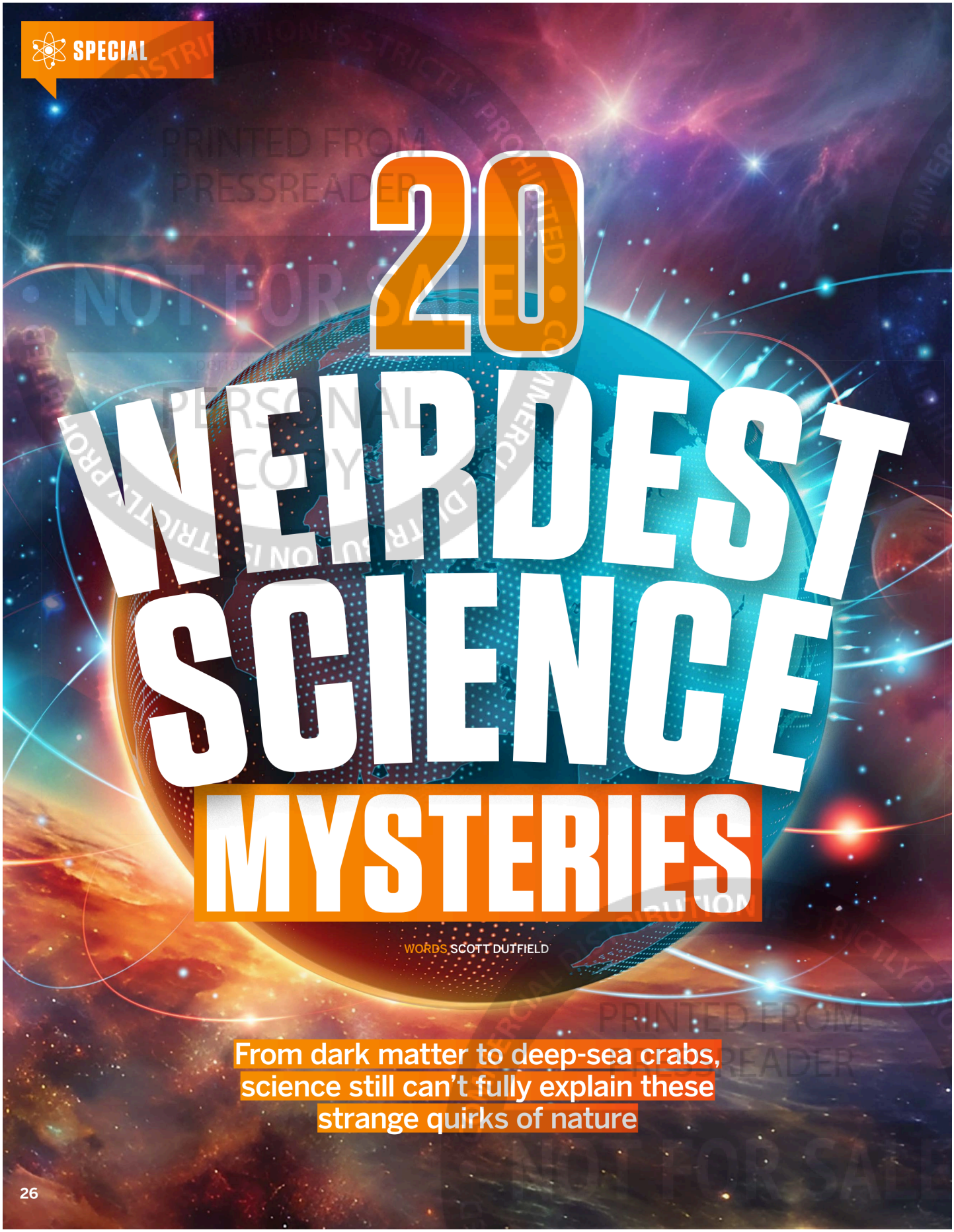
- Curiosities and wonders



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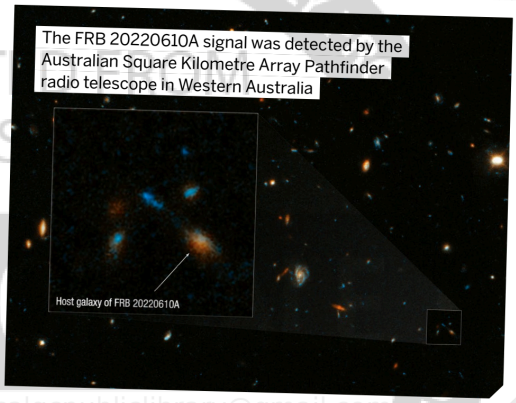
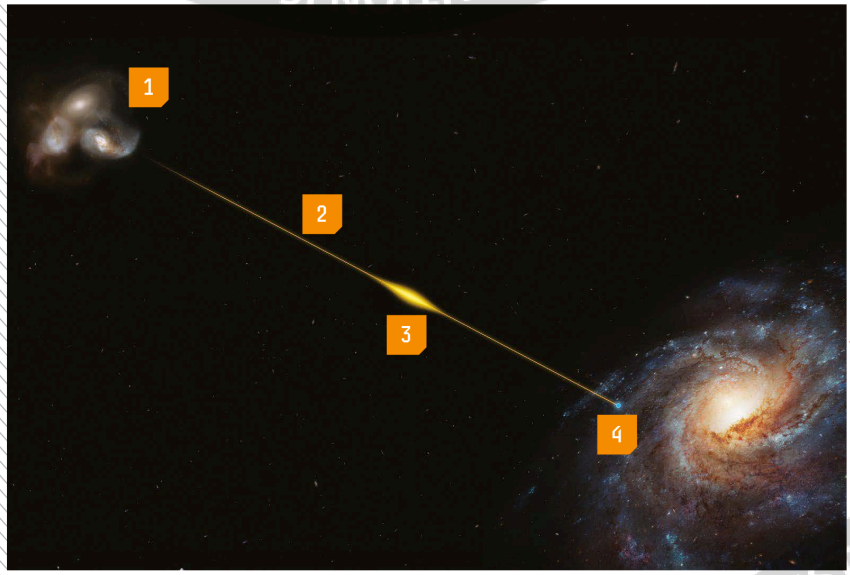
DID YOU KNOW? The oldest possible age for humans is unknown – the current record is 122 years and 164 days

STRANGE RADIO BURSTS FROM DEEP SPACE



The FRB 20220610A signal was detected by the Australian Square Kilometre Array Pathfinder radio telescope in Western Australia

1 Since 2007, scientists have been plagued by cosmic signals called fast radio bursts (FRBs). In just one-thousandth of a second, bursts of radio waves radiate from a source. These then travel through space and are picked up on Earth. FRB 20220610A, detected in 2022, travelled around 8 billion light years before it reached our planet. The first FRB was detected in 2001 by the Parkes Observatory in Australia, emanating from a nearby dwarf galaxy called the Small Magellanic Cloud. However, researchers didn't discover the burst until 2007 while looking through archival data. Since then, around 1,000 have been detected, though their origins remain unknown. Many theories have emerged to answer the mystery behind the bursts, including energetic neutron stars, black holes or highly magnetised stars. Most FRB signals are also non-repeating, curbing scientists' efforts to pinpoint their sources.



MYSTERY SIGNALS

The journey FRB 20220610A took before reaching Earth

1 GALACTIC SOURCE
Although the exact source of the FRB is unknown, scientists know that it emerged from a dwarf galaxy that's part of a compact group of galaxies.

2 LONG JOURNEY
The FRB travelled from 8 billion light years away – one light year is equal to around 5.8 trillion miles.

3 POWERFUL BURST
Within a fraction of a second, the burst emitted more energy than the Sun's total energy output for the last 30 years.

4 DETECTION
The FRB was traced back to the dwarf galaxy by the Very Large Telescope (VLT).

WHERE DOES CONSCIOUSNESS COME FROM?

2 We all know that who we are comes from our brains, but scientists are still scratching their heads when it comes to figuring out how this organ conjures up consciousness, which gives us the ability to be self-aware and feel things with the help of the sensory information that the brain receives from our bodies. All the information directed to the brain crosses a network of billions of neuron cells that store, recall and process it, allowing us to interact with the world around us and develop a sense of self. Within that network of neurons is a region of the brain called the cerebral cortex, which scientists believe is the 'seat of consciousness'. However, how the neurons create consciousness in the cerebral cortex remains a mystery.

