The Bays Mountain Astronomy Club Newsletter

ISSUEMONTH 2021

Kingsport, TN

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Cosmic Reflections

William Troxel - BMAC Chair

Greetings and Welcome to the 2021/2022 Bays Mountain Astronomy Club Year.

July marks the start of the new year for the club. To explain for new members, we elect a Chairperson at the last meeting of the BMAC year, which is June. The July members-only picnic marks the start of the new club year. In 2020, the pandemic forced the club to cancel the annual picnic. However, that was last year. During the business portion of the June Zoom meeting, you, as a club, decided on a few matters that will effect the next two meetings. I will discuss those decisions later in this letter.

First, I want to thank Olivia Kuper for her wiliness to share with the club about her research experience and to be our speaker. I think each one of the members enjoyed her topic and speaking for myself, I enjoyed the presentation. Thank you again Olivia!

Next, I want to thank the club membership in your continued support for another term as your chairperson. There is a lot of work that we can do as a club to move forward. I say this because this is not my club, this is our club. The entire club membership is part of its foundation to help it run well. Part of your responsibility is to be a part of the programs and events. Everything that we decide is something we want to be a part of. You elected me your Chairperson, but I am not only the face of the club. I am a member just like you. Each of our programs or events should have each of us involved. I want to encourage you to be part of what makes the club. Share your ideas for programs and help with events the club sponsors.

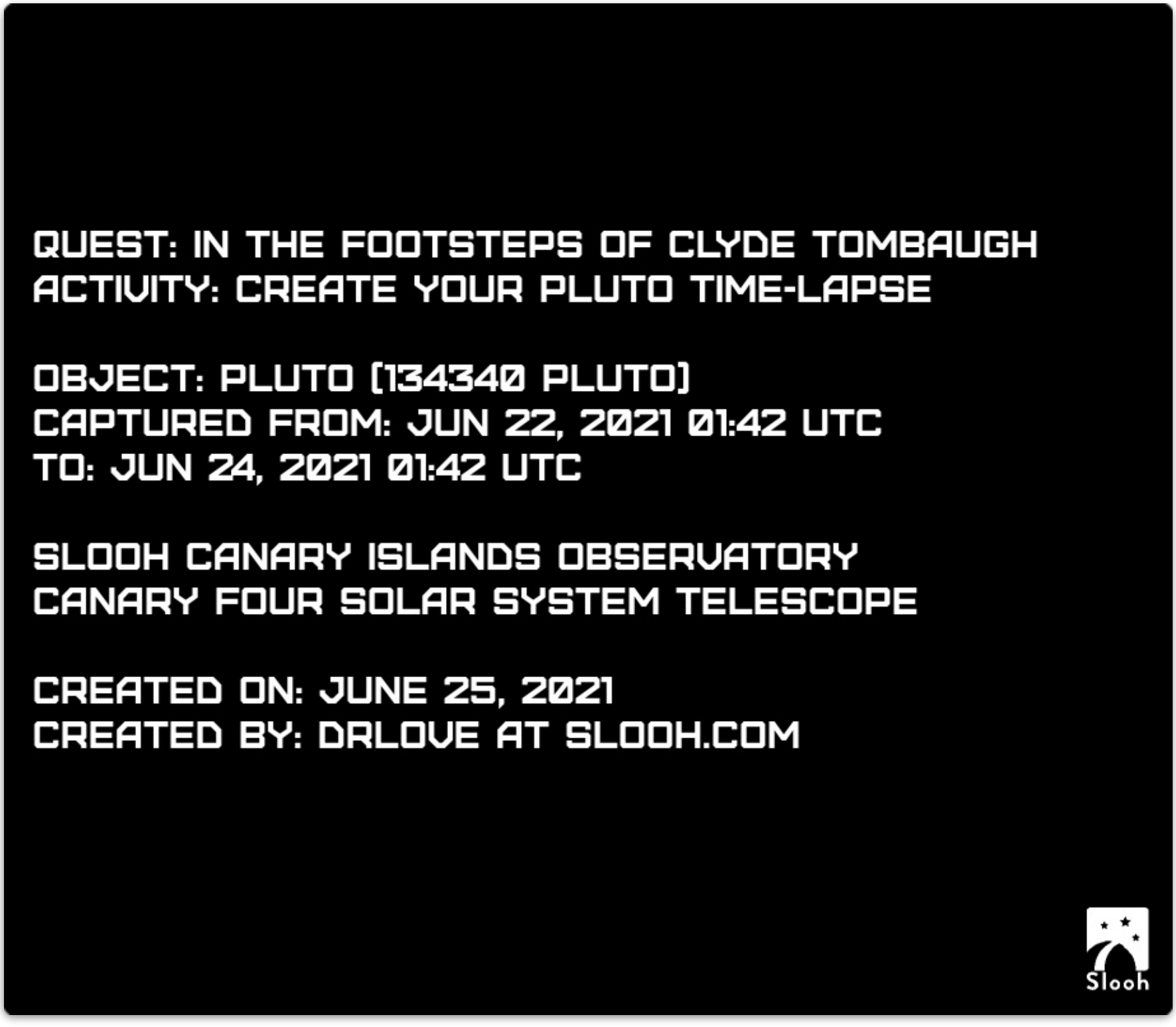
Now, I want to talk a bit about the decisions you voted to approve in the June meeting. July and August will be members-only events. Therefore, please be sure to check your e-mail for the details. At the end of August, we take another look at how we will proceed going forward.

