

Ode to E. Pluribus Unum for Sunday February 13 2022



Meander



Barbara Medaille: Oil on canvas 48X60

Barbara and I have been friends since the 1960s. From Los Angeles, Barbara now lives in Healdsburg, CA where she pursues her art career with a passion for unspoiled places. Her work can be found at the Stewart Kummer Gallery in Gualala, CA (www.stewartkummertgallery.com/Medaille/BMedaille.htm)

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Bear Thang

There are bears all colors, shapes and sizes
Some 'out on the town' as the moon rises.
Black/Brown Bears offer an ambivalent mood

Often simply seeking sources of food.
Protecting her young is a mother bear's priority
She demonstrates with a fearless temerity.
Roaming and foraging and climbing a tree
Is Black/Brown Bear's adventure in
Being Free.



Like bears, we are critters who like to eat
Appeasing hunger is a daily feat.
Children, like cubs, are held the closest
Next to the heart that loves them the mostest.

Independence is found in self-control.
And Freedom is always the valued goal.

Francie Troy 1'22

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Do You Know Who Dr. Krissoff Is? You Should.



<https://youtu.be/7tyT4glkvBs>

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Paralysed Man with Severed Spine Walks Thanks to Implant

By Pallab Ghosh, Science correspondent, Lausanne



Spinal implant allows Michel Roccati to walk

A paralyzed man with a severed spinal cord has been able to walk again, thanks to an implant developed by a team of Swiss researchers.

It is the first time someone who has had a complete cut to their spinal cord has been able to walk freely.

The same technology has improved the health of another paralyzed patient to the extent that he has been able to become a father.

The research has been published in the journal Nature Medicine.

Michel Roccati was paralyzed after a motorbike accident five years ago. His spinal cord was completely severed - and he has no feeling at all in his legs.

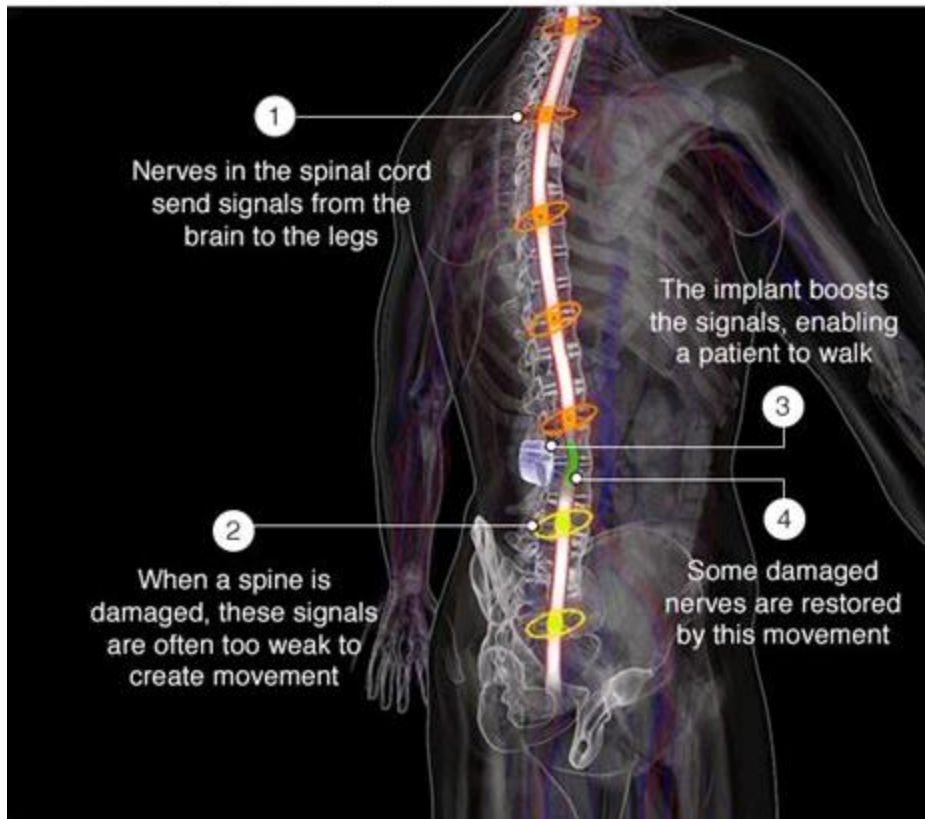
But he can now walk - because of an electrical implant that has been surgically attached to his spine.

Someone this injured has never been able to walk like this before.

The researchers stress that it isn't a cure for spinal injury and that the technology is still too complicated to be used in everyday life, but hail it nonetheless as a major step to improving quality of life.

I met Michel at the lab where the implant was created. He told me that the technology "is a gift to me".

How the spinal implant works



"I stand up, walk where I want to, I can walk the stairs - it's almost a normal life."

It was not the technology alone that drove Michel's recovery. The young Italian has a steely resolve. He told me that from the moment of his accident, he was determined to make as much progress as he could.

"I used to box, run and do fitness training in the gym. But after the accident, I could not do the things that I loved to do, but I did not let my mood go down. I never stopped my rehabilitation. I wanted to solve this problem."

