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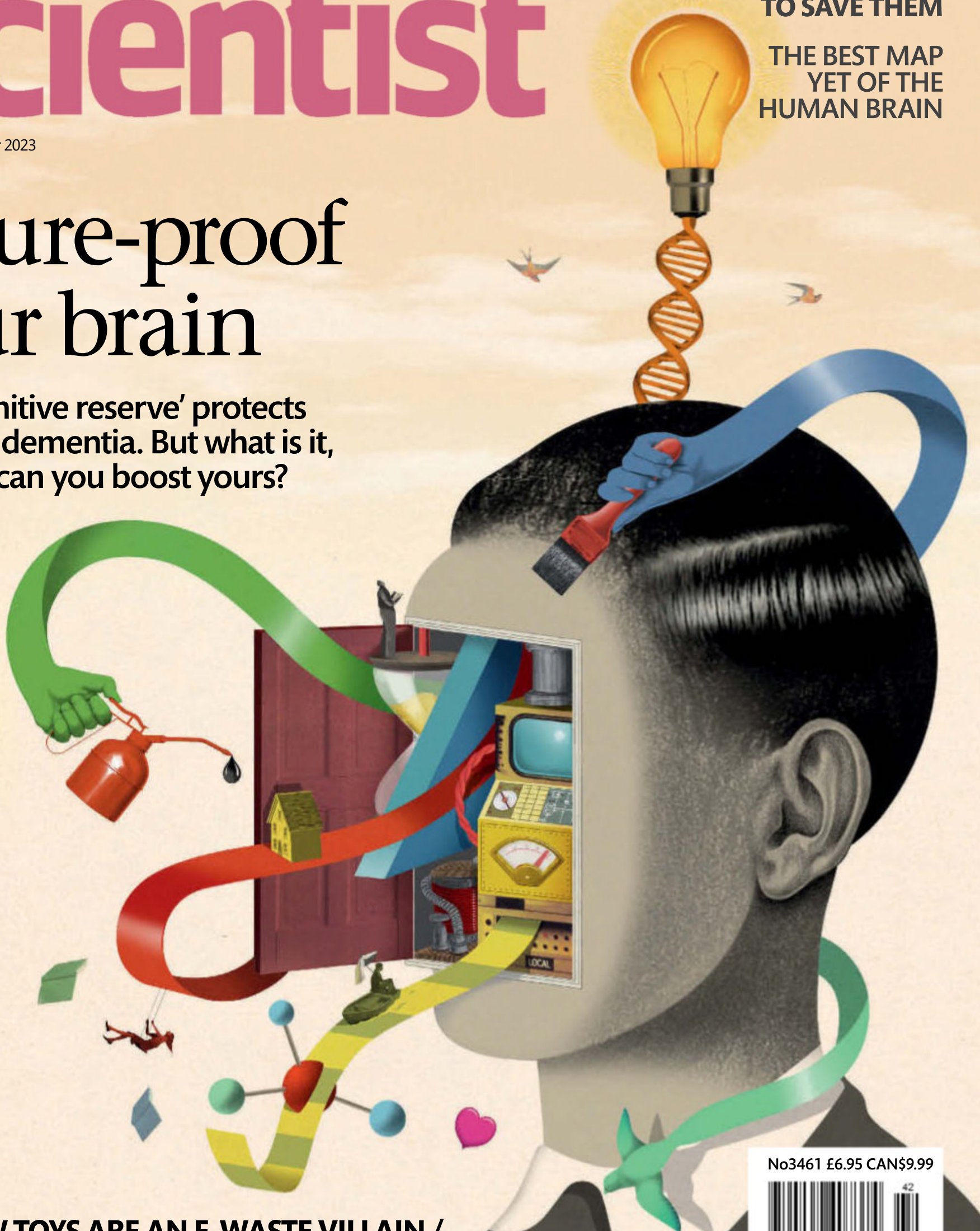

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Space

Two giant planets collided and vaporised in a distant star system

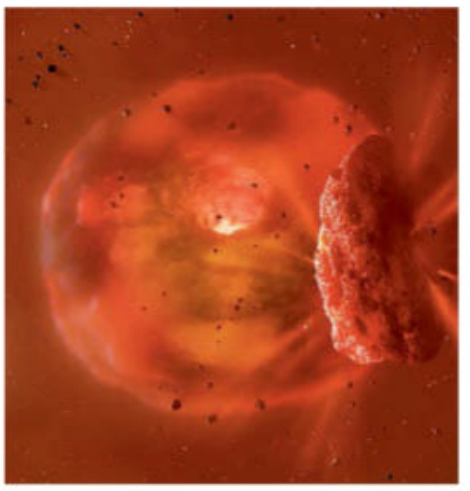
Jonathan O'Callaghan

A STAR system 1800 light years from our own may have been the scene of a cataclysmic collision, as two giant planets crashed together and were incinerated, leaving behind a glowing-hot doughnut. If so, it is the first time we have seen a planetary collision, and its aftermath, as it happened.

