



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

## News from the Den

El Niño currents are deepening in the central Pacific Ocean, spawning storms of immense intensity. The tenth and as yet unnamed storm is entering the northwestern coast of the United States and Canada. Indigo, this winter's storm number 9, is sweeping across the central US and joining an Arctic air mass sliding south from Canada. Indigo will again create lake-effect snows for the northeast. We sound like a weather forecaster, but this conveyor belt of one storm after another will have lasting effects as we head into summer—flooding in some places and deep drought in others, with the risk of associated wild fires. The UN predicts significant impact on developing countries even as the El Niño of 2024 is predicted to be short-lived and begin weakening in late spring. So, cuddle up and break out the hot chocolate. Or, a cold one in the southern hemisphere. [Read more.](#)

## Latest and Greatest Science New - It's All About Cats

Cats are perfect, of course as a cat person, I would say this. One must admire their beauty, variety of coat and eye colors, and their independence. But, Dr. Anjali Goswami, an evolutionary biologist at the Natural History Museum of London, states "Cats are evolutionarily perfect. From tabbies to tigers, no matter the size they are all the same." All cats are hyper-carnivores and highly-developed predators. Their diets do not vary. Unlike bears or rodents or humans which are omnivores. Cats perfected their multiple species through evolution and now don't change with genetical variation. Some are smaller, some are larger, some purr, others roar. They all have variations in fur patterns and eye color, but they don't vary in anything else. They are the uber-species evolutionarily, I couldn't agree more. [Read more.](#)

Dogs may seem friendlier, but cats are more expressive. Some consider cats aloof, but with over 276 different facial expressions, cats can express a multitude of emotions. You just need to take the time to understand. Ears, whiskers, mouths and eyes combine to illustrate their state of mind. These observations, when added to vocalizations, indicate a cat's emotions. Take a moment to observe and learn the wealth of information a cat is sharing. [Read more.](#)

6% of all wild-caught fish goes into cat food. But the question is: why would an animal which evolved 10,000 years ago in Mid-Eastern deserts love fish so much? Its all about umami—the rich, savory flavor of meat. And all tuna is packed with umami and therefore the number one go to for cats. Umami is one of the five tastes we humans enjoy, but is true heaven for an obligate carnivore. My cat Peet notwithstanding, cats can't taste sweet but groove on all things umami. (Peet ate everything, but loved Cheetos the most).

Cats originally were believed to lack the Tas 1r1 gene, thus limiting their tastes to those on the Tas 1r3 gene. But a recent study identified the Tas 1r1 gene does exist in cats and therefore, they have an ability to fully taste umami. In the studies, another interesting fact was discovered, cats taste in opposite ways to humans. For cats, its smell first, then taste. [Read more.](#)

So if smell is so important to cats, what's different about their noses? A cat's nose is a labyrinth of twisting, turning channels. These channels are covered in sensors called turbinates. Smells easily dissolved in water travel the farthest into the nose, less soluble smells travel the least distance. The turbinates, act like a gas chromatograph, separating the smell-chemicals by distance traveled in the nasal passages. This allows cats to differentiate smells to a fine degree of precision. So precise, cats actually express a 'smelly-face' when getting a whiff of an odorous smell. Another thing cats have is an additional smell organ in the roof of their mouths. Jacobson's organ connects the cat's mouth to the nose, adding another smell pathway to the nose. So if you see a cat open their mouth when investigating food, they are using Jacobson's organ to move more air to the turbinates and refining the smell. [Read more.](#)

You can't ignore the amazing eyes of a feline. All cats, no matter the species, exhibit a rainbow of eye colors. Researchers have traced this trait back to the first feline - an ocelot-like creature that lived more than 30 million years ago. Snow leopards and their stunning blue eyes, golden eyes of a house cat, hazel of lynx, and deep greens of all species are part of the rainbow. It is hypothesized the wide range of eye color was developed through natural selection—eye color may be a trait pleasing to a mate and therefore selectively passed on to offspring. [Read more.](#)

And then there is the purr. Not all feline species purr—some roar, some chirp, some mhuurp. All vocalize. A domestic cat purr produces a low-frequency sound. These 20-30 hertz sound waves are usually only produced by very large animals (e.g. elephants and whales). It is thought that pads discovered on the cat's vocal cords slow vibration, producing low frequency sounds, regardless of the animal's size. Purring is often correlated with happiness or contentment. But this is a false fact, a cat in pain, stressed or traumatized will purr. But in the end, even though scientists argue about how the purr is created, just enjoy it. Cuddle that purring kitty, it is shown this will lower your blood pressure. [Read more.](#)

Dogs are noted for play, especially the game of fetch. But don't be fooled, cats fetch too. Fetch has been identified as a part of cat play. Drop a paperclip or pencil and watch them pounce and play with the item. Some cats will return the item to you. Retrieving is something researchers believe is learned in kittenhood and is a spontaneous behavior to a randomly dropped item. But don't expect fetching to be a long game. Cats bore easily and will usually stop the game when they are bored or distracted. [Read more.](#)

