# **IMPACT REPORT**



## Dear friend of Knowable Magazine,

This past summer broke <u>global records for heat</u>. It was sweltering in parts of Europe, South America, Japan and the US. The world witnessed droughts, extreme rains and flooding, and raging wildfires that cast smoke-filled air to distant cities.

Talking about the weather these days often means talking about climate change and its role in driving such extremes around the globe. Climate change is both complex and increasingly hard to ignore. But many people find the scale of the problem — as well as trying to assess the possible remedies — overwhelming.

At *Knowable Magazine*, we believe that the tools of science and the fruits of research can help to bring both problems and solutions into focus. And we believe that substantive, evidence-based reporting about what scholars are learning is essential to moving communities to take action to protect life as we know it.

Over the past few years, we have made a concerted effort to cover sustainability issues in a broad range of formats, and to tell climate stories that matter, for people's lives, for policy, and for the Earth. Through feature articles, Q&As, podcasts, infographics, online events and more, we examine evidence that can affect individual decisions around what to eat or where to live; probe the promise and limits of "green" technologies old and new; and untangle tricky, climate-related economic policy concepts such as the social discount rate.

We reach a broad and international audience for this work, both on our website and through our network of republishing partners. And this year, we've added millions of Spanish-speaking readers, through the launch of *Knowable en español*.

All the while, we continue to cover a broad array of other scientific disciplines — including vital developments and curiosity-driven explorations of the natural world.

Faced with global challenges like climate change, a well-informed and science-literate public has never been more important. And *Knowable Magazine* can dedicate itself to informing people about fundamental and cutting-edge research — for free, and without ads — thanks to the support of donors like you.

Please read on to learn more of what your generosity has enabled in the past year. We are proud of what we have accomplished, and we hope that you will be proud to be part of the *Knowable Magazine* community.

Thank you again for your support,

Sincerely, Eva Emerson Editor in Chief, Knowable Magazine



## Stats & facts: October 2017 – September 2023

### TOTAL CONTENT PUBLISHED

(articles, videos, comics and podcasts) ENGLISH: 712 SPANISH: 121

#### REPUBLICATIONS, TRANSLATIONS & SYNDICATION 2,400+

### NEWSLETTER SUBSCRIBERS ENGLISH: 54,000+ SPANISH: 3,500+

READERSHIP KNOWABLE MAGAZINE WEBSITE + REPUBLISHED VIEWS: 47 MILLION+ PAGEVIEWS

Republished views include estimated readership for partners who do not provide data. In 2023, Knowable Magazine implemented COUNTER-compliant reporting to gather a fuller picture of article usage.



### **Recent awards and recognitions**

### 2023 EDDIE AND OZZIE AWARDS

#### **SCIENCE SINGLE ARTICLE (CONSUMER)**

Winner: Climate change is altering the chemistry of wine

Honorable mention: <u>The road to low-carbon</u> <u>concrete</u>

NEWSLETTER (CONSUMER) Winner: Knowable Magazine newsletter

## SCIENCE SERIES OF ARTICLES (CONSUMER)

Winner: The future of meat — and 'meat'

ILLUSTRATION (CONSUMER) Winner: Could getting rid of old cells turn back the clock on aging?

#### VIDEO (CONSUMER)

Honorable mention: Long Covid: A parallel pandemic

#### **GRAPHIC ART**

Honorable mention: Wine in a warming world | Climate change is altering the chemistry of wine

### **2022 ONLINE JOURNALISM AWARDS**

GENERAL EXCELLENCE IN ONLINE JOURNALISM (MICRO NEWSROOM) Finalist: Knowable Magazine newsroom

## POCKET'S BEST OF 2022: FOOD

Inclusion: How sustainable are fake meats?

### 2023 ACOUSTICAL SOCIETY OF AMERICA SCIENCE COMMUNICATION AWARDS

SHORT FORM PRINT Winner: Life in the soil was thought to be silent. What if it isn't?