Thank you again for your support of the Bays Mountain Astronomy Club and this your Chairperson wishing each of you…

Clear Skies.

Can You Spot Dwarf Planet Pluto?

BMACer Greg Love submitted these three images he imaged on three consecutive nights using Slooh. Look for the moving dot to find Pluto!



Celestial Happenings

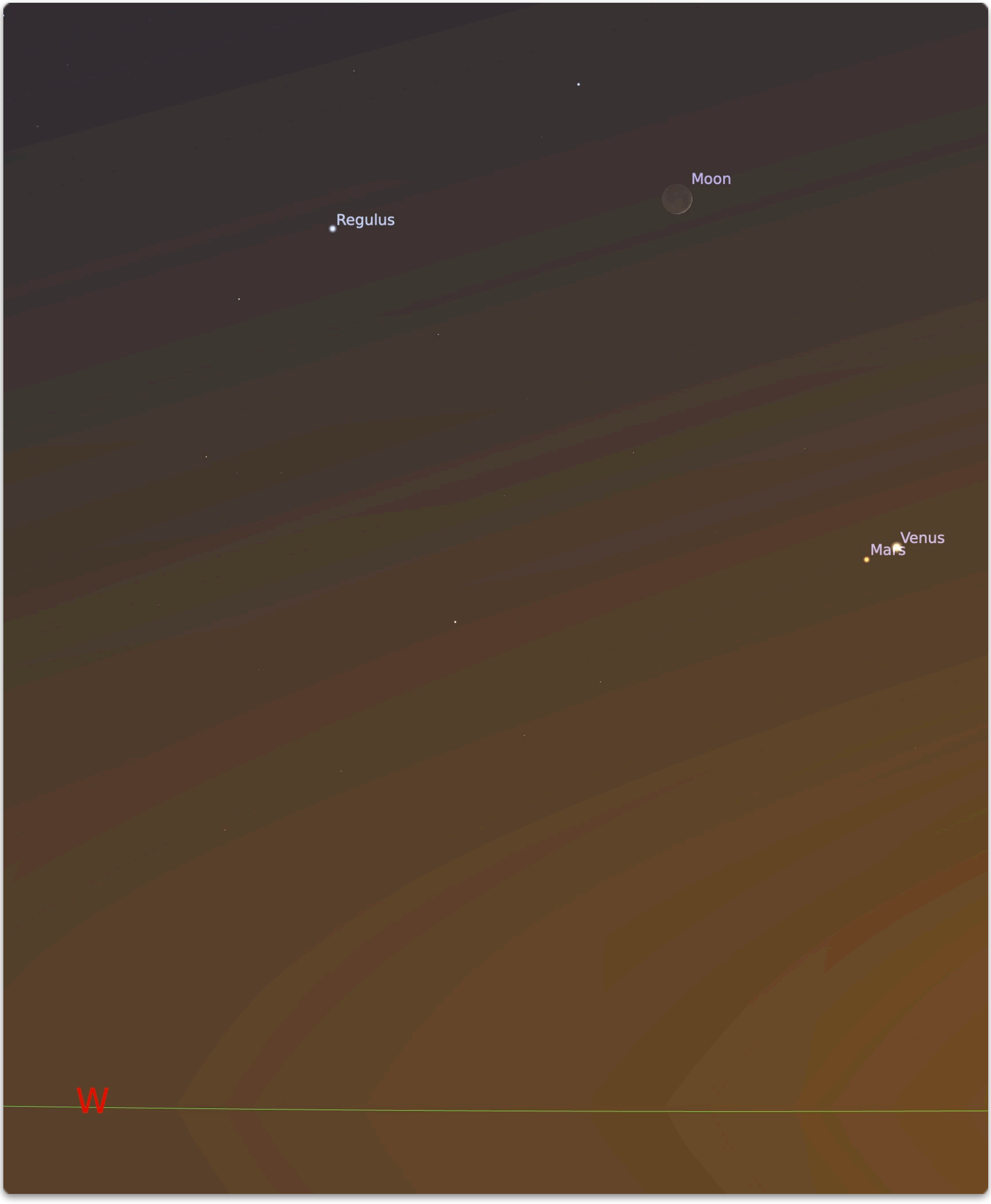
Jason Dorfman

As July begins, the Sun sets just before 9 p.m. with the dark, star-filled skies not appearing until after 10:30 p.m. We're not quite two weeks past the Summer Solstice and the daylight hours are still quite long. The late evening twilight brings with it a conjunction of Venus and Mars. Those up for some late night observing will be rewarded with some spectacular views of both Jupiter and Saturn. The sunrise progresses from 6:15 a.m. to 6:35 a.m. over the month, so the dark predawn skies will begin to brighten a little before 5 a.m. If you're up for some early morning observations, you can catch Mercury at the beginning of the month.

Planets

As the Sun sets and the bright twilight begins to dim in the west, a brilliant point of light will be the first of the night's treasures to appear. Often referred to as "the evening star," Venus will dominate the early evening skies for the next couple of months. It shines brightly at magnitude -3.85 on the 1st. Mars can be found to the upper left of Venus. Start your observations about 45 minutes after sundown, Venus will be easy to spot hanging about 10° above the horizon just north of west. Much fainter Mars at magnitude +1.8 sits about 7° east of Venus. As the evening progresses, it will become easier to spy the Red Planet against the fading twilight sky. If you're observing the two with a telescope, you'll find Venus appearing quite gibbous at 90% illumination with the disk spanning about 11". More distant Mars looks like a small orb as its disk spans just 4" in diameter.

Venus and Mars both start out the month against the backdrop stars of Cancer, the Crab. They are moving swiftly eastward into Leo. Watch over the next two weeks as Venus catches up to Mars while both move towards the heart of the lion. If you observe about the same time each evening, you'll see Venus appear to move a bit eastward along the horizon while Mars descends directly down to meet it. On the 11th, roughly 45 minutes after sunset, Venus is an easy target sitting about 10° high with Mars just 1° to the left of Venus. A very thin two-day old Moon can be found about 6° to the right of Venus and down about a degree and a half. Over the next two evenings, Venus and Mars will be separated by just half a degree. Venus will be north of Mars on the 12th with the young crescent Moon now about 7° to the upper left of the pair. The following evening, Venus will appear above Mars with the two sitting about 10° high 45 minutes after the Sun has gone down.