Dog-owners in the United States are battling a serious and sometimes fatal respiratory infection in their canine pets. But cats in Europe are dying from an outbreak of a new feline coronavirus. Yes, that's correct a coronavirus in the same class as Sars-CoV-2. This highly-contagious virus appears to have mutated from a virulent canine strain-crossing species barriers. The first outbreak was detected on the island of Cyprus, which had a cat population in excess of one million, before 300,000 cats died of virulent infection. FCoV-23 is not transmutable to humans, but is a viral example of the rapid genetic evolution all coronaviruses exhibit, and the ease of trans-species transmutability. Cat owners across the European continent are being asked to monitor their cats for signs of coronavirus infection. [Read more.](#)

In another study, Scotland's 'Highland tigers' *Felis silvestris*, a breed of wildcats are nearly extinct due to cross-breeding with the growing population of domestic cats. A group of 19 captivity-bred European wildcats was released in an isolated corner of the Highlands. Hopes run high this group will evolve into a breeding population. Studies of the wildcat genome shows contamination with domestic cat DNA (those descended from MidEastern populations of *Felis lybica*). It seems the contamination is a recent occurrence. Most domestic cats which were favored by ancient Romans and Vikings were descendants of the desert breed. Their pets were not domesticated from the local wildcats.

The current wildcat breeding program focuses on cats with the lowest amount of identified domestic-

cat DNA. Using a process called de-introgression, they mated wildcats with the lowest domestic cat genetic influence. The kittens then carry more wild DNA with each generation. It is estimated 10-20 generations will be needed to recover a complete Scottish wildcat genome—one lacking all domestic cat DNA. Go science - go wildcats! [Read more](#).

So, one can see why cats are evolutionarily perfect and have evolved into the wonderful multitude of species we have today.

## Photo of the Month - The Cat's Paw Nebula



Credit: EOS

NGC 6334, photographed in 1986, exists in the constellation Scorpius.

## In Memoriam - Factory of Ideas

Ten Nobel prizes, five Turing awards and more than 20,000 patents. That's just a brief summary of what Bell Labs in Murray Hill NJ gave to the world and how humans have been enriched. I remember when the 'hiss' heard within the microwave spectrum throughout open space was identified and classified. Arno Penzias and Robert Wilson correlated this persistent noise to cosmic background radiation—the leftover 'sound' of the Big Bang. They won the 1978 Nobel for Physics for their precise and detailed observations. At the time, there were two competing theories on the origin of the Universe. Only the Big Bang theory predicted the production of microwave radiation, thus making it the primary focus of all future research. This discovery laid the foundation for modern cosmology. Nokia, the owners of Bell Labs, are going to close the Labs and move the work to a downtown office site in New Brunswick NJ, abandoning the very center of creativity and discovery. Arthur C. Clarke named Bell Labs—the 'Factory of Ideas'. What will be lost in this move?

# Historical Foundations - The British Library

When you think about a foundation—what comes to mind? A base for construction? The first step in a process? A tenet or doctrine? In science, it is the hypothesis formulated within the scientific method developed from observations of data or information. But what if all the data, observations and work of those that came before is gone or locked away—out of reach? This is what happened 28 October 2023 at 9:54am London time. A cyberattack on the British Library, that pillar of learning and information, lost all digital media, all WiFi, their online catalogues. No one could complete a digital search through their vast archives. The reading room, their website, all phone lines, point of sale for transactions were gone. Locked down behind the hackers' firewalls. All book transfers from their offsite storage warehouses were halted. And more importantly, you couldn't reach the librarians, their email was lost. As panic rose throughout the world, the ransomware demands began to appear. The criminal group Rhysida claimed responsibility. One week after the attack the entire British Library database was available on the dark web. [Read more](#).

Another complication is that the BL utilizes a bespoke cataloguing process. Dewey decimal systems are not used, instead the books are catalogue by size. This method placed unrelated books next to each other in seemingly random order. The BL IT specialists and investigators from the British National Cyber Security Centre (an equivalent organization to our NSA) got some things working. But access was lost for the public and all researchers.

As of 15 January 2024, the online catalogue is being restored by hand. And the majority of reference materials available are accessible but being able to find them physically is another task. The British Library includes all books published in the UK since 1710, two of the four surviving copies of the Magna Carta, the largest collection of original Chaucer manuscripts and five copies of Shakespeare's First Folio. What is the cost of the loss of this primary reference site to humankind? [Read more](#).

## Book of the Month - *Catology: The Weird and Wonderful Science of Cats*, Stefan Gates

Filled with all the amazing facts a cat owner needs to better understand their furry feline. Available on [Amazon](#).

## Minutiae

We hope you've enjoyed our foray into the amazing world of felines. I know the 19.5 years Peet blessed me with his friendship was one of the most impactful events of my life. Even if you are a dog person, remember you can still learn a lot about the world by observing all animals. Whether domestic or wild they can enrich your life experiences.

Remember: dogs have owners and cats have staff. I am more than happy to be staff to our furry felines.

We are one month closer to spring. But winter storms are still being spawned from El Niño, so don't put the shovels away yet.

Stay warm and curl up with your furry friend. Be well, be kind. CA



keep being curious

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