NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

FEBRUARY 2021

PRESIDENT'S NOTES

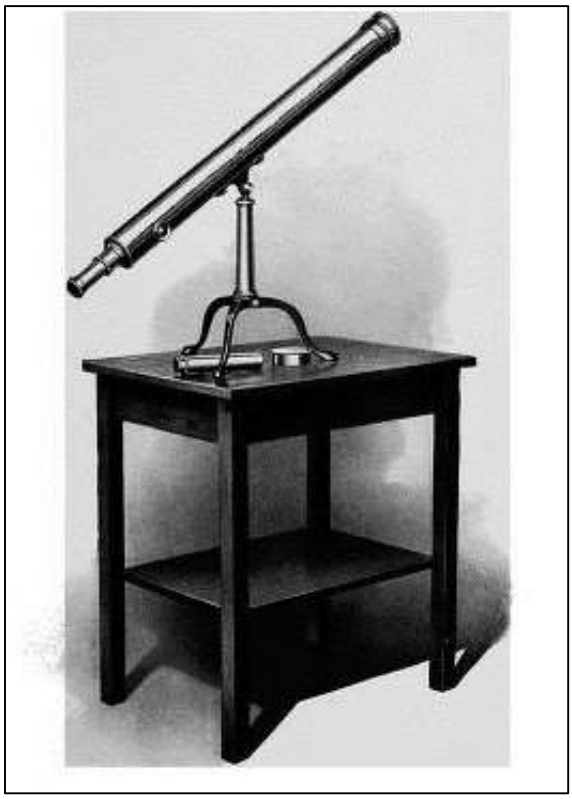
Humbler than Hubble:

Well, it's February 2021, and there's no leap year this time, so make every night count. And to that end I've decided to have my articles go back to basics this year. We've got plenty of advanced astro-photographers in the club that are active and self-supportive. We have plenty of very capable, technically savvy, experienced to beyond advanced visual observers who already have plans on how they will spend their clear evenings, nights, and predawn hours.

But I'm betting we have a boatload (that's a technical term for a substantial number of our club members) that still consider themselves beginners. Sure, we may have telescopes and binoculars. These tools may even be on the sizable scale: 8x binoculars with 50mm or larger objective lenses and or telescopes with 4", 8", or larger apertures. Good stuff. An 8" telescope, be it a reflector from the Newtonian family or from the Cassegrain branch, has enough light grasp (given dark enough skies) to keep an observer happy far over a single lifespan (if you happen to be on this planet). If you have a refracting telescope with an 8" or larger aperture, well, then you are in a rarefied class of observers and other members of this club (including this writer) would like to make your acquaintance and help you use your telescope. But I digress [get used to it].

The point I'm trying to make is that there is a large portion of our club that is probably in a sort of an astronomical limbo most clear nights. If an astronomical event is deemed important, like a bright comet, a meteor storm, or planet conjunction, then you normally hear about it from the news. But most nights it is just up to you to plan and execute an observing session. You may have just gotten a telescope or started using your binoculars for looking up rather than at daytime critters. You probably don't have your own private observatory (yet) and don't have a scheduled, delineated astronomical workflow. You are not yet working (seriously) on your Abell, Caldwell, Forte, Harvard, Herschel, Kepple and Sanner, Lynds', or Messier catalogs. However, you may be working on starting or faithfully using an observing log. Heck, you still like to go out just to look at the Moon! I know it takes time to pull out the books or charts, as well as to set up the scope. If you don't have time to form a plan and dusk is turning into nightfall, you might just forgo observing entirely. That is not a happy prospect. So, if the Moon is up, I hope you at least go out to stare at it.

A MODERN SMALL TELESCOPE



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 103.

And what about books? There are all kinds of books and charts and software programs that you can use but with s-o-o-o many choices a mind freeze can paralyze! Which one to use? Many are very complete and complex, others are simplistic, still others narrowly focused. Some texts sacrifice the majesty of observing by substituting with the cold physics, and again you end up reading instead of viewing. You don't get that much time to observe, so you don't want to take your valuable time sifting through a sea of viewing choices, many of which may be too big, small, or dim for

your equipment, given your location or the eyeball expertise.

