Ode to E Pluribus Unum for Sunday September 3 2023

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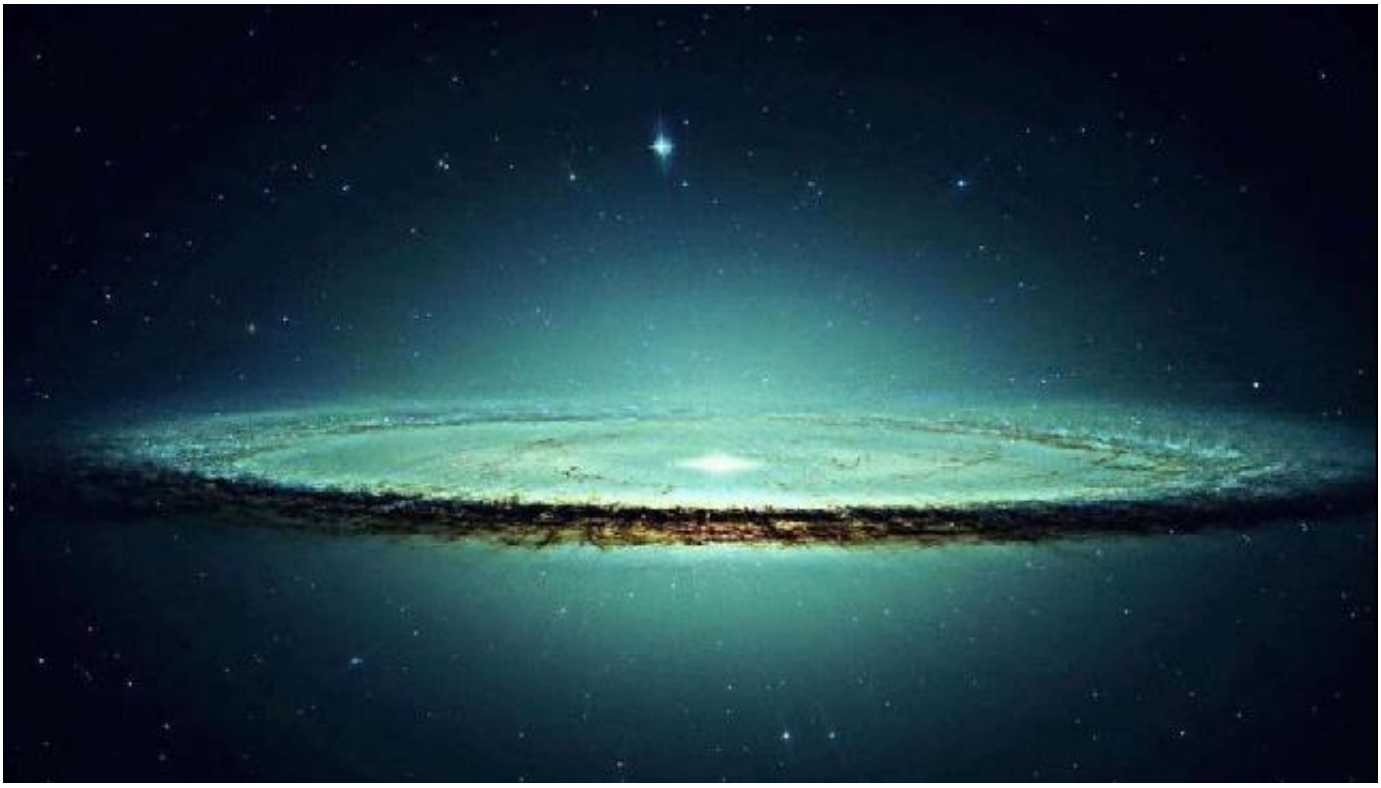
Sombrero Galaxy in Infrared



Credits: NASA and the Hubble Heritage Team (STScI/AURA)

This stunning Hubble image of M104, also known as the Sombrero galaxy, is one of the largest mosaics ever assembled from Hubble observations. The hallmark of the nearly edge-on galaxy is a brilliant, white, bulbous core encircled by thick dust lanes comprising the spiral structure of the galaxy. This dust lane is the site of star formation in the galaxy. The center of M104 is thought to be home to a massive black hole.

