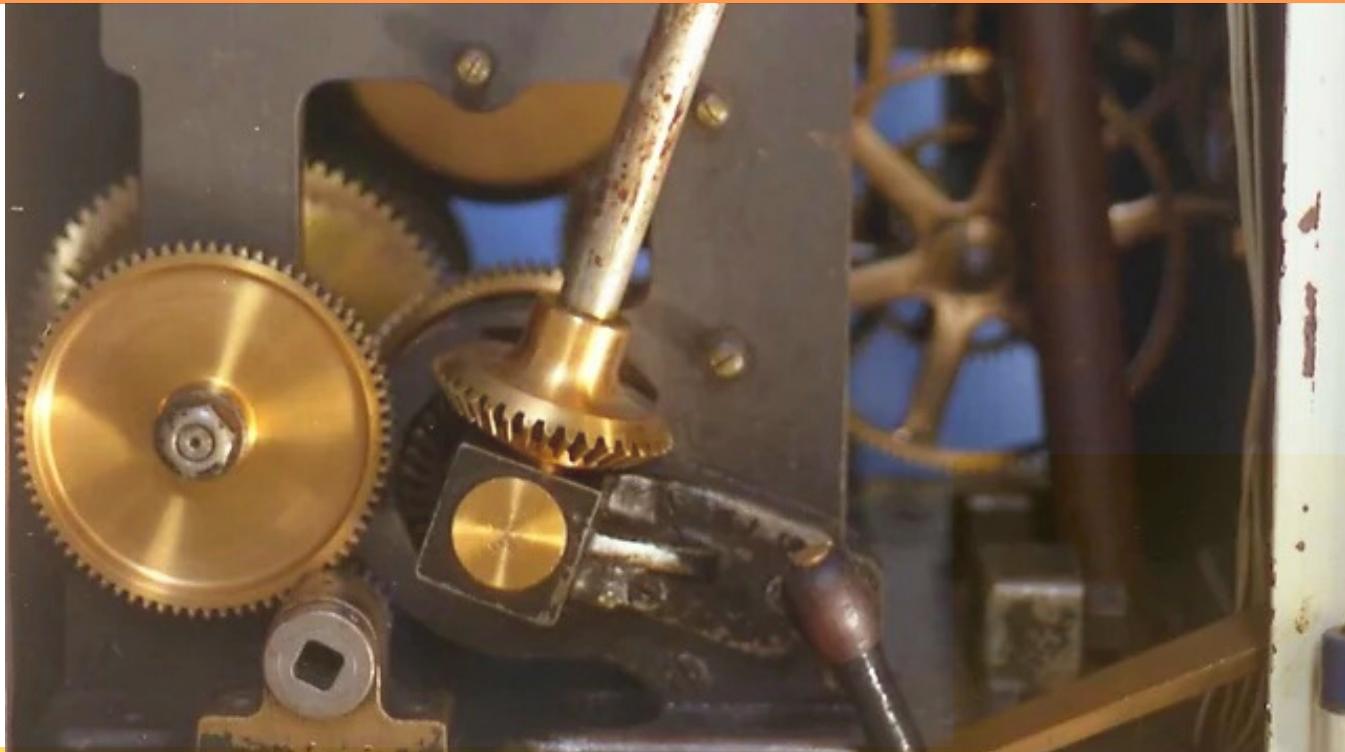




CORNELL ASTRONOMICAL SOCIETY NEWSLETTER

ISSUE 5 • OCTOBER 2022



LETTER FROM THE PRESIDENT

Dear lovely readers and fellow citizens of Earth,

Welcome to the first issue of the Cornell Astronomical Society Newsletter of the semester! I'm incredibly proud of the writers, editors, sudoku and crossword makers, and artists who made this issue possible, and I can't wait for all of you to see the results of their work! In this edition we travel as far as Callisto for a bumpy ride over its craters, as well as a bit closer to home, with a look at the upcoming Artemis mission and much more!

For some CAS updates, our Friday lecture series has started off strong with a talk by Dr. Tajana Schneiderman on planetary histories told through gas and dust. We have a great schedule of lectures coming up in the next few weeks, so keep your eyes open!

Love,
President Annika

TABLE OF CONTENTS

Fuertes Telescope's
100th Anniversary,
Budget Update • 2

Artemis I • 3

Callisto • 5

Why Stars Twinkle • 7

Space Poetry and Joke • 8

Carl Sagan Misquoted! • 9

Summer Triangle • 12

Crossword and Sudoku • 13

Credits • 14

100TH ANNIVERSARY OF THE IRVING PORTER CHURCH MEMORIAL TELESCOPE

October 16, 1922, was the day our beloved [Irving Porter Church Memorial Refractor Telescope](#), better known as Irv, was placed in the Fuertes dome. Unfortunately, October 16 falls on a Sunday. But that won't stop the celebrations!

Join us on October 14 for a discussion of Irv history (part of our [lecture series](#) this semester) by CAS faculty advisor Phil Nicholson. We'll meet in Appel Commons Multipurpose Room 303 at 7:30 PM, then head to the observatory afterward for more events.

CAS voted between five student submissions for a special Irv centennial logo. Congratulations to Abigail Bohl on her winning design! We're ordering the stickers pronto and hope they arrive soon.