If you have a good star-book with which you are familiar your plans become far more straightforward, allowing you more time to observe. There are a lot of books out there geared specifically to binoculars and others for certain ranges of telescope size. There are even guides for urban or rural observers. Again, decide on a book that makes sense for your location, equipment, and you level of expertise.

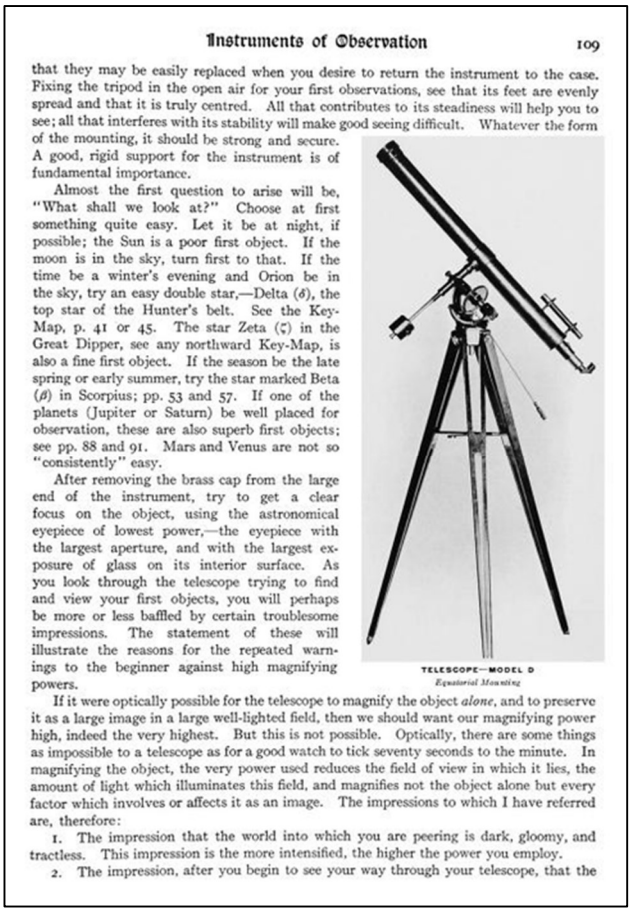
THE GREAT NEBULA IN ANDROMEDA, MESSIER 31 (M-31)

Source: From a photograph taken at the Yerkes Observatory, ca 1901, McKready, p 20. See also: http://photoarchive.lib.uchicago.edu.ezproxy.uindy.edu/db.xqy?one=apf6-01445.xml

This gets me to what I want to focus on with you this year. It is an old star-book I bought in a garage sale when I was a kid. And when I mean I bought it; I mean I ran home to beg mom for the money. And when I mean old, I mean the book was written long before the time it came into my ownership (ca. 1937). 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, by Kelvin McKready. The book was first published in 1912. My copy is the fourth edition revised by Maud King Murphy, thoroughly revised from the original author's work by updating planet position tables and updating astronomical definitions. Even revised, the planet tables were decades out of date, and it classified galaxies as nebulae. I honestly agree with this book's definition of galaxies (nebulous) from an observer's point of view, especially if when viewing through a 3" refractor. Also, the book's documented distances to these "nebulae" are not to be believed. But there again, they have been corrected many times over the years and they are still being honed you might as well have those numbers in erasable ink. Lastly, it is not so old as to propose canals on Mars, so this reference book has got that going for it.

At the time I bought this book I had the use of a pair of binoculars (in name only). One eye was aimed up and over from the other's point of view. Eventually that binocular became a monocular and served me well for many more years (but once more I diverge from my storyline). The Star-Book (as it was called) delineated celestial objects by viewing instrument. From small opera glasses with just a couple of power, through field-glasses (modern prism binoculars), up to 3" telescopes.

A SAMPLE PAGE FROM THE STAR-BOOK



Instruments of Observation 109

that they may be easily replaced when you desire to return the instrument to the case. Fixing the tripod in the open air for your first observations, see that its feet are evenly spread and that it is truly centred. All that contributes to its steadiness will help you to see; all that interferes with its stability will make good seeing difficult. Whatever the form of the mounting, it should be strong and secure. A good, rigid support for the instrument is of fundamental importance.