Consciousness means the brain is the only organ which can question its own existence



Did you know?
The human brain is 60 per cent fat

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SPECIAL

3 SPONTANEOUS HUMAN COMBUSTION



Dr John Irving Bentley is thought to have died from SHC aged 92 in 1966 – only his leg remained

Spontaneous human combustion (SHC) is something that has puzzled the scientific community for the past 300 years. Over this time, around 200 accounts of humans bursting into flames have been recorded. In December 2011, a coroner ruled that a 76-year-old man in Galway, Ireland, had died as a result of SHC. Investigators found no accelerant for the fire that consumed the man, along with damage to a patch on the ceiling directly above the body and the floor below it.

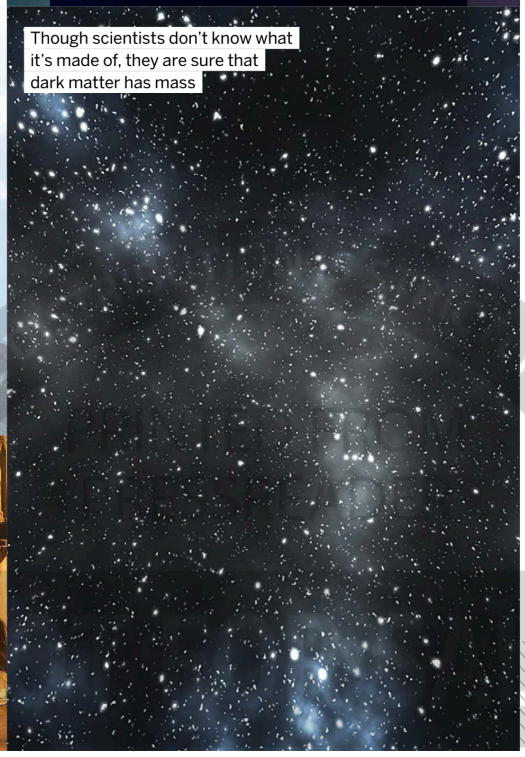
However, the existence of SHC has been furiously debated, with many scientists laying blame on undetected flame sources being the true culprit. This scepticism has been further supported by a theory called the wick effect, where clothes act as a candle wick and body fat acts as the fuel. British biologist Brian Ford has suggested that the buildup of flammable acetone in the body may offer some explanation as to how the human body might stay alight. Nevertheless, scientists haven't been able to categorically prove whether SHC is a real phenomenon, and if it is, how it can be explained.

4 WHAT IS DARK MATTER?

Over 27 per cent of the known universe is made up of a mysterious substance called 'dark matter'. Unlike visible matter, also known as baryonic matter, dark matter emits no light or energy and is completely undetectable by conventional sensors. The only way that scientists know of its existence is because of the gravitational effect it has on visible matter. It was first inferred in the 1930s while Swiss astronomer Fritz Zwicky was studying the movement of galaxies in the Coma Cluster. However, the existence of dark matter wasn't confirmed until the 1970s by American astronomer Vera Rubin. What scientists don't know is what particles make up dark matter. Some researchers have speculated that weakly interacting massive particles (WIMPs), which are currently hypothetical, are the building blocks of dark matter. Others believe that our understanding of gravity might be challenged by the existence of dark matter and that it exists as a web throughout the universe and affecting visible matter.

Did you know?

