Science News

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This will be the last issue of *Science News* for the school year. Have a great summer!

Life Science

Newly Discovered Frog Species with Transparent Skin

In the Neotropics (in Central and South America), there is a whole group of so-called glassfrogs that amaze with their transparent skin covering their bellies and showing their organs underneath. A recently discovered new species from Amazonian Ecuador, however, goes a step further to fully expose its heart thanks to the transparent skin stretching all over its chest as well as tummy. The new amphibian is named *Hyalinobatrachium yaku*, where the species name (*yaku*) translates to 'water' in the local language Kichwa. Water and, more specifically, slow-flowing streams are crucial for the reproduction of all known glassfrogs. The reproductive behavior is also quite unusual in this species. Males are often reported to call from the underside of leaves and look after the egg clutches. Their precise geographic distribution is rather uncertain for a couple of reasons. First, the species' tiny size of about 2 cm makes it tough to spot from underneath the leaves. Then, even if specimens of the species have been previously collected, they would be almost impossible to identify in a museum collection, as many of the characteristic traits, such as their dark green spots, disappear after preservation. This is why the conservation status of the species has been listed as "Data Deficient."
https://www.sciencedaily.com/releases/2017/05/170529085609.htm

Earth Science

Atlas of the Human Planet 2017: How exposed are we to natural hazards?

One out of three people in the world is exposed to earthquakes, a number which almost doubled in the past 40 years. Around 1 billion in 155 countries are exposed to floods, and 414 million live near one of the 220 most dangerous volcanoes. The 2017 edition of the Atlas of the Human Planet, by the European Commission's Joint Research Centre, looks at the exposure of people and built-up areas to major natural hazards, and its evolution over the last 40 years. The atlas covers six major natural hazards: earthquakes,

volcanoes, tsunamis, tropical cyclone winds, tropical cyclone storm surges, and floods. Global exposure to these hazards has doubled between 1975 and 2015, mostly due to urbanization, population growth, and socioeconomic development. Some of the hazards pose a threat to a particularly large number of people in different regions of the world. Of all hazards, the largest number of people are exposed to earthquakes. The number of people living in seismic areas increased by 93% in 40 years (from 1.4 billion in 1975 to 2.7 billion in 2015). In 2015, more than 400 million people lived near one of the 220 most dangerous volcanoes, exposed to the consequences of possible eruptions. Tsunamis affect coastal areas in many regions, with dangerous areas more concentrated in Asia. The highest amount of built-up surface exposed to tsunamis is in Japan by far, followed by China and the United States of America. Its population is four times more exposed than that of China, the second most affected country.
https://www.sciencedaily.com/releases/2017/05/170524085528.htm

Climate Change

Land height could help explain why Antarctica is warming slower than the Arctic

Studies of the earth's past climate show that, as the earth warms in response to an increase in greenhouse gases in the atmosphere, temperatures rise faster at the poles than in other parts of the planet. This is known as polar amplification. But this amplified warming is not the same at both poles. On average, warming for the entire Antarctic continent has been much slower than Arctic warming so far. A possible cause for the accelerated Arctic warming is the melting of the region's sea ice, which reduces the icy, bright area that can reflect sunlight back out into space, resulting in more solar radiation being absorbed by the dark Arctic waters. This is an important contribution to warming in the region, but it's not the only one. The Antarctic's land height also helps explain why the Arctic has thus far warmed faster than Antarctica. With an average elevation of about 2,500 m, Antarctica is the highest continent on Earth, much due to a thick layer of ice covering the bedrock. The continent also has high mountains, such as Mount Vinson, which rises almost 4,900 m above sea level. Computer simulations showed that, if Antarctica's land height is reduced, temperatures in the region respond more strongly to a rise in the concentration of greenhouse gases over the continent. This contributes to an increase in Antarctic warming, which reduces the difference in polar amplification between the Arctic and the Antarctic.

The most significant factor, however, was a change in the way heat is transported in the atmosphere from the equator to the poles in a flat-Antarctica world compared to the real, high-elevation Antarctica. The simulations show that as the altitude of the ice is lowered, it becomes more prone to melting.
https://www.sciencedaily.com/releases/2017/05/170518083039.htm

Physical Science and Technology

New Studies of Subatomic Particles

Atoms are made of electrons, protons, and neutrons, and those particles, in turn, are made of quarks and gluons. Researchers using particle accelerators ("atom smashers") now regularly recreate tiny specks of quark-gluon plasma (QGP), a mixture of quarks and gluons, the fundamental building blocks of visible matter, which last existed as free particles some 14 billion years ago. Researchers analyze the particles as they decay just tenths of a millimeter from the center of a trillion-degree fireball that mimics the early universe. The collisions free the quarks and gluons from their confinement within ordinary particles (e.g., protons and neutrons) so nuclear physicists can study their interactions and the force that holds them together in the universe today. The new measurements showed how a type of heavy particle containing a "charm" quark gets caught up in the flow of the expanding fireball. This measurement gives scientists a new window into understanding the interactions of the particles that make up the subatomic world. By comparing the measurements with theoretical predictions that include the various parameters that play a role in these interactions -- things like the diffusion coefficient (how quickly the charm quarks spread throughout the plasma) and viscosity (how sticky the QGP is) -- researchers can learn about how these different properties relate to one another, and ultimately why the QGP behaves the way it does.
https://www.sciencedaily.com/releases/2017/05/170530140658.htm

Astronomy

New Science Results from NASA's Juno Mission

Early science results from NASA's Juno mission to Jupiter portray the largest planet in our solar system as a complex, gigantic, turbulent world, with Earth-sized polar cyclones and plunging storm systems that travel deep into the heart of the gas giant. Images from Juno show both of Jupiter's poles are covered in Earth-sized swirling storms that are densely clustered and rubbing

together. The spacecraft also revealed differences among the belts and zones that encircle the planet. The belt near the equator penetrates very deeply, while the belts and zones at other latitudes seem to evolve to other structures. Prior to the Juno mission, it was known that Jupiter had the most intense magnetic field in the solar system. Measurements of the massive planet's magnetosphere indicate that Jupiter's magnetic field is even stronger than expected, and more irregular in shape. The magnetic field greatly exceeded expectations at 7.8 gauss, about 10 times stronger than the strongest magnetic field found on Earth. The magnetic field looks lumpy: it is stronger in some places and weaker in others. This uneven distribution suggests that the field might be generated by currents closer to the surface, above the layer of metallic hydrogen.
https://www.nasa.gov/press-release/a-whole-new-jupiter-first-science-results-from-nasa-s-juno-mission

Science & Society

Catnip Repels Mosquitoes More Effectively Than DEET

Researchers report that nepetalactone, the essential oil in catnip that gives the plant its characteristic odor, is about ten times more effective at repelling mosquitoes than DEET — the compound used in most commercial insect repellents. Researchers used *Aedes aegypti*, which can carry the yellow fever virus from one host to another, in their tests. This mosquito is found in most parts of the United States. Yellow fever itself, however, only occurs in Africa and South America. Vaccines and mosquito control programs have essentially wiped out the disease in the United States, although there have been isolated reports of unvaccinated travelers returning with the disease. Why catnip repels mosquitoes is still a mystery. It might simply be acting as an irritant or they don't like the smell. No animal or human tests are yet scheduled for nepetalactone, but perhaps they will take place in the future. If subsequent testing shows nepetalactone is safe for people, researchers say that it would not be too difficult to commercialize it as an insect repellent. A high school science lab would have the equipment to distill it, and on the industrial scale it would be quite easy.
https://www.sciencedaily.com/releases/2001/08/010828075659.htm

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