Almost the first question to arise will be, "What shall we look at?" Choose at first something quite easy. Let it be at night, if possible; the Sun is a poor first object. If the moon is in the sky, turn first to that. If the time be a winter's evening and Orion be in the sky, try an easy double star,—Delta (δ), the top star of the Hunter's belt. See the Key-Map, p. 41 or 45. The star Zeta (ζ) in the Great Dipper, see any northward Key-Map, is also a fine first object. If the season be the late spring or early summer, try the star marked Beta (β) in Scorpius; pp. 53 and 57. If one of the planets (Jupiter or Saturn) be well placed for observation, these are also superb first objects; see pp. 88 and 91. Mars and Venus are not so "consistently" easy.

After removing the brass cap from the large end of the instrument, try to get a clear focus on the object, using the astronomical eyepiece of lowest power,—the eyepiece with the largest aperture, and with the largest exposure of glass on its interior surface. As you look through the telescope trying to find and view your first objects, you will perhaps be more or less baffled by certain troublesome impressions. The statement of these will illustrate the reasons for the repeated warnings to the beginner against high magnifying powers.

TELESCOPE—MODEL D
Equatorial Mounting

If it were optically possible for the telescope to magnify the object *alone*, and to preserve it as a large image in a large well-lighted field, then we should want our magnifying power high, indeed the very highest. But this is not possible. Optically, there are some things as impossible to a telescope as for a good watch to tick seventy seconds to the minute. In magnifying the object, the very power used reduces the field of view in which it lies, the amount of light which illuminates this field, and magnifies not the object alone but every factor which involves or affects it as an image. The impressions to which I have referred are, therefore:

1. The impression that the world into which you are peering is dark, gloomy, and tractless. This impression is the more intensified, the higher the power you employ.
2. The impression, after you begin to see your way through your telescope, that the

Source: McKready, p 109.

I know some of the questions that come to mind. Why would I choose an obscure, out of print tome as a reference for an entire year of present-day articles? If I have an 8" telescope, why would I limit my viewing to objects visible to mere 3" telescopes referenced in the 1930s? What could I possibly learn from such an old, out of date book? I wonder what other articles besides this one are in this issue of Nightfall?

Those are all good questions, so I'll try to take them one by one. The obscure Star-Book is still a good primer for observational astronomy, and far past copyright protection. It is available FREE! FREE! FREE! on the web at this address: https://archive.org/details/cu31924012302588/page/n49/mode/2up . Together, using the Star-Book as a readily

available-to-all reference, we can all have common charts and object descriptions. We can all have common viewing objects that can serve as an observational base for learning the stars, the constellations and the various objects that inhabit our sky. Especially objects that are usually overlooked nowadays.

Many (most) people today get a telescope (yep, computer controlled) and immediately start (if they get beyond the computer control part) hunting for objects they have only seen as beautiful, colorful things in magazines. They are deeply disappointed when they either cannot see color in the object. Dejected they go to the next target, with the same results. A death spiral begins. Soon, the telescope is safely stowed in a closet. Shackled in a dungeon, is more like.

The poor telescope didn't do anything wrong. It just didn't live up to the hype and peer pressure from the Hubble Space Telescope. While the Star-Book has some beautiful plates (images) they are far less flamboyant, and the focus is not on them but on the written descriptions of the target objects. Also, these objects are humbler than Hubble. Yet they are beautiful and emphasize what is at the core of astronomy, stars. Pretty points of light. Alone or in pairs. In small and large groups. In huge associations and clouds of dust and gas. And the stars have color, too. And the Star-Book includes nebulae. The dust and gas glowing and or reflecting light from nearby stars. That's a lot to ask for from a small telescope, but it can pull it off.

The Star-Book is also an exceptionally good manual, describing the basic tools of the trade and how to become comfortable using them. Although the technology is ancient by today's standards, the concepts are nevertheless still fundamentally sound and important. The author speaks to the concerns of new observers that are as true today as they were a century ago. All this gives the reader a sense of context as to how we got to this high-tech age and to our current interpretation of celestial objects.