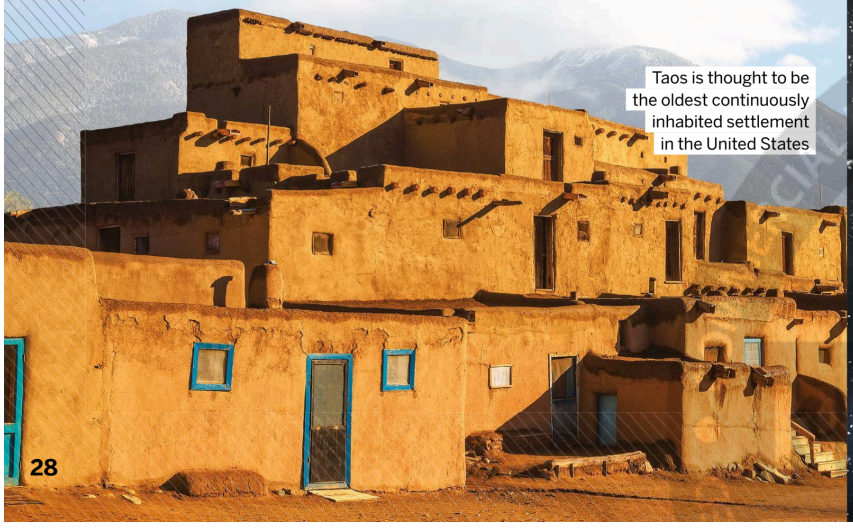
Dark matter outweighs visible matter by around six to one



Though scientists don't know what it's made of, they are sure that dark matter has mass

5 THERE'S A CONSTANT HUM IN NEW MEXICO

There's a hum that has rippled through the town of Taos in New Mexico since the early 1990s. Only around two per cent of Taos' residents can hear the hum, which many describe as a low-rumbling engine, while others have compared it to a bee hive or the whir of a fan. Researchers have attempted to locate the sound and have been unable to account for the source of the hum. However, there have been plenty of suggestions as to why people may experience the sound, including geological formations creating acoustic resonance, electromagnetic fields or that the hum is a form of tinnitus or 'spontaneous otoacoustic emission' in the hearers. Taos is not alone. There are several unexplained 'hums' around the world, including in Auckland, New Zealand, and Darmstadt, Germany.



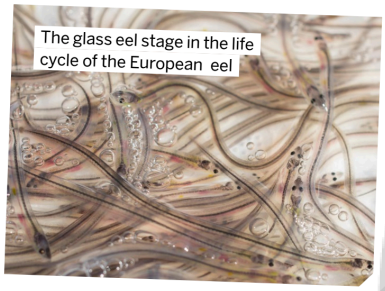
Taos is thought to be the oldest continuously inhabited settlement in the United States

DID YOU KNOW? Scientists have only explored around five per cent of the world's oceans

BREEDING GROUNDS OF AN ELUSIVE EEL

The ancient Egyptians believed that eels sprung up from the Sun-warmed waters of the Nile, and during the 4th century BCE, Aristotle thought they erupted from mud. However, it wasn't until 2022 that scientists finally tracked down where the mysterious European eel goes to mate. Every year, European eels journey from continental rivers to their breeding grounds in the Sargasso Sea in the North Atlantic. How they find their way there and what they do once they arrive, however, has not been documented and remains a mystery.

