Ode to E Pluribus Unum for Sunday December1 2024

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Wetland Wrestle

Photograph By Karine Aigner, Wildlife Photographer of the Year

American wildlife photographer Karine Aigner was leading a tour group in Mato Grosso, Brazil, when she noticed an odd shape in the water. Her binoculars revealed a yellow anaconda coiling its body around the snout of a yacare caiman.

In "Wetland Wrestle," which took home the award for Behavior: Amphibians and Reptiles, it's unclear which predator attacked first. Aigner has photographed multiple stories for National Geographic, including a rare look at a bobcat family.

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Curiosity Mars Rover Takes a Last Look at Mysterious Sulfur

The rover captured a 360-degree panorama before leaving Gediz Vallis channel, a feature it's been exploring for the past year.

NASA's Curiosity Mars rover captured this last look at a field of bright white sulfur stones on Oct. 11, before leaving Gediz Vallis channel. The field was where the rover made the first discovery of pure sulfur on Mars. Scientists are still unsure ex...
Credit: NASA/JPL-Caltech/MSSS

The rover is searching for evidence that ancient Mars had the right ingredients to support microbial life, if any formed billions of years ago, when the Red Planet held lakes and rivers. Located in the foothills of Mount Sharp, a 3-mile-tall (5-kilometer-tall) mountain, Gediz Vallis channel may help tell a related story: what the area was like as water was disappearing on Mars. Although older layers on the mountain had already formed in a dry climate, the channel suggests that water occasionally coursed through the area as the climate was changing.

https://go.nasa.gov/4eIx1df

You might want to save this since Curiosity won't pass this way again.

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I hate hotel towels. So thick and fluffy, I can't even close my suitcase.

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SUV Named Stanley Revolutionized Driverless Car Technology

Stanley won the 2005 DARPA Grand Challenge Stanford Racing

Almost 20 years ago, a blue Volkswagen Touareg, now on view at the National Museum of American History, won a competition and led to the "birth moment" of self-driving cars

On October 8, 2005, a blue Volkswagen Touareg modified with sensors for mapping beat 22 other robot vehicles to win the Defense Advanced Research Projects Agency (DARPA) Grand Challenge, a 132-mile driverless car competition across desert terrain near the California-Nevada state line funded by the Department of Defense. The Stanford Racing Team, the winners who built and operated the car, called Stanley, won the $2 million prize with a time of 6 hours, 53 minutes.

https://bit.ly/3T7JYp9

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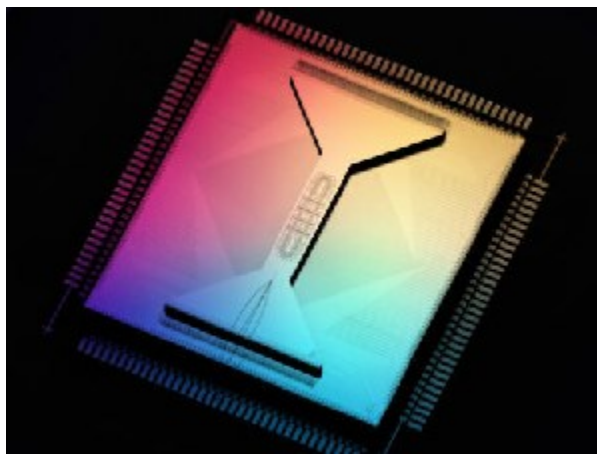## Classic Tin Toys Live on for the Holidays

moss&fogg

With all of the millions of modern toys and electronic gifts available these days, it's refreshing to see that old fashioned, analog toys dating back over 100 years are still available.

https://mossandfog.com/classic-tin-toys-live-on-for-the-holidays/

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Microsoft Performs Operations with Multiple Error-Corrected Qubits

Microsoft boosts error correction on Quantinuum machine, partners with Atom Computing.

Enlarge / Quantinuum's H2 "racetrack" quantum processor.
Quantiniuum

On September 10, 2024, Microsoft made a series of announcements related to its Azure Quantum Cloud service. Among them was a demonstration of logical operations using the largest number of error-corrected qubits yet.

