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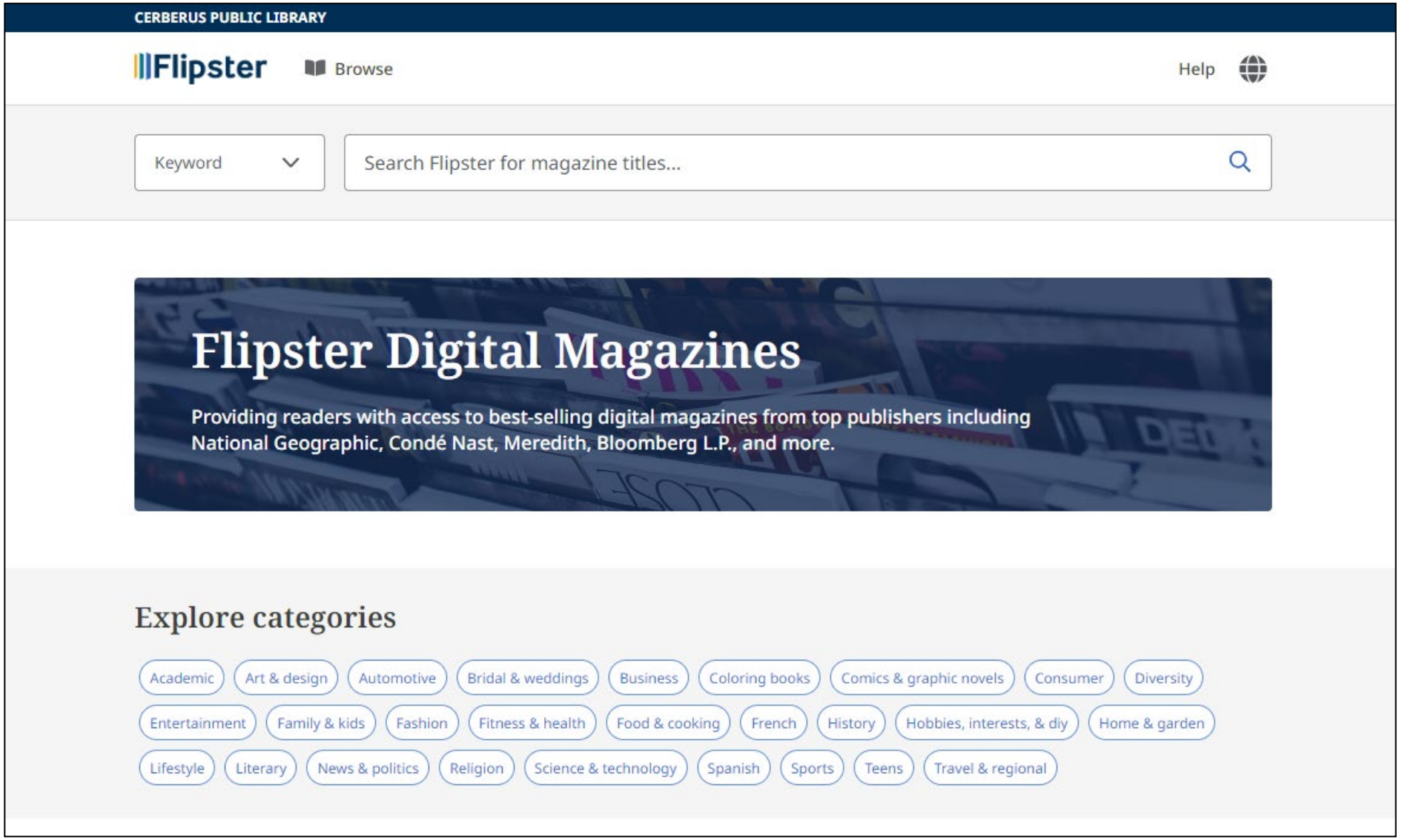
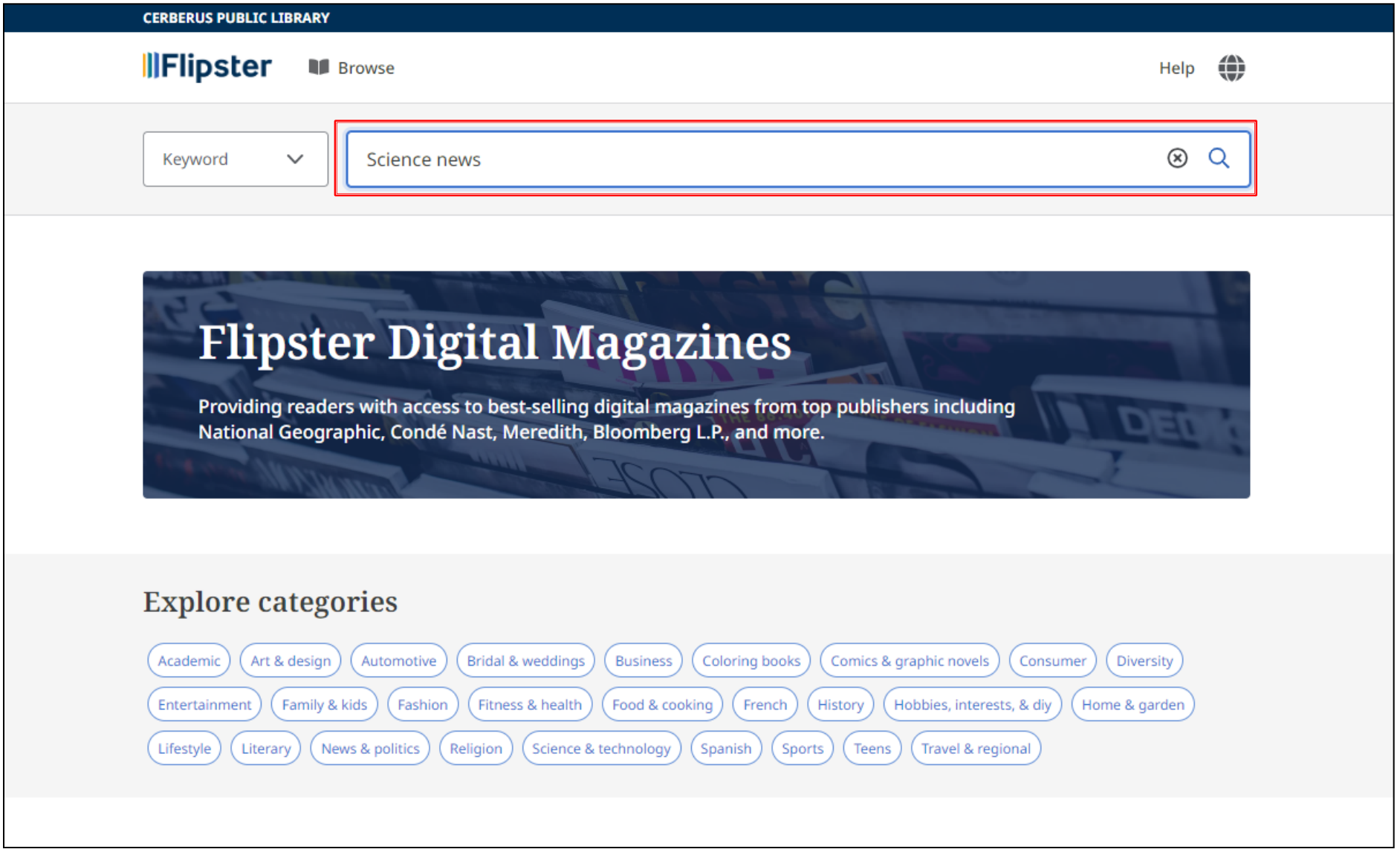
Tutorial



Flipster is a next-generation digital magazine service that allows users to access their favorite magazines from a variety of publishers through their local libraries, and read them anytime, anywhere on a variety of devices.

