

Ode to Happiness for Sunday August 8 2021

## **The Tulip and Cygnus X-1**



*Image Credit & Copyright: Carlos Uriarte*

This tall telescopic field of view looks out along the plane of our Milky Way Galaxy toward the nebula rich constellation Cygnus the Swan.

Popularly called the Tulip Nebula, the brightest glowing cloud of interstellar gas and dust above center is also found in the 1959 catalog by astronomer Stewart Sharpless as Sh2-101.

Nearly 70 light-years across the complex and beautiful Tulip Nebula blossoms about 8,000 light-years away, shown in a Hubble palette image that maps the glow of the nebula's sulfur, hydrogen, and oxygen ions into red, green, and blue colors. Ultraviolet radiation from young energetic stars at the edge of the Cygnus OB3 association, including O star HDE 227018, ionizes the atoms and powers the emission from the Tulip Nebula.

Also in the field of view is microquasar Cygnus X-1, one of the strongest X-ray sources in planet Earth's sky. Driven by powerful jets from a black hole accretion disk, its fainter bluish curved shock front is only just visible though, directly above the cosmic Tulip's petals near the top of the frame.

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## **Why are Vinegar and Baking Soda so Good for Cleaning?**

By Stacy Kish - Live Science Contributor

It's basic (and acidic too).



*Cleaning with baking soda can be an effective way to cut out harsh chemicals from your home. (Image credit: Credit: BSIP/UIG via Getty Images)*

More and more people are tossing out the harsh chemicals from their daily cleaning routine and instead turning to natural products, such as baking soda and vinegar, to remove grime, disinfect surfaces and leave spaces shiny and clean, according to Reader's Digest. So why are these household items such effective cleaning agents? The answer is pretty basic — baking soda and vinegar lie on opposite ends of the pH scale.

"When you are cleaning using baking soda or vinegar, you are actually doing very complicated manipulations of molecules," said May Nyman, a professor in the department of chemistry at Oregon State University.

Baking soda is the common name for sodium bicarbonate ( $\text{NaHCO}_3$ ). Most people probably associate it with cooking, because it makes your cakes and breads big and puffy. Vinegar is a dilute solution of acetic acid ( $\text{HC}_2\text{H}_3\text{O}_2$ ), produced by bacteria during fermentation.

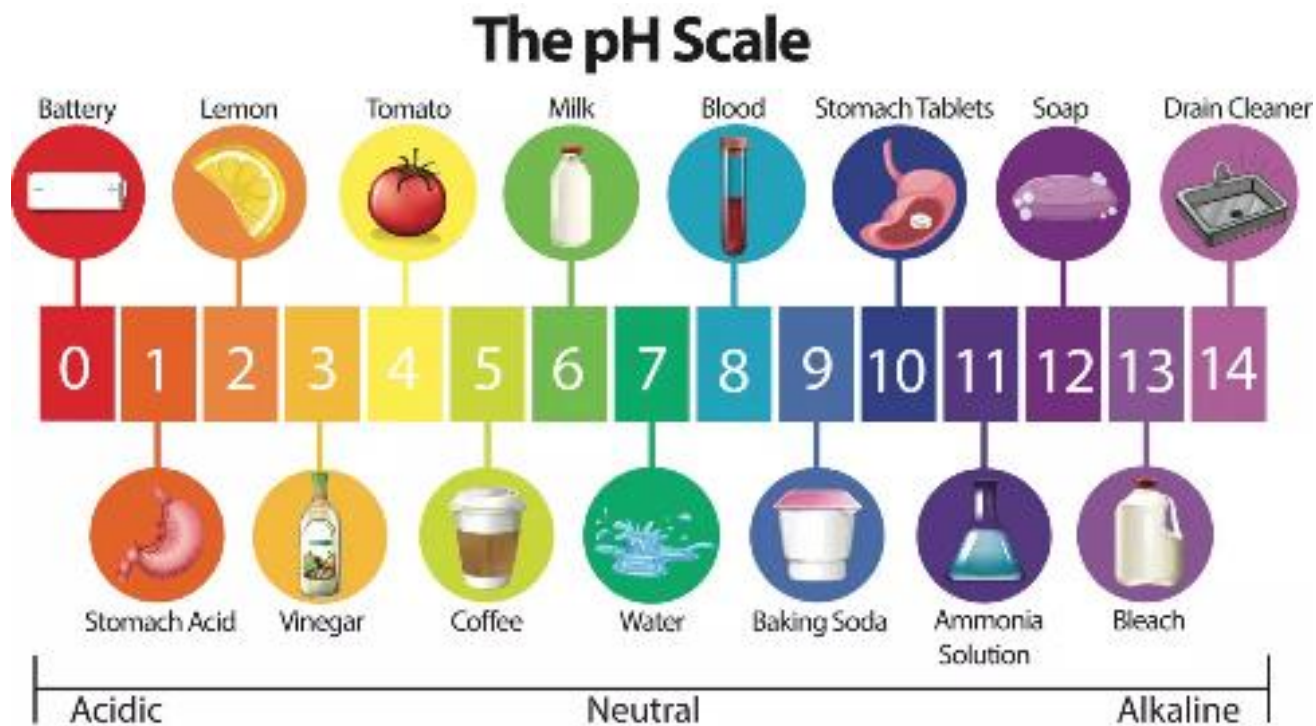
"Baking soda is the opposite of vinegar. It is harsh like vinegar but dissolves organic matter," Nyman told Live Science. "Like vinegar, it cannot harm you and will not be harmful when cleaning places where you store your food."

Both kitchen ingredients are effective cleaning agents because they are found on opposite sides of the pH scale. pH is a measure of how acidic or basic a substance is, on a scale from 1 (very acidic) to 14 (very basic), with a neutral value at 7. Pure water has a pH of 7. Baking soda has a pH of 9, while vinegar has a pH of 2, according to the U.S. Geological Survey.

