NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

MAY 2021

PRESIDENT'S NOTES

Yep HACers, it's May. Welcome to you club newbies and to, well, everybody! I'm your HAC President David Roemer. The evenings are still getting shorter and warmer, so reset the thermal cooling of you astro-cameras, dust the spring pollen off your mirrors and eyepieces, and let's go bag some galaxies. Oh, and discuss another book.

BUT FIRST: COMET ALERT

One more thing before I begin, a brightening comet, C2020 R4 ATLAS, is in the Constellation of Boötes as I'm writing this and will be in good position for the rest of May; high in the east in the "Realm of the Galaxies," away from the Milky Way, and getting higher as the night goes on. It might brighten to naked eye levels but probably not. By the way, the Realm of the Galaxies is where we will be hunting this month. By late in May the comet will be high in the south at dusk. Now back to our regularly scheduled article.

RECAP

Last month we found our way from the Earth's celestial north pole, across the sky to the constellation Leo Major (known simply as Leo in current astronomical references). Then, we zeroed in on several bright galaxies. Most are bright enough to see in large binoculars and small telescopes. Most of them also have Messier (M) object designations.

A RETURN TO THE GALAXIES OF LEO (MAJOR)

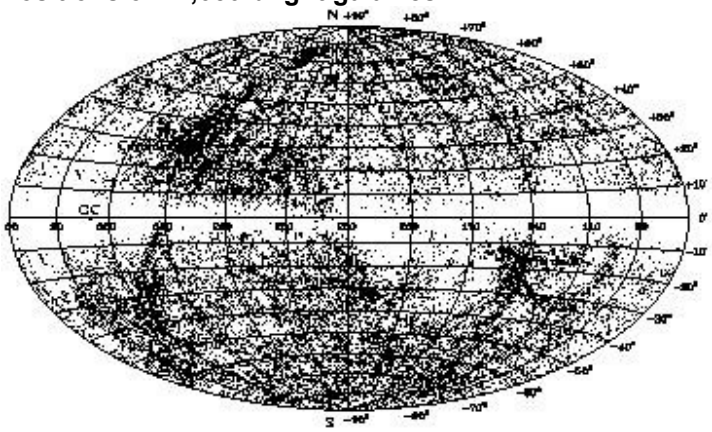
This month we return to Leo and to the bright star Denebola to find more galaxies. We will use Denebola as a starting place to find a few more bright galaxies. Again, the bright ones usually have Messier designations. Along the way we will see that these bright galaxies are surrounded by scores of dimmer ones. These objects usually have different designations such as NGC (New General Catalog) or IC (Index Catalog), that is a supplement to the NGC. There are other still dimmer galaxies in the same area, but let's draw our line at NGC objects. We will already be at outer edge of the visual capability of many midsize telescopes, and way out of the range of small telescopes and binoculars. Our objective in these articles is to get you out there to see something.

We're trying to start you off in this hobby with a positive attitude and get you comfortable observing, not "I think I can see it," or "I can't see anything in this thing." It's not a test, just practice. That is also the philosophy of the Star-Book (A Beginner's Star-Book by Kelvin McKready], learn bright stars and objects. To learn, or more importantly, *how* to learn the night sky. End of commercial.

BUT FIRST: A MILKY WAY ORIENTATION

Let's start this month's conversation with a bit of framework. Time to expand our view: off planet, beyond our star system, outside our own galaxy (the Milky Way), 'til we are looking into our extended galactic neighborhood. From this perspective we see we are surrounded by larger and smaller galaxies. As depicted below in the 3D map centered on the Milky Way, there are galaxies above and below our galaxy's plane (as represented by the equator on this map).

Positions of 14,650 bright galaxies.



