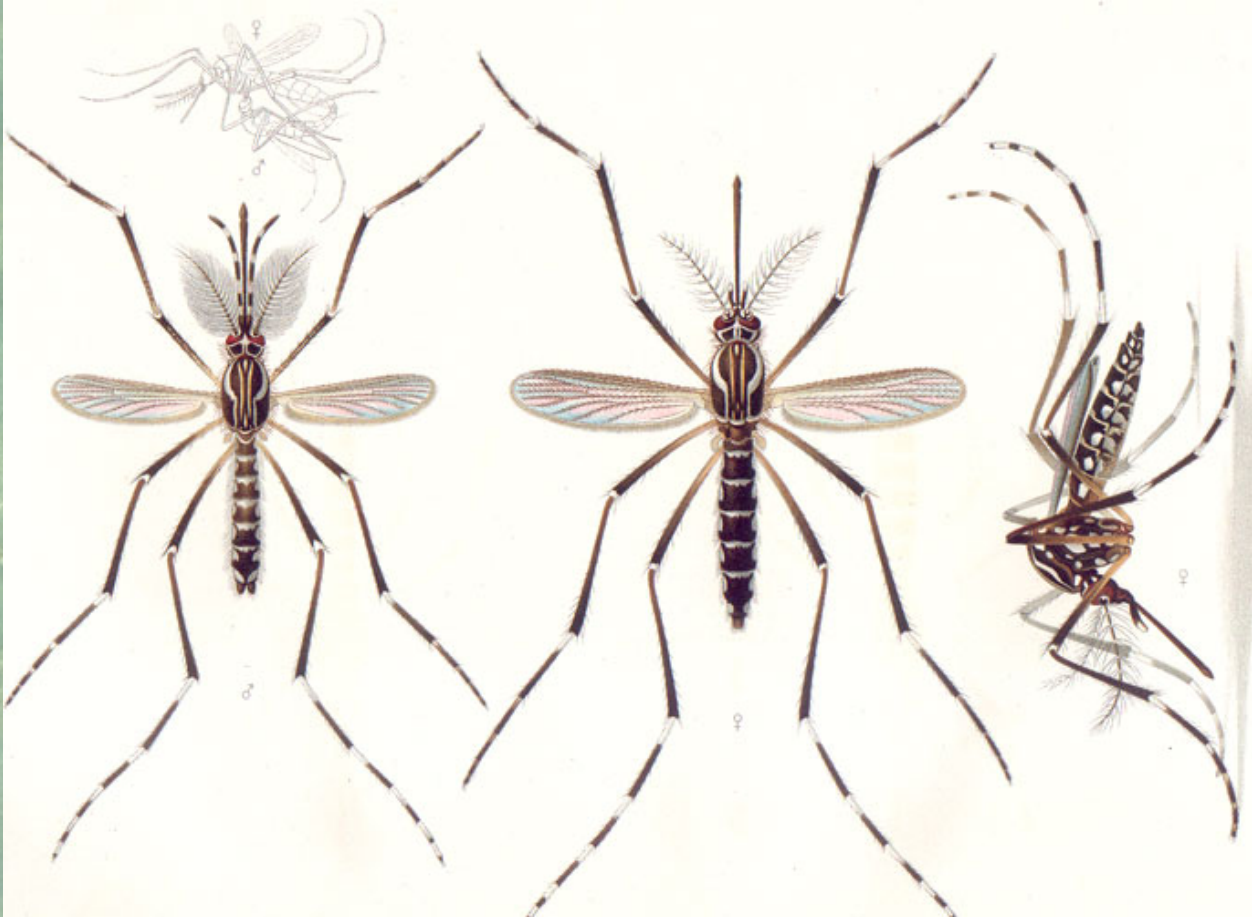




Dispatches From The Wild, Weird World Of Humanity And Its Biosphere

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Mosquitoes



The US Environmental Protection Agency [has approved the release](#) of up to 2.4 billion genetically modified *Aedes aegypti* mosquitoes in the Florida Keys and California's Central Valley, starting now in Florida and soon when California's regulators also sign off and continuing through April 2024. The company applying to do this, [Oxitec](#), has already tested this technology with a 2021 release of 144,000 of the same type of gene-edited mosquitoes in the Florida Keys; the new approval continues that program and expands to California. Oxitec's *Aedes aegypti* are all males, so they don't bite people (only female mosquitoes suck and they've been modified so as to only breed male offspring like themselves. Within a few generations, the overwhelming majority of mosquitoes are non-biting males

that can themselves only have male children, so the cycle continues until there are no mosquitoes left at all. It's incredibly humane; they're not even killing any mosquitoes in the course of this.