The speed of Michel's recovery amazed the neurosurgeon who inserted the implant and expertly attached electrodes to individual nerve fibres, Prof Jocelyne Bloch at Lausanne University Hospital

"I was extremely surprised," she told me. "Michel is absolutely incredible. He should be able to use this technology to progress and be better and better."

'I always dreamed of walking again'

Doctors use deep-brain ultrasound therapy to treat tremors

Parkinson's results beyond researchers' wildest dreams

The research has been backed by Dr Ram Hariharan, a consultant at the Northern General Hospital in Sheffield who is independent of the research team and also speaks for the Spinal Injuries Association.

"They have done something that has not been done before.

"I have not heard of any study where they have put in an implant [into a patient with a complete spinal cord cut] and demonstrated muscle movements and improving balance, enough to stand and walk."

But he added more clinical trials needed to be carried out before he could be convinced that it was an effective treatment.

"We need more numbers [of patients] to show that it is first safe and that it significantly enhances their lives. Only then can it be taken forward."

Nerves in the spinal cord send signals from the brain to the legs. Some people are paralysed when the nerves are damaged through injury.

In Michel's case there's no signal at all to his legs because the spinal cord is completely severed. But the implant sends signals directly to his legs enabling him to walk, but only when the implant is on.

So far nine people have received the implant and regained the ability to walk. None of them use it to help them walk in their everyday lives - because it's too complicated at this stage. Instead, they use it to practice walking - which exercises their muscles, improves their health - and often, restores a little bit of movement.

David M'zee was one of the first patients to receive the implant. Like Michel, he was able to walk with the implant while using a walker. David's health improved to such an extent he has been able to have a baby girl with his partner Janine, something that was not possible after his accident in 2010.

His daughter, Zoe, is now one year old. When I was with them, she raced with her Dad with her baby walker and took great delight in beating him.

"It's really beautiful!" he beamed with fatherly pride.

"It is great fun. It's the first time I have been walking with her in that way - she with her baby walker, I with my walker."

Having a family has given David a huge amount of joy. And the implant has helped him in subtle, but important ways.

"It helps with the hypotension. I had it for so long. At first I didn't realise I had it. I was getting so tired from time to time.

"Once we found out that the implant can increase the blood pressure it was like 'Wow, that's how life can be!'"

"It's these small things that make a big difference," he told me.

There is still a long way to go before the technology can be used routinely to help paralyzed people to walk, according to Prof Grégoire Courtine, who led the team that developed the technology at the École Polytechnique Fédérale de Lausanne (EPFL).

"This is not a cure for spinal cord injury. But it is a critical step to improve people's quality of life. We are going to empower people. We are going to give them the ability to stand, to take some steps. It is not enough, but it is a significant improvement."

A cure would require regeneration of the spinal cord, possibly with stem cell therapies, which are still at a very early stage of research. Prof Courtine believes that his implant technology could be used in conjunction with nerve regeneration treatments once they are ready.

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Monica the JSF Competitor with Rowdy Yates at the Helm



https://www.thedrive.com/the-war-zone/44157/test-pilot-explains-why-the-x-32-lost-to-what-became-the-f-35?fbclid=IwAR3NISC3WaMLF_IChTqMxLUB6nmZo5Do_ccDj9dKd6NPoj1_8GLHU1BisXg

Its Goofy looks don't tell the whole story but its test pilot does.

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Super Bowl Tickets

I know it's late notice, but a friend of Pete's has two tickets for the Super Bowl in Inglewood, CA at SoFi Stadium Sunday February 13th. They are box seats and he paid \$3,500 per ticket, which includes the ride to and from the airport, lunch, dinner, a \$400.00 bar tab and a pass to the winners locker room after the game. What he didn't realize when he bought them last year was that it's on the same day as his wedding.

If you are interested, he is looking for someone to take his place. It's at St. Paul's Church at 3 pm. Her name is Ashley. She's 5'4", about 100 pounds, a good cook, loves to fish and hunt and will clean your truck. She'll be the one in the white dress.

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Deere Adds 7 Companies to Technology Partnership Program



Deere & Company has added seven companies to its 2022 Startup Collaborator program, which is designed to enhance and deepen its interaction with startup companies whose technology could add value for Deere customers.

The Startup Collaborator is a year-long program providing flexibility for John Deere and startup companies to test innovative technologies with customers and dealers without a formal business relationship. Startups also gain affiliation with and mentoring from a world-class leader in technology for agricultural and construction equipment.

"The startup collaborator shows that part of our investment in technology is establishing a mechanism to help external ideas and knowledge collide with ours," said Julian Sanchez, director, emerging technology for John Deere, in a prepared statement.