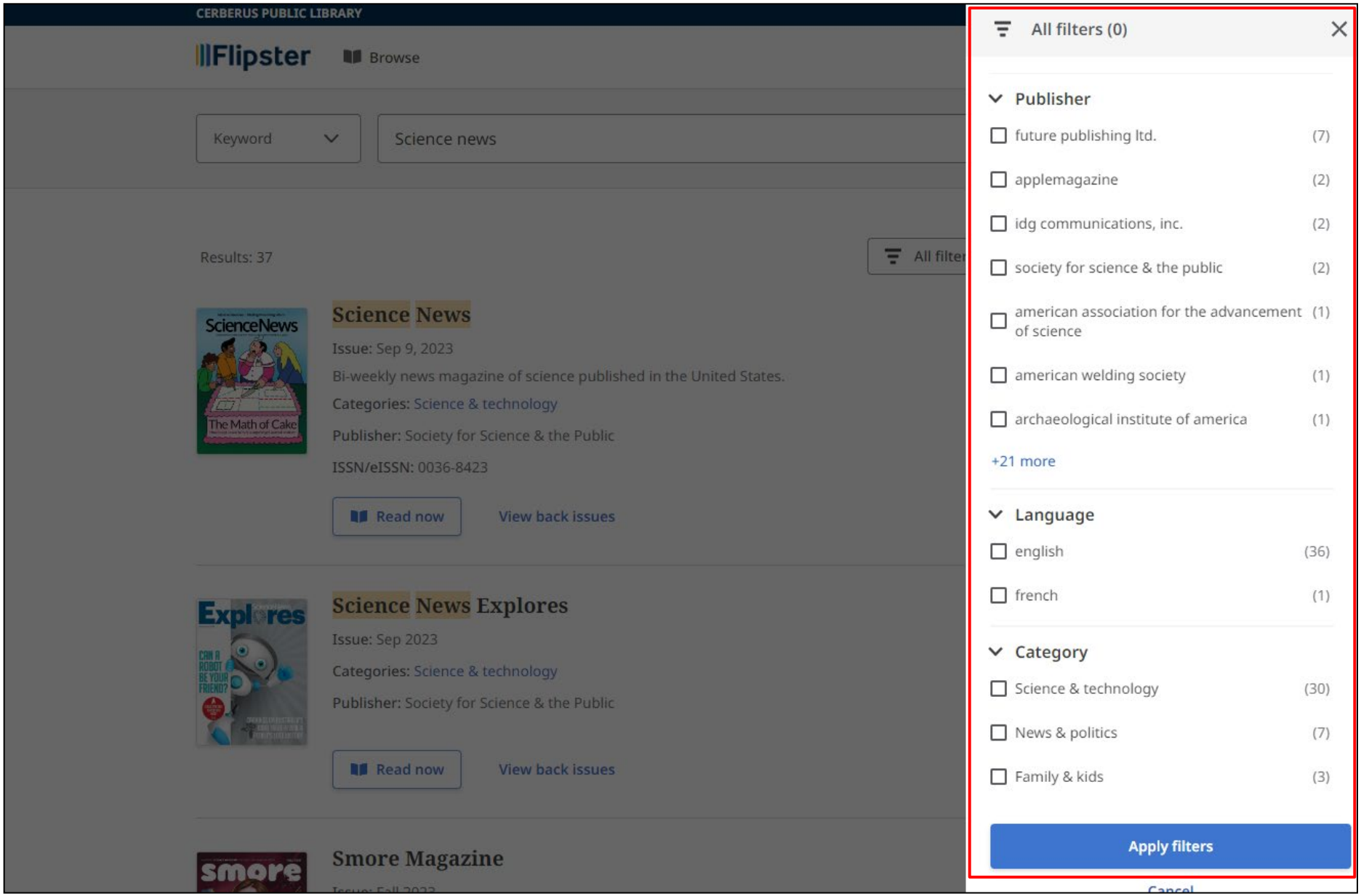
In this tutorial we look at searching for magazines in Flipster, as well as reading a magazine in the viewer.

From the Home screen you can browse available magazines by selecting a category in the **Explore categories** area. You can also browse the latest magazine issues available under **Latest Issues**. Click on a cover image to read the magazine in the Flipster viewer or click **Browse all** to view all of the latest issues.