Honorable mention: Speaking in whistles

"Ute Eberle's captivating Knowable Magazine article ('Life in the soil was thought to be silent. What if it isn't?") shines a light on the oftenoverlooked acoustic richness beneath our feet. Eberle's insightful exploration uncovers the hidden symphony of the soil, revealing the vital role sound plays in the ecosystem. Through her meticulous research and engaging prose, Eberle challenges preconceptions, opening a new realm of wonder and discovery." —Acoustical Society of America

See the full list of awards and recognitions: knowablemagazine.org/awards-and-recognition

## Science journalism: Staff highlights

Science journalism comprises the heart of *Knowable Magazine*'s offerings: smart, solid and deeply researched articles, crafted with style and edited with care. Our features, explainers, Q&As and other pieces are reported and written by seasoned science journalists and undergo a thorough fact check and copy edit before publication. Here, members of the *Knowable Magazine* staff share some of their recent favorites.

#### Eva Emerson, Editor in Chief

#### What the image of the Milky Way's black hole really shows

I've long been fascinated by black holes and our changing sense of them. These almost unfathomable objects are relatively common — there's one in the center of our own galaxy, which wasn't known when I started in science journalism. This story by Katie McCormick describes the creation of a "picture" of a black hole and what you actually see (and it's not the black hole itself).

#### Rosie Mestel, Executive Editor

<u>The future of</u> <u>meat — and 'meat'</u> (series)

At Knowable, we love to dig into the data behind claims, even (especially?) when they sound like they must be true. Bob Holmes's articles on what we know about the sustainability of fake meats (Impossible, Beyond, etc.) and the role that beef, pork and chicken could have in a planet-friendly diet, were gems in that respect, offering nuance and surprise. Lisa Modica, Editorial Art Director

How heat pumps of the 1800s are becoming the technology of the future

The graphics in this story distilled a lot of complicated technological information into easy-to-follow diagrams. Heat pumps just look like big air conditioners to me; these graphics let you see under the hood - with just the right amount of detail. You learn how the devices work in a step-by-step manner, without getting distracted or overwhelmed.

#### Rachel Ehrenberg, Associate Editor

#### A treasure hunt for microbes in Chile's Atacama desert

I always love a good microbe story, but this piece stands out: Lindzi Wessel visited the seemingly barren and definitely desolate Atacama Desert — and wouldn't you know it, the place is teeming with life. Wessel digs into the science and invites us to consider what might be lost if the Atacama is treated as little more than a source for minerals.









Katie Fleeman, Audience Outreach and Strategy Manager

#### Salt taste is surprisingly mysterious

As someone with an insatiable salt tooth, I've always wondered what might underlie my penchant for potato chips, pretzels and other sodium-rich treats. I was surprised to learn that my taste buds are sensing two types of "saltiness": the "yummy" kind and one that signals, "hold the salt." Hopefully, science will one day discover why I have the former in abundance.

**Debbie Ponchner,** Editor, *Knowable en español* 

When criminals rule the land / Cuando quienes gobiernan son los delincuentes

Journalist Pablo Fonseca Q. interviewed political scientist Andreas Feldmann to explore a growing phenomenon in Latin America: criminal governance, in which paramilitaries, death squads, guerrillas, drug cartels, organized crime groups and/ or gangs assume the traditional role of the state and govern or co-govern a territory and population. This is among Knowable en español's mostread articles to date. **Betty Baboujon,** Editorial Production Manager

The neurons that make us feel hangry

One of my favorite things about science stories is how they take you down the research rabbit hole, way down to microscopic levels, to explain something as quotidian as, say, getting the grumps when your stomach grumbles. Amber Dance's story puts me in the lab right next to the scientists - and the result is fascinating enough to make me forget I'm hangry.

Emily Underwood, Science Content Producer, Virtual Events

#### The vital crosstalk between breath and brain

I've been hearing how important breathing is to my mental state for years, but never took it too seriously. This story showcased how complex breathing is, affecting perception of the world, our emotions and memories. Greg Miller describes the physiology of breathing and its connection to brain function with arresting images and details that stuck with me for days.









## Communicating knowledge: Multimedia

## Short documentaries

*Knowable Magazine* has produced several mid-length videos that provide viewers with an immersive look at the process and insights of scientists.



### Preparing for future pandemics: Learning from Covid-19

Insights gleaned from interviews with experts during the pandemic, and lessons on how to better prepare for what scientists call the inevitable emergence of the next global health emergency.



A look at efforts to remove carp from a famously polluted lake in the hopes of helping the native fish and keeping toxic algal blooms in check.