### Cleaning one-two punch

As a base, baking soda dissolves organic compounds like dirt, grease and other sticky ickies. In addition, the mineral structure of each baking soda particle provides a gentle abrasive to clean without leaving scratches behind. As an acid, vinegar breaks down minerals that form from hard tap water, forming unsightly stains on sinks, tubs and counters.

Combining these two common household substances can produce incredible results in the kitchen, but it's important to not combine them in equal amounts because you need to keep the mixture in either the acidic or basic side of the neutral value. When baking soda is mixed with vinegar, the acid breaks down baking soda, releasing carbon dioxide gas that can help lift dirt from the surfaces being cleaned.



*Everyday items on the pH scale.  
(Image credit: Shutterstock)*

### Here are some recipes to try.

- Freshen your sink by mixing one part of baking soda with two parts of vinegar. This mixture unlocks an effervescent fizz of carbon dioxide that cleans and freshen drains.

- Remove hard water stains by placing a vinegar-soaked towel over the affected area. After a few hours, remove the cloth and scrub the affected area with a paste made of baking soda and water.
- Kill mildew in laundry using baking soda and vinegar. Add a half a cup of baking soda with the laundry detergent to supercharge the cleaning process. Follow this with one cup of vinegar during the rinse cycle to kill bacteria and soften fabric.
- Clean grout by applying a baking soda paste made of baking soda and water. Spray the paste with vinegar before scrubbing the grime away.

*Originally published on Live Science.*

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Not sure how I'm going to explain this to my wife.

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## Poetry for Today

### Wanting

It seems I always play your wicked game,  
I'm wanting you beside me at all cost  
You'd think that dignity and pride would reign,  
But over lust important things are lost.

My wish is the ability to fly,  
But your indifference bends, then breaks my wings.  
The kindly taunts within your truthful lies  
Have shattered me with gentle battering.

Thus pushed and pulled in every single way,  
I live a life constrained within your whims.  
Obsession is a nasty game to play,  
And maybe the most deadly of the sins.

A playback of my life makes me decide  
I'm getting off this roller coaster ride.

### Summer Songs

#### Part 1

I look out into the horizon  
of your indifference.  
A vast outstretching of perpetual sunsets,  
the blaze extinguished again and  
again.  
I try to catch your heat, to find it, to meld it  
with my own.  
My fleeting successes like capturing a match flame  
with my fingers.  
I'm left only with a wisp of climbing  
smoke,  
and pain of blisters  
the sweetest kiss could not suffuse.

I wish to feel your power  
like bonfires, I have seen and felt  
and crowded in the cold —  
my hands outstretched toward warmth  
that dying embers can't provide.

The fire of our love affair  
snuffed out from the inside.

## **Part 2**

I look out into the horizon  
of your indifference.  
My landscape sucks greedily  
at the pale fire of  
your sunset,  
clings needily  
to the last translucent blaze.

You drop behind,  
Rising to greet some other land.  
I fade to black.

## **Part 3**

I look out into the horizon  
of your indifference.  
Your sun sets one more time  
as I agonize its liberty  
but understand its flight  
from a day  
that no longer can process  
its heat.

For a moment,  
my wish is to follow you, fading star  
or call you back to brightness.

But I know  
as I watch you melt away  
it's not merely your sunset I should see  
but the cycle I was part of,  
in all its glorious phases.

So now I sit  
in the tranquility of a nighttime  
full of hope  
bright stars

and a full moon ascending.

*Kelley Kay*

Kelley is a much published author I've met this year in a Zoom writing critique group. Her webpage, <https://kelleykaybowles.com/>, shows the range of her writing talents.

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## **World Mercator Projection with Countries Going to True Size**



<https://www.youtube.com/watch?v=qrRo0UNknDw>

This is a fascinating look at the difference between map depictions of countries and their real size. While we may have known of the distortions of Mercator depictions in high and low latitudes, this video shows them most graphically.

*Right click the map and click on LOOP to repeat the actions.*

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## **I love Rock n Roll: Joan Jett and the Blackhearts**



Joan Jett, an American rock singer, songwriter, composer, musician, record producer, and actress is best known for her work as the frontwoman of her band Joan Jett & the Blackhearts. Jett is known for her rendition of the song "I Love Rock 'n Roll" which was number-one on the Billboard Hot 100 for seven weeks in 1982

<https://youtu.be/d9jhDwxt22Y>

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## Albinoni Adagio on Piano for Bull Elephant



<https://youtu.be/EK9-iPvk9Go>

Albinoni Adagio for others... Copernicus Chamber Orchestra, Horst Sohm conducting

<https://www.youtube.com/watch?v=eLU5W1vc8Y>

Albinoni: Adagio For Strings And Organ In G Minor · Berliner Philharmoniker

<https://www.youtube.com/watch?v=o6Q8Y9rhLQc>



The neo-Baroque composition commonly attributed to the 18th-century Venetian master Tomaso Albinoni, was actually composed by 20th-century musicologist and Albinoni biographer Remo Giazotto. It was purportedly based on the discovery of a manuscript fragment by Albinoni. There is a continuing scholarly debate about whether the alleged fragment was real, or a musical hoax perpetrated by Giazotto. Regardless of its authorship, Adagio is a lush work, well worth your and your elephant's attention.

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## How PCs Became Giant Smartphones

We all know the pandemic juiced sales of toilet paper and hand sanitizer.



|You can add PCs to that list, too.

According to Christopher Mims at The Wall Street Journal, quarterly PC sales were up 50%+ vs. 2019 as remote work became the norm.

Smartphones have taken over the world...

... but the PC -- with a bigger screen, physical keyboard, and no Candy Crush app -- is the better option for productivity.