The seven companies John Deere added to the program include:

1. **ViewAR**, a company with more than 10 years of experience in creating Augmented Reality (AR) business solutions which address many customer pain points and use cases, like indoor navigation and AR for service, and allows them to easily create their own high-quality AR-Apps and start their augmented reality journey.
2. **Burro**, a company providing people-scale robotic platforms to help farm laborers work more productively today, while laying the base for comprehensive automation of the most labor-intensive on-farm tasks tomorrow.
3. **CropZone.com**, the electrifying solution available to every grower looking for a sustainable and reliable solution to control weeds and desiccate crops without residue.
4. **Four Growers**, a company providing robotic harvesting and analytics for high-value crops - starting with greenhouse tomatoes.
5. **SeeDevice**, a company working to provide enhanced CMOS SWIR image sensing capabilities and performance, using quantum-based photodetector technology for smart devices in automotive, biomedical, and machine vision applications.
6. **Ucropit**, a company bringing together farmers and companies to create, aggregate and share Crop Stories with verified sustainability traceability.
7. **Yard Stick**, a company developing low-cost, instant, in situ soil carbon measurement technologies to enable gigaton/year carbon removal via agriculture.

The Startup Collaborator is a year-long program providing flexibility for John Deere and startup companies to test innovative technologies with customers and dealers without a formal business relationship. Startups also gain affiliation with and mentoring from a world-class leader in technology for agricultural and construction equipment.

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Marcus Eder's Ultimate Run



<https://youtu.be/fbqHK8i-HdA>

Don't try this unless you are in a hurry to get to your next life

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Physicists Help Create Time Crystals With Quantum Computers

A team of researchers including ones from Stanford and Google have created and observed a new phase of matter, popularly known as a time crystal.

By Taylor Kubota

There is a huge global effort to engineer a computer capable of harnessing the power of quantum physics to carry out computations of unprecedented complexity. While formidable technological obstacles still stand in the way of creating such a quantum computer, today's early prototypes are still capable of remarkable feats.



*The Google Sycamore chip used in the creation of a time crystal.
(Image credit: Google Quantum AI)*

For example, the creation of a new phase of matter called a “time crystal.” Just as a crystal’s structure repeats in space, a time crystal repeats in time and, importantly, does so infinitely and without any further input of energy – like a clock that runs forever without any batteries. The quest to realize this phase of matter has been a longstanding challenge in theory and experiment – one that has now finally come to fruition.

In research published Nov. 30 in *Nature*, a team of scientists from Stanford University, Google Quantum AI, the Max Planck Institute for Physics of Complex Systems and Oxford University detail their creation of a time crystal using Google’s Sycamore quantum computing hardware.

“The big picture is that we are taking the devices that are meant to be the quantum computers of the future and thinking of them as complex quantum systems in their own right,” said Matteo Ippoliti, a postdoctoral scholar at Stanford and co-lead author of the work. “Instead of computation, we’re putting the computer to work as a new experimental platform to realize and detect new phases of matter.”

For the team, the excitement of their achievement lies not only in creating a new phase of matter but in opening up opportunities to explore new regimes in their field of condensed matter physics, which studies the novel phenomena and properties brought about by the collective interactions of many objects in a system. (Such interactions can be far richer than the properties of the individual objects.)

“Time-crystals are a striking example of a new type of non-equilibrium quantum phase of matter,” said Vedika Khemani, assistant professor of physics at Stanford and a senior author of the paper. “While much of our understanding of condensed matter physics is based on equilibrium systems, these new quantum devices are providing us a fascinating window into new non-equilibrium regimes in many-body physics.”

What a time crystal is and isn’t

The basic ingredients to make this time crystal are as follows: The physics equivalent of a fruit fly and something to give it a kick. The fruit fly of physics is the Ising model, a longstanding tool for understanding various physical phenomena – including phase transitions and magnetism – which consists of a lattice where each site is occupied by a particle that can be in two states, represented as a spin up or down.

During her graduate school years, Khemani, her doctoral advisor Shivaji Sondhi, then at Princeton University, and Achilleas Lazarides and Roderich Moessner at the Max Planck Institute for Physics of Complex Systems stumbled upon this recipe for making time crystals unintentionally. They were studying non-equilibrium many-body localized systems – systems where the particles get “stuck” in the state in which they started and can never relax to an equilibrium state. They were interested in exploring phases that might develop in such systems when they are periodically “kicked” by a laser. Not only did they manage to find stable non-equilibrium phases, they found one where the spins of the particles flipped between patterns that repeat in time forever, at a period twice that of the driving period of the laser, thus making a time crystal.

The periodic kick of the laser establishes a specific rhythm to the dynamics. Normally the “dance” of the spins should sync up with this rhythm, but in a time crystal it doesn’t. Instead, the spins flip between two states, completing a cycle only after being kicked by the laser twice. This means that the system’s “time translation symmetry” is broken. Symmetries play a fundamental role in physics, and they are often broken – explaining the origins of regular crystals, magnets and many other phenomena; however, time translation symmetry stands out because unlike other symmetries, it can’t be broken in equilibrium. The periodic kick is a loophole that makes time crystals possible.

The doubling of the oscillation period is unusual, but not unprecedented. And long-lived oscillations are also very common in the quantum dynamics of few-particle systems. What makes a time crystal unique is that it’s a system of millions of things that are showing this kind of concerted behavior without any energy coming in or leaking out.

“It’s a completely robust phase of matter, where you’re not fine-tuning parameters or states but your system is still quantum,” said Sondhi, professor of physics at Oxford and co-author of the paper. “There’s no feed of energy, there’s no drain of energy, and it keeps going forever and it involves many strongly interacting particles.”