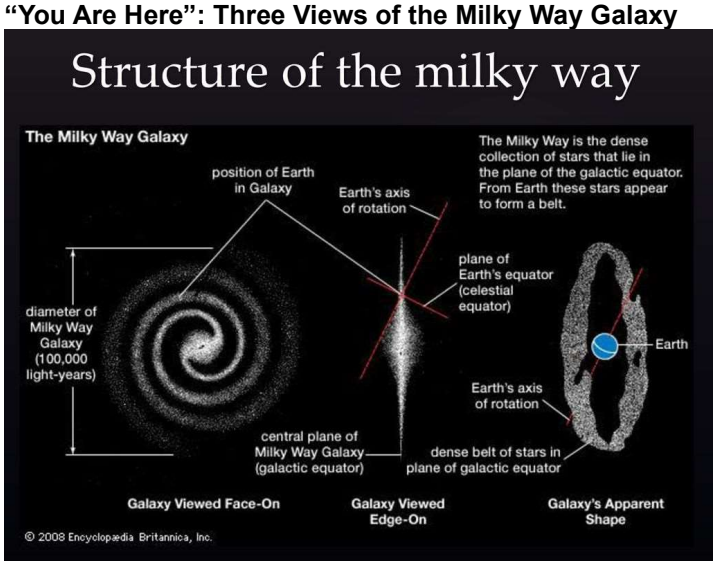
Source:
https://ned.ipac.caltech.edu/level5/Sparke/Sparke1_1.html

The graphic also shows (or doesn't) the main reason I bring this up in the first place. Galaxies near the plane of the Milky Way's disk are hidden by the Milky Way's stars and dust. When we look at the Milky Way we are looking across – no, through – the dense arms and central bulge of our galaxy. There are stars, dust, and gas. A lot of each. So much in fact, it is extremely hard to see anything beyond it, and so we know of very few galaxies behind the Milky Way's disk.

When we look in directions away from the Milky Way, we still see stars, yes, but there tend to be fewer of them, and those that are there tend to be brighter. That's because they are *local* stars (that is, they are usually in our arm of the galaxy). There is also less gas and dust locally as well.

These sparse regions of the sky allow us to look much farther into intergalactic space.

"You Are Here": Three Views of the Milky Way Galaxy



Source: Encyclopedia Britannica, Inc. https://www.britannica.com/place/Milky-Way-Galaxy/The-structure-and-dynamics-of-the-Milky-Way-Galaxy

Leo, Coma Berenices, and Virgo

One such region includes the constellations we want to concentrate on this month. Peering out beyond the constellations Leo Major, Coma Berenices, and Virgo (which are covered on pp 48-49 of the Star-Book) we see a representative view of the universe beyond our galaxy.

I don't want you to overlook the opportunity to view some of our local stars in this area of sky. After all, it was one of my main reasons for bringing this book to your attention in the first place. So, go through the write-up as always. Also, as highlighted in the write-up on page 49, the region is home to some of the dimmer stars in this part of sky. Coma Berenices to the east (or left) of Leo Major is a kind of rare constellation in that it is made up of faint stars rather than bright "landmark" stars. Because Coma Berenices is composed of such faint stars it was considered an *asterism* rather than a constellation by ancient civilizations.

An Aside on Asterisms

An asterism is usually thought of as an informal group of stars within one or more constellation, kind of a bit player rather than the major character. The Pleiades (or seven sisters) for example are an asterism within the constellation of Taurus another example is the Beehive Cluster (which is also known as Praesepe, M44, NGC 2632, or Cr 189) is an open cluster in the constellation Cancer. The Big Dipper is an asterism within Ursa Major. The Keystone is an asterism within Hercules. A list could go on and on.

Asterisms usually have a common name, maybe even a familiar shape, and some of the stars that make up the group may even have names, but they are not constellations. I believe the reason behind this hierarchy is that you would use bright stars in very recognizable patterns for navigation, bright stars to help you on your journey even in not so good weather; not the dimmer, less distinct stars such as those contained in Coma Berenices. However, astronomers later found Coma Berenices of sufficient interest and occupying enough area that it has been elevated to constellation status. The back-story associated with this now constellation is also recalled elsewhere in the Star-Book.

I feel about the same way towards Virgo as the ancients thought about Coma Berenices, lots of star but not enough of a perceived form to be a constellation. Personally, I cannot (do not?, will not?, just not register?) recognize Virgo as a constellation. Instead, I give it all the triangular area between the bright stars Denebola, Arcturus and Spica, and call it Virgo. That said, the territory of Virgo contains one of the richest concentrations of bright galaxies we can view from this planet (or more probably, from this arm of our galaxy). To thoroughly investigate this claim, however, we need more information than the Star-Book can give us.