Also, don't miss our Halloween open house on October 28! The theme is "pirates", so acquire your costumes now (and we'll provide the pirate hat for Irv).



CAS BUDGET UPDATE

BY BEN JACOBSON-BELL

With the reduction of allotment for the highest spending cap tiers under new guidelines from the Student Activities Funding Commission, CAS's annual budget fell this year from \$10,000 to \$8,000. In the fall cycle, we submitted a budget requesting \$4,091.10 from the commission, all of which was approved.

Our main budget focuses for the year are (1) broadening our capacity for astrophotography, (2) continuing the renovation of our museum and week-to-week open house operations, and (3) setting a baseline of science demonstrations we can run in the future in collaboration with the Sciencenter.

The most significant purchase this semester was a new 9-mm, 120° eyepiece from [Explore® Scientific](#), capable of bringing Irv to 508x magnification (or the Obsession to 190x) with a stunning wide-field view. Other purchases, including two new tarps and a set of new charging bricks for lasers, were long overdue necessities. The remainder were in more specific pursuit of the above projects—we hope to share them with you soon!

ARTEMIS I

BY DYLAN JACKAWAY

Months after the successful but much-delayed deployment of NASA's headline-making James Webb Space Telescope, the space agency is once again asking everyone at Cape Canaveral to please hold for technical difficulties.

The Artemis program was announced in 2019 as the successor to the Apollo missions that brought the first humans to the lunar surface. Named for the Greek goddess of the hunt and twin sister to Apollo, Artemis aims to send the first woman and first person of color beyond low earth orbit.



Render of Artemis I in flight

Credit: [NASA](#)



What Artemis I's Orion spacecraft might look like while orbiting the Moon | Credit: [NASA](#)



The Orion spacecraft will venture thousands of miles beyond the Moon in a four-to-six-week mission | Credit: [NASA](#)

Artemis is an [international effort](#) with contributions from twenty-one different countries, primarily from the European Space Agency (ESA), Japanese Aerospace Exploration Agency (JAXA), and Canadian Space Agency (CSA). Apollo astronauts only had several hours to explore and conduct experiments before taking off again, but these agencies hope Artemis will lead to the establishment of a permanent human presence on the Moon.

Its first flight, Artemis I, will be an uncrewed test of the equipment that will fly on a [distant retrograde orbit](#) around the Moon for two weeks. This orbit was chosen for its gravitational stability, taking advantage of locations called [Lagrange points](#). A space station called Gateway could be built at one of these points, which would serve as a pit stop for missions landing on the Moon as well as missions on their way to Mars.

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Factoring in the travel and return time, the time between launch and splash-down off the coast of San Diego comes out to around a month. If Artemis I is successful, Artemis II plans to follow it up with a crewed lunar flyby in the spring of 2024, preparing Artemis III to take the next giant leap for humankind a year later.

After having satisfied the agency's tests in June, the launch was scheduled for August 29, but received the no-go signal when a fuel pipe was found to be leaking, on top of communication issues with Mission Control. A few days later, a second attempt was scrubbed for the same reason. Rather than persisting, administrators decided to take a few weeks to look more closely into the issues; after all, an exploding rocket is far costlier than another delay.

Their new target is between November 12th and 27th, and if everything goes well, the mission will finally get off the ground. If you decide to tune into NASA's livestream that day, though, maybe hold off on the champagne.



A view of the Artemis I Space Launch System (SLS) and Orion spacecraft just before sunrise | Credit: [NASA/Ben Smegelsky](#)



SLS Rocket Inside Vehicle Assembly Building
Credit: [NASA/Glenn Benson](#)

CALLISTO

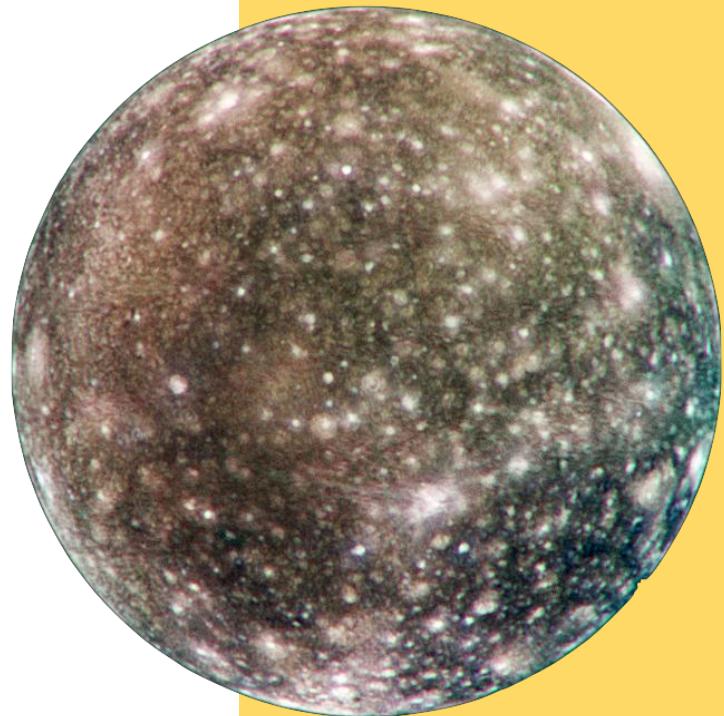
BY JUSTINE SINGLETON

Picture this: You are in a passenger seat on the bus. It still has a few stops to make before it gets to your destination, so you pass the time staring out the window, or at your phone, or into space. Then there's a jolt. You look out the window to see what's wrong and realize the road is filled with potholes. Any sense of alarm shifts to annoyance.