"Since April, we've tripled the number of logical qubits here," said Microsoft Technical Fellow Krysta Svore. "So we are accelerating toward that hundred-logical-qubit capability." The company has also lined up a new partner in the form of Atom Computing, which uses neutral atoms to hold qubits and has already demonstrated hardware with over 1,000 hardware qubits.

Collectively, the announcements are the latest sign that quantum computing has emerged from its infancy and is rapidly progressing toward the development of systems that can reliably perform calculations that would be impractical or impossible to run on classical hardware. We talked with people at Microsoft and some of its hardware partners to get a sense of what's coming next to bring us closer to useful quantum computing.

I suspect the next iteration will be made of unobtanium.

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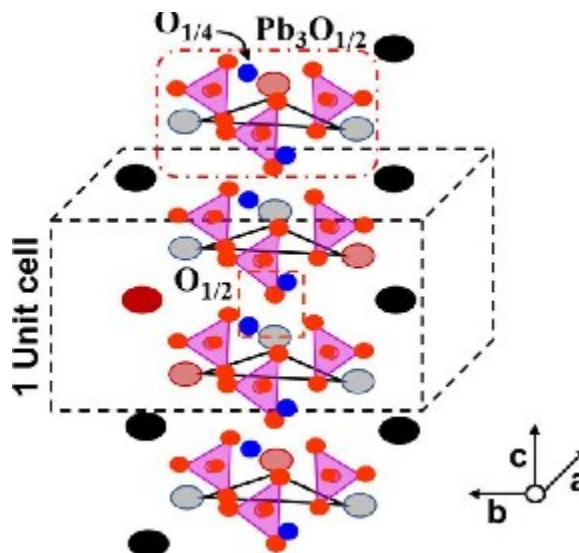
Superconductivity: the Search and the Scandal

Recent high profile controversies haven't deterred scientists from searching for one of research's ultimate prizes: room temperature superconductors. Kit Chapman reports on the claims

The 'superconductor' LK-99 was supposedly a copper-doped lead apatite.
Source: © Sukbae Lee et al

In July 2023, the world became obsessed with superconductivity. Two pre-prints from a group in South Korea claimed that a copper-doped lead-apatite, dubbed LK-99 after its two proposers, Lee Sukbae and Kim Ji-Hoon, was a superconductor at room temperature and ambient pressure. The claims spread across social media, with both seasoned groups and amateur chemists trying to recreate the material. By August, a consensus was reached that LK-99 was yet another dead end, and not a superconductor at all.
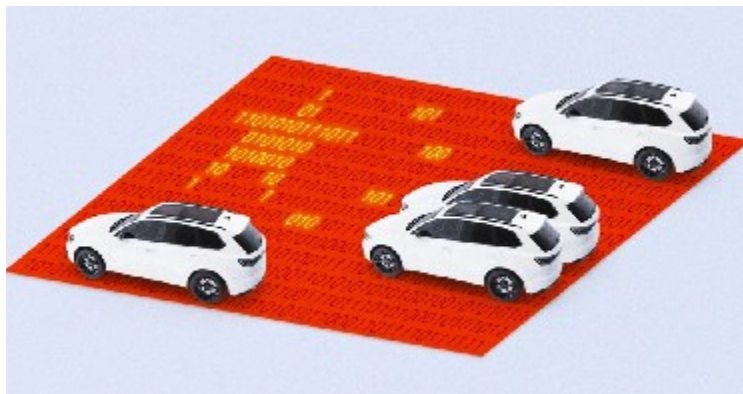
The news followed a paper in Nature that proposed another room-temperature superconductor, this time only showing its properties at intense pressures, by Ranga Dias at the University of Rochester in the US. Yet Dias' claims have now been retracted, and his data and academic reputation have been brought into question amid allegations of research fraud and plagiarism.

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What Does a Proposed Ban on Chinese Tech Mean?

There is little Chinese software or hardware on US roads today, but US government officials are proposing a proactive ban.

Anna Kim

A US Commerce Department proposal that would ban the sale or import of connected and autonomous vehicles made with Chinese and Russian software and hardware could do just that.

If implemented, the software ban would take effect for model year 2027 vehicles. The hardware rules would take effect "for model year 2030, or January 1, 2029 for units without a model year."

https://bit.ly/3ZTHijl

A response to one of them-there existential threats we keep hearing about.