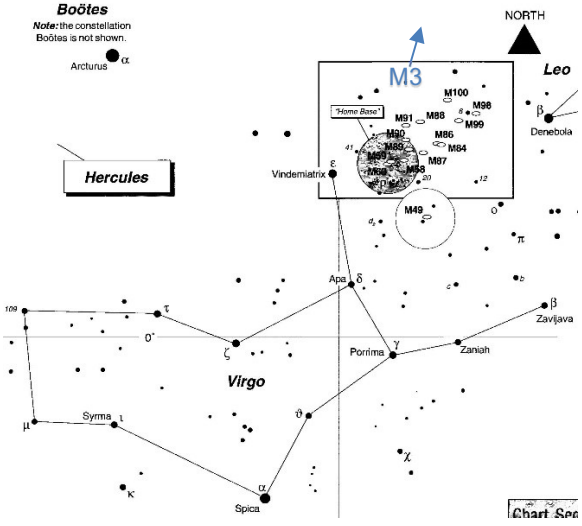
And Now, Another Favorite Field Guide

So please welcome another friend found in *many* visual astronomers' bookcases, *The Year-Round Messier Marathon Field Guide*, by Harvard Pennington. This book is written for star hoppers to use before and during a Messier Marathon (that we have already discussed). But the M-objects are also, and more importantly, arranged so they can be viewed throughout the year. It uses clearly drawn star charts and simple, bright star-to-star (hopping) directions to get the reader to each target. As well, it is a very good introduction to the night sky, with clever ways of getting to know key stars and constellations to orient yours scopes like a pro. Part of what makes this book work so well is its use of a 1X power, heads-up display finder called a Telrad.

An Ode to the Terrific Telrad …

This ingenious device deserves to be on every scope, no matter how big or small. In fact, I've seen a Telrad attached to the Large Binocular Telescope (LBT) atop Mount Graham. LBT is a pair of 8-meter(!) class telescopes mounted side by side. But again, I digress, sorry. I'll return to the marathon field guide from time to time, but this time I have included one of the close-up area star charts that includes just some of the Virgo Cluster Galaxies.

An Example of one of the Virgo Area Star Charts Including Telrad Circles



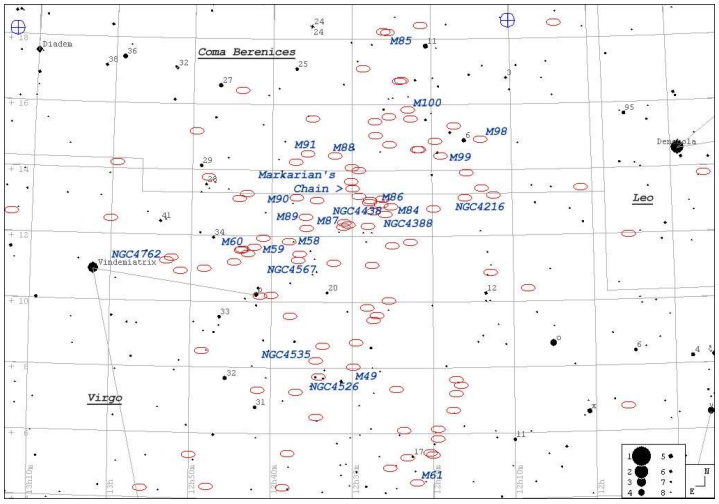
Source: "Virgo," *The Year-Round Messier Marathon Field Guide*, Harvard Pennington, Willmann-Bell, Inc. ca 1998, p131.

Note: the "Home Base" and M49 circles represent a 4-degree field of view.

… And back to Cruising Virgo's Faint Fuzzies

Speaking of binoculars, they are wonderfully useful to scout out Leo Major, Coma Berenices, and Virgo. Start from Denebola as we did last month, then slowly scan the sky eastward. Stop when you get to the bright star Arcturus in Boötes. Go back to Denebola, move slightly north or south (a few degrees) and then repeat your scans until you have covered a wide swath as far north as the globular cluster M3 and south as far as Spica, the brightest star in Virgo. With the wide fields that you have in binoculars it shouldn't take you that long to skim the sky, but don't hurry. **Take your time** and get to know the area of Coma Berenices and Virgo. Maybe you can even come to recognize the constellation of Virgo.