Hubble easily resolves the Sombrero galaxy's rich system of globular clusters, estimated to be nearly 2,000 in number — 10 times more than the number of globular clusters in our Milky Way galaxy. The ages of the clusters are similar to those in the Milky Way,

ranging from 10-13 billion years old. Embedded in the bright core of M104 is a smaller disk (not visible in the image), which is tilted relative to the large disk. X-ray emission suggests that there is material falling into the compact core, where a one-billion-solar-mass black hole resides.

With an apparent magnitude of 8, the Sombrero galaxy is beyond the limit of naked-eye visibility but can be spotted through small telescopes most easily during May. M104 is located 28 million light-years away in the constellation Virgo, and with a mass equal to 800 billion suns, it is one of the most massive objects in the Virgo galaxy cluster.

M104 was discovered in 1781 by the French astronomer and comet hunter Pierre Méchain, one of Charles Messier's colleagues.

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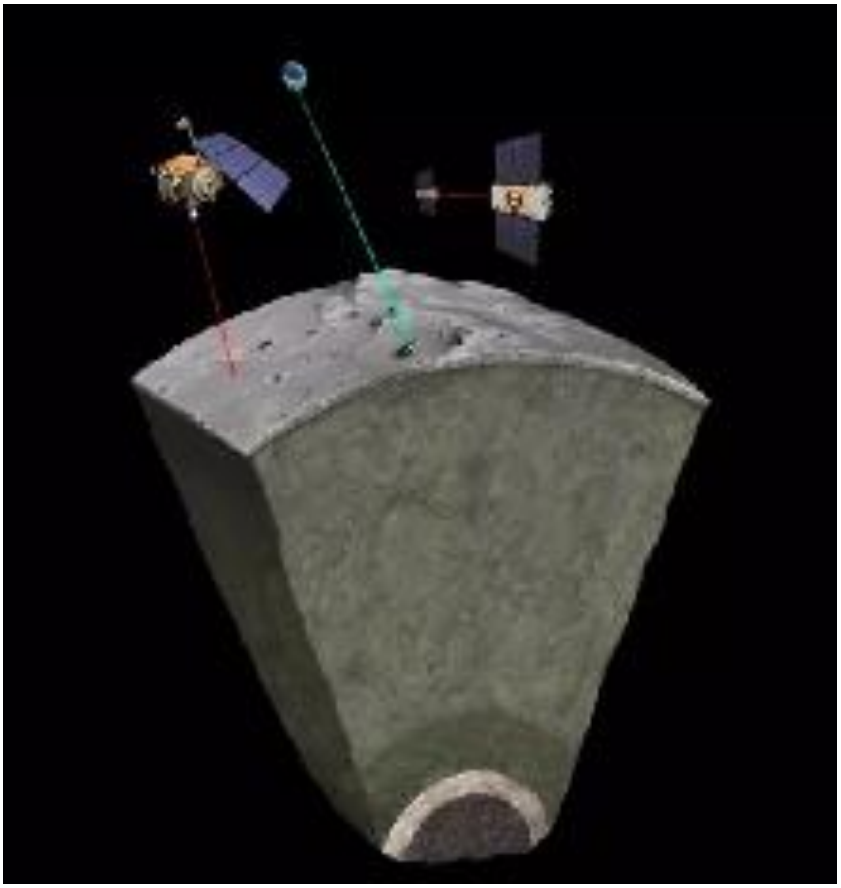
Confirmation the Moon Has a Solid Iron 'Heart' Just Like Earth

After more than 50 years, scientists finally confirmed that the moon has a solid inner core, just like Earth.