Once the bus reaches a smoother patch of road, you can relax again, even if you know it's not for long. Your thoughts begin to drift. The situation reminds you of Jupiter's moon Callisto. There are no potholes on Callisto, since no roads have been built there, but there are craters. Callisto has the most craters of any body in the Solar System. It has so many, you remember, in part because it has no tectonic activity. The crust Callisto has now is the same it has had for a very long time. You try to imagine this. Callisto has no quakes, no volcanoes, not even a large mountain. Nothing but speckled craters.

The bus screeches to a halt, and a few people get off. You still have a while before your stop, though. As the bus prepares to move again, you imagine that you are riding across the surface of Callisto. The bus doors turn into an airlock, and next to the gas tank is a full air supply. You would need it—although the Jovian moon may have oxygen, its atmosphere is very thin.

The bus rumbles across its cratered path. If you were really on Callisto, you wonder, would the bus bounce? After all, its surface gravity is slightly less than the Moon's.



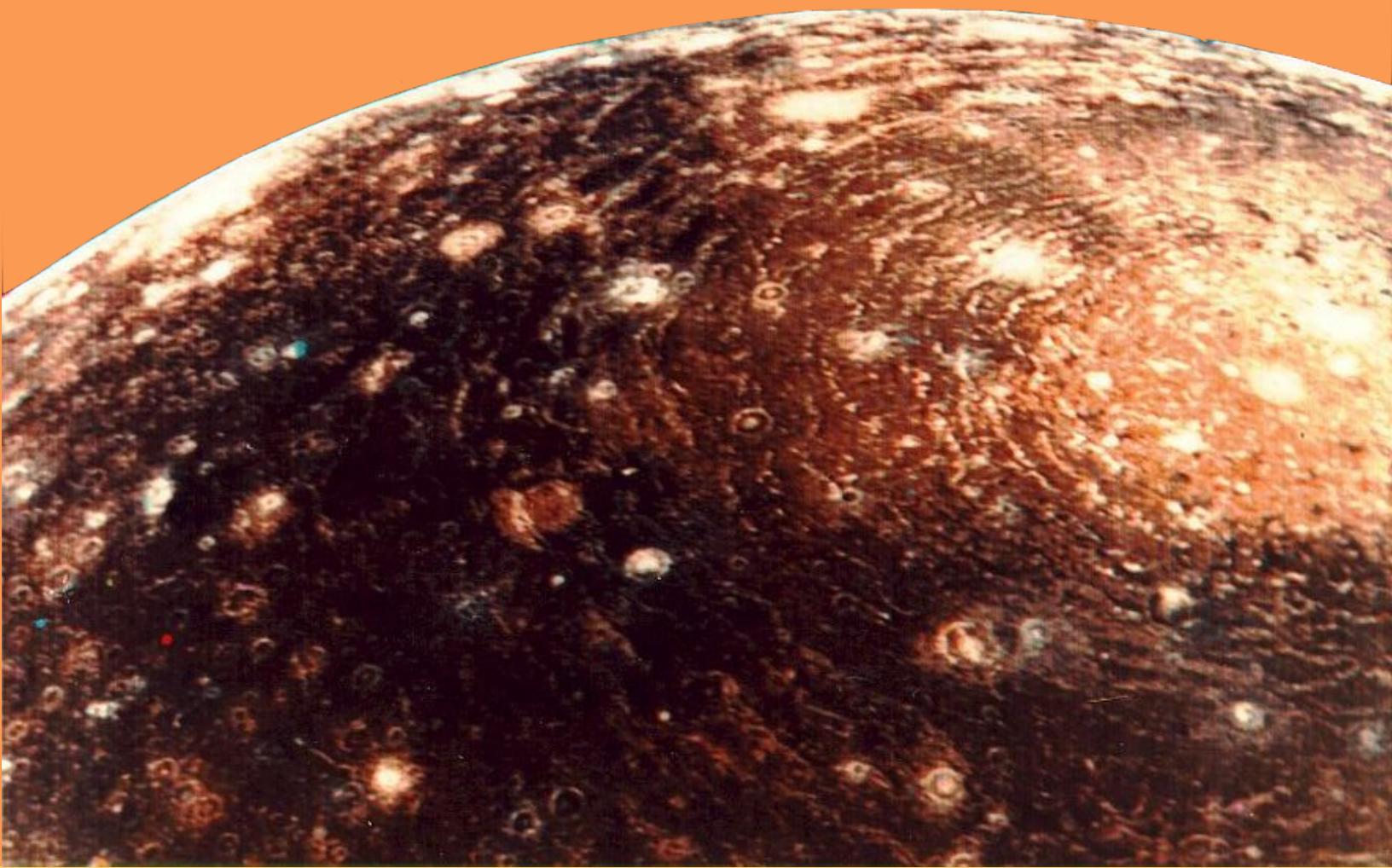
You stare out across the surface and notice white patches in some of the craters. Those have been filled in with ice. In the most detailed photos of Callisto, they look like specks. Before the most recent observations, you remember, they didn't even know those were there. Scientists didn't think there was anything on Callisto and assumed it was bland and boring, especially compared to its neighbors. A few called it "the dead moon." But that changed in the '90s. The Galileo mission revealed Callisto's atmosphere, more detailed pictures of its surface, and even found hints of an underground ocean.