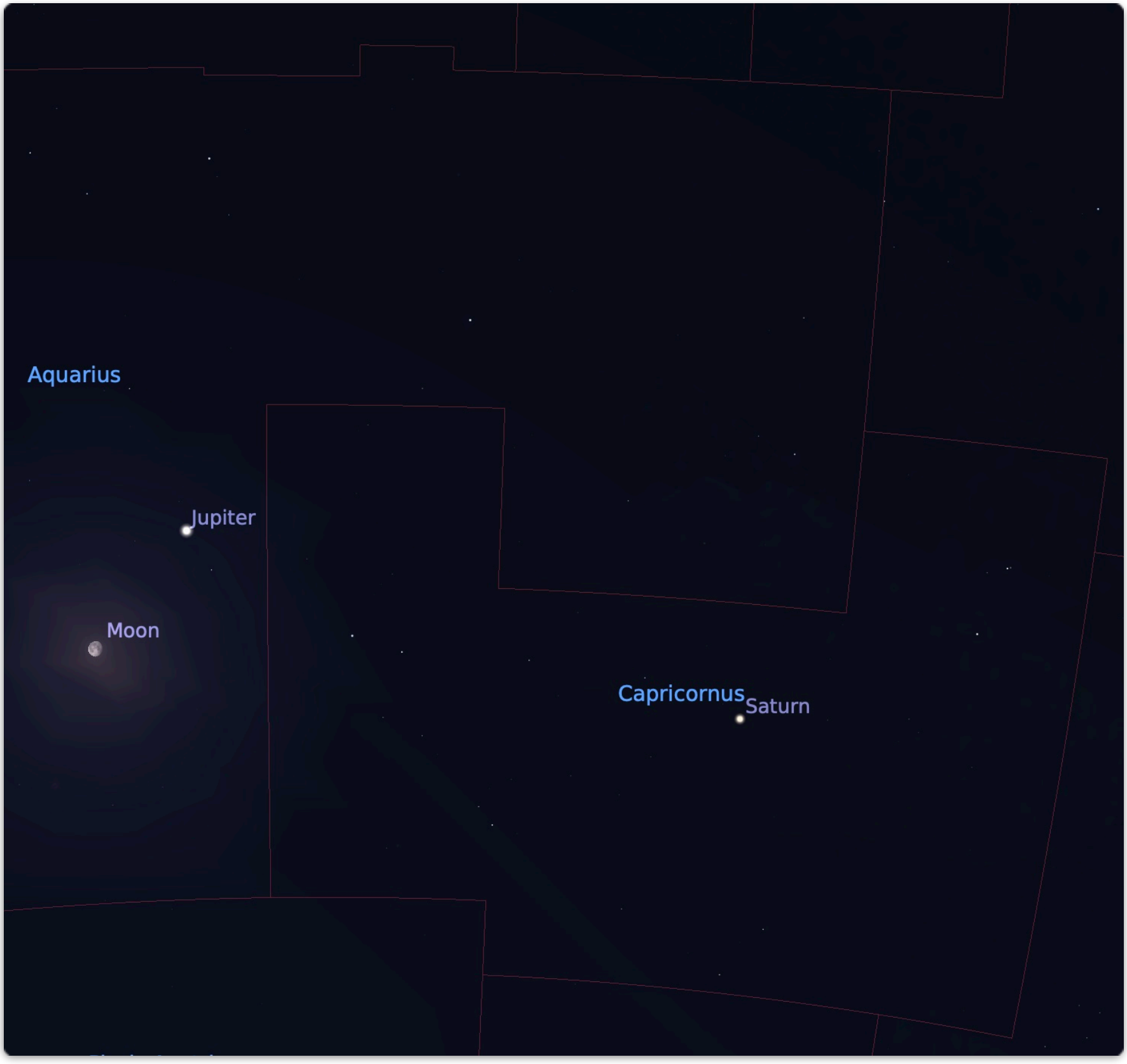
Venus and Mars conjunction on July 12th with thin crescent Moon. Image by Jason Dorfman using Stellarium.

On the 21st, Venus will pass slightly more than a degree north of the bright star Regulus. Mars will do the same 8 days later when it passes within a degree of the alpha star in Leo. You may have a more difficult time spotting that conjunction, however, as the two will sit just 5° high 45 minutes after sunset.

Over the last several months, we have seen the views of Mars continue to degrade as the separation between our two worlds increased. This month will be the last month to really catch a descent view of the Red Planet, as it begins its descent into the fading twilight of the setting Sun by month's end. Venus, however, will continue to be a prominent figure in the evening sky as it increases its apparent separation from the Sun and brightens slightly to magnitude -3.9 over the month. On the 31st, Venus will appear 82% lit and its disk will span 13".

Saturn and Jupiter will be wonderful late evening/early morning targets as they head for opposition in August. Saturn rises first at about 10:40 p.m. followed by Jupiter an hour later. At midnight on the 1st, Saturn will have climbed to almost 15° in altitude above the SE horizon. Saturn currently resides in Capricornus and is moving slightly in retrograde this month. Over the month, the magnitude of the ringed planet will increase from +0.4 to +0.2. The gaseous disk of this giant world spans about 18.5" with the ring-plane extending out to 43". The best views of Saturn will occur when it reaches the meridian. This happens just before 4 a.m. on the 1st and two hours earlier at the end of the month. When on the meridian, Saturn will stand 35° above the southern horizon.