An illustration of the moon's newly confirmed interior structure, showing a thin crust, a very thick mantle, a zone at the mantle/core interface of low viscosity, a liquid outer core, and a solid inner core.
(Image credit: Geoazur/Nicolas Sarter)

After more than 50 years, scientists have finally uncovered the moon's interior structure, showing that our closest celestial companion has a fluid outer core and a solid inner core, similar to Earth's. A team of researchers from the Côte d'Azur University and the Institute of Celestial Mechanics and Ephemeris Calculations (IMCCE) in France detailed these findings May 3 in a study published in Nature(opens in new tab).

Astronomers have puzzled over the moon's structure since well before any probes landed there. A hot debate raged in the first half of the 20th century as to whether the moon was a "primitive" rocky world, like Mars's moons Phobos and Deimos, or whether it had a rich inner geology.

The first hints that the moon had an Earth-like interior came from NASA's Apollo missions. Data gathered by the lunar landers' instruments suggested that the celestial body was differentiated — or layered with denser material at the center and less dense material nearer the surface — as opposed to uniform rock all the way through. Apollo

astronauts even left seismometers on the moon, which later revealed that it experiences moonquakes, according to NASA(opens in new tab).

However, scientists were only recently able to sort through the massive data sets from the Apollo missions and other lunar probes to get a clearer picture of the moon's insides. In 2011, research from NASA suggested that the moon's outer core was made of fluid iron, and created a distinct partially melted layer where it met the mantle. The study also hinted that the moon might have an iron-based inner core.

Now, the new study has confirmed that this dense inner core exists. Using a detailed computer model built on geological data from the Apollo program and NASA's GRAIL mission — which used a pair of probes to monitor the moon's gravitational field for more than a year — the researchers determined that the inner core is about 310 miles (500 km) in diameter, or only 15% of the Moon's width. This small size likely explains why scientists had such a hard time detecting it, according to the researchers.

In addition, the study found the first evidence of mantle overturn on the moon — a process by which warmer molten material rises through the mantle like blobs of wax in a lava lamp. According to the researchers, this may explain the presence of iron on the moon's surface.

Gaining a deeper understanding of the moon's inner workings can help scientists further unravel its geologic mysteries, such as what happened to the once-powerful lunar magnetic field. (While the moon has no magnetic field today, rock samples suggest it once had a magnetic field that rivaled Earth's). And as governmental agencies and private space companies gear up for new lunar missions this decade, the promise of more data is right around the corner.

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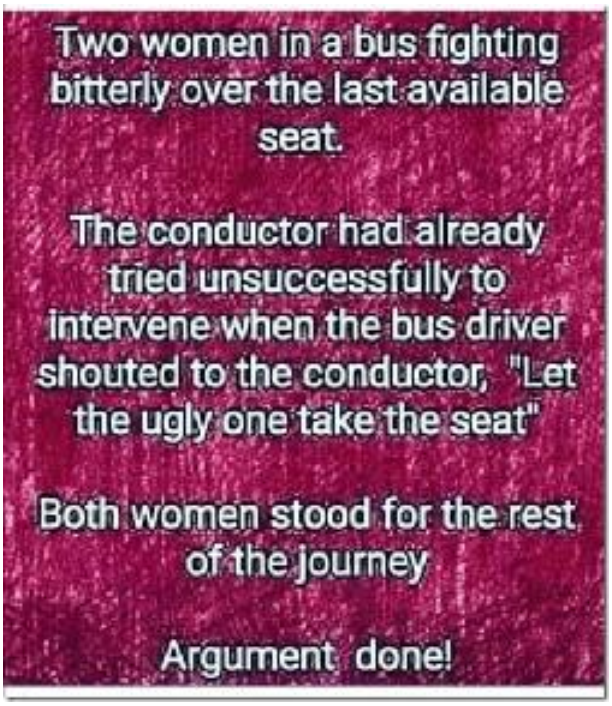

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Carrier Landings in the T-28C

https://youtu.be/MH1G6k_N6J8

It's one small step to becoming a Naval Aviator.