While this may sound suspiciously close to a “perpetual motion machine,” a closer look reveals that time crystals don’t break any laws of physics. Entropy – a measure of disorder in the system – remains stationary over time, marginally satisfying the second law of thermodynamics by not decreasing.

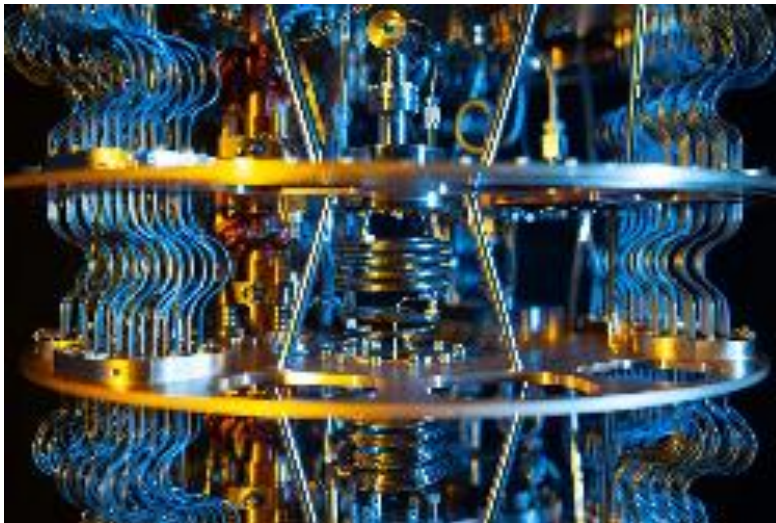
Between the development of this plan for a time crystal and the quantum computer experiment that brought it to reality, many experiments by many different teams of researchers achieved various almost-time-crystal milestones. However, providing all the ingredients in the recipe for “many-body localization” (the phenomenon that enables an infinitely stable time crystal) had remained an outstanding challenge.

For Khemani and her collaborators, the final step to time crystal success was working with a team at Google Quantum AI. Together, this group used Google's Sycamore quantum computing hardware to program 20 "spins" using the quantum version of a classical computer's bits of information, known as qubits.

Revealing just how intense the interest in time crystals currently is, another time crystal was published in Science this month. That crystal was created using qubits within a diamond by researchers at Delft University of Technology in the Netherlands.

Quantum opportunities

The researchers were able to confirm their claim of a true time crystal thanks to special capabilities of the quantum computer. Although the finite size and coherence time of the (imperfect) quantum device meant that their experiment was limited in size and duration – so that the time crystal oscillations could only be observed for a few hundred cycles rather than indefinitely – the researchers devised various protocols for assessing the stability of their creation. These included running the simulation forward and backward in time and scaling its size.



*A view of the Google dilution refrigerator, which houses the Sycamore chip.
(Image credit: Google Quantum AI)*

"We managed to use the versatility of the quantum computer to help us analyze its own limitations," said Moessner, co-author of the paper and director at the Max Planck Institute for Physics of Complex Systems. "It essentially told us how to correct for its own errors, so that the fingerprint of ideal time-crystalline behavior could be ascertained from finite time observations."

A key signature of an ideal time crystal is that it shows indefinite oscillations from all states. Verifying this robustness to choice of states was a key experimental challenge, and the researchers devised a protocol to probe over a million states of their time crystal in just a single run of the machine, requiring mere milliseconds of runtime. This is like viewing a physical crystal from many angles to verify its repetitive structure.

"A unique feature of our quantum processor is its ability to create highly complex quantum states," said Xiao Mi, a researcher at Google and co-lead author of the paper. "These states allow the phase structures of matter to be effectively verified without needing to investigate the entire computational space – an otherwise intractable task."

Creating a new phase of matter is unquestionably exciting on a fundamental level. In addition, the fact that these researchers were able to do so points to the increasing usefulness of quantum computers for applications other than computing. "I am optimistic that with more and better qubits, our approach can become a main method in studying non-equilibrium dynamics," said Pedram Roushan, researcher at Google and senior author of the paper.

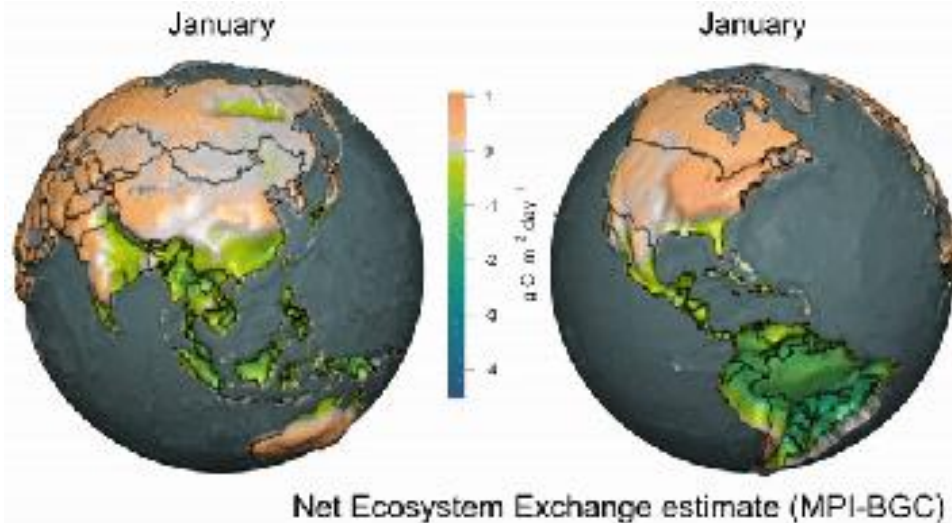
"We think that the most exciting use for quantum computers right now is as platforms for fundamental quantum physics," said Ippoliti. "With the unique capabilities of these systems, there's hope that you might discover some new phenomenon that you hadn't predicted."