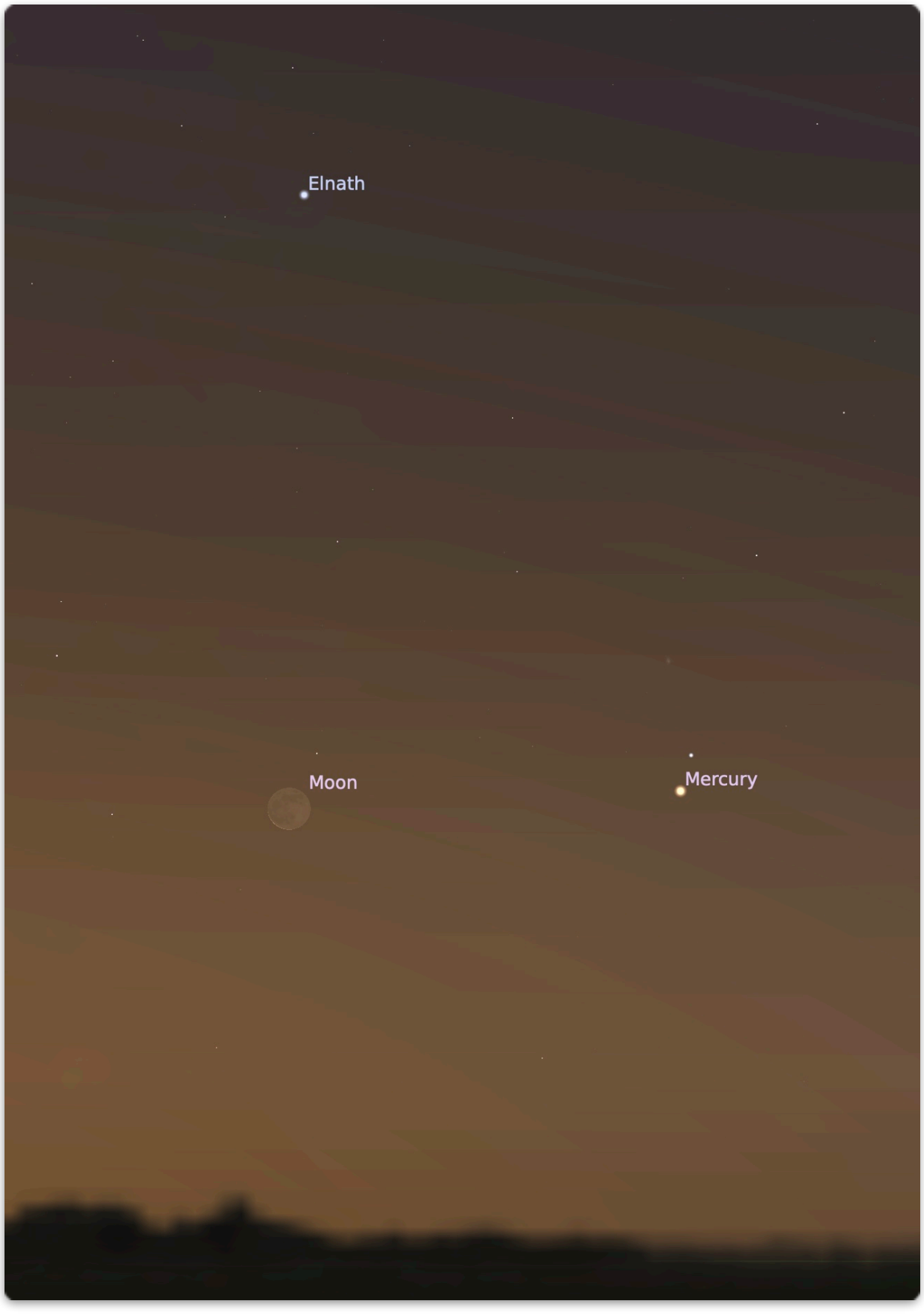
Jupiter sits about 10° high in the SE at 12:30 a.m. This giant of the Solar System will reach an altitude of 42° as it crosses the meridian just after 5 a.m. Over the month, we'll see the magnitude of Jupiter brighten from -2.65 to -2.82 as the diameter of the disk increases from 45" to 48". Jupiter is moving slowly in retrograde in the constellation of Aquarius.



Jupiter and Saturn on July 26th with waning gibbous Moon. Image by Jason Dorfman using Stellarium.

The swift inner world of Mercury will be a prominent morning target in the predawn twilight. It will brighten over the month as it moves through its greatest elongation to the west and moves towards a trip around the far side of the Sun. On the 1st, you can locate Mercury about 5° high in the ENE 45 minutes before the Sun rises. It begins the month at magnitude +0.8 with its disk spanning 8.7" and appearing as a crescent at 28% illumination. Mercury reaches its greatest western elongation as we celebrate our Independence Day. Its appearance will not have changed much by then. On the 8th, a thin crescent Moon hangs about 5° to the left of Mercury. The pair will be about 7° high roughly

45 minutes before sunup. Mercury will then appear to be 46% lit with a 7.3" diameter disk shining at a magnitude of 0.0. As the month continues, Mercury will continue to brighten, making it easier to locate, but this is offset by its motion back in the direction of the Sun. On the 21st, just a half hour before sunrise, look for Mercury sitting 5° high glimmering at magnitude -1.2 against the competing morning twilight. This small world is now 85% illuminated and spans a small 5.6”.



Mercury in the morning sky on July 8th with a thin, waning crescent Moon. Image by Jason Dorfman using Stellarium.