### Long Covid: A parallel pandemic

Tens of millions of people are living with long Covid. Yale immunologist Akiko lwasaki explains the current state of play in the search for causes of, and treatments for, this potentially debilitating illness.

"By far the most helpful content I've seen on long Covid to date. Very informational, easily understandable, and empathetic. I felt seen, especially by the biologist at Yale." *—Viewer comment* 

### Podcasting

The *Knowable Magazine* podcast explores the limits to what's knowable — and how thinking about big questions in science and technology evolves over time. Hosted by science journalists Adam Levy and Charlotte Stoddart.

Scientists warned about climate change in 1965. Nothing was done. Naomi Oreskes, a historian of science, and Dana Nuccitelli of the Citizens' Climate Lobby discuss the misinformation campaign that stymied action for decades.

### The fossil that launched a dinosaur revolution

Paleontologist Julia Clarke explains how the discovery of *Archaeopteryx* forever changed our understanding of dinosaurs and the origin of birds.

### How the placebo effect went mainstream

Ted Kaptchuk, an expert on placebos, explores the significance and limitations of a landmark article that pushed scientists to better understand how we process pain.

Quantum entanglement's long journey from 'spooky' to law of nature Physicist Nicolas Gisin explains how quantum entanglement has matured into a pillar of physics.



"The weirdness of quantum physics and how Einstein felt about it is part of the backdrop of *Oppenheimer*. This is a great episode to get a primer on where science currently stands with 'spooky action at a distance."

—Erik Jones, Hurt Your Brain

## Communicating knowledge: Online events

*Knowable Magazine* and Annual Reviews offer a deeper engagement for our community of curious readers through our ongoing series of virtual events. These live conversations with leading experts, including Q&As with audience participants, address topics relevant to society and to our viewers' day-to-day lives.





### **Climate futures**

Viewers heard directly from economists, environmental scientists and policymakers on the science of climate solutions. Produced with Future Tense, a partnership of *Slate*, New America and Arizona State University.



Insuring our uncertain future



Rethinking cities in the face of extreme heat

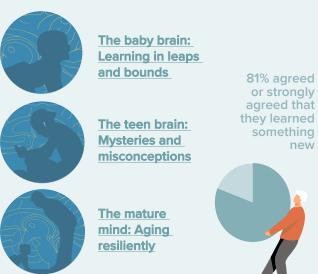


Beyond COP27: Who will pay for climate solutions? *"Future Tense* loved collaborating with *Knowable Magazine* on an events series on climate futures. The *Knowable* team has incredible skill in finding new, solutions-driven approaches to complex topics and engaging their audience and diverse stakeholders."

—Mia Armstrong-López, Managing Editor of Future Tense

## Inside the brain: A lifetime of change

Viewers learned how the brain develops and changes as we grow from infancy to adolescence and late adulthood. Produced with the support of the Dana Foundation.



### AUDIENCE FEEDBACK

"Engaging, informative, brilliantly led and lots of practical advice. More events like these, please."

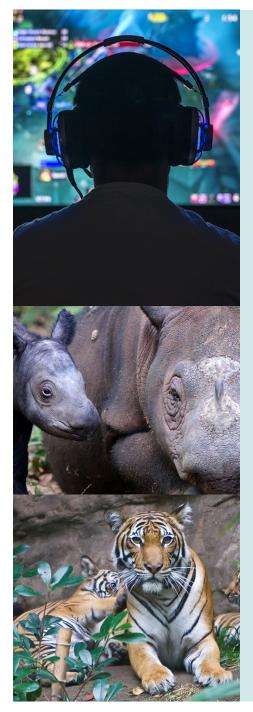
"I learned that at age 82, I am not done living, just done being able to do some things I can no longer do."

Additional support for online events was provided by the Gordon and Betty Moore Foundation.

## Communicating knowledge: Expert-written commentaries

*Knowable Magazine*'s Opinion editor works with leading researchers to craft clear, cogent and jargon-free articles that offer readers solid scientific information and provocative viewpoints.

