UNUSUAL SHIMMY FROM A SHIMMERING ELEMENT

For the first time, physicists have clearly observed a rare and complex motion of atomic nuclei called longitudinal wobbling.

An atomic nucleus is composed of protons and neutrons, collectively called nucleons. In an excited state, some nuclei with an odd number of nucleons exhibit a complex wobble – like that of a spinning top – because of their imbalanced geometry. Previous observations detected wobbling around only either the longest or shortest axis of nuclei with fewer than 170 nucleons.

Nirupama Sensharma at the University of Notre Dame in Indiana and her colleagues bombarded an ytterbium target with fluorine ions to produce the form, or isotope, of gold called gold-187. Analysis of γ-rays that the nuclei produced called gold-187. Analysis of γ-rays that the nuclei produced indicated that the nuclei were wobbling. This makes these nuclei the heaviest wobbling isotope known.

The team detected the 187Au nucleus wobbling about an axis that was neither its longest nor its shortest, but was of an intermediate length – the first clear observation of such behaviour.

Phys. Rev. Lett. 124, 052501 (2020)

EXTINCT RODENT WAS ALL BRAWN AND LITTLE BRAIN

Behold Neoepiblema acreensis, an 80-kilogram rodent related to chinchillas that lived 10 million years ago in what is now Brazil. Curious about the brains of these beasts, José Ferreira and Leonardo Kerber at the Federal University of Santa Maria in Brazil and their colleagues used computerized tomography to peer inside two fossil skulls.

To compare brain sizes between creatures of varying weights, scientists can calculate a species’ ‘encephalization quotient’, a measurement of the difference between the expected brain size and actual brain size for an animal of a certain weight. Any value under 1 means an animal’s brain is smaller than expected.

The team estimates that the brain of N. acreensis (artist’s impression pictured) weighed just 47 grams. The encephalization quotient of one individual studied was 0.20; that of the other individual was 0.33. In other words, N. acreensis’ brain was unusually puny in comparison to its body. By contrast, modern South American rodents have an average encephalization quotient of more than 1.05.

The researchers suggest that, because N. acreensis had few predators to outwit, a large brain simply wasn’t worth the maintenance costs.

Biol. Lett. 16, 20190914 (2020)

LARKS AND OWLS BENEFIT FROM LATE SCHOOL STARTS

Whether they’re early birds or not, teenagers could get healthy amounts of sleep and improve their academic performance by attending school in the evening.

Around the world, secondary school trends to start early in the morning. But the biological clock in many adolescent brains doesn’t align with school schedules, resulting in sleep loss and other problems.

Maria Juliana Leone at the National Council of Scientific and Technical Research in Buenos Aires and her colleagues collected sleep data from teenagers at a local secondary school at which students were randomly assigned to start classes at 7.45 a.m., 12.40 p.m. or 5.20 p.m. The researchers placed students on a continuum from early-rising ‘larks’ to later-rising ‘owls’, according to their preferred waking time.

Analysis of students who started school in the morning showed that, compared with larks, owls had overall lower grades that worsened as they advanced through school. Almost no students on the morning schedule got adequate sleep, leading the authors to suggest that a progressive delay of school start times throughout adolescence could benefit all.

Nature Hum. Behav. http://doi.org/dmmn (2020)

FOOD FOR THOUGHT: THE NATIONS THAT WASTE THE MOST

The world wastes twice as much food as previously estimated – and rich countries are disproportionately responsible.

Markets allow harvested vegetables to rot; families throw out leftovers. These and other forms of loss and waste claim one-third of the world’s food supply, according to an estimate by the United Nations Food and Agriculture Organization (FAO).

Monika van den Bos Verma at Wageningen University and Research in The Hague, the Netherlands, and her colleagues wanted to explore how consumer affluence affects food waste. The researchers drew on 2003 data collected by the World Health Organization, the FAO and others to estimate calories purchased, calories consumed and calories wasted by people around the globe.

Belgium had the most food waste, and the Philippines had the least. (The study covered two-thirds of the world’s population, and did not include large food-wasting countries such as the United States.) As household spending rose above roughly US$6.70 per day per person, the amount of food waste also rose quickly, but then slowed.

Globally, people waste 527 calories per person per day – more than twice as much food as scientists had thought.

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