

from a folded configuration within 100 milliseconds. The quick, springlike action and robustness of these wings stem from the geometry and deformation of a tape-spring-shaped vein in the beetle's wing frame. Baek *et al.* emulated the vein's structure to develop an origami design with elastic energy storage and self-locking capabilities that deploys within 116 milliseconds and can sustain loads of up to 210 grams (150 times its own weight). Kinetic and static behaviors were enhanced using the origami design in both a jumping robot and a jump-gliding robot. —MML

Sci. Robot. 5 eaaz6262 (2020).

CORAL REEFS

A complex landscape for reef management

Coral reefs are among the most biodiverse systems in the ocean, and they provide both food and ecological services. They are also highly threatened by climate change and human pressure. Cinner *et al.* looked at how best to maximize three key components of reef use and health: fish biomass, parrotfish grazing, and fish trait diversity. They found that when human pressure is low, all three traits can be maximized at high conservation levels. However, as human use and pressure increase, it becomes increasingly difficult to promote biodiversity conservation. At some levels of human impact, even the highest amount of protection is not able to maximize biodiversity conservation. —SNV

Science, this issue p. 307

GENE EDITING

A PAMless base editor

CRISPR-Cas DNA base editing typically requires a specific motif for targeting known as a protospacer-adjacent motif (PAM). This requirement limits the sequences within a genome that can be targeted. Walton *et al.* engineered specific variants of the *Streptococcus pyogenes* Cas9 enzyme named SpG and SpRY that could recognize and edit a wider array of PAMs. Using SpRY,

the authors were able to correct previously uneditable mutations associated with human disease. Although off-target effects were observed for these engineered Cas enzymes at levels similar to those of the wild-type enzyme, depending on the context, these engineered enzymes widen the potential applications of precision genome editing. —LMZ

Science, this issue p. 290

CATALYSIS

Lighting the way coming and going

Catalysts accelerate chemical reactions by breaking existing bonds and then forming new ones. Often, the factors that favor the first process can muddle the second one, constraining a catalyst's generality. Torres *et al.* found that visible light excitation of a palladium complex can facilitate both the breaking and making of carbon-halogen bonds (see the Perspective by Kathe and Fleischer). The reaction specifically forms acid chlorides by carbonylation of a wide variety of alkyl or aryl bromides and iodides. These products in turn can react further to form amides and esters. —JSY

Science, this issue p. 318;
see also p. 242

DROUGHT

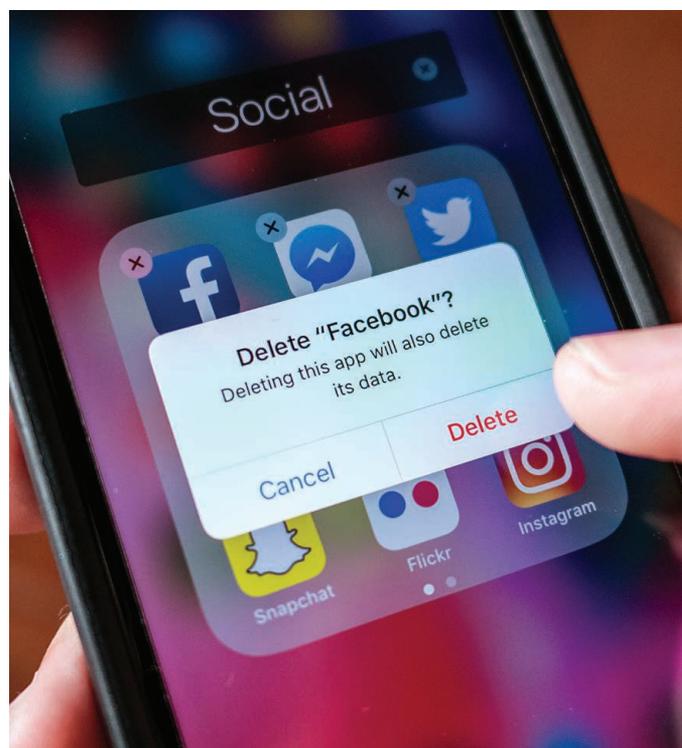
A trend of warming and drying

Global warming has pushed what would have been a moderate drought in southwestern North America into megadrought territory. Williams *et al.* used a combination of hydrological modeling and tree-ring reconstructions of summer soil moisture to show that the period from 2000 to 2018 was the driest 19-year span since the late 1500s and the second driest since 800 CE (see the Perspective by Stahle). This appears to be just the beginning of a more extreme trend toward megadrought as global warming continues. —HJS