### Recent Opinion articles and where they appeared



Can playing video games make you smarter? Author: Richard E. Mayer *Knowable en español:* ¿Jugar videojuegos puede llevarlo a ser más inteligente? Republished: *The Mercury News; La Nación* Read more: *Annual Review of Psychology* 

Europe should shape the clean fuel market now Authors: Benjamin Görlach and Michael Jakob Republished: <u>Euractiv</u> Read more: Annual Review of Resource Economics

The importance of understanding wildlife sex Author: Pierre Comizzoli Republished: <u>New York Daily News</u> Read more: Annual Review of Animal Biosciences

Dealing with rats, and their health, in America's 'rattiest' city Author: Maureen Murray *Knowable en español:* El manejo de las ratas y la salud en la ciudad con más roedores de Estados Unidos Republished: *Next City* Read more: *Annual Review of Ecology, Evolution, and Systematics* 

Zoos need to change

Author: Rafael Miranda *Knowable en español:* Los zoológicos tienen que cambiar Republished: *Salud con lupa* Read more: *Annual Review of Animal Biosciences* 



## Key initiatives: Knowable en español

This fall marks the one-year anniversary of *Knowable en español*, which serves readers across the Spanish-speaking world. *Knowable en español* features translations of *Knowable*'s English content as well as original articles that are published first in Spanish (and then translated into English and published by *Knowable Magazine*). *Knowable en español*'s original reporting illuminates significant and thought-provoking science that is being conducted in Latin America or is of special relevance to the region.



### **Original articles**

Saliva: la próxima frontera en la detección del cáncer El extraordinario caso de los feroces topos hembra Cuando quienes gobiernan son los delincuentes América Latina abre la puerta al hidrógeno verde Las aves cambian su canto en la ciudad

Reescribiendo la historia de los bosques tropicales de América

Navegando los dilemas éticos de la investigación del ADN humano antiguo

Trufas: una expansión aromática por el mundo

*"Knowable*'s articles are always interesting and of a great quality and offer *El País* the opportunity to delve into stories, profiles and topics of great variety, which are very much appreciated by our readers."

--Patricia Fernández de Lis, Science, Health and Technology Editor-in-chief, El País

## Select republications

Through our republishing network, *Knowable en español* reaches an international audience.

El extraordinario caso de los feroces topos hembra: El País in Spanish and English

Saliva: la próxima frontera en la detección del cáncer: *El Espectador*, Colombia (Spanish); *Smithsonian* (English); *Atlantico* (French)

Cuando quienes gobiernan son los delincuentes: La Nación, Costa Rica (Spanish and in print); Atlantico (French)

The launch of *Knowable en español* was made possible by the generosity of the Gordon and Betty Moore Foundation. Additional funding is provided by the Howard Hughes Medical Institute.

## Key initiatives: Climate solutions

Climate change is arguably the most pressing global issue of our time, and *Knowable Magazine* has done deep dives on multiple facets of the crisis and efforts to mitigate its effects, from the growing trend of climate litigation to ways to formulate greener concrete.



#### As glaciers retreat, new streams for salmon

Ecologist Sandy Milner has traveled to Alaska for decades to study the development of streams flowing from melting glaciers. He's seen insects move in, alders and willows spring up, and spawning fish arrive in thousands.

#### The road to low-carbon concrete

For thousands of years, humanity has had a love affair with cement and concrete. But now, industry groups and researchers are seeking solutions to the huge amounts of carbon dioxide that cement-making generates.

### How green are biofuels? Scientists are at loggerheads

Replacing gasoline with ethanol has changed landscapes across the globe as grasslands and forests give way to cornfields. Researchers are deeply divided over what this means for the planet. Here's the science behind the conflict.

## What will it take to recycle millions of worn-out EV batteries?

In Nevada and other US states, entrepreneurs are anticipating the coming boom in retired lithium-ion batteries from electric cars and hoping to create a market for recycled minerals

### Dead trees around the world are shocking scientists

Forests once deemed resilient are suffering surprising dieoffs. To predict the fate of the world's woods in the face of climate change, researchers need to understand how trees die.