Lastly, what's the difference between learning astronomy through a tome geared for a 3" telescope even when you have a larger telescope, and why would you want to? Well, the objects hunted for will be much brighter, usually easier to find in your larger instrument, and the extra aperture increases resolution so that further aspects of the objects might be perceived. Oh, and if you are using a modern 3" telescope to view, all the above reasons are still most likely true. Due to improvements in materials, lens glass, mirror glass, improved eyepiece design, and glass and mirror coatings, almost any telescope now manufactured is better than those made 100 years ago.

So, this month's reading assignment is pages 1-35 of the Star-Book. That will set us up for using telescopes, getting to know how to look at things through them, and being ready to use the included star maps. Extra credit for looking at the star maps (charts) on pages 42-45.

A couple of quick subjects before I go. Last year we had a season of great conjunctions between Jupiter and Saturn, and the Moon from time to time. This year, starting mid-month, we get a chance to see Saturn and Mercury; and Saturn and Venus; and then Saturn, Venus and Jupiter; all vying for positions close to one another in the predawn sky.

Also, a couple of events to keep an ear-open for in February. On the February 18, NASA's Perseverance continues our planet's unrelenting assault on peaceful Mars by landing near Jezero Crater. Then, soon after in February (sorry, I don't have a date), China is due to land their probe, Tianwen-1, on Mars near Utopia Planitia.

Until next time, I hope you like the Star-Book. Ready your binocs and scopes. And most of all, get out and stare.

Welcome Our Newest Members

HAC's new members include C. Karen Madtes of Sierra Vista. Karen observes with a Celestron C-5 and a small refractor. She joined the club in January. Marge and Steve Conroy of Sierra Vista also joined in January. They own an Orion 4.5-inch reflector. We also welcome Gretchen Pieper of Sierra Vista who introduced herself to the club by donating a Celestron NexStar 8 and a number of accessories. Brian Daly joined from Atlanta Georgia after attending our virtual meeting in January and being impressed by Tom's Patterson project. .Welcome to the club, we are glad you joined!

Thank You!

In response to the difficult times and the lack of club activity in 2020, HAC members were granted a "dues holiday" this year – making payment of 2021 dues voluntary for members that were current in 2020. Thank you to all the members that made voluntary payments. A special thank you to those of you that went above and beyond and made additional contributions in support of the club.

Sky & Telescope Article

By Ted Forte

Sky & Telescope readers,

I hope you'll read my article "Springtime Blossoms" in the March issue, page 59.

The subtitle reads: "Vernal skies bloom with planetaries – some are more familiar while others are more challenging"

Most of the dozen objects discussed are PN program targets, but not all. If you are as enamored of planetary nebulae as I am, you'll want to check out the Astronomical League's Planetary Nebula Observing Program. You can earn a certificate by completing the basic program (observe

60 objects) or a certificate and a pin by completing the advanced program. You do that by observing all 110 objects or imaging 90 objects. Your name will be published in the Reflector magazine and be recorded on the League's on-line awards database once you complete the award.

Imagers actually have 180 objects to choose from since the potential pool includes the southern hemisphere objects and the alternates for northern observers.

Visual observers can use a "Go-To" telescope or do the program entirely by traditional star hopping methods (your certificate will indicate that you completed the program manually) and there are provisions for reporting negative observations in the advanced visual program for any objects that remain invisible to you after diligent attempts to see them. Visual observations of PNe done for other programs are accepted so long as all of the appropriate information is recorded. Observers should record their location, instrument and magnification used (including filters), and the date, time and sky conditions when logging objects. Your description of a planetary nebula should include any color seen, the visibility (or invisibility) of the central star and your report on whether or not the object was visible without the use of a filter.

Imagers can use remote observatories, whether owned, borrowed, or rented so long as you do your own planning, image collection, and processing. Your images can be presented in any format or through any media that allows me to see your work.

All of the objects in the program are visible from here, but the use of alternate objects to mitigate some particular circumstance (like the height of your observatory walls preventing you from reaching a target) is allowed. You can do both the visual and imaging programs or even both the northern and southern versions of the programs or any of several combinations. You earn certificates for each iteration, but only one "pin" per awardee.