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Earth Inhales and Exhales Carbon in Mesmerizing Animation

By Stephanie Pappas for Live Science

The animation shows plants taking up and releasing carbon as the seasons change.



Earth breathes in this cool animation by Markus Reichstein.

(Image credit: Markus Reichstein /Creative Commons license)

The Earth seems to inhale and exhale in a new animation that shows how carbon is taken up and released as the seasons change.

https://www.livescience.com/carbon-sinks-globe-animation?utm_source=SmartBrief&utm_medium=email&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_content=152F556F-B39F-41B4-B0D4-8C6469E266A2&utm_term=259fcfb-705f-4282-8a39-1d5a56b9ef08

The animated continents seem to deflate during summertimes, indicating times and places where vegetation is growing and plants are sucking carbon dioxide out of the atmosphere. When it's winter, the continents seem to inflate, indicating that vegetation is dying off and carbon is being released.

The changes are most striking at temperate latitudes like continental Europe and North America, where seasonal differences are more pronounced. Equatorial regions don't change as much throughout the year, while some desert regions, being sparsely vegetated, don't store or release much carbon at all.

The data for the animation comes from satellite observations and hundreds of carbon-monitoring stations worldwide, said Markus Reichstein, the director of the Biogeochemical Integration Department at the Max-Planck-Institute for Biogeochemistry in Germany, who posted the animation on Twitter on Jan. 6.

"The visualization is really just a fun project," Reichstein told Live Science.

What the animation ultimately shows is an important portion of the carbon cycle, or the flow of carbon throughout the planet's system. Carbon can be released into the atmosphere by decaying organic material and by the erosion of rocks containing carbon compounds; conversely, it can be taken up by the oceans and by plants, which use carbon in the process of photosynthesis.

The importance of plants is clear in the animation, which shows places chock full of plants such as the Brazilian Amazon and the forests of Eastern Europe taking in massive amounts of carbon in the southern and northern hemisphere summers, respectively. The ocean isn't included in the animation, because while the ocean does take in carbon, it does not show strong seasonal patterns, Reichstein said.

Climate change is altering the pattern of vegetation growth around the globe, Reichstein said, so the flow of carbon in and out of the biosphere is also changing. Those changes are too small to show up on a visualization such as this one, he said, but they will have different impacts in different places. For example, warmer, longer summers in the Northern Hemisphere can be good for plant growth, he said. But where warming comes with a lack of precipitation — as in much of the American West — climate change can restrict plant growth.

"This carbon cycle and how it changes from month to month tells us a lot," Reichstein said. But when it comes to societal impact, he said, the takeaway message is that forests are crucial to the planet's health. Recent research finds that the Amazon, one of the biggest carbon sinks on the planet, has recently been releasing more carbon each year than it takes in thanks to deforestation and wildfires, Live Science reported.

"It basically is showing how important it is to protect the carbon sinks," he said.

Originally published on Live Science.

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Junkers G38; The Giant Airliner with Cabins in its Wings



<https://www.youtube.com/watch?v=5uFNOtsuckE>

Developed during the late 1920s, it would become the largest landplane in the world when it first took off in 1929. Despite only two being built in Germany, they would quickly make a name for themselves with Lufthansa as luxurious air liners.

Its main feature was the massive wing, which had a span of 44 meters and was almost 2 meters thick. This allowed it to hold a pair of passenger cabins, 'engine rooms' for mechanics to service the engine, and a large fuel capacity - giving it excellent range and endurance. Unfortunately the aircraft was let down somewhat by its lack of passenger capacity (never exceeding 34), but it was an exciting demonstration of 'big wing' design. The G38 was also built under license in Japan as the Mitsubishi Ki-20 (or Type 92).

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Truths Fighter Pilots Live by, in this Case Regarding Drones



"Drones will not be late to briefings, start fights at happy hour, destroy clubs, attempt to seduce other pilots' dates, purchase huge watches, insult other services, sing 'O'Leary's Balls,' dance on tables, yell 'Show us yer tits!' or do all of the other things we know win wars.

I see no future in them."

Ace Jewell, Commander USN (retired), now 88 years old, fighter pilot in 3 wars:

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Oshkosh Partners with Army on Autonomous Project...By Gosh

Oshkosh is partnering with the U.S. Army's Ground Vehicle Systems Center (GVSC) and an industry team including Oshkosh Defense, Robotic Research, and DCS Corporation on the Expedient Leader-Follower (ExLF) project.



