



A little science...A touch of fiction...A lot of adventure...

News from the Den

It's October and that means it's Nobel Prize month. The Nobel is given out annually in six categories: physics, chemistry, medicine, literature, peace and economics. The prize evolved from the will of Alfred Nobel, a Swedish scientist and the inventor of dynamite. His amassed fortune is the basis for the prize as stated in his will. He was appalled to learn others saw him as the 'Merchant of Death-by finding more ways to kill more people faster'. A moniker he read when his obituary was erroneously published instead of that for his brother. Now his legacy is the annual awards, given only to living recipients who's contributions in the prior year conferred the greatest benefit to humankind.

This year's prizes caused some stir in the scientific communities as AI researchers took the prize in physics and chemistry. Their work was on neural networks. Three scientists won the chemistry prize for their work on proteins. One for building an entirely new protein structure and the other two for the use of AI in unravelling the complex structure of proteins. And discovering new ones. The medicine award went to two scientists for their discovery of micro-RNA and its role in the regulation of genes on organism development and function.

The only woman to win this year is Han Kang, a South Korean author. The Nobel Prize in Literature recognizes her poetic prose in telling stories about historical trauma and the fragility of humankind.

On 6 August 1945, the United States Army Air Force dropped the first of two atomic weapons on the Japan. First Hiroshima and three days later, another weapon on the city of Nagasaki. Both devices destroyed most of their targets and killed more than a third of the population residing within each city's boundaries. Many lingered with radiation sickness long after the attack. A group of bomb-survivors - known as Hibakusha - received this year's Nobel Peace Prize. The award was granted in recognition of their ongoing efforts to stigmatize the use of nuclear weapons - creating a taboo around these weapons of mass destruction. The group fights to eliminate nuclear weapons from the world's arsenals in hopes another one is never used. May this recognition lead to the success of their efforts, as the world teeters on the brink of nuclear weapon release in the Mideast and Ukraine conflicts.

The Nobel for Economic Studies was awarded to three researchers for their work on the relationship between societal institutions and the rule of law with overall country prosperity. How apt as we approach another contentious presidential election in United States. A result which could threaten the US's economic prosperity.

Latest and greatest science news

This month's latest and greatest science news is all about music. Those who make it. How we 'hear' it. Who owns it.

We've all heard the phrase 'I can't carry a tune in a bucket.' This may not be as true as some think. It seems humans have an innate musicality. We're not talking about 'perfect pitch' - this is a rare gift

found in less than 1 in 10,000 individuals. We're talking about the ability to spontaneously recall a melody with some degree of accuracy. Researchers define long-term memories as an ability to recall the gist of something. This is an indication of our brain using 'short-cuts' to recall long ago memories. You may not be able to recall it completely but have enough recall to remember some of it. To study the existence of these short-cuts, the scientists used ear-worms. You know those tunes that get stuck in your head. Over a two-week period, using 30 volunteers, they captured 462 ear-worms. These were studied for pitch and musical accuracy. Unbelievably, 45% had a pitch error of 0. With nearly 69% repeating their ear-worm within 1 semitone of accuracy. This research identifies a hidden pitch ability in a large percent of the population. ([Hear more here](#))

Maybe more people can reproduce more music from memory more accurately because the latest, most-popular songs are simpler. An overall decrease in vocal musical complexity was found in an analysis of the top five Billboard chart toppers from 1950-2023. Rhythms and pitches were found to be 30% less complex. Even though we say - they don't make songs like they used to - don't despair - these two vocal musical characteristics - rhythms and pitch - are not the only ones of import in music. The study did not consider speech patterns in rap and hip hop music nor the complex variation in chord progressions. ([Melodies abound here](#))