Luna

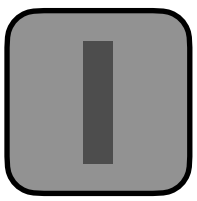
This month begins and ends with a Third Quarter Moon. Our Moon passes through New Moon on the 9th as it heads for an appearance with Venus and Mars in the west after sunset. It will reach First Quarter on the 17th, though we'll see it looking close to half on the night of the 16th. Full Moon is on the 23rd.

Thanks for reading and have fun observing!

The Queen Speaks

Robin Byrne

Book Review: Uncertainty: The Life and Science of Werner Heisenberg



n choosing another title from my shelf of unread books, I found myself drawn to Uncertainty: The Life and Science of Werner Heisenberg written by David C. Cassidy. I was a little intimidated by the size of the book (669 pages, including notes and index), but it was calling to me, so I persevered. I'm glad I did.

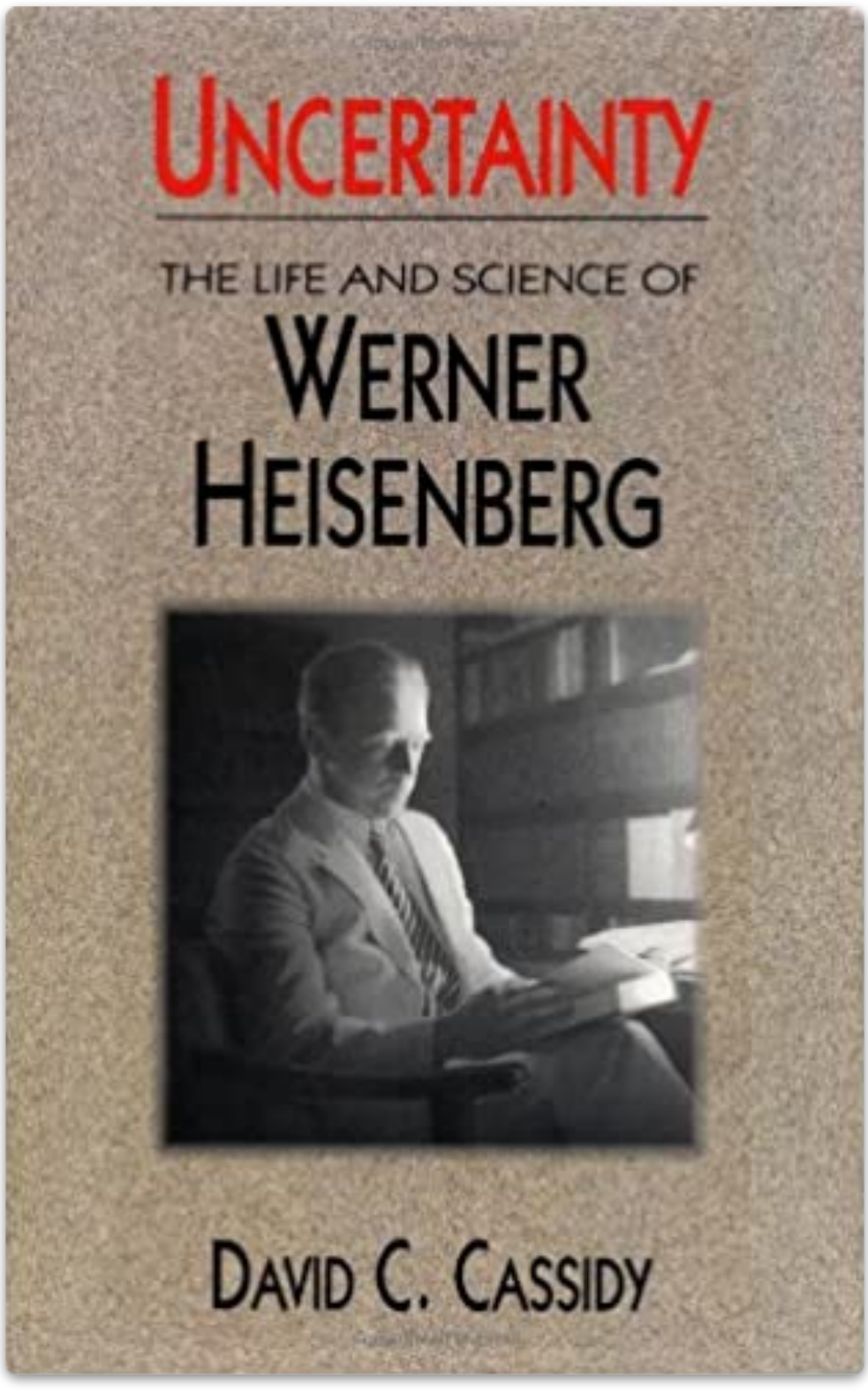
The book covers, as the title indicates, the life and work of Heisenberg. Heisenberg lived from 1901 to 1976, spending most of his life in his native Germany. That means that he was in Germany during both World Wars. In addition to alluding to Heisenberg's contributions to quantum physics, the book's title of "Uncertainty" also refers to trying to understand Heisenberg's attitudes related to Germany's role in both wars, but especially the Nazi regime. My impression from the book is that Heisenberg had tremendous national pride and love of his country, compelling him to stay in Germany, even when many of his colleagues fled prior to World War II.