And this is much needed, since *Aedes aegypti* (pictured, above) has been a scourge of humanity for centuries. And, worse, it looked likely to be gaining new strength from climate change. *Aedes aegypti* has been found to carry [over 50](#) different viruses, a primary vector for the viruses responsible for dengue fever, yellow fever, chikungunya, and Zika, while also being a secondary vector for the viruses causing West Nile Virus, eastern equine encephalitis, and dozens more. Native to Africa, this mosquito was brought to the Americas by the slave trade, and [wreaked havoc by causing over dozens of major outbreaks of yellow fever in the 1700s and 1800s](#). This threat abated with the rise of modern sanitation and the invention of the yellow fever vaccine in 1938, but *A. aegypti* still infects tens of millions of people per year with the agonizing dengue fever: one 2013 study estimated that the world sees [96 million severe dengue infections](#) per year. A study modeling potential climate effects on *Aedes* mosquitoes found that in a worst-case climate scenario, [over a billion more people could be exposed to *A. aegypti* by 2080 \(6 billion are already exposed\)](#), including the populations in previously-too-cold areas like Canada and Northern Europe. Even today, in California's Central Valley, where the Oxitec mosquitoes are seeking permits, *A. aegypti* is [proliferating and moving into new areas](#) (it was detected in California [for the first time](#) in 2013), aided by rising temperatures and more stagnant water left by the recent droughts. The world could really use some new tools to counter this.

So while at first glance the release of billions of mosquitoes might sound weird and scary, it's actually great news, a new chapter in humanity's long-running noble struggle against infectious disease and a new way to protect America from one of the most insidious dangers posed by climate change.

It's also worth putting this development in a broader context. In the last few years, there's been a huge surge in the development and deployment of highly promising interventions to prevent mosquito-borne illnesses. A malaria vaccine for children, the first in history, [gained WHO approval for "broad use" in October 2021](#), and several more [with higher efficacy](#) are in development. (Note that malaria is caused by Plasmodium parasites that spread exclusively by the bite of *Anopheles* mosquitoes, not *Aedes aegypti* mosquitoes). Another *Aedes aegypti* focused initiative, the World Mosquito Program, is breeding mosquitoes inoculated with a form of *Wolbachia* bacteria that outcompetes the viruses that cause dengue et al within the mosquitoes' bodies, essentially displacing the disease while keeping the mosquitoes. They're already putting this into practice from Australia to Brazil.

In sum, mosquito-borne diseases are being assailed on many fronts. For the first time in human history it feels within reach at last that someday soon, dengue fever, chikungunya, yellow fever, and even perhaps malaria will become as rare as polio, syphilis, measles, mumps, rabies, and leprosy. We may even hope that with enough work and institutional commitment, they will someday be eradicated, as smallpox and rinderpest have been and guinea worm disease is tantalizingly close to being, with [just 14 cases worldwide in 2021](#). Human progress!



Gravity Vault Energy Storage



As renewables advance, energy storage is becoming a more and more important part of energy policy discussions. What do we do to keep the lights on when the wind isn't blowing and the sun isn't shining? Nuclear and geothermal have great potential to serve as zero-carbon-emission sources of baseline power, but it's also highly desirable to store some extra wind and solar electricity. Thus, as this newsletter has often discussed, grid-scale battery storage is expanding immensely, with the technology improving rapidly, [costs declining](#), [investment surging](#), and [installations skyrocketing](#). Pumped hydro storage [is also booming](#). Now, a new solution is emerging to join the crew, with the potential to become a big player in energy storage down the line: gravity-based energy storage. A startup called Energy Vault is building out an elegantly simple technology: using surplus energy to lift 35-ton blocks, then letting those blocks slowly descend when extra energy is needed, turning turbines with the force of gravity to feed power back into the grid. ([Pictured above](#) is their tower-style prototype in Switzerland; they plan to build future gravity vaults within buildings). Energy Vault [has signed contracts](#) to build 2.5 gigawatt-hours worth of such gravity-driven energy storage vaults for customers around the world (from mining companies to green hydrogen producers), starting this year. May this grow still further to help support the renewables revolution!



Sumatra



The Sumatran rhino is the most threatened large mammal on Earth. There are only [an estimated 30 individuals](#) alive in the wild, most of them in Way Kambas National Park on Sumatra. The scientific consensus is that the fate of the species rests with an international captive breeding effort; and despite [a history of bureaucratic wrangling verging on incompetence](#), the Indonesian government has lately been devoting more resources to this project. There are only nine Sumatran rhinos in captivity, seven of them at a facility near Way Kambas-until recently, that is. On March 28th, it was revealed that [a new calf had been born](#) at the sanctuary, to Andatu and Rosa, becoming the eighth rhino there. ([Pictured above: the new calf](#), yet unnamed, with her mother, Rosa). Such births are rare and precious, as [reproductive problems are common](#) among Sumatran rhinos; Rosa had miscarried eight times between 2017 and 2020.

“With the birth of Rosa’s rhino calf at the Way Kambas Sumatran Rhino Sanctuary, we hope this puts a new hope for us to continue hearing great news of more Sumatran rhino newborns in the future,” [said Wiratno, director-general of conservation at the Indonesian environment ministry](#). (Many Indonesians have only one name).

The species still teeters on the brink, but this new birth is a baby step away from oblivion. Great news!



The Weekly Anthropocene

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