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The bus rolls over another set of potholes. You're glad, at least, that these aren't filled with ice. Callisto's icy surface is another reason why it doesn't have mountains, you recall. The mix of rock and ice in its crust cannot hold elevation changes for very long, so large mountains or especially deep craters smooth out. But what Callisto's crater systems lack in height or depth, they make up for in surface area. Valhalla is the largest crater basin on Callisto and possibly in the Solar System, stretching out its concentric rings to a diameter of 2,500 miles. You try to imagine a pothole that large. Ridges as far as the eye can see. It would take days to drive across it, even without any stops.

As if on cue, the bus rushes to a stop again. You're closer to your stop, but still not there yet. Some new passengers enter. People going to work, people going to the store, people just traveling. A mother with a toddler in tow, the child shakily holding a juice box. Juice. The Jupiter Icy Moons Explorer, or JUICE, is going to study Callisto, as well as its sibling moons Ganymede and Europa. Currently, it is scheduled to launch in April 2023, for an arrival in 2031. Hopefully, the schedule will stick. You offhandedly remember a pop culture reference to the upcoming probe, so that might have some influence as well.

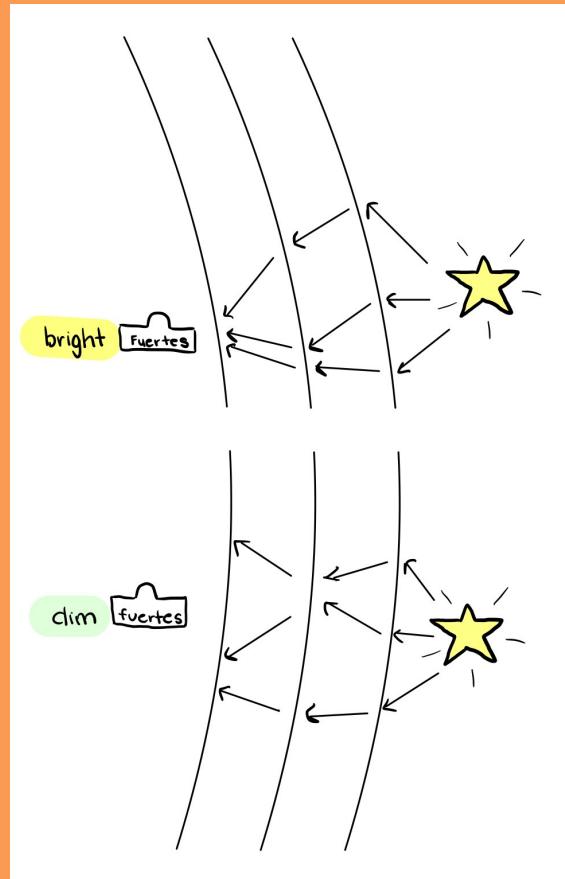
Finally, the bus stops again, and this time it's for you. The doors open, you make sure you have everything, and then you're off. After it pulls away, you stare back at the pothole-filled road, this time with more fascination than annoyance. After all, you never know what you could find beneath the surface.



WHY DO STARS TWINKLE?

BY ABRA GEIGER

On a September Friday at Fuertes, Arcturus twinkles away along the horizon. It appears to vary in brightness and color, almost like a rainbow, reminding one of "Twinkle, Twinkle, Little Star." But why do stars twinkle?



The atmosphere almost acts like many lenses stacked upon each other, repeatedly changing the path of the photons.



This phenomenon, scientifically referred to as scintillation, is caused by the scattering of light in Earth's atmosphere. The atmosphere is highly turbulent, due to its variance in temperature and density. Because of this turbulence, the photons emitted from distant stars are scattered in different directions when they reach Earth, depending on wavelength. By chance, the scattered rays might converge at the observer, or at other times scatter in different directions. This results in a star appearing brighter when the light rays have converged, or dimmer if they have not—hence twinkling!

But why does Arcturus appear to scintillate so much in comparison with other stars in the Fuertes sky? Arcturus twinkles so apparently because of its position in the sky during our September open house hours, 8:00 pm to midnight. Very close to the horizon, its light must traverse more of Earth's turbulent atmosphere before reaching us. Essentially, the scattering of photons from Arcturus is exaggerated from our point of view!