And, to be really useful, PC manufacturers are trying to integrate the best parts of the smartphone experience:

- Longer battery life
- Thinner and more portable sizes
- High-quality cameras (for ugh Zoom meetings)
- And, soon, direct cellular network connection including 5G

While the changes are nice, we remain adamantly against all attempts of turning laptops into foldable tablets.

### Apple has pushed the industry

Mims writes that Apple's decision to build its own PC chip (M1) is forcing competitors to play catch-up.

By closely integrating software and hardware, Apple's laptops and desktops are blazing fast.

The one-size-fits-all approach pioneered by Intel -- which still powers ~80% of laptops -- is changing. PC makers are embracing the new ethos by tapping chip designer Arm and manufacturers like Qualcomm and MediaTek for custom chips.

### The big winner might be Google

"Thanks largely to rapid adoption in the education market," writes Mims, "[Google's] Chromebooks as a share of PCs sold have exploded in the last 18 months."

Chromebook laptops -- which are built around the Chrome OS and browser-based productivity -- are among the most affordable options.

Even with Google's gains, the entire market is growing for the first time in a decade, and there's a prize worth fighting for.

Just in time for the madness: Microsoft announced its new Windows PC operating system on June 24.

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## **NASA's James Webb Space Telescope Passes Key Review Ahead of Fall Launch**

By Mike Wall Space.Com Senior Writer



*NASA's James Webb Space Telescope, seen here during testing operations at Northrop Grumman's Space Park in California, is scheduled to launch in fall 2021.  
(Image credit: NASA/Chris Gunn)*

NASA's next big space telescope just took a big step forward toward its planned launch this fall.

The \$9.8 billion James Webb Space Telescope mission has passed a key launch review, keeping it on track to lift off atop an Ariane 5 rocket before the end of the year, European Space Agency (ESA) officials announced last week.

"This major milestone, carried out with Arianespace, the Webb launch service provider, confirms that Ariane 5, the Webb spacecraft and the flight plan are set for launch," ESA officials wrote in a July 1 update. "It also specifically provides the final confirmation that all aspects of the launch vehicle and spacecraft are fully compatible."

While Webb is primarily a NASA mission, ESA and the Canadian Space Agency (CSA) are important partners. The CSA is providing the telescope's guidance sensor and one of its scientific instruments. ESA is contributing some science gear to the mission as well and is also providing launch services, procuring the Ariane 5 heavy lifter to get Webb off the ground.

The launch will take place from Europe's Spaceport in Kourou, French Guiana. Mission teams are working toward a launch readiness date of Oct. 31, but liftoff is not expected to actually take place on Halloween.

"The precise launch date following 31 October depends on the spaceport's launch schedule and will be finalized closer to the launch readiness date," ESA officials wrote in the same statement.

After launch, Webb will head to the Sun-Earth Lagrange Point 2, a gravitationally stable point in space about 930,000 miles (1.5 million kilometers) from our planet. The observatory, which features a 21.3-foot-wide (6.5 meters) primary mirror and a deployable sunshade the size of a tennis court, will then begin observing the cosmos in infrared light. It will study the universe's oldest stars and galaxies and hunt for signs of life in the atmospheres of alien planets, among many other tasks.

On two recent missions, the Ariane 5 rocket experienced issues with the system that enables separation of the payload fairing, the protective nose cone that encapsulates satellites during launch. Those missions were still successful, but the rocket was more or less grounded while teams worked to troubleshoot the issue, as Space News reported.

As a result, the Ariane 5 has not flown since August 2020. But its hiatus will end soon: The rocket is scheduled to launch two communications satellites on July 27. And there's another Ariane 5 mission on the docket before the Webb launch — another communications-satellite mission, which is targeted for late September, according to Spaceflight Now.

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## **How Does DNA Know Which Job to do in Each Cell?**

By Donavyn Coffey - Live Science Contributor

If each cell carries the same blueprint, what sets them apart?



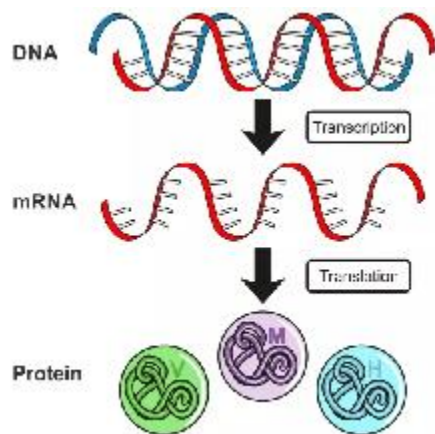
*Illustration of DNA*

*(Image credit: MR.Cole\_Photographer via Getty Images)*

A copy of your DNA is harbored in the nuclei of all 37.2 trillion of your cells. Theoretically, all of these cells have the same capabilities, because they carry the same blueprint. So how does your DNA know when it's in a blood cell versus an olfactory cell, for example? How does it know which genes need to be "switched on"? How does a cell know and carry out its function?

Like all things DNA-related, it is a multifactorial and highly regulated process. In humans and other organisms with eukaryotic cells (which have an enclosed nucleus), a concept known as "central dogma" explains how DNA serves as an instruction manual, with DNA informing messenger RNA (mRNA), which is then used as a road map for protein production. So, transcribing the right piece of DNA into mRNA is just the first step in ensuring the cell has all the proteins it needs.

A special protein called a transcription factor turns on genes, said Karen Reddy, an assistant professor of biological chemistry at John Hopkins University School of Medicine. The transcription factors bind to the DNA to increase or decrease the expression of specific genes. But it raises a question: Where does the transcription factor come from?