Heisenberg's attitude toward the Nazis is murkier, and I'm not sure how objective the author was in presenting this part of his life. Heisenberg never joined the Nazi party, believing that academics and politics don't mix. But at the same time, he also made a point of referencing Albert Einstein by name in lectures and publications, in defiance of policies that attempted to erase Einstein from the picture, and signed on to a petition condemning policies that were driving away prominent physicists. Within the physics community of Germany during the Nazi era, the most ardent supporters of Naziism were those who studied more traditional areas of physics, and they referred to relativity and quantum physics with the derogative phrase "Jewish Physics." They even dubbed Heisenberg, and others, as "White Jews" for their work in quantum physics, an accusation that could have been sufficient to send Heisenberg to a concentration camp. So, from this angle, Heisenberg appears clearly opposed to Nazis.

Werner Heisenberg, 1933. Image from Wikipedia

But the picture isn't crystal clear. We also see that he sought recognition and assistance from Heinrich Himmler to help secure his position at a university, participated in propaganda tours to occupied countries to give public presentations on German contributions to physics, and gave only half-hearted assistance to colleagues trying to rescue family members from concentration camps. After the war, Heisenberg and some of his colleagues were in the custody of the British. While there, they crafted a statement that claimed they deliberately didn't pursue building an atomic bomb to keep one out of the hands of the Nazis. This seems to be an exaggeration. They were certainly pursuing a way to harness nuclear power, and they knew they could use the same concepts to build a bomb. But to say that they deliberately didn't build a bomb seems untrue. By the end of

the war, they had not even created a self-sustaining chain reaction, yet alone the ability to build a bomb. My personal conclusion is that Heisenberg was more interested in protecting his own reputation and career than in worrying about the atrocities perpetrated by the Nazis. He loved his country, he was proud of the accomplishments of German physicists, and felt it was his duty to protect the reputation and future of the physics community in Germany. In his writings, Heisenberg talked about the small circle of his life during the war; he didn't think beyond what directly impacted his life at that time. On the other hand, to his credit, Heisenberg was one of several prominent German scientists who helped convince the West German government in 1957 to not develop nuclear weapons.



Cover to Uncertainty

The story of Heisenberg's personal life, especially during that time, is fascinating to read. The parts of the book covering his discoveries in physics was more of a challenge. It is not clear what the target audience was in the author's mind, because the level of the presented material ranges from feeling the need to explain what integers are, to presenting Hamiltonian functions in modern relativistic form. And if you have no idea what the last part of the previous sentence even meant, you are not alone. Much of the physics discussed in the book was presented as though the reader had taken more than one class in quantum physics and already was familiar with the material. Having not taken quantum physics, I recognized vaguely some of the ideas, but was lost by the details. So reading those sections of the book, I let it wash over me, without worrying too much about the details. Debates between S-matrix versus quantum field theory meant absolutely nothing to me, but the fact that there was a debate of how to approach modeling the behavior at the atomic level was interesting.

If you enjoy the history of science and learning about the lives of scientists, Uncertainty by David C. Cassidy is not an especially easy read, but it is worth the effort.

References:

Uncertainty: The Life and Science of Werner Heisenberg by David C. Cassidy; W. H. Freeman and Company, 1992

The Space Place - NASA Night Sky Network

David Prosper

Observe the Milky Way and Great Rift

Summer skies bring glorious views of our own Milky Way galaxy to observers blessed with dark skies. For many city dwellers, their first sight of the Milky Way comes during trips to rural areas - so if you are traveling away from city lights, do yourself a favor and look up!

To observe the Milky Way, you need clear, dark skies and enough time to adapt your eyes to the dark. Photos of the Milky Way are breathtaking, but they usually show far more detail and color than the human eye can see – that's the beauty and quietly deceptive nature of long exposure photography. For Northern Hemisphere observers, the most prominent portion of the Milky Way rises in the southeast as marked by the constellations Scorpius and Sagittarius. Take note that, even in dark skies, the Milky Way isn't easily visible until it rises a bit above the horizon and the thick, turbulent air which obscures the view. The Milky Way is huge, but is also rather faint. Our eyes need time to truly adjust to the dark and see it in any detail. Try not to check your phone while you wait, as its light will reset your night vision. It's best to attempt to view the Milky Way when the Moon is at a new or crescent phase; you don't want the Moon's brilliant light washing out any potential views, especially since a full Moon is up all night.