Chart of the Bright Virgo Cluster Galaxies found on the Internet at astrosurf.com



Source: http://www.astrosurf.com/jwisn/virgo-cluster.htm

Well, I've come to the end of my allotment of time and space this month, without really walking you through to any of the objects, but that's ok. I've got you in the ballpark, pointed you to the field, and given you a chart. There are more charts and apps, books, and another article in this newsletter to fill in the gaps I've left. The rest will be your own adventure…

When you do switch to a telescope and a low-power, wide-field eyepiece, retrace your steps. Be on the lookout for small fuzzy patches everywhere. You are in the realms of the galaxies: the Coma Cluster and the Virgo Cluster. Together there are ~~hundreds~~ thousands of galaxies in these clusters. Now, don't expect to see them all -- or even most of them. Depending on the size of your telescope, expect about a dozen but probably less than 50? They will be small in your eyepiece; most will be dim, fuzzy ovals. Some will be merely puffballs. You may see some structure in the brighter ones, perhaps an arm or a dust lane. Again, do not expect to find everything in one night or one week of nights. Set up, relax, enjoy, and most of all get out there and stare.

Welcome our new members

Mireya Vera, and Jirina and George Ramescu, all of Sierra Vista, joined the club after attending the April event at the Patterson. Welcome, we are glad you joined!

Return to Public Night at Patterson Observatory

The April Patterson Public Night, a hybrid outreach event, was a success. We incorporated elements of a live Public Night, a Zoom event, and Facebook.

We allowed a limited number of guests, with advanced registration, to visit the observatory in person. They were able to view the moon on two scopes equipped with video cameras and attached to lap top computers. They also viewed the night sky live through an 18-inch Dob.

David Roemer and Vince Sempronio participated over Zoom from their home observatories away from the city lights.

The Henry F. Hauser Museum arranged a companion event at the Sierra Vista Library where Penny Brondum kicked things off with a talk on the Constellations. The two events were linked by Zoom.

Wendee Grinde of the University South Foundation acted as our Master of Ceremonies and hosted the Zoom event. While there were a few technical glitches, it was very successful overall and we were encouraged enough to try it all again. We will have another hybrid event at our next scheduled Public Night on May 20.

Please let Ted Forte know if you would like to participate and please share your ideas to improve the event.

Research at Patterson Observatory

Tom Kaye's on-going observing campaign, as part of an international consortium of amateur and professional astronomers, continues. In what may be the first ever mention of the Patterson Observatory in a scientific presentation, Tom and the Patterson Observatory are listed as contributors on an abstract that describes a planned talk by Tamás Borkovits (SzTE Baja Observatory, Hungary), to be delivered to the TESS Science Conference II which is scheduled for August.

The consortium team is engaged in ground-based follow-up observations of TESS discoveries. They concentrate on hierarchical triple or multiple stellar systems where the outer stellar component recurrently eclipses the inner eclipsing binary or is eclipsed by it.

Previously, Tom was doing this sort of pro-am work from Junk Bond Observatory (JBO). JBO has been sold and Tom's own 1.1-meter observatory is still months away from

first light. He switched operation to the Patterson in December. In return for making the 20-inch RC available for this project, we are benefiting from Tom's expertise in making Patterson fully robotic and remotely operable.

Farewell Bennu

We've been following the OSIRIS REx asteroid sample return mission since it first came off the drawing board. We cheered at our live launch party, signed up to count rocks when the mission was surprised by Bennu's unexpected rough surface, and held our collective breath as the Touch and Go sample collection was underway. The spacecraft conducted its final close pass of the sample site to document how the surface was affected on April 7. Now, it's ready to say good bye to asteroid Bennu. O-Rex will fire its thrusters to leave orbit and begin its two-year journey home on May 10. Tucked away inside the sample return capsule is precious cargo: a quantity of regolith collected from the asteroid's surface. We can, for now, only imagine the secrets it will contain. The capsule will land in the Utah desert in September 2023.

Above is the sample site as it appeared on April 7.

NASA Night Sky Notes May 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!