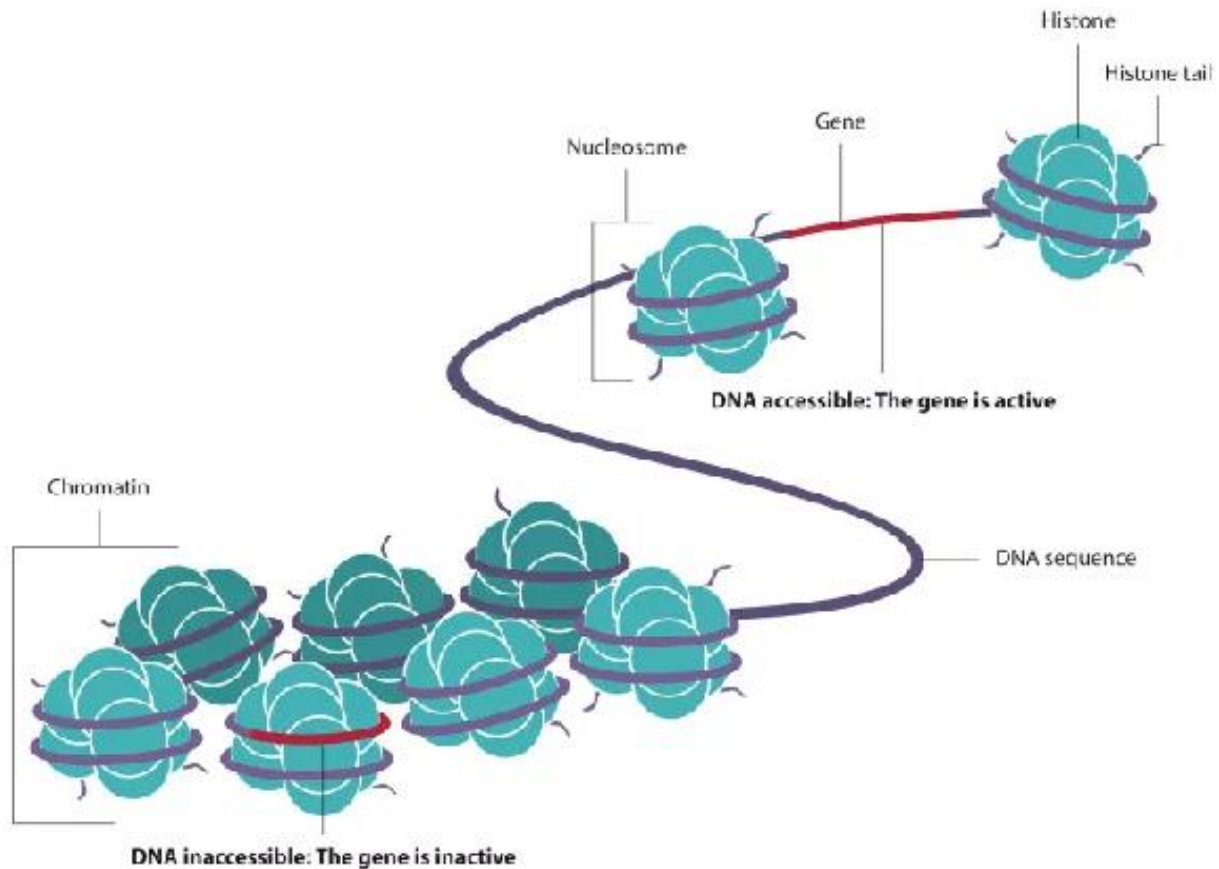


*This illustration shows "central dogma," with DNA informing messenger RNA (mRNA), which serves as a roadmap for protein production in cells.  
(Image credit: Shutterstock)*

"Lots of transcription factors are reused from cell to cell to cell," Reddy told Live Science. It's like how the same parts can be used in different cars. One transcription factor can activate different genes in different cell types. For instance, a transcription factor used in olfactory cells called Olf-1 is identical to the one used in specifying B cells, Ebf-1. And the transcription factor knows to activate different genes in these cells because the DNA is organized and packaged differently in different cell types, also known as having different chromatin landscapes.

In the nucleus, a complex of DNA, proteins and RNA function together to package the long strands of DNA. The complex is called chromatin. How the DNA is wrapped around a complex of proteins called histones, and the chemical modifications to those histones, is called the chromatin landscape. This impacts which genes are more or less exposed. In a given cell type, some genes are poised for activation by the transcription factor because of how they are exposed in the chromatin structure, Reddy said. Others are repressed — or tucked away — by the chromatin landscape. These can still be turned on, but first there need to be enough transcription factors and chromatin modifiers to alter the chromatin structure and reveal them.

"There's cross talk between the chromatin landscape and the transcription factor universe," Reddy said.



*DNA wraps around proteins called histones to form chromatin.*  
(Image credit: Shutterstock)

Overlaying both of these factors is the 3D architecture in the cell nucleus, Reddy said, or how the chromatin is folded and organized in the nucleus. This folding facilitates interactions between the genes that need to be expressed and elements that increase their expression. The active — or needed — parts of DNA in a given cell type are grouped near the center, while the inactive sections are close to the outside of the nucleus.

Some elements that control how a gene is expressed, like a promoter that can turn the gene on or off, are immediately nearby the gene. But other elements, like a tissue-specific enhancer that increases gene expression, can be much farther away from the gene they need to enhance for the cell. The folding or 3D architecture brings the enhancer in proximity to the gene of interest, Reddy said.

Finally, there are processes that make more long-lasting changes to the DNA itself. For example, DNA methylation involves adding a methyl group to a nucleotide (the DNA "building block" cytosine and its backbone) and is generally associated with repression of a gene, Reddy said. DNA methylation can be transmitted from generation to generation, influences which genes are turned on or off in a specific type of cell, and



keeps you from over-expressing certain genes, which, in turn, can lead to conditions such as nervous disorders and cardiovascular disease, according to a 2015 review in the journal *Cureus*.

All of these levels — DNA methylation, chromatin landscape, folding and transcription factors — are important regulatory steps for expressing essential genes in the right place at the right time, Reddy said. "Any of these levels of control are perturbed in a disease like cancer."