### A warmer planet, less nutritious plants and ... fewer grasshoppers?

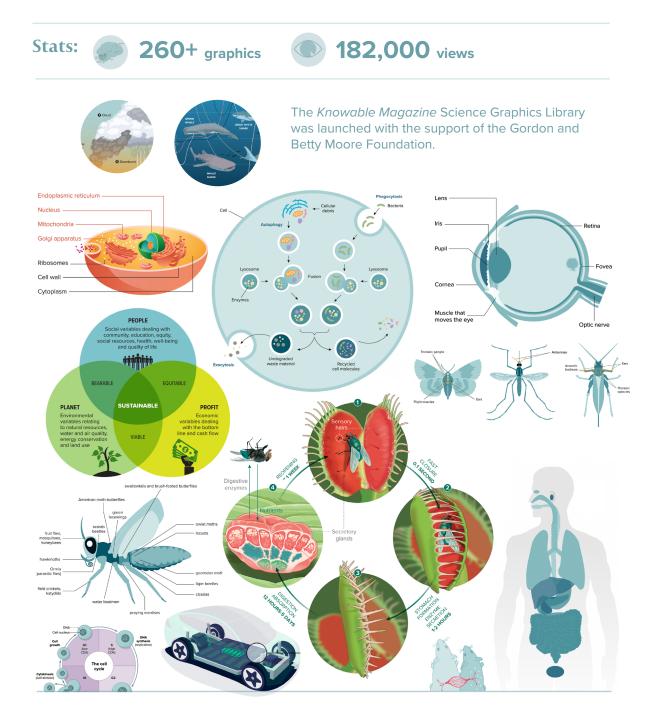
Higher levels of carbon dioxide are changing micronutrients in grasses, trees and even kelp. What does that mean for animals higher up the food chain?



## Key initiatives: Graphics library for teachers

Quality visuals can make all the difference in explaining complex science, and we're committed to providing teachers with a reliable resource. The new *Knowable Magazine* Science Graphics Library makes many of our deeply reported and beautifully designed graphics and illustrations available for free classroom use.

These infographics explain topics in genetics, physics, technology, medicine, ecology, environmental science and more. We will continue to update and develop this resource as we publish new articles.



## Our reach: Republishing, translation and syndication

## Republication

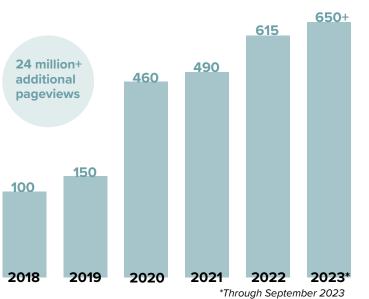
All *Knowable Magazine* articles are freely available to republish under a Creative Commons license, and we actively work to place our content in other outlets, bringing our fact-checked science journalism to readers around the world. Our republishing partners include large, broad-interest publications; science and technology magazines; and specialist and trade publications.

## Translation

In addition to our Spanish-language offerings, select *Knowable Magazine* articles can be read in a variety of other languages through our partnerships with various international outlets, including *Spektrum der Wissenschaft* (German), *Le Scienze* (Italian), *Pour la Science* (French), *Atlantico* (French) and *Sai Xiansheng* (Chinese).

## Syndication

We reach readers on their favorite news aggregators, including Yahoo News and Apple News.



### **REPUBLISHING & SYNDICATION BY YEAR**

"Ars Technica readers have very high expectations for the science stories we publish — they want to see scientific accuracy, a compelling topic, and good writing. If those expectations aren't met, we know we'll hear it from them.

*"Knowable* is one of the only places that consistently clears these bars when we consider articles for syndication. They work with some of the best science writers around, and their editorial process clearly ensures that the scientific quality of the articles matches the stellar writing.

"Our readers can tell, as a number of them have mentioned they've become regular *Knowable* readers in order to make sure they don't miss any articles we haven't syndicated."

—John Timmer, Senior Science Editor, Ars Technica



## Our reach: Knowable Magazine in the world

### On the radio

Writer Chris Gorski chatted with *Science Friday*'s Ira Flatow about <u>saliva's effects on our sense</u> of taste and what he learned reporting on the topic for *Knowable Magazine*. Several options for spit-filled science experiments accompanied the segment.

Listen now: Saliva: The Unsung Hero Of Taste (May 5, 2023)

### On podcasts

*Knowable en español* Editor Debbie Ponchner joined the *BBC Unexpected Elements* podcast and discussed several *Knowable* articles, including Pablo Correa's report on <u>ancient tropical forests</u> and Greg Miller's feature on the <u>psychology of conspiracy theories</u>.