CASSIOPEIA

BY ARIEL MARXENA

Dance across the night with me
underneath the starlight
Let the moon watch us weave
through life and worlds till midnight
Let the star that hugs you close
guide you in this dance

Look in my eyes and leaves will blow
In the cold of the night let's have this trance
Feet tracing W mirrored in the sky
spilling into the Milky Way
Pointing to Andromeda as we fly
across the night bleeding into day

Look in my eyes and I in yours
I will give you the world, this universe is ours

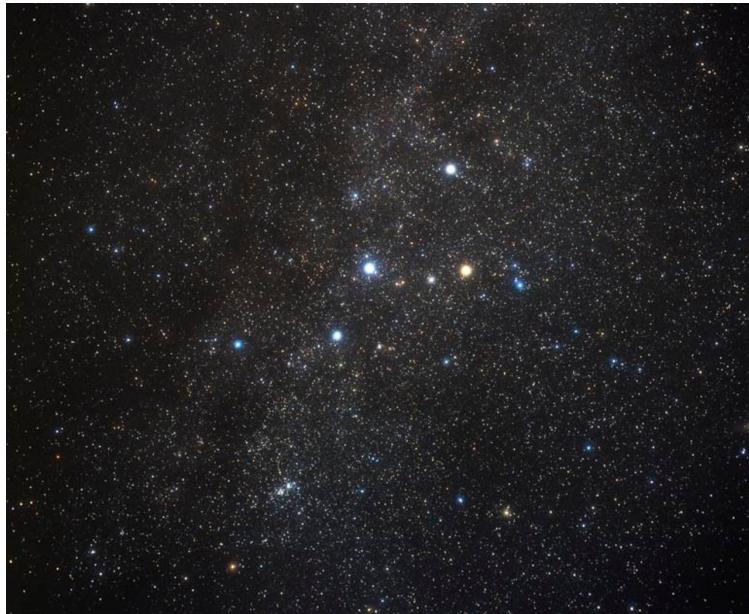
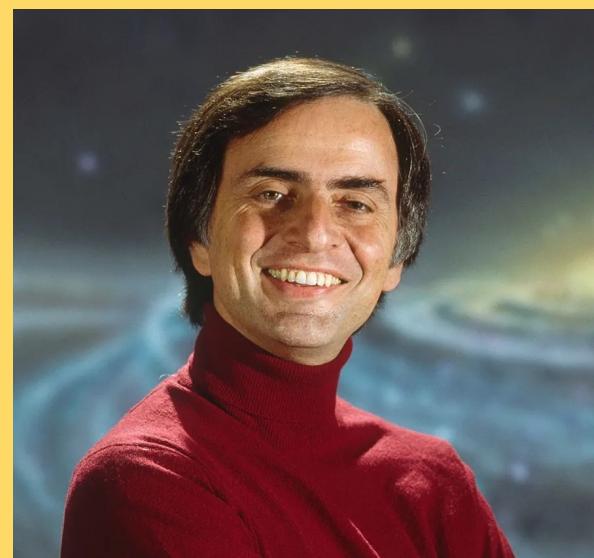


Image of the Constellation Cassiopeia | Credit: [A. Fujii](#)

SPACE JOKE

In the suburbs of St. Louis, Missouri, it is customary to provide a joke prior to receiving your trick-or-treating candy.

So here is mine: What do you call a pirate sailing the "billions and billions" of seas?



Carl Sagan
Credit: Tony Korody / Sygma / Corbis

Answer:

Carl Sagan!

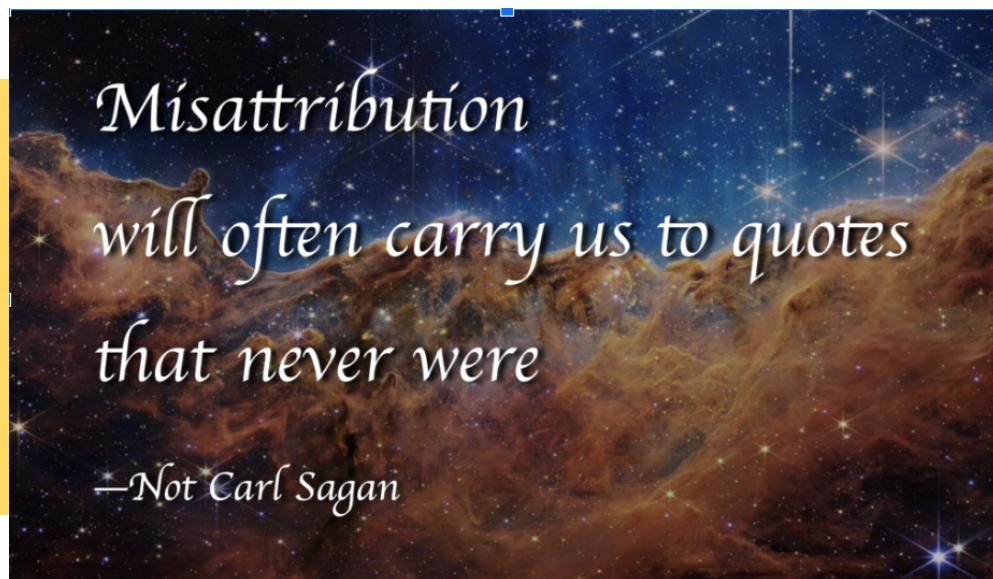
Joke selected by Gillis Lowry

GREAT SENTIMENT. BUT CARL SAGAN NEVER SAID THAT

BY GILLIS LOWRY

If you search for the quote that NASA Administrator Bill Nelson used to conclude the recent JWST livestream—"Somewhere, something incredible is waiting to be known"—you'll find a barrage of these words against spiraling galaxies and long-exposed skies, with the occasional image of Carl Sagan himself, floating happily amongst the stars. I've seen it in giant typeface on the wall of the Cornell University store, and on a T-shirt at the Hayden Planetarium. It has a lovely, but very easily Pinterest-able sentiment.