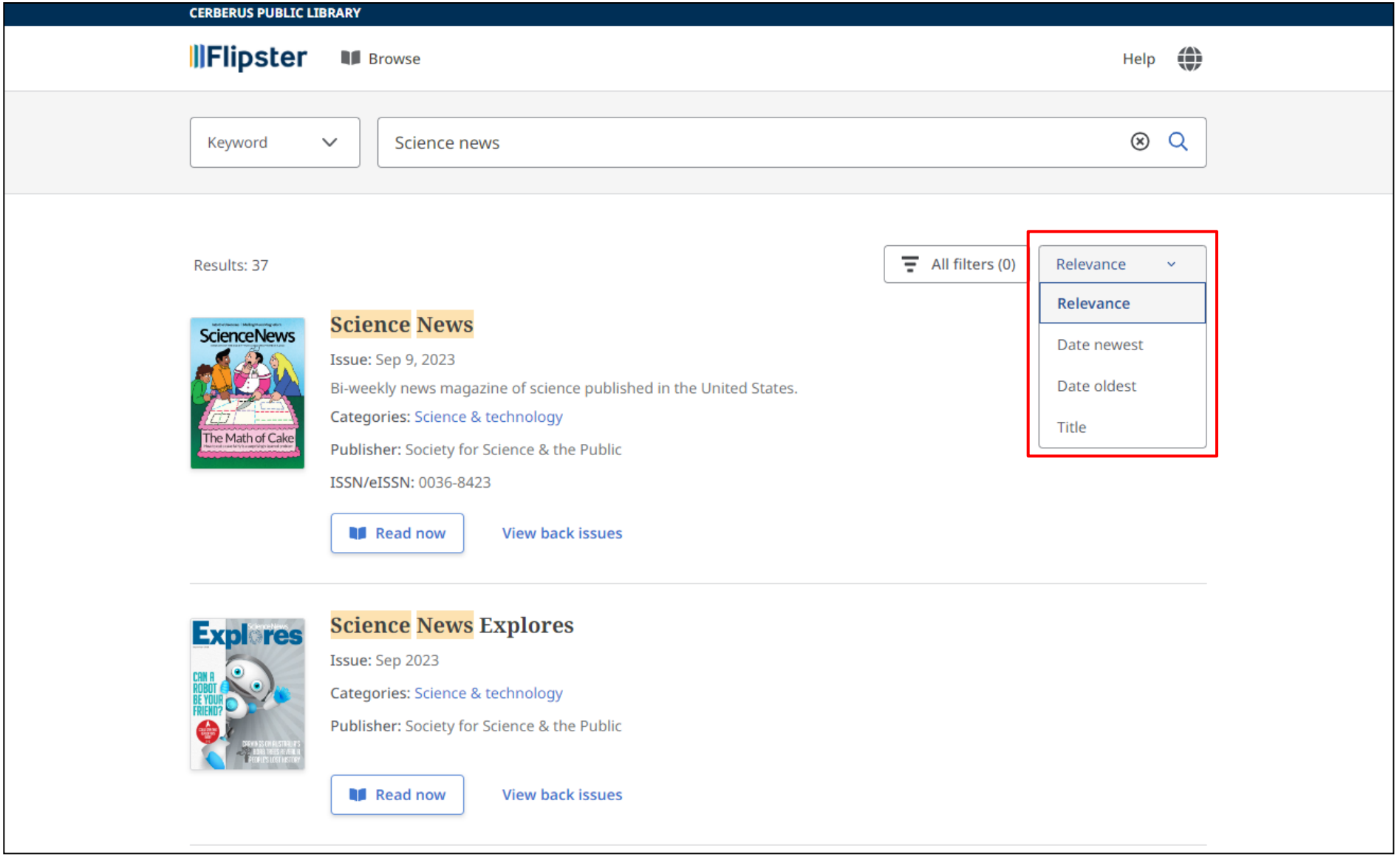


Searching for your favorite magazines is easy. Simply enter your search terms in the **Search box** and click **Search**. Search terms can be a specific magazine title or a subject of interest.

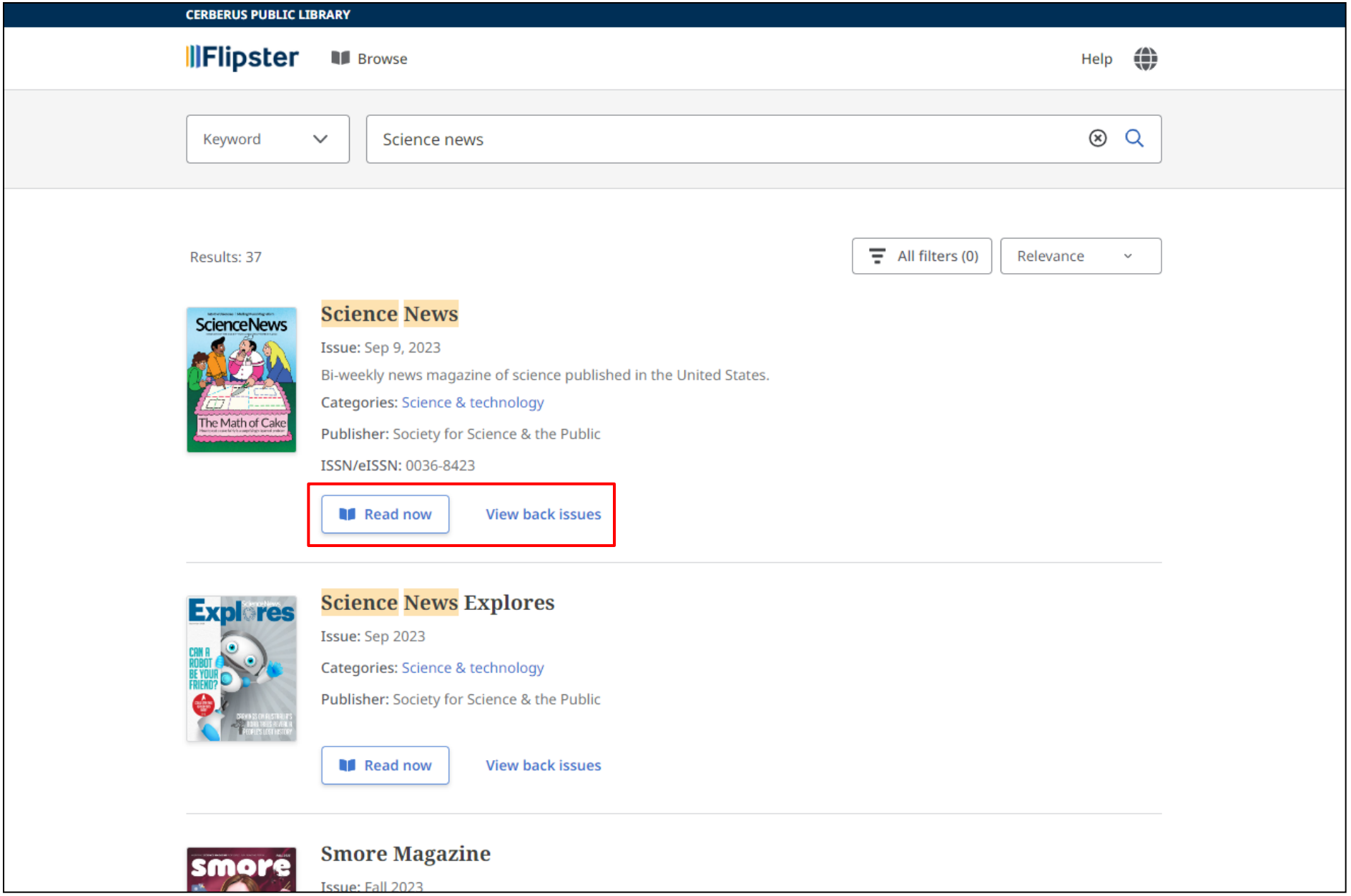
In this example, we will browse for science news magazines by entering our terms in the search box and clicking the magnifying glass.