Science, this issue p. 314;
see also p. 238

IN OTHER JOURNALS

Edited by **Caroline Ash**
and **Jesse Smith**



SOCIAL MEDIA

Connected, but at what cost?

Facebook users, randomized to deactivate their accounts for 4 weeks in exchange for \$102, freed up an average of 60 minutes a day, spent more time socializing offline, became less politically polarized, and reported improved subjective well-being relative to controls. However, the treatment group also became less knowledgeable about current events. Allcott *et al.* report that after the 4-week deactivation period ended, the treated subjects' Facebook use remained persistently lower than that of the controls, and treated subjects lowered the amount of compensation they would demand to deactivate their accounts for another 4 weeks. —BW

Am. Econ. Rev. 110, 629 (2020).

Disconnecting from Facebook led ex-users to socialize offline more, become less politically polarized, and improve their subjective well-being.

IMMUNOPSYCHIATRY

Depressing effects of microglia

Microglia act as the brain's resident cleanup squad by phagocytosing apoptotic cells, plaques, and pathogens. Because they can prune and reshape synapses, microglia

may also be influential in the pathogenesis of psychiatric illnesses. Lago *et al.* report that CD300f, a receptor found on microglia that recognizes the "eat me" signal phosphatidylserine, may be involved in major depressive disorder (MDD). A polymorphism of CD300f affects signaling and

is associated with protection against MDD in women but not men. A lack of CD300f impairs microglial metabolic fitness, and *Cd300f^{-/-}* female mice exhibited depressive-like behavior in models of MDD. Caveats about murine MDD models aside, this suggests that microglia and CD300f may be suitable future therapeutic targets for this disorder. —STS

Proc. Natl. Acad. Sci. U.S.A. **117**, 6651 (2020).

METABOLISM

Gut microbes and obesity

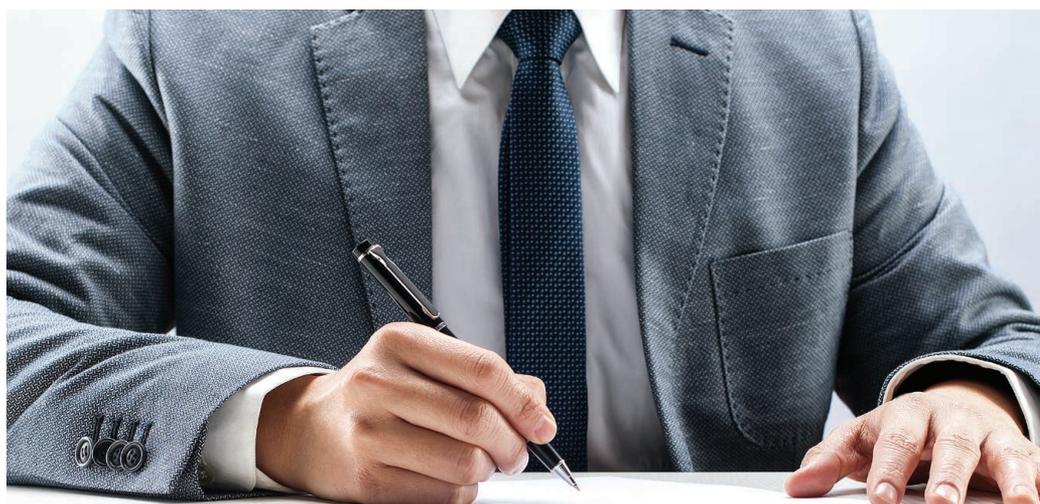
A plethora of studies have uncovered correlations between gut microbiome composition and common disorders such as metabolic disease. The hope is that these correlations can be translated into therapies using mechanism-based approaches. An alternative approach is fecal microbiota transplantation (FMT), a procedure in which gut microbiota from healthy donors are delivered to individuals who have, or are at risk of developing, a specific disorder. Yu *et al.* conducted a small, double-blind clinical trial to determine whether obese adults at risk of developing type 2 diabetes would benefit from oral FMT capsules derived from healthy, lean donors. After 3 months, they found durable microbial shifts in the recipients but no clinically meaningful changes in their metabolism or weight. —PAK