Keeping your eyes dark adapted is especially important if you want to not only see the haze of the Milky Way, but also the dark lane cutting into that haze, stretching from the Summer Triangle to Sagittarius. This dark detail is known as the Great Rift, and is seen more readily in very dark skies, especially dark, dry skies found in high desert regions. What exactly is the Great Rift? You are looking at massive clouds of galactic dust lying between Earth and the interior of the Milky Way. Other "dark nebulae" of cosmic clouds pepper the Milky Way, including the famed Coalsack, found in the Southern Hemisphere constellation of Crux. Many cultures celebrate these dark clouds in their traditional stories along with the constellations and Milky Way.

The Great Rift is shown in more detail in this photo of a portion of the Milky Way along with the bright stars of the Summer Triangle. You can see why it is also called the "Dark Rift." Credit: NASA / A.Fujii

Where exactly is our Solar System within the Milky Way? Is there a way to get a sense of scale? The "Our Place in Our Galaxy" **activity** can help you do just that, with only birdseed, a coin, and your imagination. You can also discover the amazing science **NASA** is doing to understand our galaxy – and our place in it - at nasa.gov.

*If the Milky Way was shrunk down to the size of North America, our entire Solar System would be about the size of a quarter. At that scale, the North Star, Polaris - which is about 433 light years distant from us - would be 11 miles away! Find more ways to visualize these immense sizes with the Our Place in Our Galaxy **activity***

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** to find local clubs, events, and more!

BMAC Calendar & More

Calendar:

B MAC Meetings:

- Friday, September 3, 2021 - 7p - Nature Center, Discovery Theater. Topic TBA.
- Friday, October 1, 2021 - 7p - Nature Center, Discovery Theater. Topic TBA.
  - Note, if StarWatch is not cancelled, this meeting will start at 6p at the observatories to perform a cleaning.
- Friday, November 5, 2021 - 7p - Nature Center, Discovery Theater. Topic TBA.
- Friday, December 3, 2021 - 7p - Nature Center, Discovery Theater. Topic TBA.

S unWatch:

- **Cancelled until further notice.**
- Every clear Saturday & Sunday - 3p-3:30p - March-October - On the Dam
  - View the Sun safely with a white-light & Hα view if clear.; Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

S tarWatch:

- **Cancelled until further notice.**
- October 2 & 9, 2021 - 7:30p
- October 16, 23, 30 & November 6, 2021 - 7p
- November 13, 20 & 27 - 6p

- View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater.; Free.
- You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

pecial Events:

- **Annual Club Picnic - July**
  - This is a BMAC-only event. Details will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.
  - **Please bring a dish to share and bring your own chair!**
- **August Event**
  - This is a BMAC-only event. Time and details to be sent to full BMAC members directly.
- **StarFest 2021 - October 29, 30 & 31, 2021**
  - Our 37th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt, and more!
  - **Pre-registration by Oct. 8, 2021 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
  - MeadowView Marriott special hotel **rate**.
  - **StarFest Link**
- **Astronomy Day - May 7, 2022 - 1p-4p; 8:30p-9:30p**
  - Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.

Regular Contributors:

William Troxel

Robin Byrne

Jason Dorfman

Adam Thanz

William is the current chair of the club. He enjoys everything to do with astronomy, including sharing this exciting and interesting hobby with anyone that will listen! He has been a member since 2010.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Jason Dorfman works as a planetarium creative and technical genius at Bays Mountain Park. He has been a member since 2006.

Adam Thanz has been the BMAC Newsletter Editor for all but a number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Adam Thanz**

Dues:

- Dues are supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- $16 / person / year
- $6 / each additional family member
- Note: if you are a Park Association member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. For renewals, you will be sent an e-mail with an invoice and a direct link to pay online. You can also pay by mail, over the phone or in person at the gift shop.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
  - Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, August 9, 2020.
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
  - Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, July 15, 2020.
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - Image captured July 23, 2016.
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - Painting based on a photograph of the Moon Christa captured July 2020.
- **Celestial Happenings image of sunset at the Bays Mountain Park Lake during a twilight kayak program by Jason Dorfman.**
  - Image captured October 1, 2020.
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - iPhone 7, June 8, 2020.
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
  - Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.
- **BMAC Calendar & More image of the Moon by Greg Penner.**
  - iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.
- **All background images used with permission by their authors.**