This collaboration allows the company to apply next generation defense technologies and advanced systems to vehicles to meet their evolving requirement

Applications of autonomous technology in the ExLF project enable a series of unmanned vehicles to "follow" a single manned lead vehicle while operating in contested areas of operation. Leader-Follower technology serves to remove soldiers from at-risk vehicles in often-targeted convoy routes. It can help save soldiers' lives and requires fewer people to do the same amount of work. This autonomous technology creates a more efficient means for moving cargo while freeing up more soldiers to do other important work, Oshkosh says.

The U.S. Army selected the Palletized Load System (PLS) by Oshkosh Defense to be the first of the tactical fleet to field this technology.

Autonomous operation is made possible by using robotic perception technologies to understand and classify different objects in various environments.

"For a robot to operate as well as a human, it needs to be able to perceive the world and understand these different conditions," said John Beck, director of Unmanned Systems for Oshkosh Corporation. "By combining the strengths of one sensor to

accommodate the weaknesses of another, we are capable of operating in a variety of different environments.

"We use best-in-class sensing technologies, such as radar and light detection and ranging (LIDAR), to gather rich data to train novel machine learning algorithms to identify and distinguish objects in a vehicle's path," Beck said. "Their unique capability permits the autonomy system to negotiate environments intelligently and competently. This includes driving uninhibited on open ground, selecting appropriate speeds on slopes, grades and rough terrain, and avoiding hazardous obstacles while ignoring vegetation and heavy dust.

"A radar is very good at seeing through dust, smoke and rain," Beck continued. "With LIDAR, we are capable of detecting the ground surface and other objects with high precision so that we can control the vehicle confidently in complex environments."

Oshkosh is the parent company of JLG.

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Why Nasa is Exploring the Deepest Oceans on Earth



(Marine Imaging Technologies, LLC/Woods Hole Oceanographic Institution)

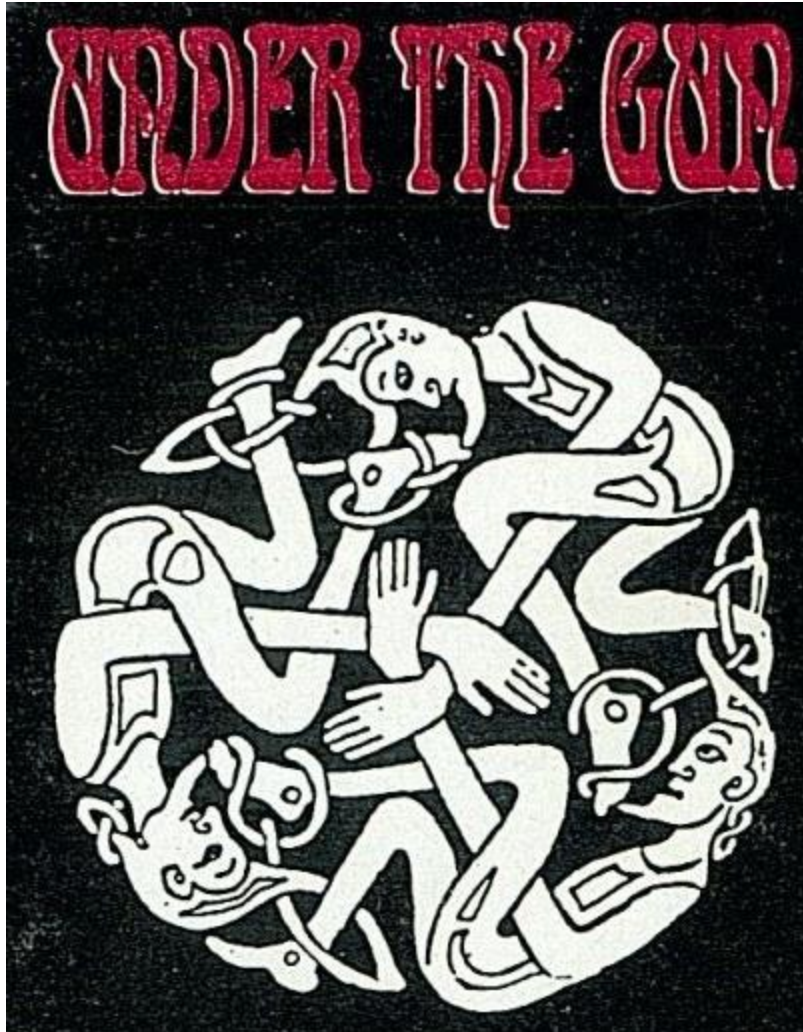
https://www.bbc.com/future/article/20220111-why-nasa-is-exploring-the-deepest-oceans-on-earth?utm_source=join1440&utm_medium=email

Could our understanding of the deep ocean help unlock the mysteries of outer space?
Nasa's space mission is leading us to unexplored depths of our own planet.

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Media Under the Gun

By Aisha Majid Twitter



A majority of people around the world are concerned that they are being lied to by journalists, according to the latest trust survey from PR firm Edelman.

Two-thirds (67%) of people globally said that they believe that journalists and reporters purposely try to mislead people by saying things they know are false or grossly exaggerated – an increase of eight percentage points on the company's last report published in 2021.