PLOS Med. **17**, e1003051 (2020).

CELL BIOLOGY

Lighting up endosomes

Endosomes are small, dynamic vesicles that sort and deliver signaling molecules to the correct location in the cell. Gupta *et al.* describe a new probe comprising a lipid-like small molecule that localizes to late endosomes, which they conjugated to a dye suitable for super-resolution imaging. These high-density, environmentally sensitive probes allowed them to visualize endolysosomes in primary cells for more than 7 minutes without affecting their structure



PSYCHOLOGY

Honesty “nudge” fails to replicate

Prior research has found that asking people to sign a tax form before rather than after filling it out increases honest reporting. This line of research has since been used as an example of the power of subtle behavioral “nudges” to influence positive behavior change compared with more-difficult-to-implement structural reforms. In a high-powered replication, Kristal *et al.* failed to reproduce this effect across several studies. Priming honesty by signing one’s name before providing information rather than afterward had no effect on subjects’ honesty. These findings have implications for current debates about the limitations of behavioral nudge-style interventions that favor subtle, easy-to-implement changes to the environment over more costly structural reform. —TSR

Proc. Natl. Acad. Sci. U.S.A. **117**, 7103 (2020).

Signing a tax form before filling it out does not produce more-honest reporting than signing after completing it.

or function. They were able to detect transient interactions between endosomes and identify endosome motility defects related to mutations associated with Niemann-Pick disease, a neurodegenerative endolysosomal storage disorder. These tools could be used to screen for small molecules that alter endosome dynamics. —VV

Nat. Chem. Biol. **16**, 408 (2020).

ECOLOGY

Extinctions and introductions

Introduced species have generally been considered a bad thing by ecologists because of the alterations that they can make to native ecosystems. In the case of introduced mammalian herbivores, however, there might sometimes be a silver lining. In a global survey

of introductions, Lundgren *et al.* show that biological traits of introduced herbivores can have the potential to match those of the large mammal herbivores that became extinct in the Late Pleistocene as a result of predation by humans. The loss of 35% of the world’s large mammal herbivores led to changes in biodiversity patterns and ecosystem structure and function, which may now be at least partly reversed as introduced species begin to fill the trait space once occupied by those that were lost to extinction. —AMS

Proc. Natl. Acad. Sci. U.S.A. **117**, 7871 (2020).

ORGANIC SYNTHESIS

Reacting at the most substituted center

Nucleophilic substitution is one of the key fundamental

mechanisms in organic synthesis that is generally used, except for a few isolated instances, to functionalize sterically unhindered primary and secondary carbon centers. Lanke and Marek report an efficient regio- and stereoselective mechanism of intermolecular nucleophilic displacement at the quaternary carbon center of cyclopropyl carbinol derivatives. It proceeds with a complete inversion of configuration at the quaternary stereocenter and demonstrates high diastereo- and enantioselectivities. Because cyclopropyl carbinols can be easily formed from commercially available alkynes, the proposed mechanism could be used as a general synthetic method to produce various acyclic structures with stereodefined tertiary alkyl groups. —YS

J. Am. Chem. Soc. **142**, 5543 (2020).

Science

Connected, but at what cost?

Brad Wible

Science **368** (6488), 279.

DOI: 10.1126/science.368.6488.279-a

ARTICLE TOOLS

<http://science.sciencemag.org/content/368/6488/279.1>

RELATED CONTENT

<file:/content/sci/368/6488/twil.full>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2020 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works