What happens in your brain when listening to music? Do you ever feel you know what is going to happen next? Is my brain different than the musicians' brains who make the music? It seems this ability to anticipate what is coming next uses a unique brain network. This network - the early auditory network in the posterior cortex - activates in anticipation of a musical boundary. A musical boundary is the moment when one section of the composition ends and another begins. If music lacked these boundaries, it would be like prose without punctuation or paragraphs - just a jumble of words or in this case a jumble of unrelated notes. Once the boundary is crossed and after it ends, a different network activates in an entirely different part of the brain to allow us to hear the music. Another part of the brain - the right ventrolateral prefrontal cortex - deactivates when listening to music. This area, responsible for complex cognitive tasks, quiets allowing the brain to 'listen' to the music. The study of how we hear music is being applied to the development of musical-therapies for individuals who have difficulty comprehending language. ([And the beat goes on](#))

Who owns your voice? Currently there are no copyright protections for the sound of one's voice. The advent of AI and cloning-chatbots which can reproduce a person's voice have been challenged in court. Scarlett Johansson won her case against an OpenAI-produced clone of her voice. ([Who owns us?](#)) The advent of generative artificial intelligence requires the strengthening of laws to protect not only our voices but also our appearances. These are needed not only for performers but to combat the creation of deep-fakes and their impact on the spread of untruths in politics, safety, medical issues, etc.

What is the carbon-footprint impact of live-music events on achieving the 1.5degC limit on global warming? This is the question the British trip-hop band - Massive Attack - ask climate scientist Carly McLachlan before they began a large-scale tour effort. The collaboration between musicians and scientists produced a road-map for producers to create Super-Low Carbon Live Music Events for the UK. ([Read the Findings](#)) Not only did they identify measurable carbon-producing activities but recommended how to minimize the impact of live events. These included - how to power the event (batteries and renewable energy sources), partnering with mass-transit providers to move concert goers to and from the event, managing waste and how to provide food and what sourced the food. The band held an Act 1.5 concert in Bristol UK - an analysis of the event is yet to be completed - but a target of 50% reduction in carbon footprint was the goal. ([Band's collaboration here](#))

What does the guitarist of the rock band Queen have to do with preserving badgers in the UK? He's championing their protection from mass culling. Brian May, the guitarist, holds a Ph.D. in astrophysics and continues to contribute his expertise in stereoscopic analysis with various space agencies. But, he also contributed his scientific expertise to a controversial animal rights problem. For a long time, farmers and scientists have assumed that outbreaks of bovine tuberculosis is due to TB carried by European badgers. But this assumption is incorrect according to Dr. May. His group of researchers

discovered cows actually contract the virus by ingesting the pathogen-containing dung of an infected cow. More than 230,000 badgers have been killed in the last 10 years to supposedly prevent cross-infection of TB from badgers to cows. At the same time more than 20,000 cows, thought to be infected, were slaughtered. May's conclusion - scientists have an inclination to find what they expect to find. Thus, perpetuating a myth. It all comes down to asking the right questions and keeping an open mind about expectations and expected outcomes. ([Guitarist and the Badger](#))

Science Factoid of the Month

4.4 billion people across 135 low- to middle-income countries - more than half the world's population - lack safe drinking water. ([Take a Sip Here](#)) This is double to estimate in 2020.

Science Foundations - The Journal *Scientific American*

Scientific American is the oldest continuous publication in the United States. This year, they celebrated their 179th birthday. As a kid I read *Scientific American*. My grandfather gave me my first subscription. The publication takes current science and translates it into everyday prose, with the supporting graphics for the general populace to understand. An educated populace will make better, fact-based decisions, if they have the facts and understand them. Happy Birthday, SciAm!

Minutiae

I am in complete agreement with the need to increase all protections of one's voice and appearance. I have a clause in my publishing contracts that no part of my books are generated using AI. My agreements with Hillary Huber - the awesomest narrator of all my audio books - has a similar clause in our agreements. Her voice is not AI generated nor will it be used to generate an AI clone. As we approach another contentious political election, the governing of AI becomes ever more important.

Fall is slowly creeping into the Central Rocky Mountains. Warm temperature and limited-to-no precipitation means a delay in the start of our alpine ski season. Boo! But has also provided an extend golf season. Yeah! Win some - lose some.

We'll be back next month with another installment. Be well, be kind. CA

p.s. Peet and I are not AI generated.



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