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David Pugh
@davidsoho1

Got sad news today. After 7 years of medical training, my good friend has been struck off after 1 minor indiscretion. He slept with 1 of his patients & now can no longer work in the job he loves. What a waste of time, training & money. A genuinely nice guy, and a brilliant vet..

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New 3D Printing Technique Creates Unique Objects with Less Waste

By using a 3D printer like an iron, researchers can precisely control the color, shade, and texture of fabricated objects, using only one material.

MIT News

Multimaterial 3D printing enables makers to fabricate customized devices with multiple colors and varied textures. But the process can be time-consuming and wasteful because existing 3D printers must switch between multiple nozzles, often discarding one material before they can start depositing another.

Researchers from MIT and Delft University of Technology have now introduced a more efficient, less wasteful, and higher-precision technique that leverages heat-responsive materials to print objects that have multiple colors, shades, and textures in one step.

Their method, called speed-modulated ironing, utilizes a dual-nozzle 3D printer. The first nozzle deposits a heat-responsive filament and the second nozzle passes over the

printed material to activate certain responses, such as changes in opacity or coarseness, using heat.

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What's the 'Coastline Paradox'?

How would you measure the coastline at Rosguill peninsula, County Donegal, Ireland?
(Image credit: Tuul & Bruno Morandi via Getty Images)

Flanked with fjords and inlets, Alaska is the state with the most coastline in the United States. But what is the length of its oceanic coast?

It depends on whom you ask. According to the Congressional Research Service, the number is 6,640 miles (10,690 kilometers). But if you consult the National Oceanic and Atmospheric Administration (NOAA), the coastal edges of the state total 33,904 miles (54,563 km).

This measurement inconsistency has fascinated mathematicians for decades. According to work published in 1961, English mathematician Lewis Fry Richardson noted how different countries had different lengths for the same shared border because of differences in scales of measurement. In 1967, mathematician Benoit Mandelbrot expanded on Richardson's work, writing a classic Science paper on the length of Britain's coastline. This later led him to discover and conceptualize the shape of fractals, a curve that has increased complexity the more you zoom in. Mathematically, the length of all fractals diverge to infinity, since in theory, you can zoom into these shapes indefinitel
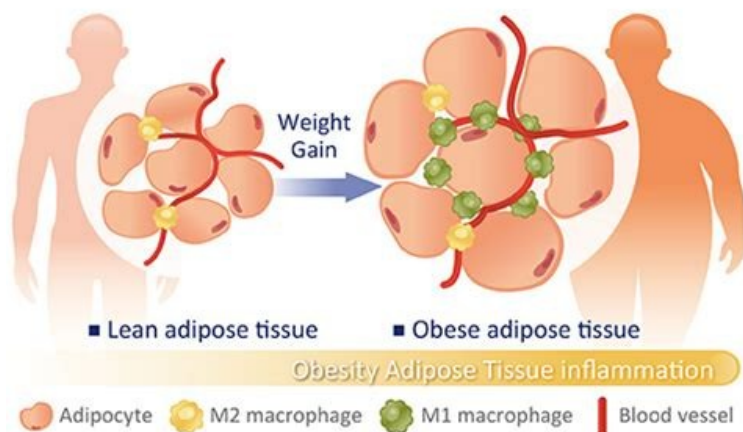
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Fat Cells 'Remember' Obesity

