'The cost of solar storms could hit $2.4 trillion.' Too Close to the Sun

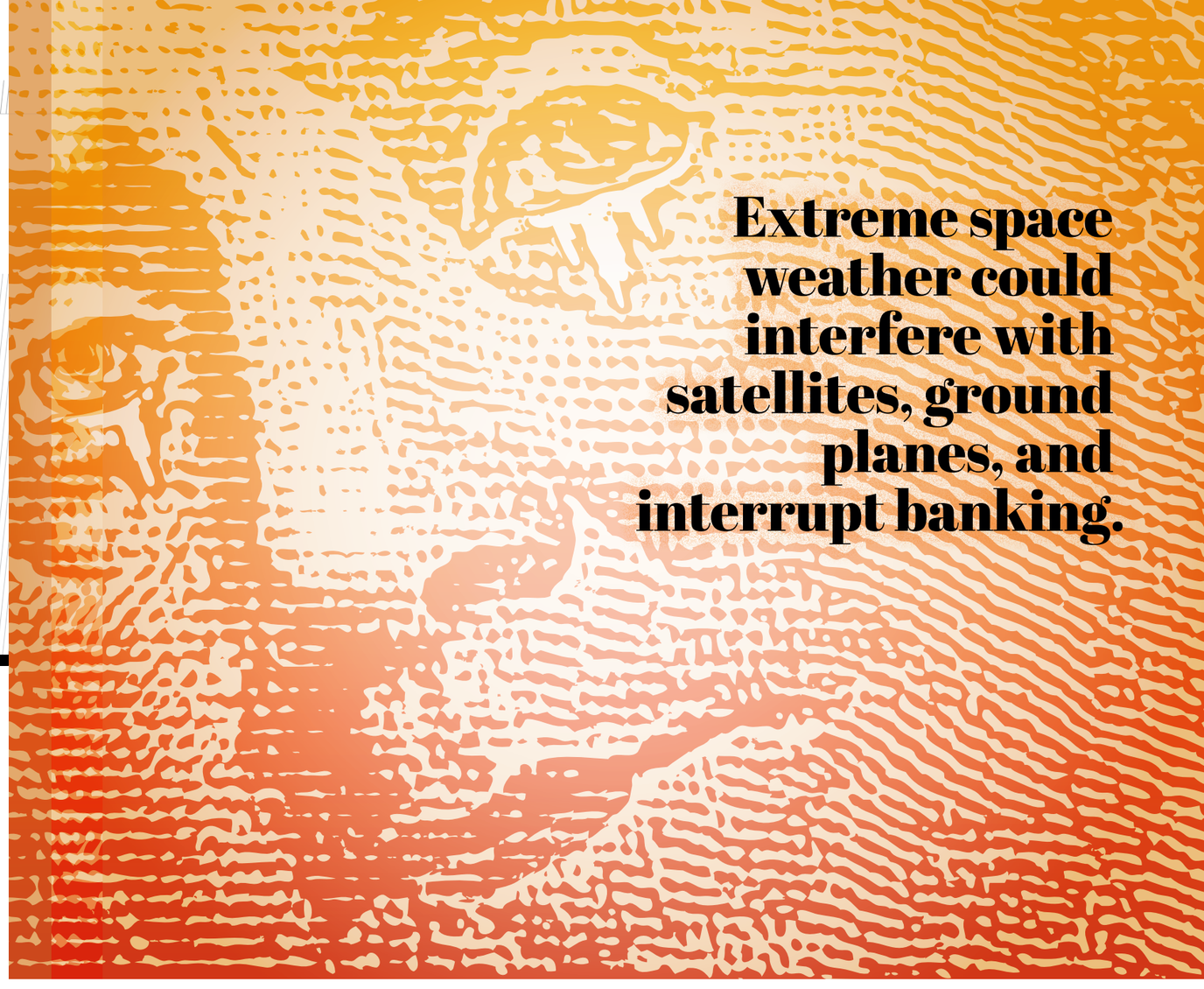
Look into the sky and much of the time you'll see the Sun, at least during the daytime. And much of the population is aware that humans, animals, and plants couldn't survive without the Sun's presence. This massive star, central to our solar system, with a circumference of 2.7 million miles, provides our tiny planet with warmth and vitamins, plus it's crucial to growing our food. Five thousand years ago, humans knew the Sun mattered, so many routinely prayed to the Sun god. We still use that name for the seventh day of the week: Sunday.

But the Sun isn't always kind to the Earth. Sometimes the solar surface is very active, with many dark spots. The really bad news is that when there are a large number of spots, there is an increase in solar flares, aka explosions, which cause disruptions on Earth. "Sometimes after a big solar storm, there can be power outages," says Arnab Rai Choudhuri, a professor at the Indian Institute of Science and an expert on solar activity. Indeed, the events often don't make big headlines, but the last major solar storm, in May 2024, created various disruptions on Earth to GPS, radio, and power grids, particularly in the midwestern United States. Farmers there reported "possessed" tractors going in circles, with the GPS mayhem causing a reported $500 million in damage.

It could have been worse—or more spectacular. Back in 1859, British astronomer Richard Carrington saw an explosion of a large sunspot, which 18 hours later delivered what is known as a geomagnetic storm. In this case, a sudden change to Earth's magnetic field shut down telegraphs across the globe and caused sparks to fly from telegraph poles. In some places, auroras swept the sky, so bright that people in the middle of the night reportedly thought it was morning and had breakfast.

The worry in the coming years is another so-called Carrington Event, because there is an extra-large sunspot on the solar surface pointed at Earth. Last year, insurance organization Lloyd's of London said "extreme space weather" entering the atmosphere could interfere with satellites, ground planes, and interrupt the banking industry, among many other tech issues. The Cambridge Centre for Risk Studies forecasts that the cost of solar-storm damage could hit $2.4 trillion over the next few years. If the solar event becomes more extreme, the global cost could reach $9.1 trillion. Such figures would be spread over a few years and would likely have a minimal impact on most developed countries. However, damage claims could be high enough to really hurt insurance company profits, experts say.

To be sure, there have been major advances in protecting the tech and electricity infrastructure. That helped limit the damage in the May 2024 event. "We are now in a better place," says C. Alex Young, associate director for Science Communication in the Heliophysics Science Division at NASA's Goddard Space Flight Center. Still, it's worth noting that when the sunspots form on the solar surface, their magnetic fields get twisted and eventually pop. "These releases could be enough to power the globe for thousands of years for all energy needs," says Young. The risk is not only to infrastructure (people, by the way, are protected from such storms by the atmosphere), but everyday space weather. "We are becoming much more space dependent, particularly satellites," says Young. "When solar radiation heats the globe, the atmosphere expands and can interfere with connections to satellite systems." Put simply, the Sun is powerful.



Extreme space weather could interfere with satellites, ground planes, and interrupt banking.

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