Edelman's Annual Trust Barometer for 2022 also found that trust in media had fallen across the world with concern over fake news at an all-time high.

Faith in the media fell in 15 countries with the US among those reporting the biggest drops. Just 39% of people in the US said that they trust the media – down six points compared to the last survey undertaken in 2021.

Fewer Brits (35%) also said they trusted the media, a fall of two points. The UK and the US are among 14 countries where Edelman says that the media is generally distrusted. In contrast, in some authoritarian states such as China and Saudi Arabia more respondents said that they trust the media.

Across the world just one in two people currently trust the media, the survey found after reviewing feedback from more than 36,000 people in 28 markets globally.

Fifty-six percent of people said that the media was a divisive force in society. Just one-third (35%) said the media contributed to making societies more cohesive.

Press Gazette's own media freedom health check in 2021 revealed that 70% of the world's population live in places with little media freedom, which has likely contributed to distrust in the press.

The report also found that concern over fake news, a phrase probably most associated with former US president Donald Trump, was higher than ever. Over three quarters (76%) of people said they were concerned that false information and fake news could be used as a weapon.

Concern over fake news ranged from 84% of people in Spain to 63% in the Netherlands. In the UK two thirds (65%) of people worry about misinformation and disinformation. Respondents in only two countries said they were less concerned about fake news this year.

When it comes to types of media sources, just 37% of people said that they trusted social media - a fall of eight percentage points.

However traditional media also saw a significant erosion of trust with less than six in ten (57%) people saying they trusted mainstream sources, a fall of five percentage points from last year.

Russia (39%), Japan (39%) and the US (43%) are among the countries where traditional media is least trusted.

Search engines meanwhile scored 59%, down three points.

The only type of media to see a small uptick in trust was "owned media" - i.e. businesses' own communications channels. But with a trust score of 43% it was still far behind traditional media.

While Edelman found that trust had declined across institutions as a whole, overall there was less faith in government and media, while more people had confidence in businesses and NGOs.

The report authors said that the survey revealed, "a vicious cycle of distrust fuelled by government and media".

"This vicious cycle of distrust threatens societal stability," they said. "It's a death grip where media is chasing clicks and government is chasing votes, both feeding a cycle of disinformation and division and exploiting it for commercial and political gain."

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Take an Online Journey Through the History of Math

'History of Mathematics' explores the origins of arithmetic, algebra, geometry and more

a picture of an ancient Indian text



In the ancient Indian text called the Bakhshali Manuscript, a black dot (as seen in the right half of the bottom row) represents zero.

By Erin Wayman

Around 1900 B.C., a student in the Sumerian city of Nippur, in what's now Iraq, copied a multiplication table onto a clay tablet. Some 4,000 years later, that schoolwork survives, as do the student's errors (10 times 45, for example, is definitely not 270). The work is a reminder that no matter how elegant or infallible mathematics may seem, it's still a human endeavor.

<https://history-of-mathematics.org/>

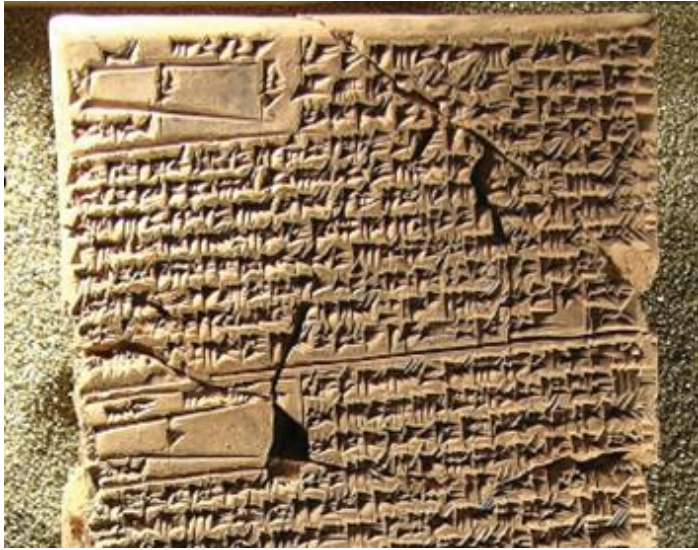
That's one lesson I took from "History of Mathematics," an online exhibit developed by the National Museum of Mathematics in New York City and Wolfram Research, a computational technology company. Bringing together the Sumerian tablet and more than 70 other artifacts, the exhibit demonstrates how math has been a universal language across cultures and throughout time.

Divided into nine "galleries," the exhibit sums up the development of key topics related to mathematics, including counting, arithmetic, algebra, geometry and prime numbers. Each gallery has a short timeline and features a handful of artifacts that serve as entry points to explore some milestones in more depth.

Among the highlights: The oldest known surviving calculating device, the Salamis Tablet, is a marble counting board from the Greek island of Salamis dating to 300 B.C. It's a precursor to the abacus. By moving pebbles across the board, a person could perform calculations. An early documented instance of using a symbol for "zero" as a placeholder (to, say, distinguish 1 from 10, 100 or 1,000) appears in the Bakhshali Manuscript, an Indian text dating to perhaps as early as A.D. 300. The manuscript's black dots eventually morphed into the open circles we know today as zeros. Also on display is *Al-Jabr*. Written in around 820 by Persian polymath Muḥammad ibn Mūsā al-Khwārizmī, the book established the field of algebra and gave the discipline its name. In 1557, the *Whetstone of Witte*, an English algebra text, introduced the modern equal symbol.