My turn at this took place in 1959 on the Essex-Class Antietam, the world's first true angled-deck aircraft carrier. Though long in the tooth by then, she was a perfect fit for the training command aircraft. Thus with scarcely a ripple to mar the billiard table

smoothness of the ocean off Pensacola, she did her duty as a willing target, absorbing my thumps before allowing me to return to Pensacola as a proud peacock.

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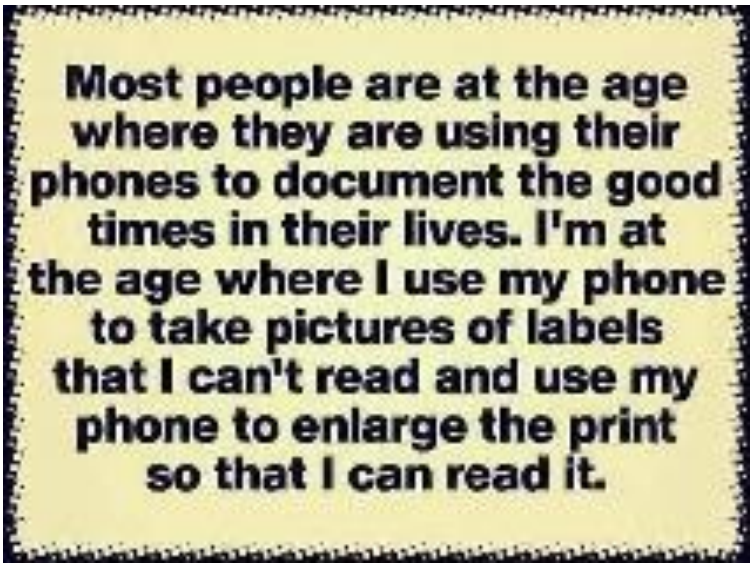

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Blockchain Explained

A blockchain is a database that is shared across a network of computers. Once a record has been added to the chain it is very difficult to change. To ensure all the copies of the database are the same, the network makes constant checks. Blockchains have been used to underpin cyber-currencies like bitcoin, but many other possible uses are emerging.

https://bit.ly/3R4VVfg

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Measuring the Speed of Light

What is the history behind determining the speed of light? How did past scientists determine it value.

This video covers Rømer, Bradley, Fizeau and Foucault and how they determined the speed of light.
https://youtu.be/jUHgIYNEzJQ?t=33

Correction to the discussion on Rømer's calculation:
https://youtu.be/TAIlswch5d0

From instantaneous to 300,000 km/sec in three centuries. Them's good brakes.

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Muriel Anderson Demonstrates Her Doolin Harp Guitar

https://youtu.be/YUlc-rQSWKc

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Why Your Phone Is Making You Sad

Phone addiction is real, and researchers are becoming more concerned with what it is doing to our brains and bodies. This video explains the up to date research on what creates phone addiction, how to tell if you are clinically addicted to your phone and the top three scientific tips for decreasing phone use.

https://youtu.be/vcjQ5JkEE_0

Do you think there's a relationship between phone addiction and gun violence?

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Mister Mr. Kyrie

Even though it is not generally interpreted as such, at the end of the day it has been asserted that Mr. Mister's "Kyrie" is more or less a prayer. More specifically the phrase "Kyrie eleison", which is repeated throughout the track, actually is Greek. When translated to English, it means "Lord have mercy". And it is the opening line of a

traditional prayer in certain parts of Europe. So we know that to some extent, the addressee of this song is actually God Himself.

But there is a particular reason he is appealing directly to the Most High. The way the story reads is that his heart is compelling him to venture into the unknown. Or stated alternatively, he has a spiritual yearning to set out into the open world in search of his destiny. And in acknowledgement of the inevitable dangers and uncertainties which lie ahead, he is asking for God's mercy. Or more to the point, he anticipates the need for divine favor and assistance as being essential in actually succeeding at this life-threatening goal. And as such, he is attempting to establish the necessary rapport with God from the onset.