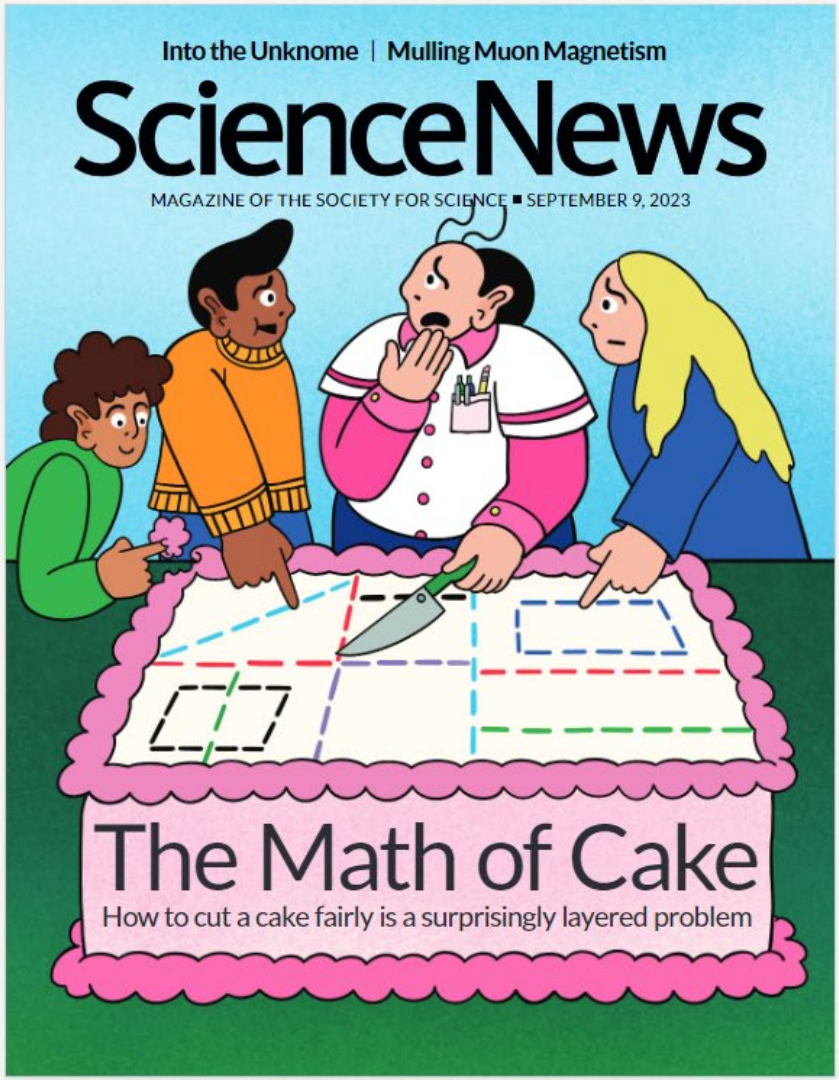
After running a search, click the **All filters** button to filter your results by Publisher, Language, and Category. Make your selections and click **Apply filters** to refresh your results.



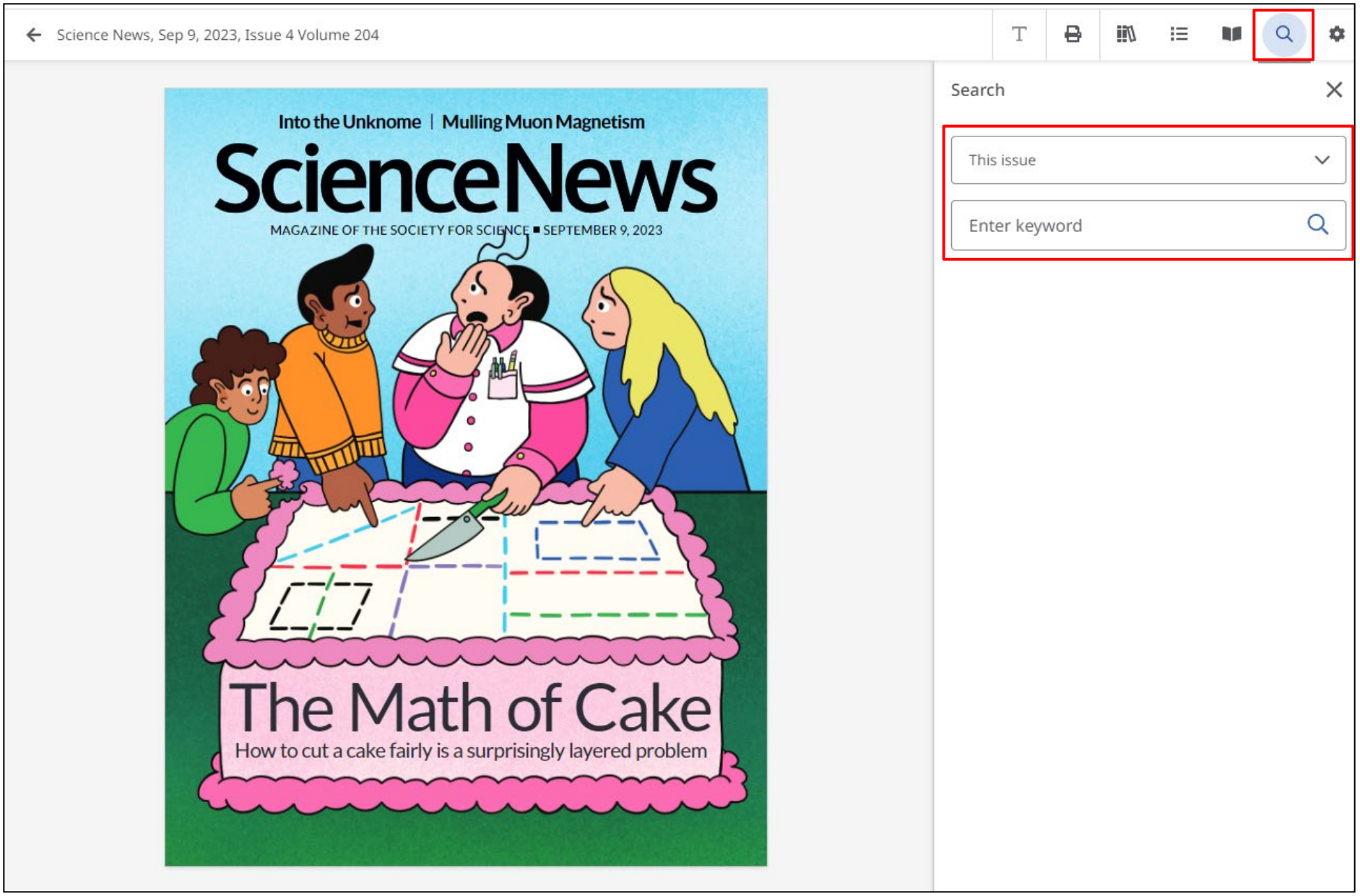
On the result list, you can sort your results by Relevance, Date, or Title. Simply click the sort drop-down and select your preferred method.



When you have found a magazine you would like to read, click **Read Now**. You can also click **View back issues** to see all back issues of the title available to you.



The Flipster viewer features several options available from the top of the screen.



To search for articles that include your keywords, click the **Search** icon to display the search box. Select to search the current issue or all issues and enter your terms in the search box. Click the **Magnifying glass** to run your search.

Click the **Table of contents** icon in the tools menu to view the contents of the current issue. Click an article in the list to read it in the viewer.

Click the **All Issues** icon to view the available back issues of the title. Click on an issue to read it in the viewer.

PALEONTOLOGY

Fires may have doomed ancient beasts

A drying climate and humans transformed Southern California

Fossils from the La Brea tar pits, including of saber-toothed cats (left) and dire wolves (right), record an extinction event 13,000 years ago.

BY JAKE BUEHLER

By about 11,700 years ago, most large land mammals outside of Africa had gone extinct. Scientists have long debated whether these extinctions were primarily driven by human activities or a changing climate as the last ice age came to a close (*SN*: 3/22/14, p. 13).