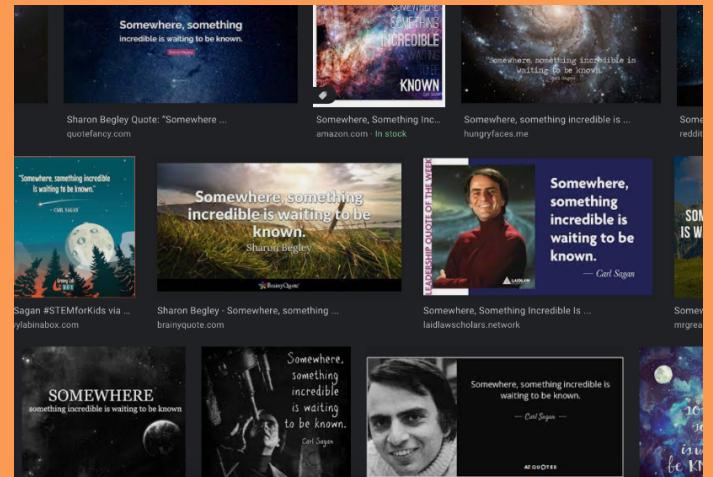
Shame he never said it.



JWST image (Carina Nebula) with a spoof on the real Carl Sagan quote "Imagination will often carry us to worlds that never were" (Cosmos, Chapter 1)

I can't claim to have read every piece of Sagan's published writing in existence. But most of the time, if you look through enough sites with his quotes (or consult Wikiquote), you'll find an exact citation and page number, pointing towards a source you can check yourself. For this particular phrase, there has never been a page number, and a scroll through Wikiquote finds it right at the top of the "misattributed" section.

Thousands of people have used this phrase. It's even one of the first results when you



Google images of false Sagan quote

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Google “Carl Sagan quotes.” So let’s entertain the idea for a moment—how can anyone prove he never said it? Technically, there are billions of spoken words every day that never get written down. We still said them, even without the evidence, right?

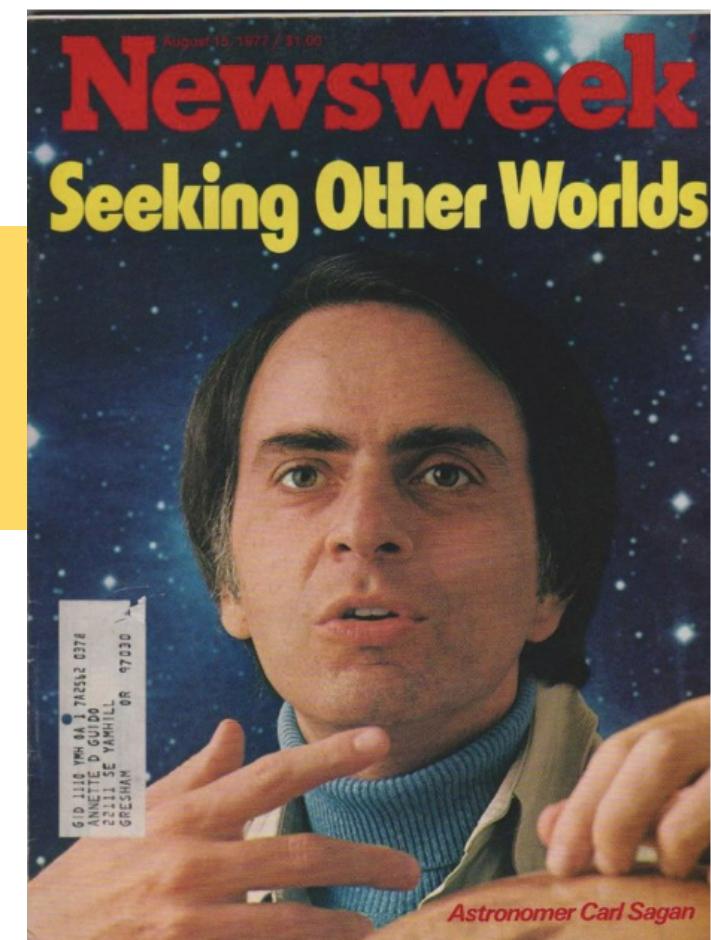
That’s true, but also not how science works. You can’t make a solid claim without evidence, or else it’s no more than a hypothesis.

In his book *The Demon-Haunted World*, Sagan describes a few tools for sniffing out the truth with a “Baloney Detection Kit” (Chapter 12). Relevant to our case: Occam’s Razor, or the idea that when faced with two hypotheses, choose the simpler one. Which makes more sense? That Carl Sagan said something that thousands of people don’t have a source for, or that he never said it at all?

Fortunately, there’s at least one piece of damning evidence showing reporter Sharon Begley wrote these words, not Sagan, as a closing sentence in an article about him.

Without the microfilm copy of the *Newsweek* article, I can’t show you the smoking gun myself. Carl Sagan’s baloney detection tools state that whenever possible, there must be an independent confirmation of the facts; I can’t independently confirm the *Newsweek* article, but no other site has offered a more convincing source. Truly, no other sites offer any source at all.