Kyrie https://www.youtube.com/watch?v=9NDjt4FzFWY

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Machine Learning Brings Sharpness and Color to Thermal Images

Clearer picture: illustration of a HADAR image of a tree made by combining thermal physics, infrared imaging and machine learning.
(Courtesy: Purdue University)

Our ability to detect and classify images in low-visibility and night-time conditions has been transformed by technologies such as sonar, radar and LiDAR. These systems involve sending out a signal (sound, radio, light etc.) signal and detecting reflections.

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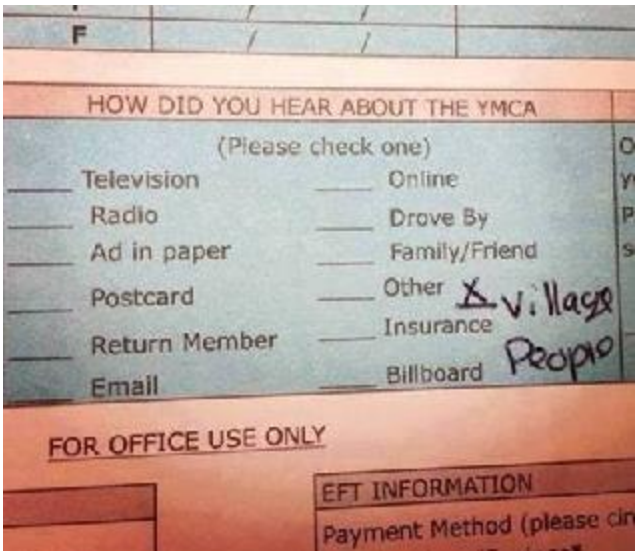

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'Largest' Commercial Electric Drone Approved

It may help you "buy the farm" with cash

Pyka

The FAA has approved commercial use of the biggest electric drone it's ever certified and it may be coming to a farm near you. The Pelican Spray, developed by Oakland-based startup Pyka, is a Cub-sized cropdusting drone that's already in operation in Costa Rica, Honduras and Brazil to spray bananas, cotton, soy and corn. The company intends to expand its business to U.S. agriculture.

https://youtu.be/KCPb863TWAk

The Pelican Spray weighs 1,125 pounds and carries 540 pounds of liquid. It takes about 15 minutes to empty the tank and while it's on the ground for a fill-up the batteries are swapped out. The aircraft has three motors, one on each wing and one on the tail. Pika is also developing a cargo drone that holds about 70 cubic feet. The FAA is currently assessing it for commercial use. Pyka officials say the ultimate goal is to build passenger-carrying drones and the cropduster and cargo aircraft are designed to "build trust in the technology," according to Bloomberg.

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The British Library Puts 1,000,000 Images into the Public Domain.

They're free for you to reuse & remix

Oxford's Bodleian Library announced that it had digitized a 550 year old copy of the Gutenberg Bible along with a number of other ancient bibles, some of them quite beautiful. Not to be outdone, the British Library came out with its own announcement:

> *We have released over a million images onto Flickr Commons for anyone to use, remix and repurpose. These images were taken from the pages of 17th, 18th and 19th century books digitised by Microsoft who then generously gifted the scanned images to us, allowing us to release them back into the Public Domain. The images themselves cover a startling mix of subjects: There are maps, geological diagrams, beautiful illustrations, comical satire, illuminated and decorative letters, colourful illustrations, landscapes, wall-paintings and so much more that even we are not aware of.*

https://bit.ly/3R2PyJ4

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Francis Poulenc. Concerto for Two Pianos and Orchestra

Composer Francis Poulenc made an important contribution to French music in the decades after World War I and whose songs are considered among the best composed during the 20th century.