A new study of the remains of animals trapped long ago in the La Brea tar pits, in what's now Los Angeles, suggests both factors worked in concert to bring about the demise of the region's megafauna. A warming, drying climate plus humans' hunting and burning of the landscape led to large fires that precipitated die-offs there around 13,000 years ago and forever changed the ecosystem, researchers report in the Aug. 18 *Science*.

The findings "reflect the reality of nature, which is that phenomena are rarely, if ever, driven by a single factor," says paleoecologist Danielle Fraser of the Canadian Museum of Nature in Ottawa.

The type of climate–human synergy implicated in the demise of some of California's biggest ancient mammals may warn of dramatic upheaval in modern ecosystems that are subjected to human-caused climate change, the scientists say. Over the last century, Southern California has warmed more than 2 degrees Celsius on average. That's a far more rapid change than the area faced during the end of the last ice age.

Paleontologist and evolutionary biologist F. Robin O'Keefe and colleagues had been studying the remains of ancient carnivores preserved in La Brea's asphalt seeps to see how the animals had physically changed over thousands of years. Then the researchers found evidence of an extinction event in the tar pit fossil record.

"We had lots and lots of megafauna, and then suddenly they were gone," says O'Keefe, of Marshall University in Huntington, W.Va.

The researchers dated the remains of 172 individuals representing eight megafauna species that lived from about 10,000 to 15,600 years ago. The sample included extinct species like saber-toothed cats (*Smilodon fatalis*), dire wolves (*Aenocyon dirus*) and ground sloths (*Paramylodon harlani*), and a single still-living species, the coyote (*Canis latrans*). Sure enough, about 13,000 years ago, seven of the eight species vanished from the tar pit fossil record, the team found.

To understand what was going on in the environment back then, the team turned to a sediment core from nearby Lake Elsinore. The core records regional vegetation, fire frequency and climate changes over tens of thousands of years. O'Keefe and colleagues also compared the extinction timing with a computer model of human population growth in North America.

Over the millennium preceding the extinction, the region warmed by nearly 6 degrees, the core revealed. The area dried out, with juniper and oak woodlands giving way to more drought- and fire-tolerant plants. Soon after this shift started, Southern California experienced a 300-year stretch of intense fires, evidenced by a spike in charcoal in the core.

Right before the burning started, human populations rapidly grew, according to the computer model, suggesting the two events are linked.

What's more, the changing climate and human activities transformed the region's woodlands into chaparral scrubland. It's a vicious feedback loop, O'Keefe says. Hunting herbivores makes the ecosystem more fire-prone as plants go uneaten. "You add more people and it gets hotter and drier, and you're killing more herbivores. So there's more fuel [to burn]," he says.

The seven extinct megafauna species vanished from Southern California about 1,000 years before they did elsewhere in North America. Those other populations may have met a similar end, the scientists say. "There is evidence for a continent-wide event, not just in Southern California but across the continent right about at the same time," O'Keefe says.

Paleoecologist Sandra Brügger of the University of Basel in Switzerland notes that similarly rapid ecological transformations have been documented in the Mediterranean and a broader swath of the U.S. West at the end of the last ice age.

The new findings, O'Keefe says, are a cautionary tale relevant to the survival of modern biodiversity. He points to recent intense fires in Hawaii, the U.S. West and Canada (*SN*: 8/12/23, p. 6). "The parallels are certainly there. The one thing that's different about today is that we know what happened before, and if we can learn something from that, maybe we can change our trajectory." ■

NATALIA KENT, CU–BOULDER MUSEUM OF NATURAL HISTORY

PARTICLE PHYSICS

Data confirm muons' weird wobbles

Experiment highlights confusion over theoretical predictions

BY EMILY CONOVER

Muons might not behave as expected. But scientists can't agree on what to expect.

By taking stock of how the subatomic particles wobble in a magnetic field, physicists have pinned down a property of the muon's internal magnet to greater precision than ever before, researchers from the Muon *g*−2 experiment reported August 10 in a seminar hosted by Fermilab in Batavia, Ill.

Previous measurements of muon magnetism haven't aligned with predictions from the standard model of particle physics, which describes subatomic particles and the forces that bind them.

Many physicists have hoped that the muon discrepancy might be hinting at a flaw in the stalwart theory that could lead to a better understanding of the universe. But recent scientific surprises have muddled the theoretical prediction of the strength of the muon's magnet, making it harder to know how the new and old measurements, which agree with one another, compare with theory.

Muons are short-lived particles that behave like miniature magnets, each with their own magnetic field. The strength of that magnet is adjusted by a strange effect of quantum physics. Empty space is filled with a constant flurry of particles that appear temporarily before flitting out of existence. Known as "virtual" particles, they have very real effects. These transient particles alter the strength of the muon's magnet by an amount that can be calculated according to the standard model.

The precise value of this tweak — the anomalous magnetic moment, or "*g* −2" — is what has befuddled physicists. Tantalizingly, particles unknown to science could shift *g* −2's measured value. So hints of a disagreement with predictions have generated a hubbub. "The muons' behavior that we're measuring is affected by all of the forces and particles in the universe," says Muon *g* −2 researcher Brynn MacCoy of the University of Washington in Seattle. "It's basically giving us this direct window into how the universe works."

The first indication of a mismatch between prediction and measurements came from an experiment completed more than two decades ago. Then in 2021, the Muon *g* −2 experiment, based at Fermilab, reported results confirming the discrepancy.

Now, Muon *g* −2 has doubled its precision in an updated measurement. "To reach that level of precision is really unprecedented," says physicist Carlos Wagner of the University of Chicago. "I am simply in awe." The measurement incorporates four times as much data as the previous one, among other improvements.

Scientists aim to compare the measured value with the standard model prediction. But determining what, exactly, the standard model predicts is complicated.

In 2020, a group of theoretical physicists, the Muon *g* −2 Theory Initiative, came to a consensus prediction. But since then, contradictory information has come out from other experiments and theoretical calculations, leaving the prediction uncertain.

The confusion hinges on a bit of the *g* −2 calculation known as the hadronic vacuum polarization, which refers to the adjustment resulting from a virtual photon emitted by the muon that splits into a quark and its antimatter partner, an antiquark. Quarks make up particles called hadrons, including protons and neutrons. The quark and antiquark interact before annihilating back into a virtual photon.

The conventional way of calculating this hadronic vacuum polarization term involves using experimental data measuring how electrons and their antimatter particles, positrons, collide and produce hadrons. The results of such experiments are thought to be well understood.

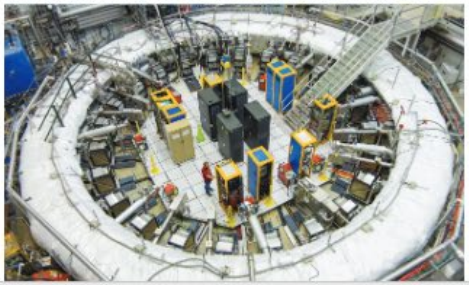
But an experiment at the VEPP-2000 particle collider in Russia disagrees with those other experiments, researchers reported in February at arXiv.org. If this outlier is correct, the hints of disagreement between muon measurements and prediction might be weaker than thought.