Listen now: <u>Hayfever, paleobotany and snot palaces</u> (June 22, 2023) <u>The man who couldn't lie</u> (August 24, 2023)

### With the science writing community

At the 2023 World Conference of Science Journalists, *Knowable en español* Editor Debbie Ponchner spoke at the workshop "Reaching Across Borders: Strengthening Science Journalism in Latin America." Ponchner also participated in the April 2023 Symposium to Advance Science Communication and Journalism in Chile (virtual) and a virtual panel at the National Association of Science Writers' 2023 meeting.

### With viewers

Filmmaker Tiên Nguyễn spoke to the <u>Friends of Gold Butte</u> about her short film <u>Can a fire-ravaged forest of Joshua trees be restored?</u>, produced for *Knowable Magazine*.

"I learned about *Knowable Magazine* and the good work they do after watching a film they produced called, 'Saving Cima Dome.' I enjoyed the film and knew that the members of my organization, Friends of Gold Butte, would enjoy it too. After reaching out to *Knowable*, they connected me with the filmmaker, Tiên Nguyễn, who agreed to show the film for us and host a discussion. Tiên was terrific in answering questions and providing additional context. We really appreciate *Knowable Magazine* for the variety of educational topics they offer."

—Terri Rylander, Board Member of Friends of Gold Butte



### **Newsletter mentions**

1440

Axios Science

Botany One

Food & Environment News

Flipboard 10 for Today

Hakai Magazine



JSTOR Daily Kaiser Health News Morning Briefing Nature Briefing MIT Technology Review Spectrum

## Advancing knowledge: Annual Reviews

Annual Reviews is a nonprofit publisher dedicated to synthesizing and integrating knowledge for the progress of science and the benefit of society. Since 1932, the articles in the Annual Reviews journals have been integral in the research-publication landscape. Annual Reviews is the proud publisher of *Knowable Magazine*.

### About Annual Reviews articles

- Capture current understanding of a topic, including what is well-supported and what is controversial.
- Set the work in historical context.
- Highlight the major questions that remain to be addressed and anticipate likely courses of research.

These articles hold a special place in the scholarly communication ecosystem. Researchers, educators, policymakers, practitioners, library patrons and journalists look to them for a clear framing of today's most pressing challenges, alongside relevant solutions.

### Subscribe to Open

Through the innovative open access model called Subscribe to Open (S2O), developed by Annual Reviews, existing institutional customers continue to subscribe to the journals. With sufficient support, every new volume is immediately converted to Open Access under a Creative Commons license and is available for everyone to read and reuse. In addition, all articles from the most recent nine volumes are also accessible to all. If support is insufficient, the paywall is retained.

We are successfully converting all 2023 journal volumes to open access using S2O, resulting in a twofold to threefold increase in global readership.

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## Additional praise for Knowable Magazine

*"Knowable* understands the science of science communication. Always clear and accurate, the articles tell human stories that deepen our understanding of ourselves and the world around us."

–Susan T. Fiske | Eugene Higgins Professor of Psychology and Public Affairs, Princeton University | Member, Annual Reviews Board of Directors *"Knowable Magazine* is a great resource for teachers, students and lifelong learners — there is something for everyone and it all comes directly to your email box."

—Lorena O'English | Social Sciences and Government Information Librarian, Washington State University

*"Knowable Magazine* provides engaging, accessible and cleareyed descriptions of current scientific research. In a time rife with misunderstandings of science, *Knowable* fills a critical role and does so elegantly."

—Steven E. Hyman | Director, Stanley Center for Psychiatric Research at Broad Institute of MIT and Harvard | Member, Annual Reviews Board of Directors



### The difference philanthropy makes

*Knowable Magazine* and its parent organization, nonprofit publisher Annual Reviews, have multiple opportunities for donors interested in deepening their support for science journalism and scientific understanding. For more information, please contact Andrea Lopez, Director of Sales, Partnerships and Initiatives: <u>alopez@annualreviews.org</u>

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*Knowable Magazine* from Annual Reviews is an editorially independent journalistic endeavor that seeks to make scientific knowledge accessible to all.

Annual Reviews is a nonprofit publisher dedicated to synthesizing and integrating knowledge for the progress of science and the benefit of society.

