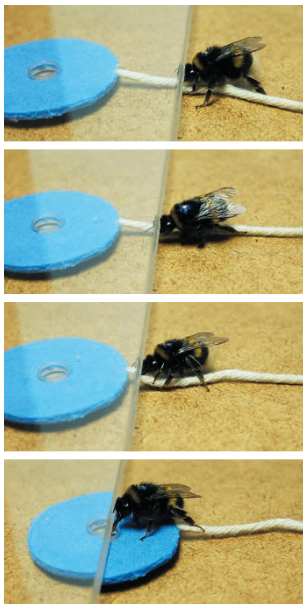
SYLVAIN ALEM



the western part of the United States between 1984 and 2015 by about 4.2 million hectares.

Climate change also accounted for about half the increase in both the length of the fire season and the number of days with a high risk of fire.
Proc. Natl Acad. Sci. USA **http://doi.org/brsj (2016)**

CHEMISTRY

Meteorite makes good catalyst

An iron-based mineral from a meteorite can catalyse a chemical reaction that splits water into oxygen and hydrogen, which can be used as fuel.

Some naturally occurring metallic minerals are known to have catalytic activity. Kevin Sivula and his colleagues at the Swiss Federal Institute of Technology in Lausanne studied pieces of the Namibian Gibeon meteorite, which was identified in the nineteenth century. They tested how efficiently the mineral could catalyse the oxidation of water, and found that it performed as well as synthetic iron–nickel catalysts and remained stable for 1,000 hours.

The catalytic performance emerged only after about 10 hours of operation, when a layer containing concentrated nickel, iron and cobalt with a unique 3D structure formed at the material's surface. Natural materials could inspire the creation of new kinds of catalyst, the authors suggest.
Energy Environ. Sci. **http://doi.org/brsp (2016)**

ANIMAL COGNITION

Bees learn and 'teach' others

Bumblebees can learn to manipulate objects — and can pass their knowledge on to other bees.

Lars Chittka at Queen Mary University of London and his colleagues presented bumblebees (*Bombus terrestris*) with a disc that had been filled with sugar water and placed under a transparent sheet of Plexiglas. To get at the disc, the bees had to pull on a string attached to it (**pictured**). Just 2 bees out of almost 300 worked out how to do this on their own; most needed stepwise training, after which more than 80% of bees were successful.

When untrained bees watched other bees getting the sugar water, they were able to learn the trick. Seeding untrained colonies with a single trained 'demonstrator' and then pairing bees from the colony with the disc apparatus eventually resulted in roughly half of the foragers learning the task. None of the foragers in the control colonies could pull the disc out.
PLoS Biol. 14, **e1002564 (2016)**

LORNA ELLEN FAULKES/RATSYSTEMS

NEUROSCIENCE

Why mole rats don't feel the heat

A gene variant could explain why naked mole rats are impervious to certain types of pain that most mammals experience when exposed to heat.

In the nervous system, a peptide called nerve growth factor (NGF) mediates hypersensitivity to pain caused by heat. Gary Lewin at the Max Delbrück Center for Molecular Medicine in Berlin and his colleagues found that in naked mole rats (*Heterocephalus glaber*; **pictured**), the chemical sequence of the NGF receptor differs from that of other vertebrates by a small handful of amino acids. As a result of these changes, the receptor fails to boost the sensitivity of another protein, TRPV1, which produces a painful, burning sensation when activated.

The authors speculate that defects in NGF signalling could also explain why, during the course of development, naked mole rats lose certain nerve fibres that conduct burning pain. This could be an adaptation to a life spent underground, where temperatures have been fairly constant for millions of years.
Cell Rep. 17, **748–758 (2016)**

PLANT BIOLOGY

RNA spray fights fungus

Spraying leaves from barley plants with a liquid containing long RNA molecules helps them to fend off fungal infection.

A mechanism called RNA interference (RNAi) uses double-stranded RNA molecules to shut down the expression of specific genes. Karl-Heinz Kogel of the Justus Liebig University in Giessen, Germany, and his colleagues used RNAi to silence three genes that fungi require to make ergosterol, a compound needed for fungal growth.

The team found that when the RNA is sprayed directly onto barley leaves, it is taken up by the fungal pathogen *Fusarium graminearum* and inhibits its growth in those leaves. Even unsprayed leaf parts are protected from the fungus, because the RNA molecules are absorbed and transported by the leaves before being taken up by the pathogen.

The approach could open the door to a new generation of fungicides, the authors note.
PLoS Pathog. 12, **e1005901 (2016)**

ELECTRONICS

Shortest transistor made

Researchers have built a transistor with a 'gate' just one nanometre long — one-fifth of the smallest length thought to be possible in silicon transistors.

The semiconductor industry is reaching the limits of its capacity to shrink silicon-based transistors. Graphene and other '2D' materials are promising replacements for silicon because they are one atom thick and have good electronic properties. Ali Javey at the University of California, Berkeley, and his collaborators have now demonstrated a transistor made of the 2D semiconductor molybdenum disulfide. In their device, a carbon nanotube laid underneath a flake of the material acts as the gate, switching the current off when a voltage is applied to it. The nanotube's one-nanometre width makes it the shortest transistor gate ever built, Javey says.
Science 354, **99–102 (2016)**

CLARIFICATION

The Research Highlight 'Greenland ice loss underestimated' (*Nature* **537,** 588; 2016) said that the sea-level rise from Greenland ice loss was 44% more than previous estimates. This is 44% more than some estimates. Others have given similar or greater values.

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