In 2021, a research group in Europe published in *Nature* an estimate of the hadronic vacuum polarization using a different method, called lattice quantum chromodynamics. That technique involves mathematically splitting up spacetime into a grid to make calculations more tractable. The estimate pointed to a closer harmony between the prediction and measurements of *g* −2.

So the focus has now shifted from scrutinizing the experimental measurements to analyzing the disagreement among theoretical techniques.

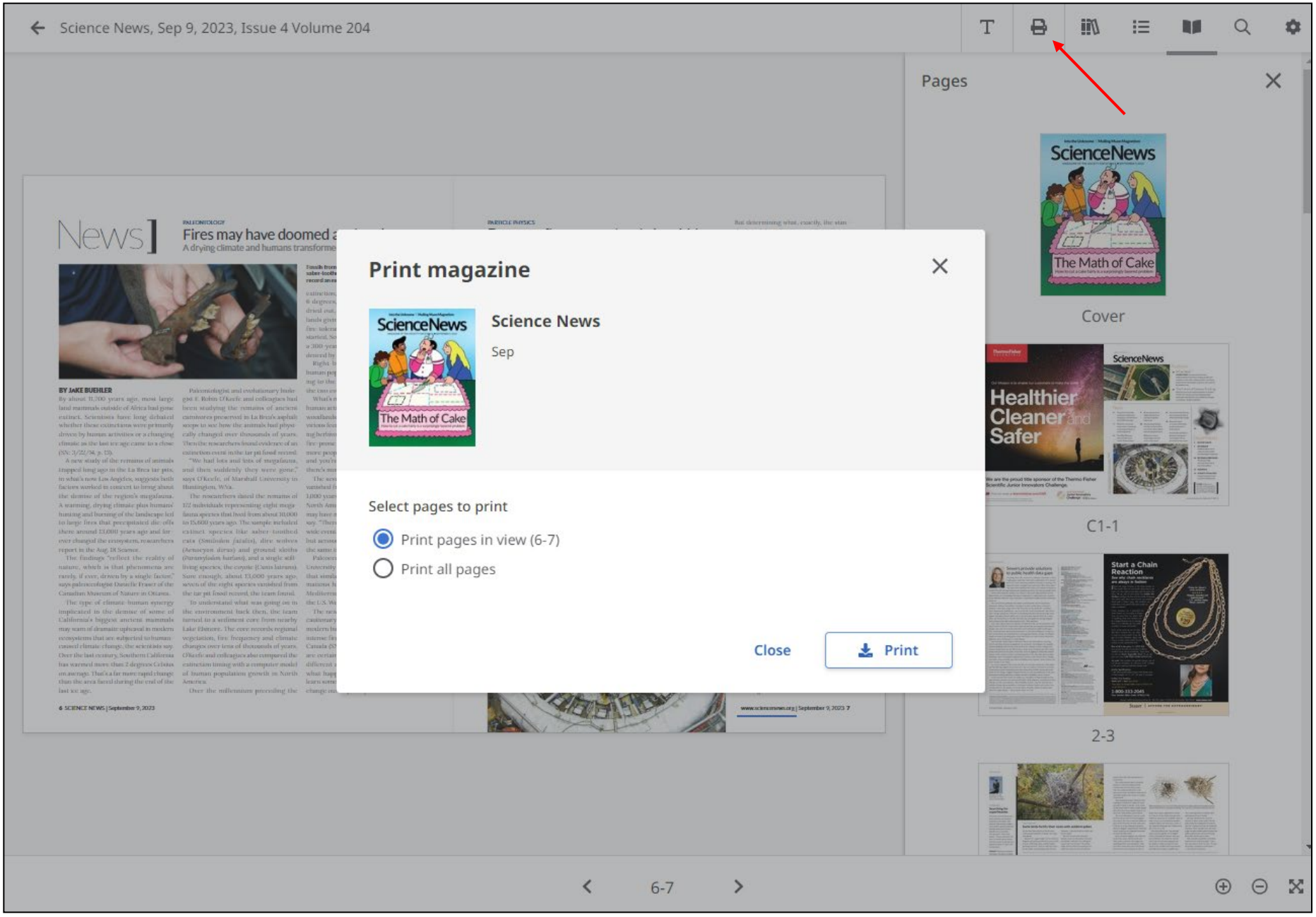
"The experiment has delivered," says theoretical physicist Thomas Teubner of the University of Liverpool in England, a member of the Muon *g* −2 collaboration. To figure out if muons are keeping with the standard model or cracking it, it's up to the theoretical physicists, he says. "We have to get our house in order." ■

Physicists have made the most precise measurement of a magnetic property of muons by studying how the particles wobbled as they circled within this doughnut-shaped magnet at Fermilab.