- Lean adipose tissue
- Obese adipose tissue

Obesity Adipose Tissue inflammation

Adipocyte   M2 macrophage   M1 macrophage   Blood vessel

genetex

Fat tissue cells keep a "memory" of obesity after dieting, with long-lasting changes to gene function, a new study finds. The study may help explain why many people struggle to sustain long-term weight loss.
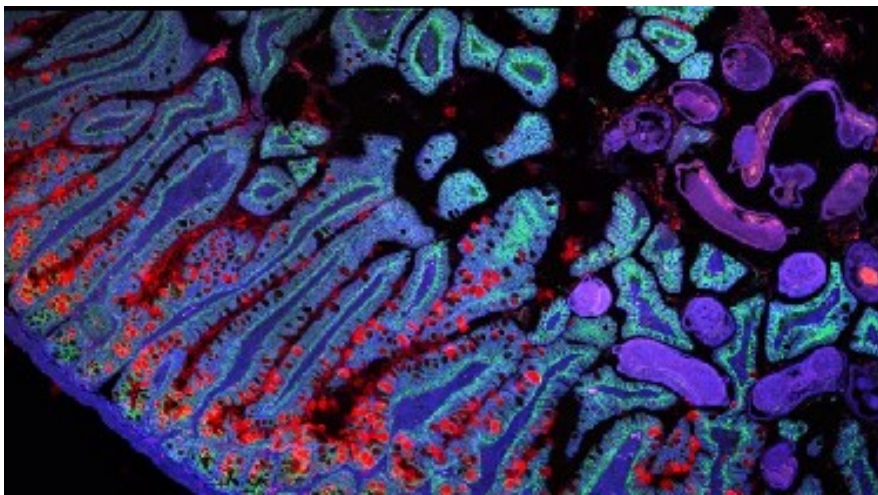
Researchers analyzing fat tissue cells in humans and mice found epigenetic changes to the RNA of those with a history of obesity compared with control groups (see RNA overview). Genes involved in metabolism for those individuals were turned off; their fat cells also took in nutrients at a faster rate. After low-calorie diets, those with a history of obesity regained weight faster than their respective control groups.

The study suggests a correlation—not necessarily causal tie—between the pace of weight regain and epigenetic markers for those with a history of obesity. These molecular differences remained even after stomach reduction and gastric bypass surgery, with no known mechanism to reverse them. Researchers suggest their findings may emphasize the value of prevention. Read the full study here.

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Atlas of Cells Transforms Understanding of Human Body

An ambitious plan to map all 37 trillion cells in the human body is transforming understanding of how our bodies work, scientists report.

The Human Small Intestine
Broad Institute

The old maps of the body had the equivalent of major roads and significant geography but also areas cartographers labelled unknown or "terra incognita".

"[Now] it looks more like a Google map, you have a high resolution view and then on top of that you have the Street View that explains what's going on, and then on top of that you can see the dynamic changes during the day when less cars are flowing or more cars are flowing," said Dr Aviv Regev, one of the founders who now works at now at Genentech.

The project so far has looked at more than 100 million cells – deeply analysing each individual one - from 10,000 people around the world.

The journal Nature has now published a series of 40 scientific discoveries as researchers work towards creating the first draft of the whole human cell atlas.

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Lender Bailing Out Desperate Luxury Property Owners—for a Price

Bay Point Advisors steps in when traditional banks won't. But some say the company can be too cutthroat when it comes to getting paid.

La Dune, once asking $150 million, sold for $89 million after an auction in January.
Photo: Chloe Gifkins

It is hard to say precisely when art magazine publisher Louise Blouin's financial problems began, but by November 2022 she was desperate.

Saddled with debt and facing foreclosure on La Dune, an oceanfront estate in the Hamptons, Blouin borrowed $62 million from Georgia-based lender Bay Point Advisors, hoping to buy herself time to refinance or sell. Roughly 14 months later, however, the bridge loan ballooned to more than $80 million, thanks to a 24% default interest rate and late fees.

https://bit.ly/3ASY2go

My alter ego, Zom, says "Tango Sierra."

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All Aboard the Most Festive Holiday Train Rides in the U.S.

Live out your Polar Express dreams on these holiday train rides across the country.

Allstate CTA Holiday Train
Railroad Museum of New England

Whether you're looking for a festive family outing, with trinkets and treats, or an elaborate evening affair with boozy libations, holiday lights shows, and a post-ride feast, there's guaranteed to be a makeshift Polar Express out there for you this holiday season. Don your coziest pair of pajamas, come hungry for cookies, and climb aboard one of these jolly trains that are sure to thaw even the Grinchiest of hearts.

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Shortlisted Images for the 2024 Close-Up Photographer of the Year

Crystal Blue Flight. Butterflies & Dragonflies.
© Jose Madrigal / cupoty.com

The Close-up Photographer of the Year competition is now in its sixth year, and recently released its shortlisted picks, with the winners set to be announced in January. The contest "celebrates close-up, macro, and micro photography," among 11 separate categories. Competition organizers were once again kind enough to share some of these amazing images with us here.

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Pictures of the Year 2024

National Geographic photographers ventured to places far and wide to capture the year's most fascinating images.