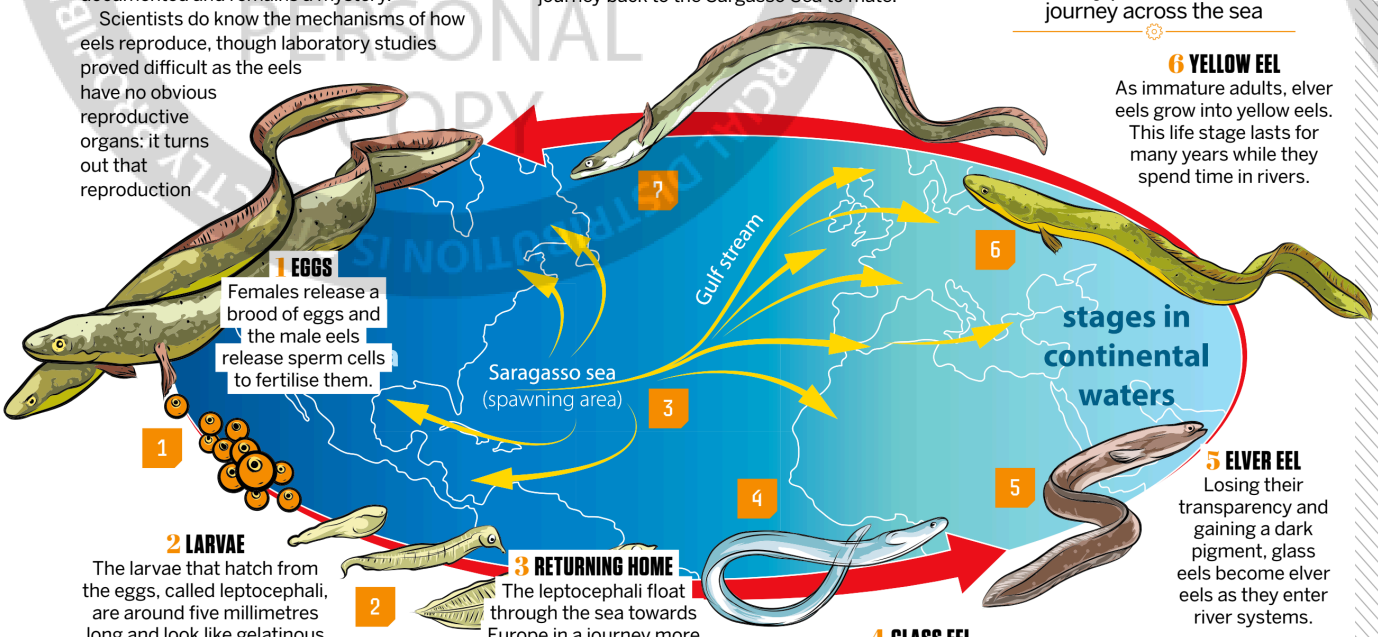
Scientists do know the mechanisms of how eels reproduce, though laboratory studies proved difficult as the eels have no obvious reproductive organs: it turns out that reproduction for eels is their final affair. When they are ready to mate, their stomachs dissolve and reproductive organs develop in their place. Females release eggs into the water, and the males fertilise them. Shortly after, the adults die, meaning their journey to the Sargasso Sea is a one-way trip.



The glass eel stage in the life cycle of the European eel

AN EEL'S LIFE CYCLE

The many phases of this fish's journey across the sea



1 EGGS
Females release a brood of eggs and the male eels release sperm cells to fertilise them.

2 LARVAE
The larvae that hatch from the eggs, called leptocephali, are around five millimetres long and look like gelatinous leaves with tiny fish heads.

3 RETURNING HOME
The leptocephali float through the sea towards Europe in a journey more than 4,000 miles long.

4 GLASS EEL
By the time the larvae have reached the continental shelf of Europe, they have grown into slender transparent eels called glass eels.

5 ELVER EEL
Losing their transparency and gaining a dark pigment, glass eels become elver eels as they enter river systems.

6 YELLOW EEL
As immature adults, elver eels grow into yellow eels. This life stage lasts for many years while they spend time in rivers.

7 SILVER EEL
When the eels reach maturity they grow into silver eels, which can reach up to 70 centimetres long. They will then make the journey back to the Sargasso Sea to mate.

DECIPHERING AN ANCIENT CODEX

Often touted as the 'world's most mysterious book', the Voynich manuscript is a 15th-century codex that researchers are still trying to understand. Thought to have been written in Central Europe, its author and the language within it remain largely unknown. Between the 240 pages of the codex are some 38,000 words and a myriad of illustrations that fall into six categories: botany, astronomy, anatomy, geography and recipes. Among the illustrations are 113 unidentified seemingly prehistoric or alien plant species.

A Polish antiquarian bookseller named Wilfrid Voynich acquired the manuscript in 1912, but knowledge of its ownership over the centuries contains many gaps. Researchers have established that the manuscript was purchased by the Holy Roman Emperor Rudolph II some time between 1576 and 1612. In 1969, the Voynich manuscript was donated to the Beinecke Rare Book and Manuscript Library at Yale University, where it remains. The origin of the manuscript, its true author and its contents remain mostly a mystery. In April 2024, researchers made some headway in deciphering its contents and proposed that a section of the manuscript was dedicated to female reproductive health and medicine.