The good news is that these regulatory elements back each other up. "You can have something go kind of wrong, and you'll be OK as a cell, because these processes reinforce one another," Reddy said.

*Originally published on Live Science.*

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### **Three Comments on the Marine Corps for Your Edification**

The Marines I have seen around the world have the cleanest bodies, the filthiest minds, the highest morale, and the lowest morals of any group of animals I have ever seen. Thank God for the United States Marine Corps!

*Eleanor Roosevelt, First Lady of the United States, 1945*

The United States Marine Corps, with its fiercely proud tradition of excellence in combat, its hallowed rituals, and its unbending code of honor, is part of the fabric of American myth.

*Thomas E. Ricks, Making the Corps, 1997*

I love the Corps for those intangible possessions that cannot be issued: pride, honor, integrity, and being able to carry on the traditions for generations of warriors past.

*Cpl Jeff Sornig, USMC, in Navy Times, November 1994*

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Why am I always the upside down guy?

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### **Geezers May not Rule, but You Better Watch out Anyway**

An old physician, Doctor Gordon Geezer, became very bored in retirement and decided to re-open a medical clinic.

He put a sign up outside that said: " Dr. Geezer's Clinic. Get your treatment for \$500 - if not cured, get back \$1,000."

Doctor Digger Young, who was positive that this old geezer didn't know beans about medicine, thought this would be a great opportunity to get \$1,000, so he went to Dr.Geezer's clinic.

Dr Young: "Dr. Geezer, I have lost all taste in my mouth. Can you please help me?"

Dr Geezer: "Nurse, please bring medicine from box 22 and put 3 drops in Dr. Young's mouth."

Dr Young: 'Aaagh! -- This is Gasoline!"

Dr Geezer: "Congratulations! You've got your taste back. That will be \$500."

Dr Young gets annoyed and goes back after a couple of days figuring to recover his money.

Dr Young: "I have lost my memory, I cannot remember anything.

Dr Geezer: "Nurse, please bring medicine from box 22 and put 3 drops in the patient's mouth."

Dr Young: "Oh, no you don't -- that is Gasoline!"

Dr Geezer: "Congratulations! You've got your memory back. That will be \$500."

Dr Young (after having lost \$1000) leaves angrily and comes back after several more days.

Dr Young: "My eyesight has become weak --- I can hardly see anything!"

Dr Geezer: "Well, I don't have any medicine for that so, "Here's your \$1000 back" (giving him a \$10 bill).

Dr Young: "But this is only \$10!"

Dr Geezer: "Congratulations! You got your vision back! That will be \$500."

Moral of story -- Just because you're "Young" doesn't mean that you can outsmart an "old Geezer" .

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## **Los Angeles ATC Warns 'Jetpack Guy is Back'**



*disneyparks*

LOS ANGELES (AP) — The FBI is investigating what one commercial airline pilot said might have been an airborne person with a jetpack, high in the busy skies near Los Angeles International Airport.

The Los Angeles Times reported that the Boeing 747 pilot radioed to report "a possible jetpack man in sight" at around 6:12 p.m. Wednesday, according to a recording from the website LiveATC.

The pilot spotted an object that might have resembled a jetpack 15 miles east of LAX at 5,000 feet altitude, a Federal Aviation Administration spokesperson told the newspaper. "Out of an abundance of caution, air traffic controllers alerted other pilots in the vicinity."

"Use caution, the jetpack guy is back," said one air traffic alert.

"Did you see a UFO?" one air traffic controller asked a pilot.

"We were looking but we did not see Iron Man," the pilot responded.

The FBI is working with the FAA to investigate the report, FBI spokesperson Laura Eimiller told the Times in an email. The agency has already looked into three other possible jetpack in the skies above Los Angeles, and has "not been able to validate any of the reports," she said.

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## **These Foldable Houses Cost \$50k and Go Up in a Day**

By Vanessa Bates Ramirez



*Boxable Casita Prefab Folding House*  
*slamagazine*

3D printing has become the hottest new construction technology of the past few years, with houses being laid down in California, Texas, New York, Mexico, Canada, Italy, and Germany, to name just a few. There's no doubt it's an efficient, low-cost way to build durable homes, with the added bonus of a wow-factor (which may soon expire given how fast the method seems to be proliferating).

But one company is taking a totally different route to affordable, easy-to-build housing: foldable homes.

If, like me, your first thought was "Foldable? That doesn't sound like something I'd want to live in, or something anyone should live in, for that matter"—hear me out. The company producing the homes is called Boxabl, and they're made of steel, concrete, and EPS foam (this stands for expanded polystyrene, and it's used as insulation).

The houses were unveiled at the International Builders Show in Las Vegas, where Boxabl is based, in March. But they've recently started to get a lot more attention after a tweet by Elon Musk raised suspicions that he lives in one. There's since been some

confusion about whether Musk's Boca Chica, Texas house is actually a Boxabl or a similar pre-fabricated home from a different builder, but either way, it's been good publicity for Boxabl.

<https://youtu.be/g8Tvqk0xAwA>

The company's first model, and the only one currently available, is 400 square feet—about the size of a studio apartment—and they're calling it the Casita. It costs \$49,500 and can be set up in a day once it's delivered. It comes as a 20-foot-wide load that can be shipped on an 8-foot footprint; that means it can be hauled by a pickup truck or SUV (perhaps not coincidentally, one video shows a Boxabl house being pulled by a Tesla Model X), and the shipping costs are far lower than those of traditional mobile and prefab homes.

The kitchen and bathroom are on the same side of the house, with items like the refrigerator, toilet, and sinks already built in. This section stays upright throughout the shipping process. Upon arrival, the house just needs to be "unfolded." It can be bolted to any foundation using connector plates.

"The actual setup of the unit itself is very fast," said Boxabl co-founder Galiano Tiramani. "We've done it here in under an hour. It really just unfolds and bolts down, and you're good to go." By "here" he means in the factory, where setup is likely easier than in a real-world setting, particularly because the home's electrical, plumbing, and HVAC all need to be hooked up.