In 2021, astronomers spotted a strange event in which a sun-like star, dubbed ASASSN-21qj, dimmed by as much as 95 per cent. When Matthew Kenworthy at Leiden University in the Netherlands and his colleagues looked at past observations of the star, they found it had doubled in brightness three years before the dimming.

The cause of that brightening and then dimming, they think, was two giant planets crashing together, with a resultant doughnut-shaped disc of heated dust and gas orbiting in place of the planets and obscuring our view of the star years later.

"We went through a whole series of possible ideas," says Kenworthy. "The one that seems to fit all the data we have is a collision of two ice giants. It's the first time this has been seen."



MARK GARLICK

An illustration of the huge, glowing doughnut produced by planets colliding

The two planets would each have been perhaps dozens of times Earth's mass, comparable to Neptune, and they would have orbited the star at a distance similar to that of Jupiter around our sun. As they smashed together, they would have been "pulverised, totally reduced to molten muck", says Kenworthy, leaving behind a "giant ball of silica vapour" about seven times as wide as our sun.

Up close, an observer would have seen a "bright red glowing collision", says Kenworthy, with rock and debris being blasted out from the planets' solid cores.

A white-hot remnant would have burned at the centre of this ball, eventually forming into a torus-shaped ring orbiting the star, with a scorching temperature of some 700°C.

That is about half as hot as what would have been expected if the two planets were rocky, leading the researchers to surmise that the worlds were rich in water vapour, making them ice giant planets like Neptune and Uranus. The remains may eventually condense into a new planet in a few thousand years (*Nature*, doi.org/kx92).

How the event happened is unclear. The two planets may have been perturbed in their orbits by a passing star or another planet before colliding, releasing the equivalent energy in an instant as a small star burning for two years.

"We have good evidence that planetary collisions do occur," says Jonathan Marshall at the Academia Sinica Institute of Astronomy and Astrophysics in Taiwan. For example, the moon is thought to have been created when a Mars-sized object called Theia smashed into Earth.

Marshall, however, has previously proposed that the dimming of ASASSN-21qj was due to comets breaking apart in the system, not a planetary collision. "We didn't feel there was enough mass to justify more than small bodies involved," he says.

André Izidoro at Rice University in Houston, Texas, says "super-Earths and mini-Neptunes are super common close to other stars, so giant impacts among them should also be super common".

However, such events should become less frequent as a star system ages. In our solar system, it is thought that this tumultuous period ended about 100 million years after the birth of the sun, but Kenworthy and his colleagues believe ASASSN-21qj is 300 million years old. If this is correct, it would show that giant impacts can happen later, says Izidoro. ▮

Health

Blood test tweak could make intensive care treatment safer

USING smaller vials to collect blood samples from people in intensive care could help prevent risky transfusions and preserve valuable supplies of donated blood.

Most hospitals around the world use standard blood collection tubes, which withdraw 4 to 6 millilitres of blood, when carrying out tests on people in intensive care units (ICUs). But most of these tests – which check organ function, clotting and respiratory health – require less than 0.5 ml of blood.

With multiple blood samples often being taken from people in ICUs every day, this can lead to substantial blood loss and anaemia.

"After eight days in intensive care, the amount of blood loss is equivalent to donating a unit of whole blood [around 350 to 525 ml]," says Deborah Siegal at the University of Ottawa in Canada.

Roughly 40 per cent of people in intensive care need blood transfusions, which carry the risk of allergic reactions and infections. Taking unnecessarily large blood samples adds to that need, says Siegal.

Now, she and her colleagues have studied more than 27,400 adults who had been in intensive care for at least two days at 25 ICUs across Canada. For the first six weeks of the study, all of the ICUs used standard test tubes to collect blood samples. Every six weeks thereafter, two of the ICUs switched to using vials that collected between 1.8 and 3.5 ml of blood.

"After eight days, the amount of blood lost to blood tests is equivalent to donating a unit of blood"

By analysing the number of transfusions given, the team found that using smaller vials resulted in one fewer transfusion per 10 people in intensive care than using the standard tubes (JAMA, doi.org/kzbr).

This amounted to saving about 1500 units of blood over an almost two-year period, says Siegal. The smaller tubes didn't affect the quality of the blood tests carried out, she says, and transitioning to smaller tubes also seemed to reduce the risk of anaemia. ▮

Carissa Wong