101.5x: $Mag = 2030/20$

The exit pupil of an eyepiece (the angular size of the cone of light it projects to your eye) is determined by dividing the telescope aperture in mm by the magnification. Our 20mm eyepiece that gives us 101.5x in that 203mm (8-inch) aperture scope produces an exit pupil of 2 mm : $EP = 203/101.5$

The (approximate) field of view in arc minutes can be computed by dividing the apparent field of view (AFOV) which you get from the eyepiece manufacturer, by the magnification it yields and then multiplying by 60. So in our example above, if our 20mm eyepiece is a Televue Nagler which has an AFOV of 82 degrees we would get a FOV of 48.5 minutes: $FOV = (82/101.5) \times 60$

Now some opinion.

You can achieve essentially any magnification in any scope, but too high a magnification will result in a uselessly expanded image and too-small a field of view. Too little magnification often results in your seeing the shadow of a reflector’s secondary obstruction. A general rule of thumb is that the maximum “useful” magnification is limited to about 50 times the aperture of the scope in inches (some people say 60). The minimum magnification should be limited to about 5 times the aperture.

Our 8-inch f/10 scope therefore should be confined to magnifications of 40x to 400x: $Min\ Mag = 5 \times 8$, $Max\ Mag = 50 \times 8$. That means you could find use for eyepieces in the 5mm to 50mm range. However, it is a very rare occasion to use maximum or minimum magnification. You’ll probably find that your most useful mag range is about 10 to 15 times the aperture, (magnifications of 80x to 120x in that 8 inch scope). So the owner of that 8-inch f/10 scope should first

purchase eyepieces of FL 25mm to 17mm. You'll probably find that your "favorite" eyepiece will be the one that yields a magnification about 12 times the aperture of your scope in inches and produces an exit pupil that closely matches the size of your eye's dark adapted pupil.

Remember that telescope/eyepiece combinations that yield an exit pupil significantly larger than your eye's pupil is wasting light and is in essence a bit like using a smaller telescope. The combo that most closely matches your eye's pupil will give the brightest possible view.

The magnification guidelines are just that. They are not hard and fast "rules". What a new observer should conclude from them is that they should start with low to intermediate mag ranges and save the short FL high power jobs for down the road.

There is a bewildering array of choices when shopping for eyepieces. There will be a wide range in price per millimeter too. In order to achieve wide APOV and long eye relief (the distance from the outer lens to the focal point which determines how close your eye needs to get to the eyepiece), designers have to add elements (lens layers). For oculars of equal quality, there is always a tradeoff between the amount of glass the light has to traverse and the brightness of the image.

In my experience, you USUALLY get what you pay for in terms of optical quality, ruggedness, customer support, and resale value. Of course the high end brand names are probably overpriced and you can find equally good products for less money. Certainly though, some cheaper brands are cheaper because they are actually inferior. So buyer beware and try before you buy wherever possible.

NASA NIGHT SKY NOTES JUNE 2021

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

ASTROPHOTOGRAPHY WITH YOUR SMARTPHONE

BY DAVID PROSPER

Have you ever wanted to take nighttime photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have a just smartphone, you can do astrophotography. Seriously!

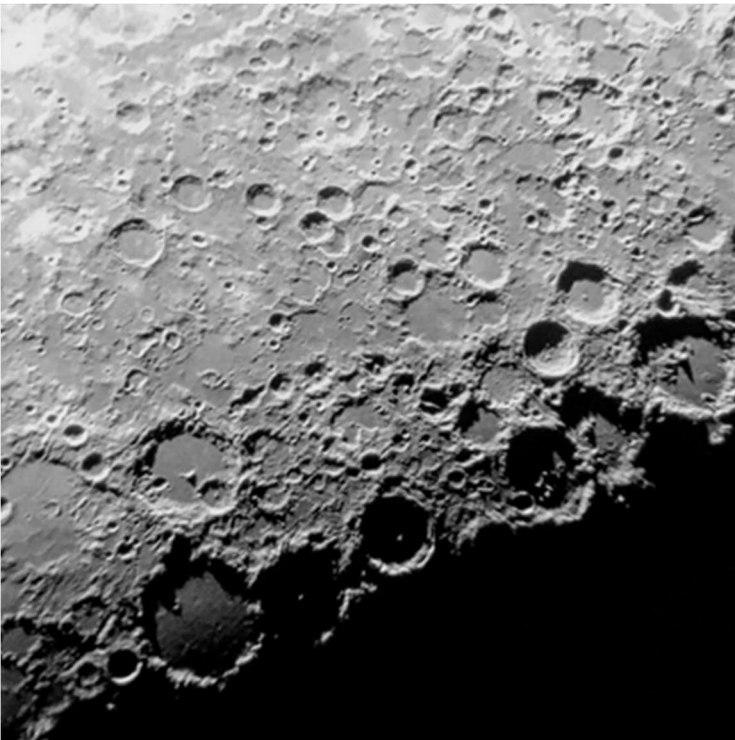
Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.



You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and

Events” map on the Night Sky Network’s website at nightsky.jpl.nasa.gov. May you have clear skies!

A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!



The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (above) was taken through the eyepiece of a friend’s Celestron C8 telescope.

FOR SALE

Patricia Houser has two telescopes to sell. Her husband was the astronomer, and can no longer pursue the hobby. She did not mention what the scopes are but would be open to potential buyers coming out to see them (Whetstone). That’s all the information we have, so if you have questions please contact Ms. Houser directly at iamtennis@peoplepc.com

MEMBERS’ ASTRO-IMAGES

NGC 3247 AND IC 2581 IN S. HEMISPHERE
ALEX WORONOW



NGC 3593 – PGC 37256 – PGC 7164 ALEX WORONOW



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Nightfall Editor: Cindy Lund cindy.jean.lund@gmail.com

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HAC June-July 2021 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
30 Saturn/Moon 4 degrees	31  MEMORIAL DAY	1 June Jupiter/Moon 5 degrees	2  00:26AM	3	4 Member Telescope Clinic 7 pm	5 Backup for telescope clinic
6	7	8	9	10  8:54 AM	11	12 Venus/Moon 2 degrees
13 Mars/Moon 3 degrees	14	15	16	17  8:54 PM Patterson Public Night Hybrid Event	18	19
20 <i>Happy Father's Day!</i> Summer Solstice	21	22	23	24  11:40 AM	25 HAC Meeting (Zoom)	26
27 Saturn/Moon 4 degrees	28 Jupiter/Moon 5 degrees	29	30	Jul 1  2:12 PM	2	3
4  Independence DAY	5	6	7 Mercury/Moon 4 degrees	8	9  6:17PM	10
11	12 Venus/Moon 3 degrees	13	14	15	16	17  3:11 AM
18 Pluto Opposition	19	20	21	22	23  7:37 PM HAC Meeting ZOOM	24 Saturn/Moon 4 degrees
25 Jupiter/ Moon 4 degrees	26	27	28	29 Mars/Regulus Conjunction .6 degrees Delta Aquariid Meteors	30 Delta Aquariid Meteors	

All times local MST

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Send an email to: HACAstro+subscribe@groups.io

Watch the group for notice when in person events and meetings will resume