In this case, the simplest assumption is that Carl Sagan did not, in fact, produce the phrase “Somewhere, something incredible is waiting to be known.” In no way do I mean to attack Bill Nelson or anyone preparing the statements at NASA; all of us get facts wrong once in a while, and it takes some close attention to suspect that this quote might be misattributed.



Newsweek cover

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What can we do in the future?

Even if you're not a government official or a trusted organization with tons of research time to spare, it's a good idea to check for a listed source on a quote before you use it—a book, article, or quick link. Even Without checking the book yourself, it's still more likely to be legitimate than a source-less quote.

An inspirational sentence misattributed here and there on your Instagram probably isn't your biggest concern. But it goes to show how easily false information can be consumed and spread. This is especially true when people tend to trust the word of government officials (Sagan warns against blind trust of authority in the Baloney Detection Kit).

While one misquotation here was largely harmless, the same cannot be said for scientific facts and public safety information. The truth is more important now than ever. Carl Sagan's detection kit, too, is more important than ever, and the tools at the heart of science itself. JWST's stunning images remind us of the strength of this science, the immensity of our universe. Bill Nelson was right—many years of incredible insight await.

And as for me, many emails to Cornell University and the Hayden Planetarium gift shop await, so I might as well get working.



The author with a blasphemous Hayden Planetarium shirt

(Article originally published on the [Carl Sagan Institute website](#))

THE SUMMER TRIANGLE

WHAT IT IS AND HOW TO FIND IT

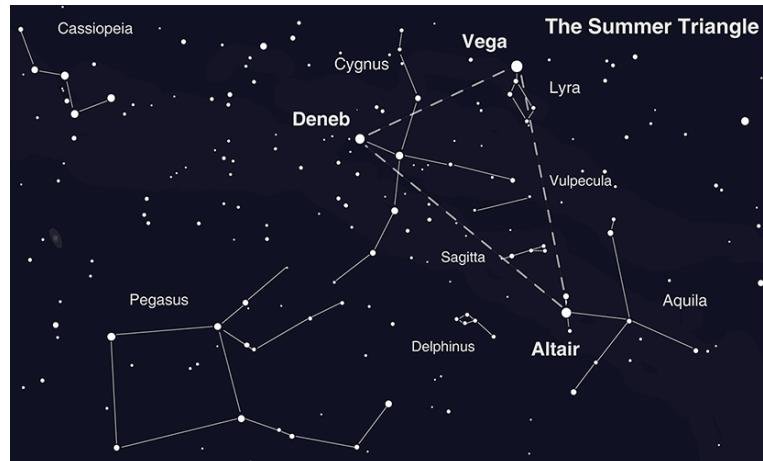
BY LUCAS LAWRENCE

The Summer Triangle is one of the most prominent formations in the summer and early autumn skies, made up of the stars Vega, Deneb, and Altair. Each plays a starring role in their own constellations, and together they form one of the most striking sights in the summer sky. In especially dark skies, the Milky Way can be seen running directly through this great triangle.

The Summer Triangle is technically an asterism, a grouping of stars not officially recognized as a constellation. Still, the Summer Triangle holds a special place in the hearts of many, and anyone interested in astronomy could benefit from knowing how to quickly find it.

Finding the Summer Triangle is fairly easy, given how bright its stars are. At this time of year in Ithaca, the summer triangle appears almost directly overhead in the evening, though if you go outside later in the night, you may have to look to the west to spot it. Look straight overhead and identify Vega, the second brightest star in the sky. Then, look for the two brightest nearby stars—Deneb and Altair. Deneb in particular is easy to identify, as it is the tail of the swan constellation Cygnus.

What we call the Summer Triangle is a recent creation, first appearing in star guides in the 19th century. However, humans have connected the dots of these brilliant stars in other ways for millenia. The stars Vega and Altair feature in the Chinese folk tale “The Cowherd and the Weaver Girl,” a story which has been adapted by cultures throughout East Asia. In most versions of the story, the couple were banished to opposite sides of the “River of Heaven” (The Milky Way) for their forbidden love. However, on the seventh day of the seventh month, a bridge forms that allows the two to meet—an event celebrated by various East Asian cultures with grand festivals.

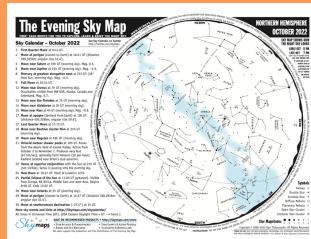


The Summer Triangle, comprised of the brightest stars in the constellations Aquila, Cygnus, and Lyra

Credit: [NASA](#)

OCTOBER SKY MAP

Scan the QR code at right to view this month's evening sky map, courtesy of [skymaps.com](#).



