NEUTRON BEAM PEERS INTO MEDIEVAL FAITH AND SUPERSTITION

The Bispegata amulet contains religious phrases and magic words.

A Norwegian amulet more than 700 years old has been hiding a runic inscription that holds religious and magic significance.

When archaeologists found the rectangular metal object during an excavation in Oslo's medieval town in 2018, they saw that it was covered with runes and folded several times. Hartmut Kutzke at the city's Museum of Cultural History and his colleagues wanted to study what was inscribed inside, but they feared that manually opening the talisman, known as the Bispegata amulet, would damage it. Because it is made out of lead — a heavy metal that blocks most X-rays — using X-ray tomography to make the hidden runes visible would not work either. Instead, the researchers used a neutron beam to peek inside the amulet and create a detailed reconstruction of it.

They found that some of the runes spell out Latin and Greek phrases, whereas others signify repetitive sequences of seemingly meaningless words. Some of the comprehensible phrases might carry religious meaning, whereas the abstruse abracadabra was probably thought to have a magic effect, the researchers say.

Archaeometry https://doi.org/g684 (2021)

MINI MACHINE CAN CHOP AND CHANNEL PROTEINS

A molecular machine that threads proteins through a membrane could one day help scientists to identify a protein from a single molecule.

Scientists have long sought a technique that can analyse individual protein molecules. Giovanni Maglia and his colleagues at the University of Groningen in the Netherlands built a molecular machine, smaller than a single cell, that takes scientists closer to this goal.

The machine has one component that chops proteins into small pieces. This sits on top of a tunnel-like structure — borrowed from a bacterium — that can form a passageway between the inside and outside of a cell. The team integrated this tunnel, or nanopore, into an artificial membrane that mimics a cell's surface.

The chopper, which was positioned above the membrane, hacked a single protein into fragments that the machine quickly transported through the nanopore. The protein fragments interfered with the flow of charged molecules through the nanopore, generating an electrical signal that is unique to each protein. The authors hope that, by fine-tuning the machine, they will be able to identify a protein by measuring this signal.

Nature Chem. https://doi.org/g6wf (2021)

EARTH IS HEADED FOR WELL OVER TWO DEGREES OF WARMING

Humanity is not on track to keep global warming below 2°C, the target of the 2015 Paris climate agreement, according to a study that looks at how climate mitigation efforts might unfold between 2030 and 2050.

Many climate studies analyse how society can reach predefined climate targets while assuming that emissions will be cut in the most cost-effective way. But in the real world, emissions cuts play out through a more complex mix of policy changes.

A team led by Ida Sognnaes at the CICERO Center for International Climate Research in Oslo used seven global models to assess how carbon dioxide emissions might change by 2050. The researchers estimated the impacts of current emissions-reducing policies until 2030 and then modelled a variety of ways in which those policies might continue or change.

The team found that even the most optimistic scenario resulted in global temperatures rising by more than 2°C by the end of the century. Policymakers need to strengthen their pledges to fight global warming even in the face of much uncertainty, the authors write.

Nature Clim. Change https://doi.org/gnj9r4 (2021)

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