GETTY

and oceanic transport, and through association with particulate matter and sinking carrion that are consumed by animals, the authors suggest.
Nature Ecol. Evol. 1, **0051 (2017)**

CONSERVATION

Penguins caught in ecological trap

Endangered African penguins are at risk from overfishing and climate change, which have reduced stocks of prey fish in their juvenile feeding grounds.

Richard Sherley and Stephen Votier at the University of Exeter, UK, and their colleagues used satellites to track 54 juvenile African penguins (*Spheniscus demersus*; **pictured**) over a three-year period as the birds migrated in search of food. They found that the juveniles tried to feed in areas off the coast of Namibia and western South Africa that had cold surface waters and high chlorophyll levels, which are normally indicative of a healthy fish population. But fishing has drastically decreased sardine and anchovy populations in these regions, and climate change has caused the remaining fish to move southward, leaving the penguins caught in an ecological 'trap'. This could explain why penguin populations have been declining across western South Africa and Namibia.

Swathes of the penguins' breeding grounds are now protected, but unless this protection is extended to their feeding grounds, populations may not recover, the authors say.
Curr. Biol. **http://doi.org/bzkx (2017)**

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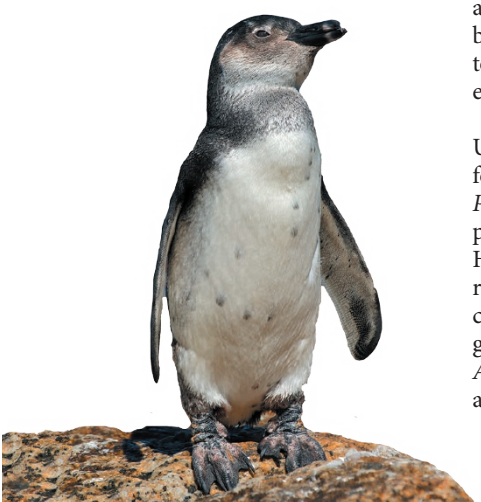

TRANSPORTATION

Superconductors drive trains

The first test of a commercial electric train using superconducting cables suggests that the technology could help a typical urban rail network to save an average of 5% in energy.

Most electric railways in urban centres suffer from voltage drops because of power losses as electricity is transmitted along the line. To reduce these losses, Masaru Tomita and his colleagues at the Railway Technical Research Institute in Tokyo designed a superconducting cable to send electricity from substations to trains. A 310-metre-long section of the cable improved the energy efficiency of a two-car train on a test track, and a 6-metre section tested on an operational commercial line successfully transmitted electricity to a three-car train running at its normal speed.

If implemented globally, superconducting cables could reduce carbon dioxide emissions by 327,000 tonnes annually, the authors estimate.
Energy 122, **579–587 (2017)**

INFECTION

How malaria boosts its spread

The malaria parasite produces a molecule that affects red blood cells, luring mosquitoes to bite infected people, and may enhance the parasite's spread.

Ingrid Faye at Stockholm University and her colleagues found that the parasite *Plasmodium falciparum* produces a metabolite called HMBPP. This stimulates red blood cells to release carbon dioxide and other gases that together attract the *Anopheles gambiae* mosquito, a major malaria vector. The mosquitoes preferred human blood containing HMBPP, ingesting larger amounts of this than HMBPP-free blood. Mosquitoes consuming malaria-infected blood laced with extra HMBPP also had more parasites in their salivary glands than did those ingesting just infected blood, suggesting that the molecule boosts the insects' susceptibility to infection.

HMBPP altered the expression of certain neural and immune genes in mosquitoes, supporting the idea that the molecule changes mosquito feeding behaviour and immune function to support malaria transmission.
Science **http://doi.org/bzkw (2017)**

CLIMATE CHANGE

The high cost of keeping cool

The potential increase in air-conditioning use in a warming climate could boost the cost of meeting peak demand for electricity in the United States by up to US$180 billion by the end of the century.

Maximilian Auffhammer at the University of California, Berkeley, and his colleagues assessed how temperature extremes affect consumption of electricity (pylons **pictured**) by analysing nine years of data on power use and weather from 166 areas of the United States. Using a suite of climate models, they predict that in a business-as-usual scenario, average electricity use could rise by 7.9% by 2100, and that peak demand may climb by 17.6%.

These results highlight the need to increase investment in electricity storage and generation, the authors say.
Proc. Natl Acad. Sci. USA **http://doi.org/bzh6 (2017)**

PHYSIOLOGY

Cells remember high altitude

Mountain climbers tend to acclimatize to high altitudes faster during a second ascent than during the first. Red blood cells have a role in this, 'remembering' how they initially adapted to the low-oxygen conditions.

Yang Xia at the University of Texas Health Science Center in Houston and her colleagues studied mice exposed to low oxygen, and healthy volunteers raised in lowland areas who climbed Mount Chacaltaya in Bolivia, which has an elevation of more than 5,000 metres. Altitude raised blood levels of adenosine, which dilates blood vessels, boosting blood flow. The team found that adenosine also helps to degrade a protein called eENT1 in red blood cells in humans and mice, causing increased production of adenosine during the first exposure to low oxygen.

Red blood cells exposed to low oxygen levels a second time had maintained the low levels of eENT1, allowing them to make adenosine faster, and in larger amounts, than during the first exposure.
Nature Commun. 8, **14108 (2017)**

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