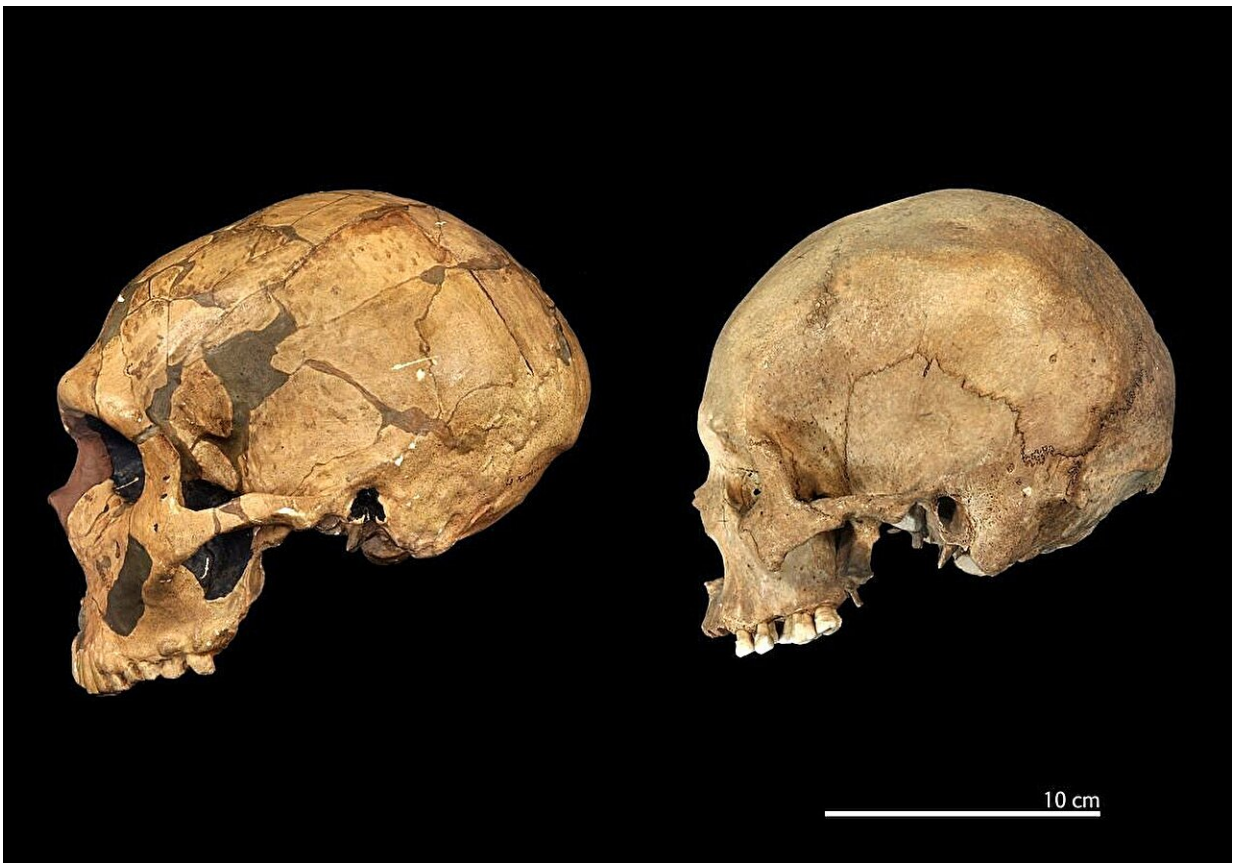
Saturday citations: The 'donut effect'; basically immortal batteries; Neanderthals and H. sapiens

December 7 2024, by Chris Packham



A replica of an approximately 50,000-year-old Neanderthal cranium from La Ferrassie, France, compared to a recent Homo Sapiens cranium. Credit: Trustees of the Natural History Museum

This week, researchers studying data from NASA's Dawn mission reported the identification of 11 sites on Ceres that suggest an internal reservoir of organic materials. A multidisciplinary team published an analysis of the dazzle camouflage patterns deployed on ships during World War 1. And Japanese researchers found a nano-switch mechanism controlled by a single hydrogen atom used by every living organism to obtain energy. Additionally, we covered the enduring impacts of the pandemic on urban real estate, the world's first carbon-14 battery, and a hearty revival of the argument about whether Neanderthals and Homo sapiens were different species:

Office space available

In 2020, the pandemic drove people from business districts and urban cores into the suburbs and the confines of home offices. This negatively impacted city tax revenues and the stock prices of chopped salad chains, and hit the commercial real estate sector particularly hard. And unfortunately, according to a new analysis by Stanford University economist Nicholas Bloom, those effects have been robust and enduring, encapsulated by a term he coined called "the donut effect"—it refers to the hollowing out of financial districts and the ensuing impact on local economies.

Using data on migration flows, real estate, commuting patterns, public transit and consumer spending, Bloom found that the 12 largest U.S. cities lost 8% of downtown residents; many of these people fled to the suburbs. And it cites a large drop in the number of businesses located in these urban cores, particularly in New York, Boston, Atlanta, Chicago, Dallas, Los Angeles and San Francisco. Other U.S. cities experienced smaller donut effects or none at all. Bloom says, "The good news for these cities is that the donut effect isn't getting bigger. Longer term, the evidence points to the donut effect as their new normal."

Full bars for centuries

By exploiting the radioactive decay of carbon-14, researchers at the University of Bristol and the U.K. Atomic Energy Authority have developed the world's first diamond battery, which has the potential to power devices for thousands of years. The carbon-14 comprising the battery generates low levels of power similarly to solar panels. However, instead of photons, it captures electrons moving throughout the diamond lattice.

There are many possible applications, including bio-compatible batteries for implant devices like pacemakers and hearing aids; the researchers also suggest the batteries could replace conventional batteries in extreme environments like outer space, where changing batteries is much more challenging. According to one incredibly good-looking science news writer, power-sucking Xbox controllers could definitely use a generations-spanning advance in battery technology.

And Tom Scott, professor in materials at the University of Bristol and one of the authors of the paper, says, "Our micropower technology can support a whole range of important applications from space technologies and security devices through to medical implants. We're excited to be able to explore all of these possibilities, working with partners in industry and research, over the next few years."

Lineage questioned

One of the many things evolutionary biologists like to argue about is whether or not Homo sapiens and Homo neanderthalensis should be classified as the same species. Well, the separatists have a new study in the *Evolutionary Journal of the Linnean Society* that advances new arguments in favor of reclassifying Neanderthals as a species unto

themselves, primarily in light of the slow process of differentiation that resulted in distinct populations. At the end of a 400,000-year process of evolution, the Neanderthals and Homo sapiens were at the final stage of speciation and had developed reproductive isolation; then Neanderthals died out.

Among the arguments in the paper, the researchers cite Neanderthals' better adaptation to cold climates than Homo sapiens; in order to gather more resources, they were more physically active for longer periods, with skeletal differences that suggest larger internal organs including the lungs and heart. From the lithe skeletons of Homo sapiens, the researchers infer a more efficient physiology that was less demanding of energy; this could have been a contributor to survival.

Citation: Saturday citations: The 'donut effect'; basically immortal batteries; Neanderthals and H. sapiens (2024, December 7) retrieved 26 January 2025 from https://phys.org/news/2024-12-saturday-citations-donut-effect-basically.html