Virgo's Galactic Harvest

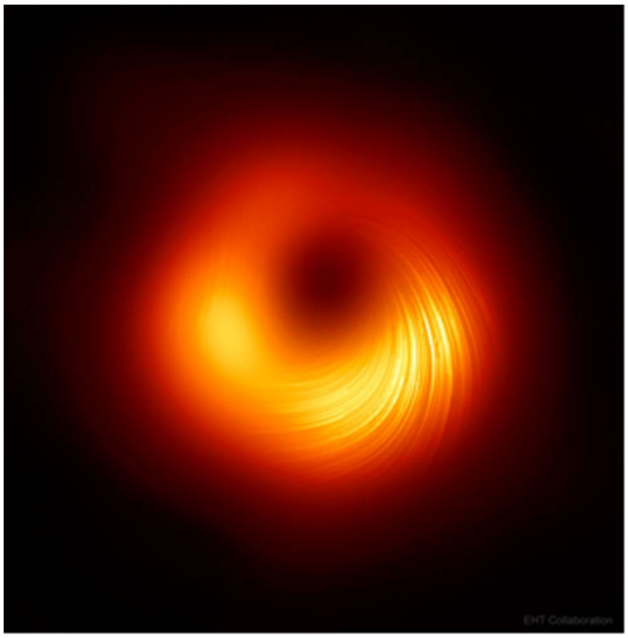
David Prosper

May is a good month for fans of galaxies, since the constellation Virgo is up after sunset and for most of the night, following Leo across the night sky. Featured in some ancient societies as a goddess of agriculture and fertility, Virgo offers a bounty of galaxies as its celestial harvest for curious stargazers and professional astronomers alike.

Virgo is the second-largest constellation and largest in the Zodiac, and easily spotted once you know how to spot Spica, its brightest star. How can you find it? Look to the North and start with the Big Dipper! Follow the general curve of the Dipper's handle away from its "ladle" and towards the bright orange-red star Arcturus, in Boötes – and from there continue straight until you meet the next bright star, Spica! This particular star-hopping trick is summed up by the famous phrase, "arc to Arcturus, and spike to Spica."

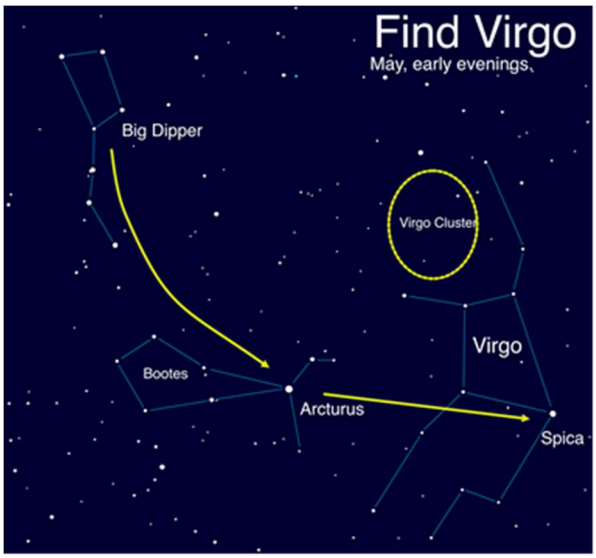
This large constellation is home to the Virgo Cluster, a massive group of galaxies. While the individual stars in Virgo are a part of our own galaxy, known as the Milky Way, the Virgo Cluster's members exist far beyond our own galaxy's borders. Teeming with around 2,000 known members, this massive group of galaxies are all gravitationally bound to each other, and are themselves members of the even larger Virgo Supercluster of galaxies, a sort of "super-group" made up of groups of galaxies. Our own Milky Way is a member of the "Local Group" of galaxies, which in turn is also a member of the Virgo Supercluster! In a sense, when we gaze upon the galaxies of the Virgo Cluster, we are looking at some of our most distant cosmic neighbors. At an average distance of over 65 million light years away, the light from these galaxies first started towards our planet when the dinosaurs were enjoying their last moments as Earth's dominant land animals! Dark clear skies and a telescope with a mirror of six inches or more will reveal many of the cluster's brightest and largest members, and it lends itself well to stunning astrophotos.

Virgo is naturally host to numerous studies of galaxies and cosmological research, which have revealed much about the structure of our universe and the evolution of stars and galaxies. The "Universe of Galaxies" activity can help you visualize the scale of the universe, starting with our home in the Milky Way Galaxy before heading out to the Local Group, Virgo Cluster and well beyond! You can find it at bit.ly/universeofgalaxies. You can further explore the science of galaxies across the Universe, along with the latest discoveries and mission news, at nasa.gov.