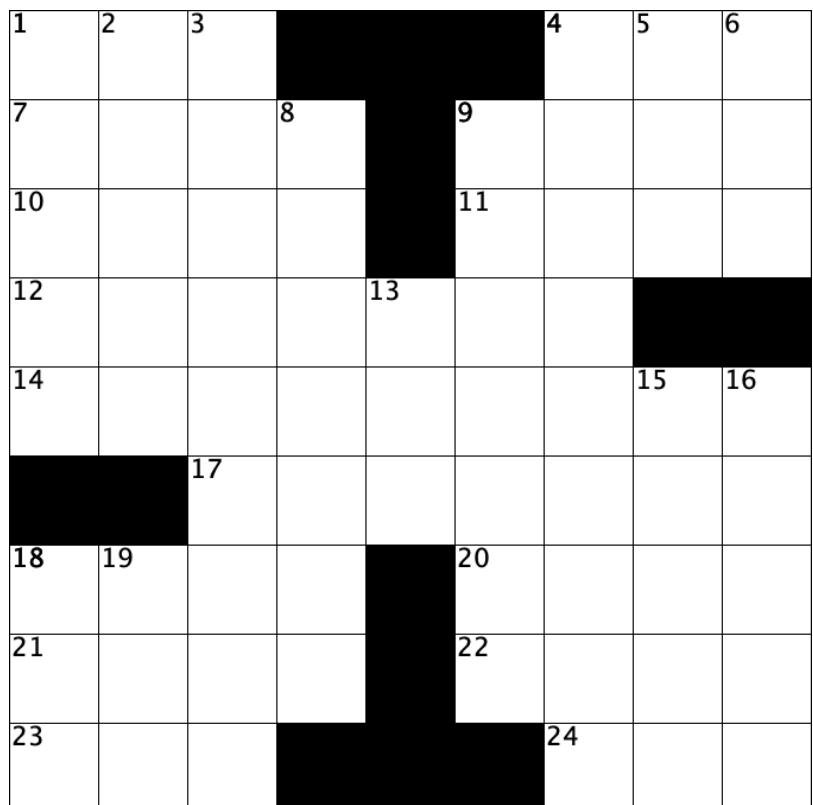
CROSSWORD & SUDOKU

ACROSS

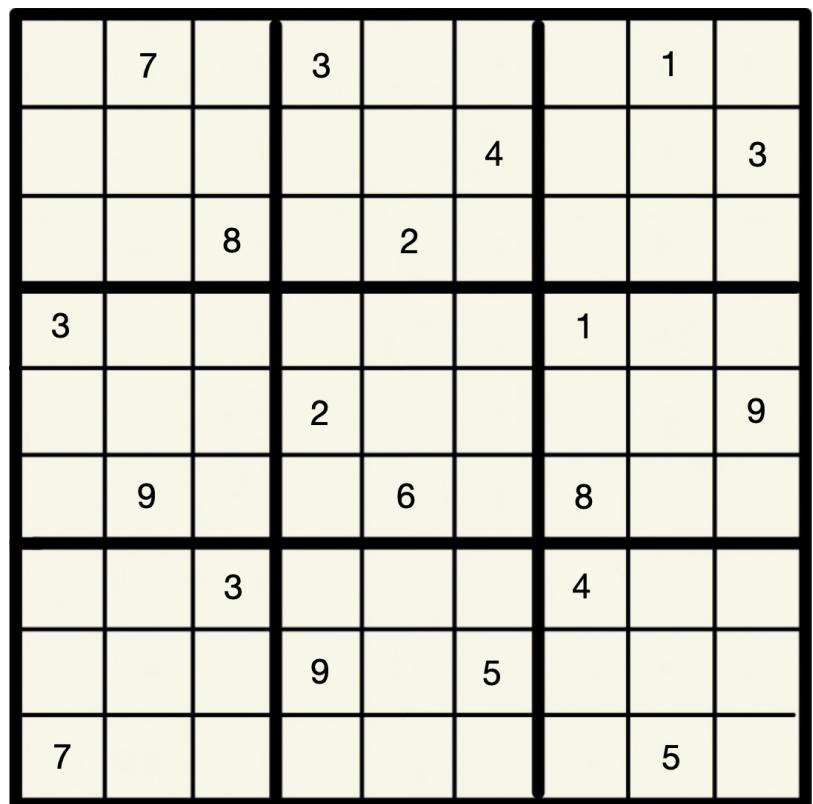
1. Place to find benches and barbells
4. Desktop download
7. Pile (onto)
9. Country statistic
10. Currency of Greece, among others
11. F.B.I. agent, informally
12. Craigslist and others
14. See 13-Down ... or see us here on Fridays for club dinner!
17. Where you might hope to find peace?
18. De ___ (all over again)
20. Sixth-largest desert in the world
21. All over again
22. ___ empty stomach
23. Part of H.M.S.
24. Exam taken by some college srs.

DOWN

1. Gather (from)
2. "Oh, for real?"
3. Perseverance, e.g.
4. Moon lander?
5. Type of soup
6. Stovetop staple
8. "I need this on my desk yesterday!"
9. Way back when
13. With 14-Across, Polaris
15. Being tried, in court-speak
16. River from the Alps
18. "I'm good"
19. Number of moons of Earth



BY BEN JACOBSON-BELL



BY SHAUNJAE SUAREZ

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Sources for "Callisto":

[1](#) - [2](#) - [3](#) - [4](#) - [5](#) - [6](#) - [7](#)

Image credit: [NASA/JPL/DLR](#),
[NASA/NSSDC Photo Gallery](#).

Cornell Astronomical Society (CAS) is a student-run non-profit organization founded in 1972.

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