A black tiger—known for its merged stripes—patrols the Similipal Tiger Reserve
Prasenjeet Yadav

https://bit.ly/4i4nYGM

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Chords & Riffs

Morten Lauridsen (1943-)

cathedralvoices.org

An American composer and teacher, the National Medal of Arts recipient (2007) was composer-in-residence of the Los Angeles Master Chorale from 1994 to 2001, and is professor emeritus of composition at the USC Thornton School of Music, where he taught for fifty-two years until his retirement in 2019.

A native of the Pacific Northwest, Lauridsen worked as a Forest Service firefighter and lookout on an isolated tower near Mount St. Helens. He attended Whitman College for 2 years, before traveling south to study composition at the University of Southern California

In 2006, Lauridsen was named an "American Choral Master" by the National Endowment for the Arts. In 2007, he received the National Medal of Arts from the president in a White House ceremony, "for his composition of radiant choral works combining musical beauty, power and spiritual depth that have thrilled audiences worldwide."

Works include O Magnum Mysterium, Lux Aeterna, Madrigali, Dirait-on, and Nocturnes

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O Magnum Mysterium https://youtu.be/_XlxtJjcgts?t=9
Sure on this shining night https://youtu.be/ZnmjP_wAAEM?t=1
How he wrote Dirait-on https://youtu.be/oT-Mh_a4H1c?t=5
Lux Aeterna https://youtu.be/wZX5wXVY-Ks?t=1
Prayer Poem by Dana Gioia Wartburg Choir https://youtu.be/x1xr-aWsQEA?t=6
Nocturnes https://youtu.be/xSy0gzaiVu0

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Why We Lose Our Voice, And How To Get It Back

'Tis the season to get croaky, fa-la-la la la, la-cough cougH COUGH

If your throat starts glowing red, please see a doctor.
Image Credit: Prostock-studio/Shutterstock.com

Medically speaking, losing your voice is known as laryngitis – an inflammation of your larynx, or voice box. And to understand why it causes your normally dulcet tones to turn raspy and hushed, it helps to have a good picture of what's going on physically inside your throat.

https://bit.ly/3UXhGyy

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For Octopuses, Changing Colors Is Hard Work

Cephalopod camouflage is serious metabolic business.

An octopus arm. The small dots visible on the arm are the chromatophores.
Credit: Jamie Andersen Fields.

Cephalopods are well-known for their incredible ability to camouflage and communicate via their rapidly color-changing skin. But the process of shifting hues or holding a color takes a significant amount of effort, according to a study published November 18 in the journal Proceedings of the National Academy of Sciences. Octopuses expend the same amount of energy activating their color-changing system as they do maintaining all other aspects of their resting metabolic rate, including digestion, respiration, organ function, and circulation, per the new research.

The findings are the first to quantify how much work goes into switching on chromatophores, the specialized color-changing organs connected to cephalopods' muscle and nervous systems, which dot the marine invertebrates' skin like pixels. When at rest, chromatophores are spherical, appearing as small points of pigment–but when expanded, they become flattened disks of color that visually merge together in remarkable displays.

https://bit.ly/40TXAZN

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'She Turns Her Siphon into a Gun'

Watch coconut octopus firing stones at fish in world-1st footage

The coconut octopus shot stones out of her siphon at passing fish — a behavior that had never been seen before.
(Image credit: Netflix/Our Oceans)

Octopus filmed firing stones from her siphon from inside a clam shell like a sniper in never-before-seen behavior captured for the Netflix series Our Oceans.

The clip, filmed for Netflix's new series "Our Oceans," shows a coconut octopus (Amphioctopus marginatus), also known as a veined octopus, as it fires tiny stones from its siphon — a tube-like structure octopuses use to swim and steer — at fish swimming by.

https://bit.ly/4fEuGSf

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Feather-Inspired Airplane Flaps Could Boost Flight Performance