Concerto pour deux pianos (Concerto for Two Pianos and Orchestra) in D minor, FP 61, was composed over the period of three months in the summer of 1932. It is often described as the climax of Poulenc's early period.

Alexander Malofeev and Sandro Nebieridze with the Svetlanov Symphony Orchestra
https://youtu.be/MHP2YFC3U-0

The concerto was commissioned by and dedicated to the Princess Edmond de Polignac, an American-born arts patron to whom many early-20th-century masterpieces are dedicated, including Stravinsky's *Renard* , Ravel's *Pavane pour une infante défunte* , Kurt Weill's *Second Symphony*, and Satie's *Socrate* .

The concerto is in three movements as follows:

Allegro ma non troppo – in D minor. Poulenc chooses to bypass the conventions of sonata allegro in the opening movement in favor of ternary form, with a slower middle section. If this first movement is meant to evoke Mozart, it is the blithe composer of the delightful Divertimenti and Serenades. The general effect is "gay and direct", words Poulenc often used to describe his own music.

Larghetto – in B-flat major. In the gently rocking, consciously naive Larghetto, Poulenc evokes the famous Andante from Mozart's D Minor Concerto, K. 466. The increasingly sonorous, steadily building middle section echoes the spirit of Camille Saint-Saëns, who, though indefatigably French, could in his serious moments be among the most Mozartean of 19th-century composers. Poulenc commented, "In the Larghetto of this Concerto I permitted myself, for the first theme, to return to Mozart, because I have a fondness for the melodic line and I prefer Mozart to all other musicians. If the

movement begins alla Mozart, it quickly diverges at the entrance of the second piano, toward a style that was familiar to me at the time."

Allegro molto – in D minor. Poulenc's finale is a syncretic Rondo that merges the insouciance of a Parisian music hall and the mesmerizing sonorities of a gamelan orchestra. Its scintillating patter and energetic rhythms produce a vivacious, effervescent effect. As did his idol Mozart, Poulenc favors us with profligate melodious invention, featuring a new theme for nearly each succeeding section. His biographer Henri Hell has observed, "the finale flirts with one of those deliberately vulgar themes never far from the composer's heart."

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Without the Sound, a Ferrari 365 GTB/4 Would Just Be a Prius

Take a little ride and you'll see what I mean.

https://youtu.be/7hJkHKGXitQ

https://youtu.be/6kEYuphUZpg?t=6

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What Can You Say That Won't Offend Someone?

https://youtu.be/VWE--VLxrdM?t=1

Nothing

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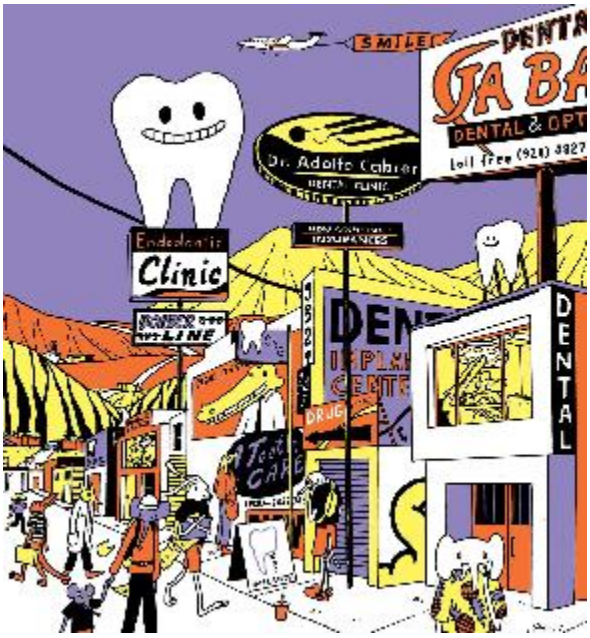
How a Tiny Mexican Border City Built a Budget Dental Empire

Medical tourists flock to Molar City for its 350 dental offices and relief from the high costs in the US and Canada.