The first image of a black hole's event horizon was taken in the center of one of the most prominent galaxies in Virgo, M87! This follow up image, created by further study of the EHT data, reveals polarization in the radiation around the black hole. Mapping the polarization unveils new insights into how matter flows around and into the black hole - and even hints at how some matter escapes! More details: apod.nasa.gov/apod/ap210331.html

Credit: Event Horizon Telescope Collaboration



Find Virgo by "arcing to Arcturus, then spiking on to Spica." Please note that in this illustration, the location of the Virgo Cluster is approximate - the borders are not exact.

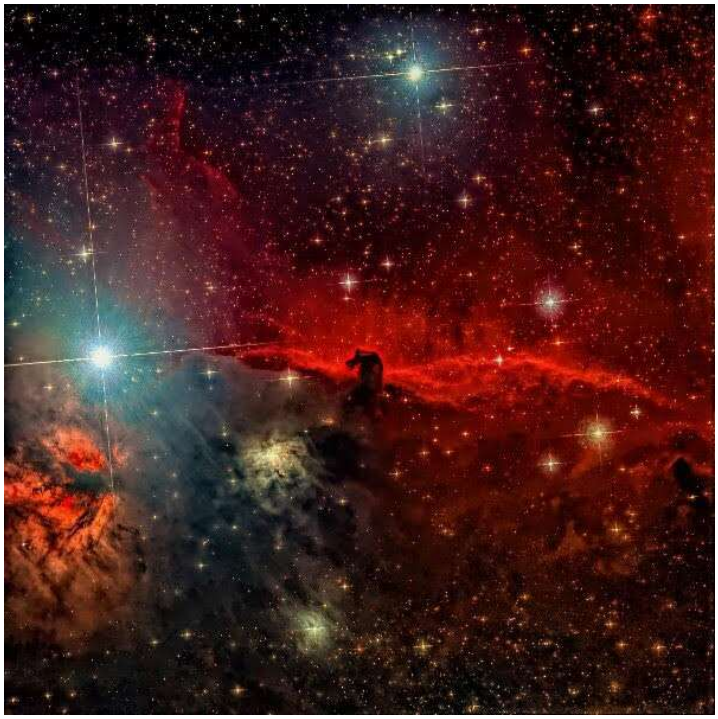
Pictures from HAC Members

Comet Atlas 2020 R4 by JD

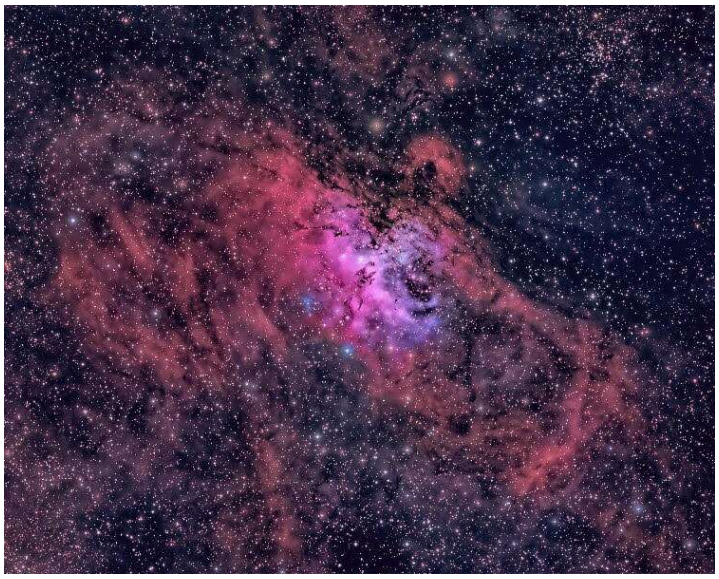
Comet C2020 T2 Palomar by David R

NGC 1313 by Alex Woronow

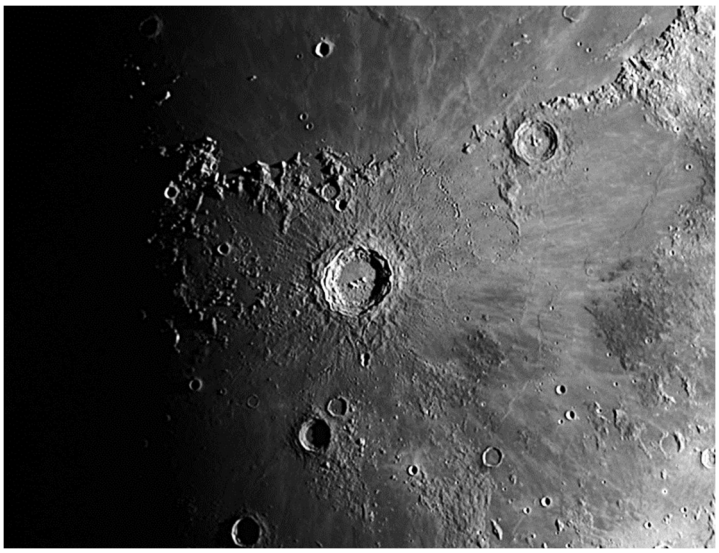
Horsehead Nebula by Alex Woronow



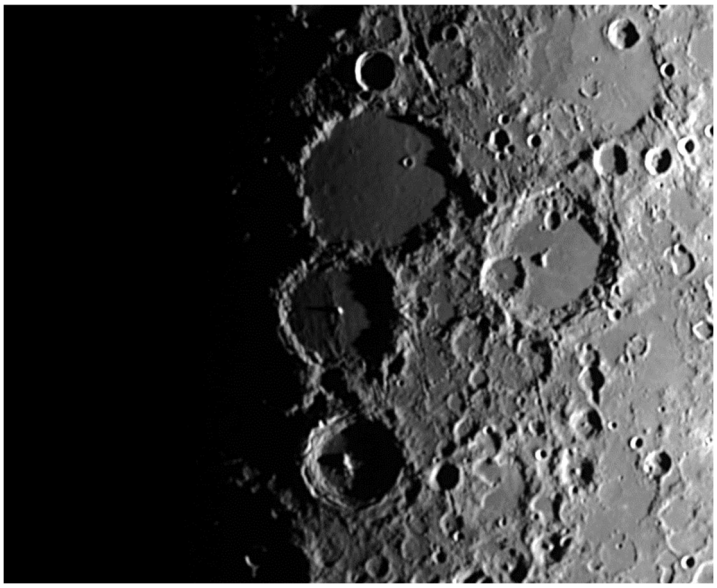
IC 4793 - A Boaring Nebula by Alex Woronow



Copernicus by David R



Ptolemaeus, Alponsus, and Arzachel by David R



M51 By David R

FOR SALE

Takahashi Mewlon 250 (10") About 9 yrs old. Seldom used. Dealer (Anacortes) installed field-flattener and upgraded manual focuser with an electric (computer-controllable) focuser. Asking just $4,700. (new price ~$ 8,000). Contact Alex Woronow at Alex@FaintLightPhotography.com (Alex lives in Silver City NM (SW Corner) but would meet a buyer halfway to deliver the scope).

FREE to good home! Anyone want a permanent pier. I used it with a 5-inch refractor and it is nice and solid. Its designed to fit on a concrete slab or floor. You can anchor it with expansion bolts by drilling holes with an impact drill. To pick up contact Bob Kepple at: astrocards@aol.com or 520-732-4841

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

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HAC May/Jun Calendar of Events

SU	MO	TU	WE	TH	FR	SA
2 May	**3** 12:51PM Saturn/Moon 4 degrees	**4** Jupiter /Moon 5 degrees	**5** Eta Aquariid meteors	**6** Eta Aquariid meteors	**7**	**8**
9 	**10** O-Rex departs Bennu	**11** 12:01PM	**12**	**13** Mercury/Moon 2 degrees	**14**	**15** Mars/Moon 2 degrees
16	**17**	**18**	**19** 12:13PM	**20** Patterson Public Night Hybrid Event	**21**	**22**
23	**24**	**25**	**26** 4:14AM	**27**	**28** HAC Meeting (Zoom) Venus/Merc conjunction	**29**
30 Saturn/Moon 4 degrees	**31** 	**1 June** Jupiter/Moon 5 degrees	**2** 00:26AM	**3**	**4**	**5**
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  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**	

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