Nonetheless, this can all be completed in a day, particularly at sites where the electrical and plumbing hookups are ready and waiting. It's worth noting that the listed price of \$49,500 is just for the house; it doesn't include the necessary utility hookups, foundation, and permits. Boxabl estimates these costs could range from \$5,000 on the low end up to \$50,000, depending on location and complexity of the site. The land you put the house on is a separate cost too, and would obviously vary widely based on location.

Boxabl will soon open a new factory in Las Vegas that will be able to produce one house every 90 minutes, and Tiramani estimates an annual output of 3,600 houses.

Though there's no 3D printing involved in the manufacturing, there will be a good deal of automation. Robotic arms will lift and move the wall panels from one step of the process to the next, placing them on lazy-susan-like rotating pallets, where they'll go from lying flat to standing up to being connected together then folded up.

If you're still wondering about safety, fear not. Boxabl's website says its homes are resistant to bugs, water, fire, wind, and mold. "Waterproof" would be a bit more reassuring than "water-resistant" (I mean, we're not talking about a raincoat here, and even if we were, the same would apply!), but it seems this is just semantics; since there's no lumber or sheetrock used for the walls, it's virtually impossible for water to warp or corrode them.

"If your Boxabl floods, the water drains out, and the structure is undamaged," the website states, adding that both the interior and exterior walls are covered in non-

combustible materials for fire resistance, and the houses can handle hurricane-speed winds. It certainly seems they've covered all the bases.



*Second Floor Unpack  
utube*

<https://www.youtube.com/watch?v=aX1TUkX8bxs>

The company plans to expand on its offerings with new shapes and sizes, which will likely be modular so customers can design their homes to fit their needs. Apparently over 1,000 people have already reserved a Casita, which can be done on Boxabl's website either by paying full price up front, giving a deposit of \$1,200 or \$200, or for free (but you'll be last in line, and let's be honest, they probably won't start making a house for you until you've put down some cash).

Like 3D printed homes, Boxabl's innovation seems promising as a source of affordable housing, and could become a major new player in the industry. However, also like its 3D printed counterparts, one of Boxabl's big limitations is that it requires an empty piece of land at ground level—and these are exactly what's scarce in dense urban centers, and often even in surrounding suburbs.

But with more people leaving cities post-pandemic and many companies implementing flexible work policies, we may not see urban populations grow as fast as expected. Either way, don't be too surprised if you see a small, sleek, folded-up house pull into your neighborhood on the back of a truck sometime in the next couple years.

*Image Credit: Boxabl*

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**Top Banana?**



*Thoiry, France·Twitter for Android*

Bananas are very slightly radioactive, so, according to particle physicist Claire Lee: "If you had a banana the same mass as the sun, then your solar-mass banana would produce nearly as many neutrinos per day... as the sun produces per second!" That is a powerful banana.

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## **Become Jackson Pollock without Messing Up the Kitchen**



<https://jacksonpollock.org/>

This is fun, and who knows, maybe one of your drizzles will sell for (notice I didn't say 'be worth') millions.

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## **A good love story...Walking on the Grass**

The room was full of pregnant women with their husbands.

The instructor said, "Ladies, remember that exercise is good for you. Walking is especially beneficial - strengthens the pelvic muscles and will make delivery that much easier. Just pace yourself, make plenty of stops and try to stay on soft surfaces, like a grass path

"Gentlemen, remember -- you're in this together It wouldn't hurt you to go walking with her. In fact, that shared experience would be good for you both."

The room suddenly became very quiet as the men absorbed this information.

After a few moments a man, name unknown, at the back of the room, slowly raised his hand.

"Yes?" asked the Instructor.

"I was just wondering if it would be all right, if she carries a golf bag?"

-----Brings a tear to your eye, doesn't it?

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## **Did Longer Days on Early Earth Set Stage for Complex Life?**

By Elizabeth Pennisi



*Divers collected samples of these colorful microbial mats to understand their role in oxygenating Earth.*

*Phil Hartmeyer/Noaa Thunder Bay National Marine Sanctuary*

Today, oxygen fuels much of life on Earth, but it wasn't always that way. Three billion years ago, this gas was scarce in the atmosphere and oceans. Knowing why oxygen became plentiful could illuminate the evolution of our planet's flora and fauna, but scientists have struggled to find an explanation satisfying to all. Now a research team has proposed a novel link between how fast our planet spun on its axis, which defines the length of a day, and the ancient production of additional oxygen. Their modeling of Earth's early days, which incorporates evidence from microbial mats coating the bottom of a shallow, sunlit sinkhole in Lake Huron, produced a surprising conclusion: as Earth's spin slowed, the resulting longer days could have triggered more photosynthesis from similar mats, allowing oxygen to build up in ancient seas and diffuse up into the atmosphere.



That proposal, described today in *Nature Geoscience*, has intrigued some scientists. "The rise of oxygen [on Earth] is easily the most substantial environmental change in the history of our planet," says Woodward Fischer, a geobiologist at the California Institute of Technology who was not involved with the work. This study offers "a totally new flavor of an idea. It's making a connection that people haven't made before."

Earth was much different when life first took hold about 4 billion years ago, with vast shallow seas whose only living creatures were one-celled. Many of those early microbes were cyanobacteria, which can form mats on sediments and rock surfaces and today sometimes cause algal blooms deadly to fish and other aquatic animals. Microbes that became cyanobacteria evolved the molecular machinery for photosynthesis early on, letting them convert carbon dioxide and water into sugars and oxygen. Researchers have long thought these microbes provided Earth's initial supply of oxygen, over the eons creating an environment that favored the evolution of aerobic life in all its forms. But they always puzzled over why about a billion years passed between the first photosynthetic microbes, which fossils indicate arose about 3.5 billion years ago, and the first good geological evidence for a buildup of oxygen.