I am both the League's coordinator for the program and our club's awards coordinator so you would submit your logs or images to me. Don't fret too much about rules or dotting all the I's and crossing all the t's. (I'm very tolerant and flexible). The goal is to get you out to an eyepiece to hunt down and observe planetary nebulae and have a great time doing it. I know a few of you are already pursuing the program and I hope a few more will follow suit. PLEASE fell free to share your observations or images here on HACAstro (that's what this group is for!).

Find the rules and observing lists for the program here: https://www.astroleague.org/al/obsclubs/planetarynebula/planetneb1.html

You'll notice that you must be an Astronomical League member to earn the recognition and the award. ALL HAC members are automatically A.L. members. If you are not already a HAC member, you can join here: https://www.hacastronomy.org/membership/join

And of course don't hesitate to contact me if you have questions or need help. You can find a series of "Planetary nebula by month" articles that appeared on the group a few years ago here: https://groups.io/g/HACAstro/files/Obs%20PNe%20Each%20month.pdf

FOR THE RECORD: Getting back to that article in Sky &Telescope: The section on PuWe 1 is in error when it states categorically that it is the largest known planetary in terms of apparent angular size. It should, of course, have said "one of" the largest.

Happy PN observing (and other stuff too if you insist).

NASA Night Sky Notes February 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!

Landing on Mars: A Tricky Feat!

David Prosper

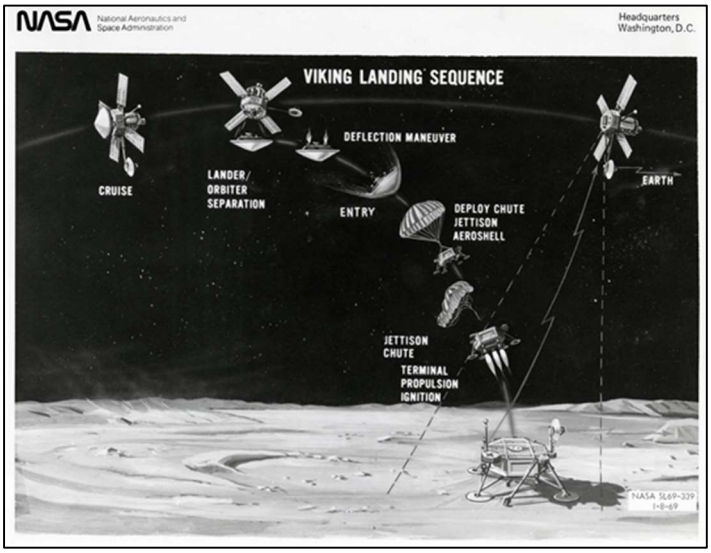
The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

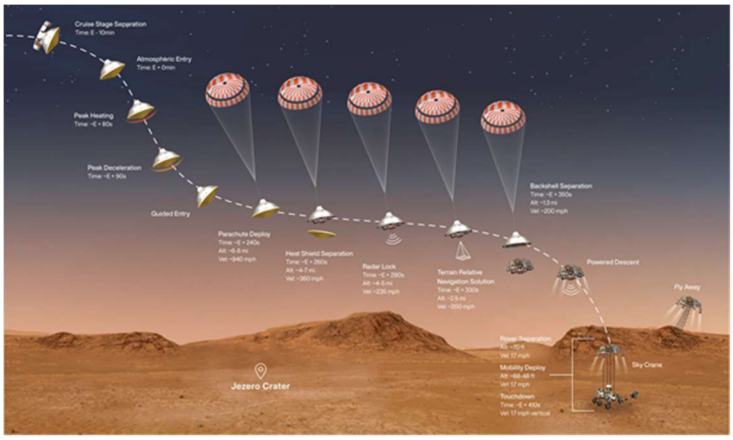
Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called Entry, Descent, and Landing (EDL).

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to

safely bounce its way to a landing on the Martian surface. Then three sturdy “petals” ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring “Sky Crane” deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at nasa.gov/nasalive. Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on mars.nasa.gov/mars2020 . And of course, find out how we plan to land on many different worlds at nasa.gov.





Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

OSIRIS Rex News

By Ted Forte

The OSIRIS REx team is gearing up for the spacecraft’s departure form Bennu orbit and return to Earth with the sample collected last October and planning a final flyby of the asteroid. The spacecraft has remained at Bennu awaiting its optimum departure window in May.

The latest information on the team website explains:

“The May departure date allows the spacecraft to consume the least amount of fuel and also provides the OSIRIS-REx team with the opportunity to plan a final spacecraft flyby of Bennu. This activity was not on the original mission schedule, but the team is studying the feasibility of a final observation run of the asteroid. They want to learn how the spacecraft's contact with Bennu's surface altered the sample site.

If feasible, the flyby will take place in early April and will observe sample site Nightingale from a distance of approximately 2 miles. Bennu's surface was considerably disturbed after the Touch-and-Go, or TAG, sample collection event, with the collector head sinking 1.6 feet into the asteroid's surface. The spacecraft's thrusters also disturbed a substantial amount of surface material during the back-away burn.

The mission is planning a single flyby, mimicking one of the observation sequences conducted during the mission's Detailed Survey phase in 2019. OSIRIS-REx would image Bennu for a full rotation to obtain high-resolution images of the asteroid's northern and southern hemispheres and equatorial region. The team would then be able to compare these new images with the previous high-resolution imagery of Bennu obtained during 2019 to inspect how the sample site was altered as a result of the sample collection event.

These post-TAG observations would also give the team a chance to assess the current functionality of science

instruments onboard the spacecraft – specifically the OSIRIS-REx Camera Suite, OSIRIS-REx Thermal Emission Spectrometer, OSIRIS-REx Visible and Infrared Spectrometer and OSIRIS-REx Laser Altimeter. It's possible that the instruments were coated by dust during the sample collection event, and the mission team wants to evaluate the status of each. Understanding the health of the instruments is also part of the team's assessment of possible extended mission opportunities after the sample is delivered to Earth."

"During its Oct. 20, 2020, sample collection event, the spacecraft collected a substantial amount of material from Bennu's surface, likely exceeding the mission's requirement of 2 ounces, or 60 grams. The spacecraft is scheduled to deliver the sample to Earth on Sep. 24, 2023 in the Utah desert."

Pictures from HAC Members

M1 Crab Nebula by Matt Lieber

NGC 7497, MBM 54 and Others by Glen Sanner

NGC 1535 by David Roemer

FOR SALE

The late Doug Snyder's Classic Obsession 20" f/5 telescope (#567 circa 2000) with encoders and an Argo Navis to be included. The scope shows some minor flaws in the wooden mirror box but the optics are good. It comes with the Obsession rip stop cover, Desert Storm cover, and wheelbarrow handles for transport. Also available is his Osypowski dual axis aluminum equatorial platform. We are asking $3,900 for the scope and $1,350 for the platform if purchased separately. $5,000 together. Money goes to Doug's family. The telescope is currently located at the Patterson Observatory in Sierra Vista, you can contact Ted Forte to arrange a visit to see the scope. We will apply a 10% discount for active HAC members and will consider all reasonable offers. Contact Ted, David Roemer or Glen Sanner.

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).

For Sale (Continued)

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 Feb/Mar Calendar of Events

SU	MO	TU	WE	TH	FR	SA
31	1 Feb	2	3	4  10:38 AM	5	6
7	8	9	10	11  12:08 PM	12	13
14 	15 	16	17	18 Patterson Public Night (tentative)	19  11:49 AM	20
21	22	23 Saturn 4 ° N of Mercury	24	25 Jupiter, Mercury and Saturn in morning sky	26 HAC Meeting (Zoom)	27  1:19 AM
28	1Mar	2	3	4 Jup/Mercury Conjunction Vesta Opposition	5  6:32 PM	6
7	8	9	10	11	12	13  3:23 AM
14 Daylight Savings Time Begins	15	16	17 	18 Patterson Public Night (tentative)	19	20 Vernal Equinox 1:37 AM
21  7:41 AM	22	23	24	25	26 HAC Meeting (Zoom)	

All times local MST

Join **HacAstro** to keep up to date with all of the Huachuca Astronomy Club events

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

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