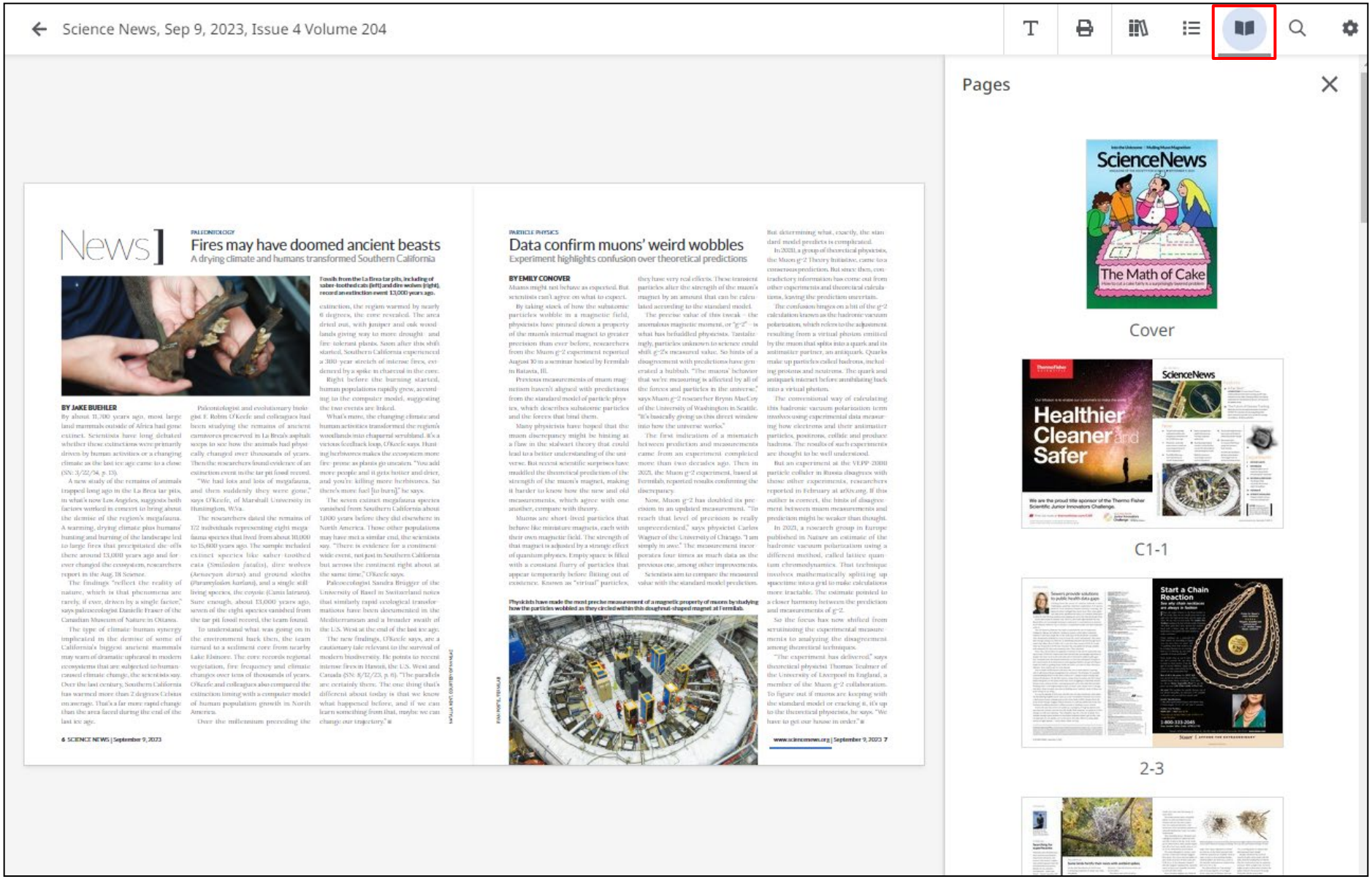


RYAN POSTEL, FERMILAB

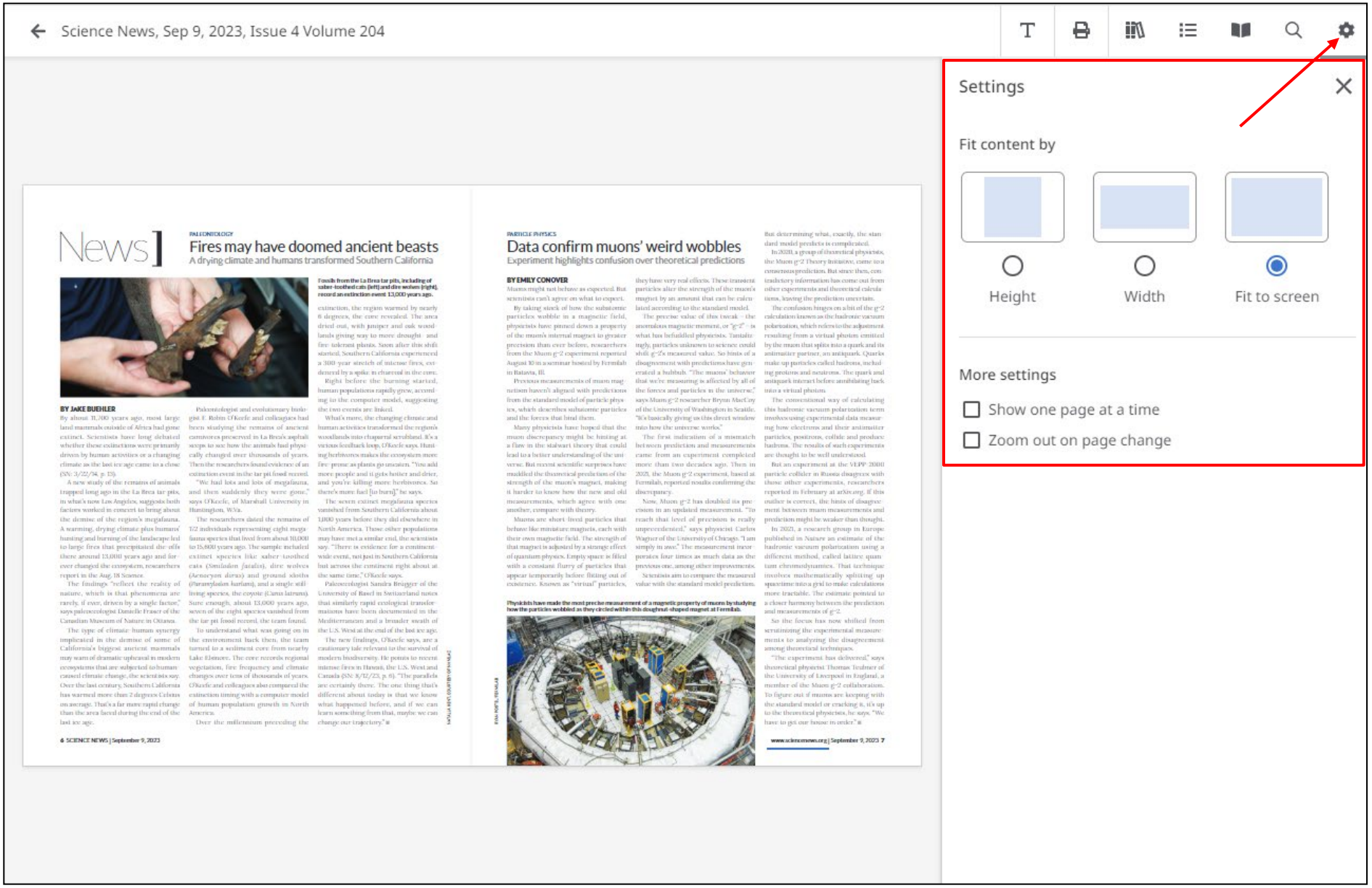
You can zoom in and out of the page using the plus (**+**) and minus (**-**) buttons, and navigate through the issue using the page arrows. You can click an article title in the Table of contents to open it in the Flipster viewer.