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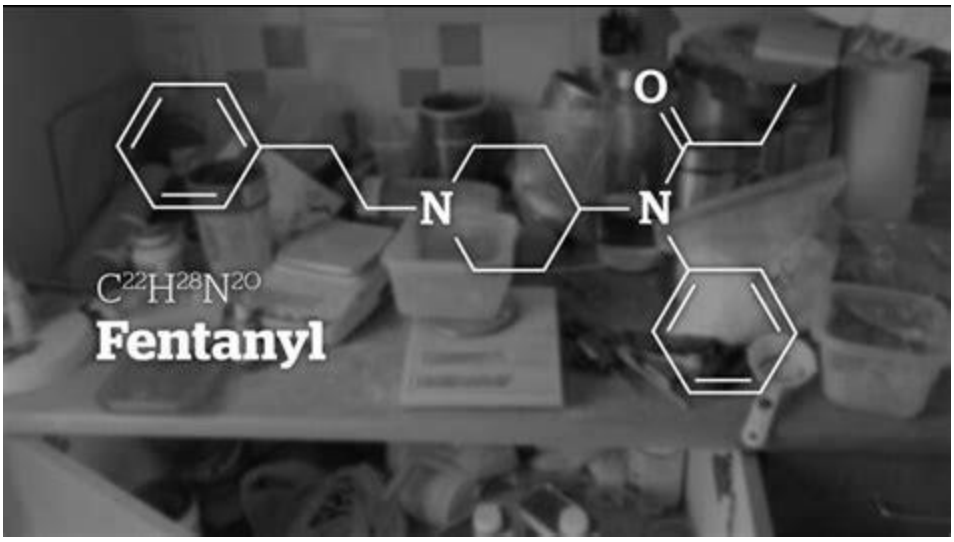
Fast, Cheap and Deadly



A grain of sand: Why fentanyl is so deadly - British Columbia - CBC News

How fentanyl replaced heroin and hooked America

https://bit.ly/3YUSb1B

I'd title this, "How Americans Hooked Themselves on Fentanyl," to include the abuser.

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More Wisdom from Codgers

The years between 60 and 90 are the hardest.....

You are always being asked to do things, and yet you are not decrepit enough to turn them down."
T.S. Elliot

"At age 20, we worry about what others think of us; at age 40, we don't care what they think of us; at age 60, we discover they haven't been thinking of us at all."
Ann Landers

"The important thing to remember is that I'm probably going to forget."
Unknown

"It's paradoxical that the idea of living a long life appeals to everyone, but the idea of getting old doesn't appeal to anyone."
Andy Rooney

"The older I get, the better I used to be."
Lee Trevino

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1930s USA – Fascinating Street Scenes of Vintage America

pinterest

https://youtu.be/xEiWB0g9sVk

Taken in the midst of the Great Depression, these photos are intriguing.

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Nearly every material, whether it is solid, liquid, or gas, expands when its temperature goes up and contracts when its temperature goes down. There is, however, a class of metal alloys called Invars (think invariable), that stubbornly refuse to change in size and density over a large range of temperatures.

Samples of invar alloy.

For over 150 years, scientists have known that thermal expansion is related to entropy, a central concept in thermodynamics. Entropy is a measure of the disorder, such as positions of atoms, in a system. As temperature increases, so does the entropy of a system. This is universally true, so an Invar's unusual behavior must be explained through something counteracting that expansion.