Pages from the hand-written Voynich manuscript, including intriguing depictions of unknown plants

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SPECIAL



Did you know?
Crabs first evolved around 200 million years ago

ANIMALS KEEP TURNING INTO CRABS

If you've ever been told that everything will look like a crab in the end, then you've heard something that isn't that far from the truth. While humans probably aren't destined for life under the sea in the near future, transformation into a crab, called carcinisation, has happened many times to various species over millions of years. Among the 52,000 species of crustaceans that traverse the world's waterways, 7,600 are known as 'true crabs', but 10,000 belong to a group called 'false crabs'. Animals in the false crab infraorder Anomura, which includes king crabs and coconut crabs, look remarkably like their true crab cousins. The groups share qualities like a rounded, flat body and an abdomen hidden on their underside with hidden tails tucked underneath. The similarities in their evolution are an example of convergent evolution, where animals develop similar characteristics that are beneficial to their environment. However, when it comes to crabs, scientists still aren't sure what natural driving force is moving so many species to the crabby side.



COMMON SIGNS OF CARCINISATION

Meet the crustaceans that have mimicked the evolution of their crabby cousins

1 FLAT BODY
The carapaces of crabs are flattened and wide, often with raised edges on the dorsal carapace.

2 FUSED THORACIC STERNUM
The underside of a crab is made up of fused segments, called sternites, into a single plate called the thoracic sternum.

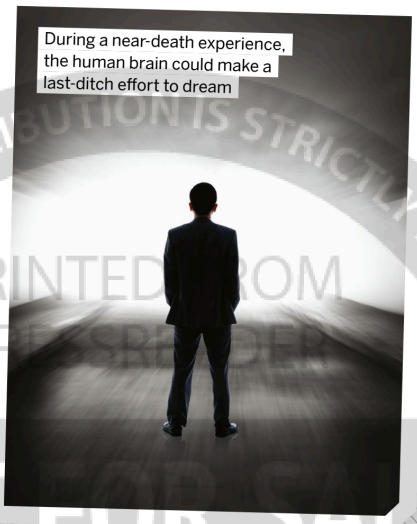
3 HIDDEN TAIL
The abdomen, or pleon, is hidden underneath from the dorsal view, under the body.

4 LOSING THE ENDS
Carcinisation causes crustaceans to lose the final fanned out segments of the tail, called uropods.

NEAR-DEATH EXPERIENCES

Around 10 to 20 per cent of people who have been close to death but have survived to report their experiences say they caught a glimpse of their loved ones who have passed, or witnessed a bright-white light. While many think the light source is a beacon from the 'other side', scientists aren't quite as convinced.

In 2023, researchers at the University of Wisconsin-Madison made some headway into discovering the source of this bright-white light. Scientists monitored the brain activity of four terminal human patients using electroencephalograms. Their brain activity was monitored both before and after the patients were withdrawn from ventilation support. What the researchers discovered is that two of the patients experienced high levels of gamma activity in the regions of the brain that are associated with internal visualisation while dreaming. This could explain the visions of loved ones and bright lights experienced during a near-death experience, though much more research is needed to fully understand how the brain reacts in a near-death situation. There are also no clues yet as to why some people experience these visual events, while others don't.


During a near-death experience, the human brain could make a last-ditch effort to dream

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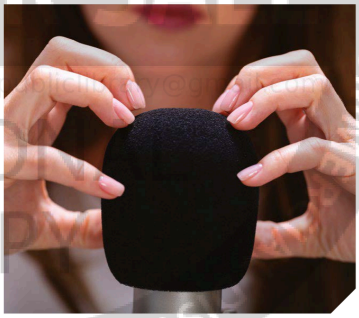
DID YOU KNOW? In the 1970s, unknown forces slightly deviated the trajectories of Pioneer 10 and 11

FEELING THE ASMR TINGLE

10 If you're the type of person who feels a spine-tingling sensation brought about by someone moving a brush over a sensitive microphone, then you might be experiencing an autonomous sensory meridian response (ASMR). Two symptoms of ASMR affect those who experience it: a tingle or sparkly sensation that travels from their heads down their spine, along with a sense of relaxation. ASMR isn't solely a response to delicate sounds – a gentle touch can also produce it. Researchers have located the region of the brain that initiates the sensation – the medial prefrontal cortex. However, an explanation as to why some people experience it and others don't remains to be found. Some scientists have suggested that brain formation and early experiences can cause a difference, or even that differences in personality may prevent certain people from experiencing the sensation.

