

ORGAN REPAIRS

A compound that can
help repair tissue

DENGUE DEBACLE

A vaccine program
isn't working

HOW EELS GET ELECTRIC

Traps into their shocking
attack mechanism

SCIENTIFIC AMERICAN



MIND READER

A new brain-machine interface detects what the user wants

PLUS
**QUANTUM
GRAVITY
IN A LAB**

Could new experiments
pull it off?

JUNE 2011

Current Issue: March 2019



Neutron stars are the densest form of matter in the universe. What's inside them? Scientists now have the tools to try and figure out what happens to matter under all that crushing gravity.

Plus:

- Some species of animals appear to experience grief, others do not, and new observations are providing insight into why.
- The jet stream has emerged as a driver of extreme weather. Quantum mathematics can explain some of the atmospheric current's mystery.
- Conspiracy theories are threatening our safety and democracy. Current psychology has pinpointed specific emotions that make people prone to belief in the unreal.

Conspiracy Theories



Why do some people believe in "highly improbable conspiracies"? There are some specific human traits that lend a hand.

What we think we know about the world often differs from reality. The Internet is underscoring the fact that there is a greater difference for some than for others, but the problem isn't new. Who are the people drawn to conspiracy theories?

- **February 1938:** "The Paranoid Personality" notes, almost apologetically, that such people are like everyone else, only to an "inconvenient or dangerous degree."
- **February 2003:** NASA sent astronauts to the moon several times. Except a few folks truly don't believe it.
- **September 2009:** A skeptic draws a straight line between paranoia and belief.
- **April 2017:** Social scientists show that "users happily embrace false information as long as it reinforces their preexisting beliefs."

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Women and Wages



Beginning in the 1880s new telephone exchanges provided an excellent job opportunity for the growing number of women working outside the home.

The ways in which women are capable of earning money has historically played a major role in confronting gender inequality.

- **May 1901:** A look at women inventors approving notes patents “yielding unusually large returns.”
- **September 1974:** “The Changing Status of Women in Developed Countries” examines the demographics of women trying to balance home life and work life.
- **September 1982:** Industrialization has had a profound effect over the centuries on how women earn wages.
- **September 2017:** It turns out that if the gap between “women’s work” and “men’s work” is closed, the whole economy benefits. Here’s how to close the gap.

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This Month in the Archives

Dear Reader,

In celebration of Women's History Month, explore the contributions women made by entering the labor force during the Industrial Revolution. Not only did their employment take them out of the household, their traditional sphere, it fundamentally altered their position in society. Also, our March 2019 issue includes a fascinating and relevant article on current research in conspiracy theories, making it a good opportunity to peruse the archives of human fear. Lastly, we paid tribute to our canine companions in February so this month we will feature our feline friends.

Current Issue: April 2019



A new generation of brain-machine interfaces have matured enough that they can deduce how people want to move their bodies.

Plus:

- Relatively cheap oyster reefs turn out to be highly effective at protecting our shorelines from the power of storm waves.
- Vaccines are a lifesaver. The dengue vaccine in the Philippines, though, turns out to have been more risky than useful.
- Electric eels. They're way cool. Now we have new insights into their shocking attack mechanisms

DNA Day (April 25)



From atoms to traits: small changes in a DNA molecule can give rise to biological organisms with subtle but important differences.

You've got lots of DNA—almost every cell in your body has about two yards of it crammed into a space that's so small you can't see it with the naked eye. In 1953, four people figured out the shape of the most important molecule produced in the body, and it continues to puzzle and fascinate us today.

- **October 1954:** Francis Crick describes "The Structure of the Hereditary Material"
- **August 1973:** A look at a few individual genes, the molecular machines guided by DNA that make useful proteins for your body.
- **March 1993:** The rules of genetics seem made to be broken.
- **January 2009:** DNA is all very well, but how do the shifting atoms in these teensy molecules give rise to different creatures?

World Autism Awareness Day (April 2)



The image captures the "aloneness" of the autistic child.

We now call it "autism spectrum disorder" because there are so many levels and subtypes of this condition that impairs a person's ability to interact with other people. Defining, diagnosing, coping with and treating autism have long been huge challenges for affected families and for scientists working in this field.

- **March 1959:** Bruno Bettelheim attempts to describe a young lad diagnosed with autism and schizophrenia who thinks of himself as a "mechanical boy."
- **June 1993:** Uta Frith gives us a description of the biology of autism and what can be done to make life better for those it afflicts.
- **February 2000:** Developmental biologists look at the function of genes that control how the brain develops.
- **November 2006:** Neurologists ponder whether improper development of "mirror neurons" in the brain might be a cause of autism.

Earth Day (April 22)



Concrete, and lots of it, will be around for a very, very, long time

There are currently 7.7 billion people worldwide and we (sometimes literally) burn through natural resources quickly, leaving an indelible mark on the planet. We've known about this impact for a long time—since well before environmentalism became a topic of politics—but it's hard to change our ways.

- **March 1879:** Cutting down so many trees helped boost the industrial revolution, but even in the late 19th century “disastrous effects” were recognized.
- **August 1948:** The dust storms of 1948 were a reminder of how farming on “marginal lands” created the “dustbowl.”
- **August 1974:** “The ocean is a plausible place” to dump garbage. Although plastic pollution back then was a matter of “aesthetics.”
- **September 2016:** Modernity is great! But the long-lasting planetary transition caused by human activity now has a name: The Anthropocene.

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This Month in the Archives

Dear Reader,

April is a very science-friendly month. Earth Day and Arbor Day urge us to consider the health of our planet. World Autism Awareness Day reminds us of how much work we have yet to do to help those with this disorder—and their families. And DNA Day celebrates the molecule that is the incredibly detailed (yet occasionally flawed) blueprint for how cells build living creatures.