Researchers already knew, from modeling the Moon's distance from Earth and the resulting atmospheric and oceanic tides, that the infant Earth turned much faster on its axis than it does today. Many agree that 4.5 billion years ago, a day was only about 6 hours long. By about 2.4 billion years ago, the models predict, the pull of the Moon had slowed that spin to about a 21-hour day. Earth's rotational speed then stayed constant for about a billion years, as its gravitational pull countered the Moon's drag. Those forces fell out of balance about 700 million years ago, because the resonance cycle between Earth and the Moon is not completely stable, and the planet's spin slowed to its current speed, creating a 24-hour day, according to the models

In 2016, after a chance suggestion, Judith Klatt, a biogeochemist now at the Max Planck Institute for Marine Microbiology, realized those slowdowns in Earth's rate of spin mirrored big leaps in atmospheric oxygen. For example, oxygen first jumped during what's called the Great Oxygenation Event, some 2.4 billion years ago, and then again during the Neoproterozoic era, more than a billion years later. During the Paleozoic, about 400 million years ago, there was a final major increase in atmospheric oxygen.

As a postdoc at the University of Michigan, Ann Arbor, Klatt had studied microbial mats growing on sediments in the Middle Island Sinkhole in Lake Huron. There, the water is shallow enough for the cyanobacteria to get enough sunlight for photosynthesis. Oxygen-depleted water and sulfur gas bubble up from the lake floor, creating anoxic conditions that roughly approximate conditions of early Earth.

Scuba divers collected samples of the microbial mats and in the lab, Klatt tracked the amount of oxygen they released under various day lengths simulated with halogen lamps. The longer the exposure to light, the more of the gas the mats released.

Excited, Klatt and Arjun Chennu, a modeler from the Leibniz Center for Tropical Marine Research, set up a numerical model to calculate how much oxygen ancient cyanobacteria could have produced on a global scale. When the microbial mat results

and other data were plugged into this computer program, it revealed a key interaction between light exposure and the microbial mats.

Typically, microbial mats “breathe” in almost as much oxygen at night as they produce during the day. But as Earth’s spin slowed, the additional continuous hours of daylight allowed the simulated mats to build up a surplus, releasing oxygen into the water. As a result, atmospheric oxygen tracked estimated day length over the eons: Both rose in a stepped fashion with a long plateau.

### **Did longer days fuel oxygen rise?**

Models suggest the amount of oxygen on Earth increased in a stepwise fashion, starting with the Great Oxygenation Event (GOE) about 2.4 billion years ago, followed by a plateau for a “boring billion” years. Oxygen rose again in the Neoproterozoic Oxygenation Event (NOE) and Palaeozoic Oxidation Event (POE). Day length rose in the same stepped pattern, suggesting that the added light boosted photosynthetic microbes, fueling increases in oxygen.

This “elegant” idea helps explain why oxygen didn’t build up in the atmosphere as soon as cyanobacteria appeared on the scene 3.5 billion years ago, says Timothy Lyons, a biogeochemist at the University of California, Riverside. Because day length was still so short back then, oxygen in the mats never had a chance to build up enough to diffuse out. “Long daytimes simply allow more oxygen to escape to the overlying waters and eventually the atmosphere,” Lyons says.

Still, Lyons and others say, many factors likely contributed to the rise in oxygen. For example, Fischer suspects free-floating cyanobacteria, not just those in rock-affixed mats, were big players. Benjamin Mills, an Earth system modeler at the University of Leeds, thinks the release of oxygen-binding minerals by ancient volcanoes likely countered the early buildup of the gas at times and should be factored into oxygen calculations.

Nonetheless, changing day length “is something that should be considered in more detail,” he says. “I’ll try to add it to our Earth system models.”

*Posted in: BiologyEarth*

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### **Sparky the Loser... *The Rest of the Story***



<https://www.youtube.com/watch?v=JVc9VKwHbjA>

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## **My Walking Thoughts**

**August 7, 2021**

As I begin my trek along the verge of Highway 33 toward Matilaja Dam, it's another Ojai Valley Tourist Bureau midsummer day with stunningly blue skies and depending where you are, temperatures ranging from the high 80s up to 100.

The good news...this is as wonderful as it gets; a time to revel before October with its desiccated desert-spawned bombasts push the mercury into triple-digit territory.

Sucking every vestige of moisture from both flora and fauna, our notorious Santa Ana winds propel the region to the top of the TV news charts recording the seemingly endless progression of raging firestorms racing up and down the scrub brush hillsides of our *Gobi-land by the sea* paradise.

At that point, coincident with my arrival at the Ventura River-bordering Rice Road, I realize that measurable rainfall or not, the bone-dry highway presents a perfect time to take a slightly different view of the subject.

### **Let's Play Games with Mother Nature**

With thoughts turned to our ongoing draught and *if* and *when* we will get a significant amount of rain to slake the thirst of our shrinking ground- and surface-water resources. The answer to both, is of course, I haven't a clue.

After the promise that last year would be a wet one in our area only to find it failed even to meet the mediocrity of our average rainfall, it's hard to expect much better this year...if for no other reason we don't have a Punxsutawney Phil to give us some hope of

an outcome different from the routine. Would there were some arcane magic to coax Coyote (Navajo), Zeus (Greek), or Freyr (Norse) rain gods onto our parched shores, I sigh in the forlorn hope someone out there is listening to my plea.

Of course we do have our alchemists with their chemical and electronic wizardry hell-bent on showing mother sophistry by leaching droplets from otherwise indolent mists.

Despite my *absolute* ignorance of the practices themselves or their most obvious consequences, I harbor whispering concerns for the more subtle issues...those *unanticipated* consequences that we may not understand or have sufficient knowledge to control.