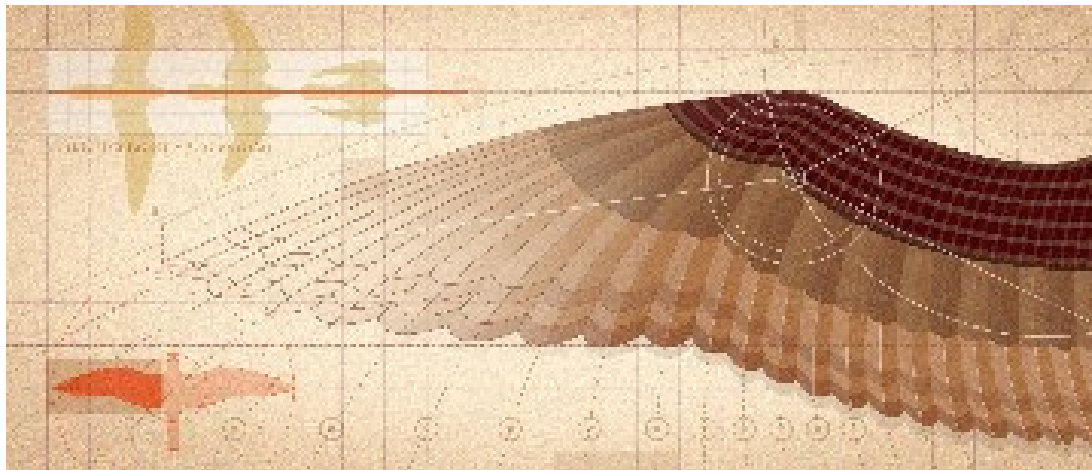*Rows of the flaps improve airfoil lift, reduce drag and mitigate stall*

The overlapping rows of covert feathers on this brown pelican's wings can be distinguished by their light gray color. Imitations of these tufts could help improve aircraft flight performance.

Bird wings are contoured with overlapping rows of feathery tufts, spreading out from near the shoulder. These "covert feathers" help birds maneuver through the air. They could boost the performance of aircraft, too. Lining aircraft wings with rows of lightweight flaps that mimic covert feathers can increase lift, reduce drag and prevent stall, researchers report October 28 in Proceedings of the National Academy of Sciences.

https://bit.ly/3YVj99S

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Nature-Inspired Designs Are All Around Us
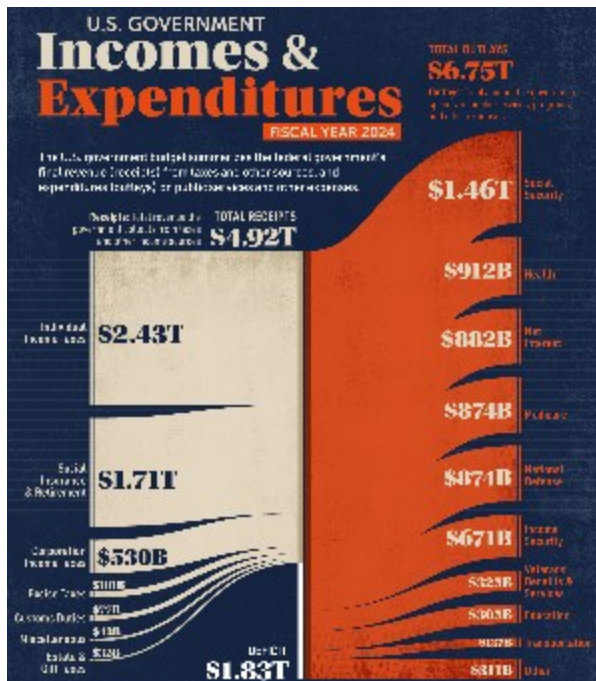

Quanta Magazine

Though the wings of Airbuses and 747s don't flap, the principles of flight were deduced from careful examination of the physics of bats, birds and insects. This phenomenon — where people model designs or machines after nature — is known as biomimicry or biomimetics. Today, such nature-inspired solutions are everywhere. In the 1940s, a Swiss engineer came up with Velcro after returning from a walk in the woods with cockleburs stuck to his legs and his dog. Japanese engineers modeled their efficient bullet trains after kingfishers. And scientists have worked to improve LED lights by studying shimmering fireflies.

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Breaking Down the U.S. Government's 2024 Fiscal Year

Net interest payments cost the U.S. government $882 billion in fiscal year 2024, the third-largest outlay in the final budget.

The U.S. government faced one of its largest budget deficits ever in fiscal year 2024, due to rising interest rates and government spending significantly exceeding revenue.