https://bit.ly/45p2QUe

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Rugby: It's How to Keep Your Favorite Beluga Whale Amused

https://youtu.be/NQ3sAIEg6OY

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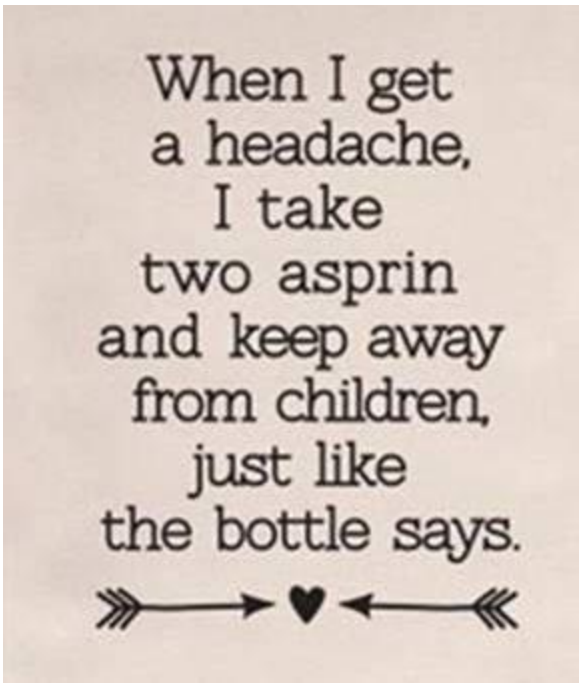

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'Power Naps' Improve Memory and Lower Heart Disease Risk,

…but, napping can come with drawbacks as well as benefits. Read on to find out how to get the most out of your afternoon snooze.

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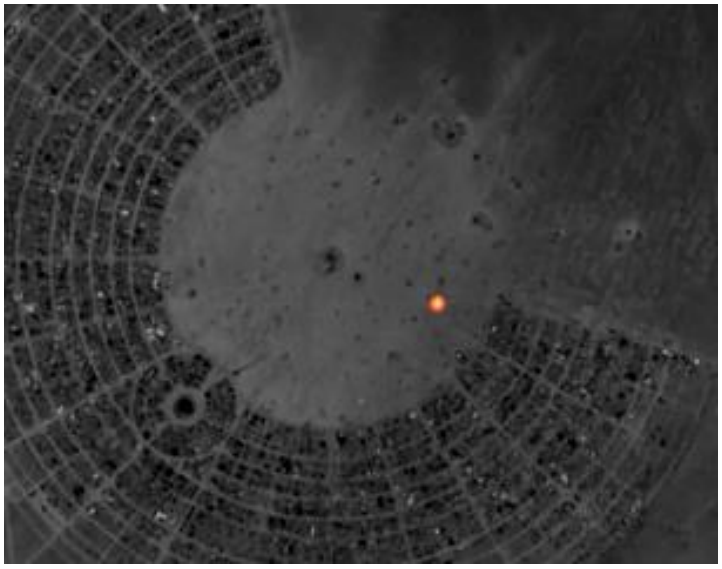
Satellites capture Burning Man festival's fire from space



https://bit.ly/3Pgsup9

Peek-a-Boo.

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What Do Jellyfish, Astronauts, and Snakes Have in Common?

Across the animal kingdom there are creatures that move through their environments not by walking or running or climbing but instead by simply changing the shape of their bodies. This kind of locomotion is found in snakes as they slither, in stingrays as a they swim, and even in cats as they twist themselves to land on their feet as they fall.

https://bit.ly/3OBy4kh

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Flash Mob Orchestra - 22 luglio Roma

https://youtu.be/o1mXFa_Z2ww

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Where is Malaysian Airlines Flight 370??

A simple barnacle could help lead us to the missing plane.

In 2014, a Malaysian Airlines flight mysteriously disappeared. A barnacle-encrusted piece of the plane's wing is one of the most important clues that has been found. New science may be able to unlock the ocean records logged in those barnacles, narrowing the search.
Getty Images

By studying the shells of washed up barnacles, scientists have developed new methods for reconstructing the drift of ocean debris that may help narrow the search.

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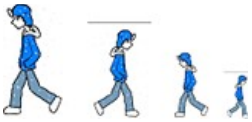
My Walking Thoughts



For Sunday September 3 2023

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I'll start with an observation about today's nation/states…they're all broke or at least facing serious financial concerns.

Last time I looked, there were 173 of these 3