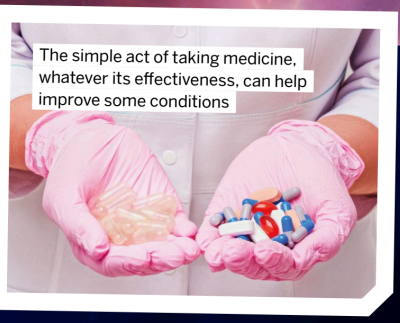
The term autonomous sensory meridian response was coined in 2010



STRANGE LIGHTS IN THE SKY

11 In the village of Hessdalen in central Norway, mysterious lights have intrigued people since the 9th century CE. Known as the Hessdalen lights, this is an atmospheric phenomenon that produces ball-like lights of different shapes and colours. These dancing lights move quickly through the sky, but can also remain in place for up to two hours, according to some reports. While some have speculated that the lights could be beacons for extraterrestrial life, scientists have proposed several earthly theories. It's been suggested that the lights may come from ionised dust that illuminates under specific conditions in the atmosphere. Other theories attribute their existence to interactions between Earth's geomagnetism and the atmosphere, charged particles from radioactive radon gas or even the piezoelectricity of nearby quartz. Nevertheless, all of these theories are yet to be proven, and the Hessdalen lights remain a mystery.

Hessdalen lights over Fjell, Norway, in the late hours of twilight



The simple act of taking medicine, whatever its effectiveness, can help improve some conditions

THE PLACEBO EFFECT

12 When trialling a new medical treatment, researchers commonly administer a portion of trial participants with a 'fake' version of the treatment, called a placebo. By using the placebo, scientists can compare the results of the trial with genuine treatments. If patients who were given the genuine treatment improved when compared to those given the placebo, it indicates that the treatment works. Along with discovering new medicines and treatments, using a placebo also brought a phenomenon called the placebo effect to light, where the act of simply taking medicine can help someone heal.

In a 2014 study of migraine attacks, researchers found that a placebo was 50 per cent as effective at treating a migraine compared to a real drug. Little is known about why taking a placebo works, but many scientists suggest that an increase in the release of neurotransmitters such as endorphins may play a role. Taking a placebo might simply act as a prompt for the brain that there's an issue in the body and it needs to act.



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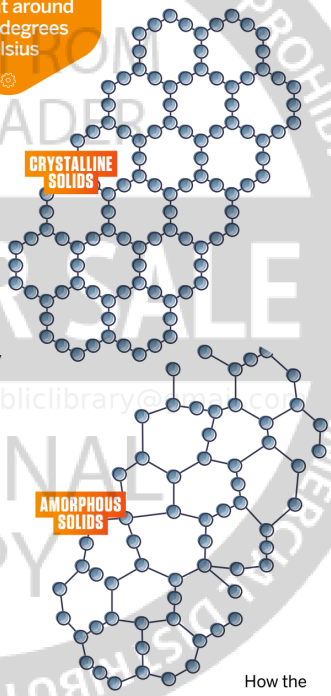
SPECIAL

Did you know?
Sand melts into glass at around 1,700 degrees Celsius

GETTING TO GRIPS WITH THE GLASS PHASE

13 School taught us that there are three states of matter: gas, liquid and solid. As matter shifts between these states, molecules arrange themselves into different orientations. However, glass doesn't technically fall into any of those three categories, and still leaves scientists confused today. When glass transforms from a molten liquid state to a solid, glass atoms don't fall into the uniform 'crystalline lattice' of a typical solid. Instead, the atoms in the 'glass phase', also known as an amorphous solid, remain in irregular orientations like a liquid. It's been suggested that the amorphous state of glass means that the atoms within it are still moving like liquid, albeit on an extremely slow basis, taking millions of years to see any sort of difference in the glass. As to why the molecules of glass don't form crystalline lattices like other solids, it remains a mystery.