This graphic visualizes the U.S. government's final budget results for the fiscal year 2024, showing the total receipts and outlays.

The data comes from the U.S. Department of the Treasury, with the U.S. fiscal year running from Oct. 1, 2023 to Sept. 30, 2024.

https://bit.ly/40W0IEw

Do we like working for the Fed? Obviously the big bank folks hope we do.

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My Walking Thoughts

For Sunday December 1 2024

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The Importance of walking

*If you are going to try cross-country skiing,
start with a small country.*

*I know I got a lot of exercise
the last few years,.....
just getting over the hill.*

*We all get heavier as we get older,
because there's a lot more information in our heads.
That's my story and I'm sticking to it.*

*Every time I start thinking too much
about how I look,
I just find a pub with a Happy Hour
and by the time I leave,
I look just fine.*

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What Last Week's Magic Hydraulic Pump Does for the Cougar.

If you were bored by my last week's gushing look at the F-9's Vickers variable displacement hydraulic pump, maybe you should go out and mow the lawn or plow some of that white stuff from your driveway, because you may not find this week's Walking Thoughts even a bit more exciting.

Anyway, if you're still here, I'd like you to consider that just about everything that moves in the F-9 other than the ejection seats and rudder does so at the behest of hydraulic pressure from the Vickers pump. Such things include:

- Powered horizontal tail
- Flaperons
- Landing gear
- Flaps
- Wingfold
- Canopy
- Tailhook retract mechanism
- Gun charger
- Speed brakes

Separately, the hinged upper portions of the flaperons know as flaperettes, are powered by an emergency hydraulic pump in the event of a main system failure.

In my 1500 hours in the Cougar, I had the opportunity to observe the limited control these had by comparison with flaperons... once on my Fam 1 flight as a student, and perhaps 50 times in demonstrations to my very own students.

While there is nothing new in the purpose and behavior of most items in the list, perhaps the flaperons and flaperettes need further explanation.

Flaperons

Cougar with flap down, starboard flaperon elevated,
Airliners.net

For most of the airplanes, lateral control is accomplished by the differential deflection of ailerons on each wing. For example, to make a turn to the left, the pilot moves the stick or yoke to the left causing the aileron on the left wing to rise thereby decreasing its lift, while the aileron on the right wing deflects down, increasing its lift.

In a flaperon system the pilot initiates the left turn as above, only here rather than differential displacements as with the ailerons, only one flaperon—the one on the left wing in this case—deploys, acting as a spoiler, spilling the lift.

Flaperons offer both advantages and disadvantages compared to traditional ailerons:

Advantages:

- Simplified wing design:
- Rugged structure
- Greater roll control at low speeds: Full-span flaperons provide more roll authority during slow flight.

Disadvantages:

- <u>Adverse yaw</u>: At large deflections, flaperons can produce significant adverse yaw.
- <u>Roll reversal</u>: At very high deflection angles (45-50 degrees and beyond), roll control may become ineffective or even reversed.
  (I experienced this in a Mitsubishi MU-2 during a decreasing airspeed approach turn at Ely, NV. Coming to the runway's extended centerline, I added left flaperon meaning to increase the turn in that direction. Instead, the MU-2 snapped nose down to the right… a very untidy situation. After an 'aw shucks' moment, I rolled the airplane wings level with rudder, at the same lowering the nose even more while going to full power. It was one of my more exciting moments, leading to a more stately approach to landing.)

Anyway. It was the simplicity of the flaperon system that made the Cougar the hallmark of the brand's fame, Grumman Ironworks… a name that made it a favorite of Navy and Marine aviators for decades.

Another of the Cougar's fighting superiorities was its hydraulic isolation system that prior to a combat engagement allowed the pilot to cut out all but those hydraulic systems—flight controls and gun charger – essential for fighting. Thus, damage to wingfold, landing gear, flaps, and canopy, would not compromise the F9F-8's fighting ability.

As it turned out, with the exception of Marine fast-mover observation flights in Vietnam, Cougars never took part in combat.

Because of its complexity, explanations of the Cougar's hydraulic system took up the remainder of that week, at the end of which I found myself champing at the bit to get into the air. But such was still a long way off. After a peek at what lay ahead in the thicket of electronics and associated components, I realized that my ground school travails had only just begun.

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