But the exhibit is more than just a collection of fun facts. As the galleries explain, humans' relationship with numbers goes back deep into prehistory. Modern math,

however, stems from the rise of cities, with the need to keep track of people and supplies, and to undertake ever more complex construction projects.



This tablet, dated to as early as 2000 B.C., shows several math problems and drawings of trapezoids and triangles. The text suggests that people in Mesopotamia grasped the Pythagorean theorem long before the Greek philosopher Pythagoras, for whom the theorem is now named, lived.

schoyen collection

Some mathematical principles must have been so vital to civilization's success that they appeared in many ancient cultures.

Take the Pythagorean theorem. The Greek philosopher Pythagoras, who lived in the sixth century B.C., famously related the side lengths of a right triangle in the equation $a^2 + b^2 = c^2$. But a clay tablet reveals that people in Mesopotamia had worked out the relationship more than 1,000 years earlier. Ancient Chinese and Indian scholars were also familiar with the relationship.

Other math problems have had multiple solutions. The history of counting is littered with an array of methods for keeping track of numbers, from various forms of finger counting to the stringed recording devices called quipus, or khipus, used in the Inca Empire in the 1400s and 1500s. The placement and types of knots along a quipu's strings indicate different numerical values, though researchers today are still trying to understand exactly how to interpret the data recorded on these devices.

Parts of the exhibit assume a high level of mathematical knowledge, such as some of the interactive features that give technical explanations behind some artifacts' mathematical principles. But a section of "learning journeys" aimed at "kids and others" provides materials that fill in some of the missing details from the main galleries and will appeal to adults whose memories of high school or college math are fuzzy.

"History of Mathematics" is a fascinating starting point for anyone interested in learning about the origins of the mathematical concepts that so many of us use every day but often take for granted.

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When you have to stay focused,
so you put your thinking cat on



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Art Linkletter and The Kids



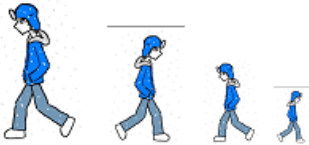
Art Linkletter, whose "People Are Funny" and "House Party" shows entertained millions of TV viewers in the 1950s and '60s with the funny side of ordinary folks remained active as a writer and speaker through his ninth decade

<https://youtu.be/UgLpRvX7Qk?list=PLtm66qe1yjN1Y2cN4C-s2bsB-06vTiWJD>

https://youtu.be/MFXti_KRcLw?list=PLtm66qe1yjN1Y2cN4C-s2bsB-06vTiWJD&t=13

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My Walking Thoughts for Sunday February 13 2022



Educational Challenges: Forget Red, Blue, or Covid. Look into the Maw

It's time to question our education system not only in what it is, but what those who create the curricula are going to do to deal with challenges such as changes in current and emergent understandings in math and science. Some of these (space-time and quantum physics for instance) are more than a hundred years old and well proven...but not effectively taught except to a very small portion of students. Chaos Theory and its implications...are rarely discussed below the college level.

But it's not just about STEM. The same is true at the other end of the scale where investigations into things from the past—the richness and diversity of the human experience--are viewed with suspicion...or more likely, not all.

Ultimately, my target is the persistent dumbing down of education to make people (not just students) feel good about themselves.

The first I saw of this was in 1971 when all California school districts were called upon by the 'Stull Bill' to explicate their Goals and Objectives. Of course, as you might

suspect, the elephant hiding in the weeds was the corollary 'If you don't do it we will do it for you.'

Bucking expectations, our College School District in little Santa Ynez, CA, met the challenge with a series of citizen meetings that led to our manifesto titled "The Role of Education in a Free Society."

Came the day of reckoning when the CA Department of Education sent its representative to tell us what his bosses felt our goals and objectives should be, presented to us in 10 single sentence behavioral objectives. It was our job to vote on what *order* we wished to pursue them.

Not surprisingly, none of them appeared in our document. This led to an explanation by the representative that we were not playing the game the way we were supposed to. Unimpressed, we remained adamant in our stand in the face of increasing threatening pronouncements by the DOE savant.

In the end it was John Vasconcellos, a State Assemblyman observing the proceedings, who stepped in to handle the impasse. The lawmaker congratulated us for doing our duty, and the meeting adjourned, but the upshot was we were required to accept the behavioral objects anyway.`

So much for The Role of Education in a Free Society.

There are a lot of problems implicit in lowering the standards in our educational systems, not the least of which is the probable impact on the administration and teaching communities whose paths are not necessarily paved in excellence.

Those of us above a certain age have been lucky to see our children receive decent educations, but it's less obvious that the same will be true to their offspring.

Finally, it is not about me. I want to--and will--present your thoughts in upcoming Walking Thoughts, so have at it...please.

Agree? Disagree? What can be done and where do we start?

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