The list of ongoing, uncoordinated, and essentially unregulated cloud-altering activities is to me rather staggering. One of these is the seemingly pedestrian seeding operation carried out in neighboring Santa Barbara County. Not only do I not know the chemicals in use there, but I haven't a clue as to the actual effectiveness of the operation...though one would hope there's some positive return for the costs involved.

My real concern here has its roots in a pair of totally unrelated experiences: the introduction of Kudzu into the Southeastern US to deal with erosion, and the brilliant program to transport North American beavers to Tierra del Fuego in hopes of creating a fur business. Both have led to environmental disasters.

Despite oversight by experts, the woods are full of such outcomes, all too often overlooked or perhaps purposefully hidden to protect reputations or perhaps bank accounts of those responsible. The roots here are as obscure as the outcomes, but it brings to my mind the question of just how the anointed are awarded the title of *expert*, and then who decides to turn them loose in arenas where the yard markers are not as well defined as perhaps they should be?

My concerns may be sour grapes on the part of a basic nobody, but I'm more than a little skeptical about those elevated to *expert* status by PR flacks or members of the press. Perhaps if I were less curmudgeonly in my expectations, their success rate would improve...but somehow I think not.

## **Root 66**

If you recall in my last dodderings, I dodged a bullet while playing host at a Welcome Back party when the intruder I was instructed to evict was no more interested in fisticuffs than I. It could go down in the annals of such activities as a triumph of good sense over testosterone; but you and I know better.

While the episode marked the end of the party, it was the beginning of another tale involving Mr. Somethingorother, whose actual name is Tom Schmidt, destined to become not only a great friend, but companion for a run around the country in a Corvette, reminiscent of the 1960 to 1964 TV adventure series titled *Route 66*.

Great idea that, but there was one little problem: our journey took place in 1957, *three years before the show*, making it difficult to know how Mr. Milner and Mr. Haharis/Corbett, were going to handle things in unfamiliar territories.

Despite this handicap, Tom and I departed Los Angeles in mid-June with high hopes resting on the rather stingy nest egg of \$212.50 and another \$400.00 to cover Standard Oil Credit Card purchases.

*But first, a little background information:*

I dropped out of school sophomore and junior years ostensibly to see whether I had the right stuff to become an aeronautical engineer. This in mind, I found myself, along with my perennial college roomie, Larry Templeton, working at Douglas Aircraft's Santa Monica plant in the preliminary design section for the DC-8. It was the company's initial foray into the commercial jet era, the four-engine intercontinental competitor to Boeing's already in service 707.

While my academic aspirations didn't make a great leap forward, I was able to purchase a shiny new 1957 Corvette from Harry Mann Chevrolet in Los Angeles for the astronomical price of \$3,000, tax, license and insurance included.

I had dreams of racing it—Mann Chevrolet fielded a team of three cars for its own effort and my car was built to the same specs as theirs—but it took only two laps at Willow Springs racetrack to disabuse me of the idea...the second only to confirm the terror I experienced during the first lap. With the high speed rear-end gears (3.56:1 versus the more usual 4.11:1 ratio) the car was capable of 140 mph at 7,000 rpm. Sadly the suspension was nowhere near up to such foolishness, signaling its discomfort with ominous hops and wiggles 20 mph earlier.

But what the higher gear ratio provided was a decent 22 mpg at highway speeds. With the 100 octane (high test) fuel coming out of gas war pumps for as low as 12.9 cents per gallon (nowhere greater than 20 cents) the resulting penny per mile for fuel leveled the cost relative to granny cars. It also showed the projected fuel cost for an 8,000 mile trip to be within budget.

All necessary gear for the trip--a couple of changes of clothes, sleeping bags, poncho halves in case of rain, bathing trunks, emergency rations, and blazers should the need for finery appear—fit by the hardest in a trunk little larger than ladies' handbags then in vogue.

Tom told the cute reporter from the Monterey Herald that our plan was to offer custodial services in return for beds-and-breakfasts at police stations along the way. It seemed like a great idea over planning session beers, but in the searing light of reality it proved to be an unh-unh. If we wanted to avail ourselves of such amenities there were processes we could follow--robbing banks or spray-painting road signs for instance—but we thought that plan B whatever it might be sounded better.

D-Day came with the two of us quivering like sprinters in the blocks with nary a brass band offering a departing oompah, no crowds of grief-stricken maidens lining Santa Monica Boulevard as we set sail on a foggy Saturday morning enroute to some undefined journey. Instead, a divine providence took charge and we were on our way...first stop, Tucson.

*Well not quite.*

We crossed the Colorado River at Blythe just past noon, but that was the last time for the rest of the trip things went as planned. As we climbed from the ramshackle riverbank village into moonscaped Arizona desert beyond, what began as a 4-lane divided highway became a two-lane state road, then a parking lot permitting us along with a sizeable crowd of stranded motorists to watch four tow trucks work to pry a pair of big-rigs off several lesser vehicles; a process that took until nautical twilight to complete.

So it was Oreo-Cookie and sleeping bag time near what is now the mini metropolis of Quartzsite. Back then the area resembled those wide-open spaces favored by homesick singing cowboys of the silver screen. Not quite bucolic, the scene was certainly vast and relatively empty of man-made annoyances.

Still in the thrall of our getaway, we bedded down under blinking stars for our first night on the road, the scene wrapped in an unfamiliar silence occasionally broken by the quavering cries of a lonesome coyote or the distant growl of a truck climbing through the exquisite blackness.

Next Stop, Tucson.

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For some time I've been wondering whether we might include a section in the Odes permitting dialog on topics in need of serious discussion, but come to the conclusion doing so makes no sense.

So rather than changing the Odes, I'm wondering how much interest there might be in developing a separate a posting for those interested in looking for ways to meet the vast array of challenges our society faces today.

If the idea appeals to you, please send your thoughts as to how we might proceed...what form, what rules, what medium to use, etcetera.

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