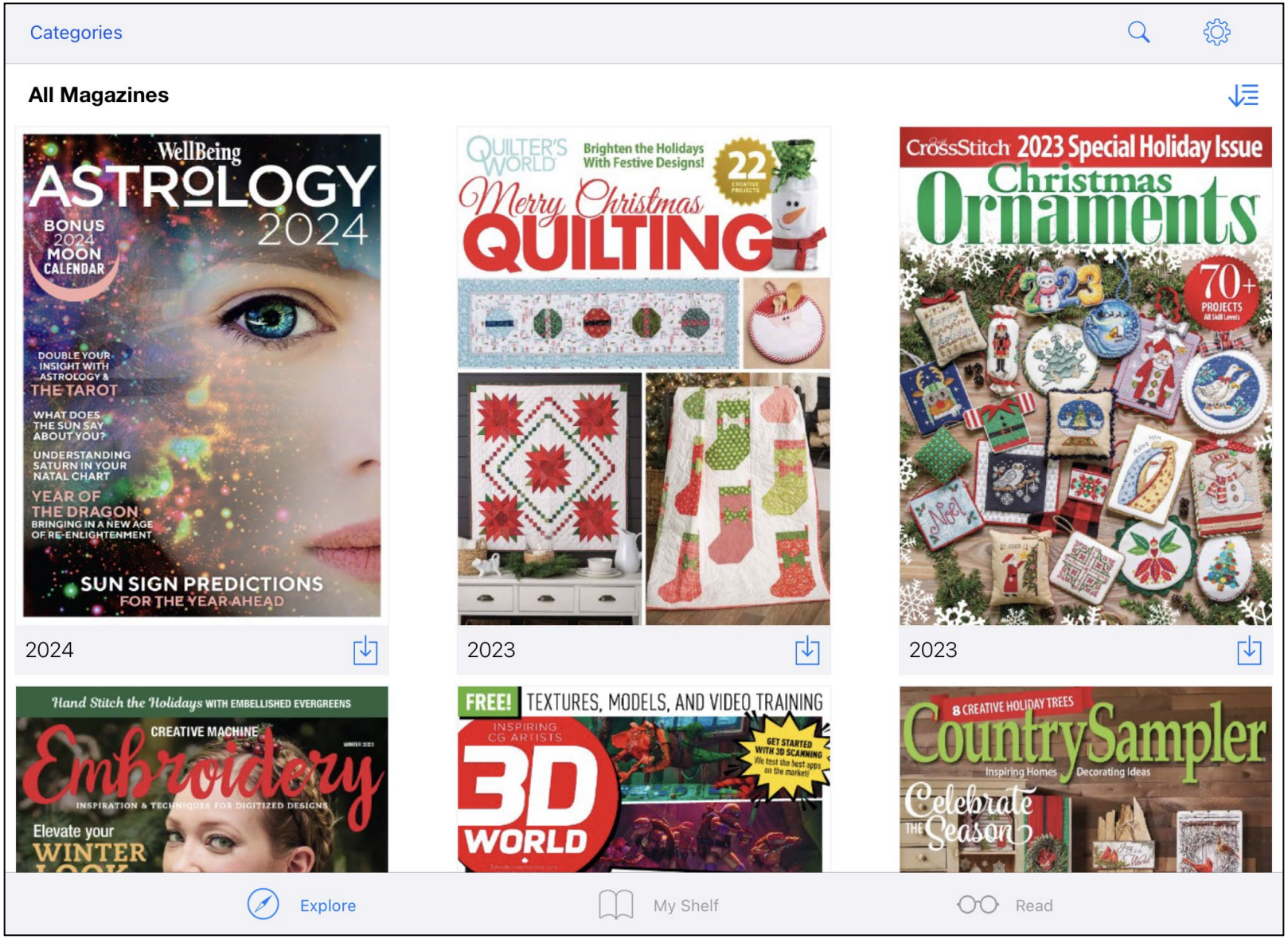
Click the **Print** icon to view the available printing options.



Click the **Pages** icon to view the pages of the issue. Click a page to go directly to it.

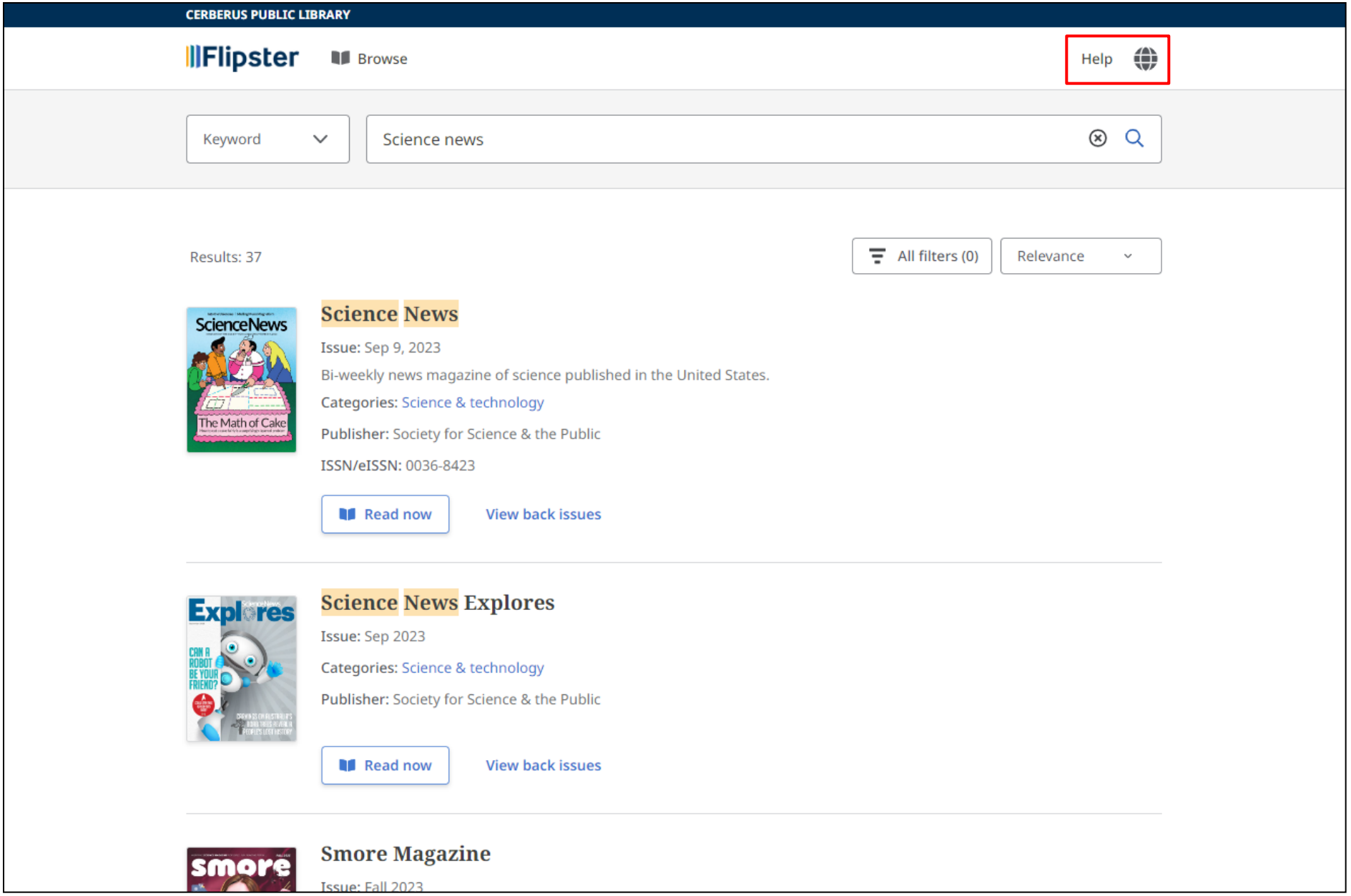


You can adjust how the magazine appears in the viewer by clicking the **Settings** icon.



If you are viewing Flipster on an iPhone or iPad, or Android phone or tablet, or Kindle Fire tablet you can also download the free Flipster app.

The app allows you to search Flipster and download issues to read them offline anytime. For more information, see the Flipster mobile app tutorials available on EBSCO Connect.



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