How the amorphous solid structure of glass compares to a crystalline solid


Dancing mania plagued Central Europe during the 14th and 17th centuries

THE DANCE-TO-DEATH PLAGUE

14 In 1518, a woman known as Frau Troffea began to dance with a rhythm that would eventually spread uncontrollably throughout the city of Strasbourg. In July, Troffea began to twist and shake through the streets. Her lively jive continued for six days straight without any respite, by which time 34 additional people had 'caught' her dance fever. By August, around 400 people had come down with the dancing disease and were compelled to bust a move. Doctors at the time blamed 'hot blood', suggesting that the dance moves were an attempt to shake the fever. Musicians were even brought to Strasbourg to help alleviate sufferers of their affliction, with little success. Some dancers suffered exhaustion and even died from strokes and heart attacks. Over time the dancing plague wore off, without any real explanation for it in the first place.

Modern scientists suspect that ergot fungus poisoning may have caused hallucinations and convulsions, or that a psychological phenomenon called mass psychogenic illness, also known as mass hysteria, may have been the culprit. The Strasbourg dancing epidemic isn't an isolated incident. Historical records show several similar dancing plagues have occurred throughout the ages.


The Mpemba effect can be easily observed by anyone at home

WHY DOES HOT WATER FREEZE QUICKER THAN COLD WATER?

15 Figures in philosophy and science, such as René Descartes and Aristotle, observed a strange phenomenon: that hot water freezes faster than cold water. However, the first scientific investigation into the oddity came from a Tanzanian teenager named Erasto Mpemba and physicist Denis Osborne in the 1960s. Mpemba had stumbled upon the mystery after impatiently putting boiled milk and sugar into a freezer to form ice cream during a school experiment, finding that it froze faster than the cool concoctions of the other students. When Osborne visited Mpemba's class, he asked Osborne why water at 100 degrees Celsius freezes before water at 35 degrees Celsius.

Intrigued by his question, the two went to University College in Dar es Salaam to recreate Mpemba's theory, which became known as the Mpemba effect. As to why the Mpemba effect occurs, the jury is still out. Several efforts have been made to explain it, including the theory that heating water might weaken the hydrogen bonds between water molecules so that it cools quicker, or that evaporation reduces the volume of the water and makes it quicker to chill. However, scientists are yet to come to a consensus as to why exactly hot water freezes faster than cold water.

DID YOU KNOW? Scientists still don't know how migrating animals precisely navigate thousands of miles to breeding sites

RAINING ANIMALS

You've probably heard the saying, 'it's raining cats and dogs', but in some parts of the world, animals have quite literally fallen from the sky as rain. Frogs, fish and birds have all reportedly been seen as 'animal rain' over the years. Tornado-like storms over large bodies of water, called waterspouts, are commonly cited as the cause of animal rain. During the storm, animals caught in the wind are thought to be whipped up, thrown around at up to a hundred miles per hour and tossed onto land. Similarly, updraft winds are thought to have the power to lift lightweight debris high above Earth's surface before releasing it as rain. What's most mysterious about animal rain is that reports tend to identify just one type of species falling from the sky at a time, without any other debris. The weight of a species could offer some explanation. For example, during a storm any animals swept up by strong winds and carried across land would drop in weight order, with the heaviest species falling first and the lighter species landing last, some distance apart from each other.



Why does just one type of animal fall from the sky?











16 SPIDERS IN BRAZIL
In 2013, a downpour of social spiders flooded the town of Santo Antônio da Platina in southern Brazil. Scientists suggested that it may have been a 'dispersal event' or sudden migration.

17 JELLYFISH IN ENGLAND
In the city of Bath, England, in 1894, by-the-wind-sailor jellyfish supposedly rained down through the streets. The cause of the downpour is unknown, although a waterspout over the Bristol Channel may have carried them across land.

18 FROGS IN HUNGARY
On 18 and 20 June 2010, the town of Rákóczifalva in Hungary experienced two frog-raining events. These froggy phenomena may have been caused by a tornado.

19 OCTOPUSES IN CHINA
2018 was the year that octopuses and some other sea life landed throughout the Shandong province of China. The eight-legged rain could have come after a heavy thunderstorm that may have washed the creatures onto land.

20 WORMS IN LOUISIANA
Clumps of earthworms landed on the ground of Jennings, Louisiana, in 2017 in their hundreds. The worms were alive as they fell and continued to wiggle around.

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