But Macdonald's model says that wasn't what was happening at all. By looking at the biomechanics of how humans balance, Macdonald has revealed the effects of the adjustments people make to keep their balance, by sticking one foot further out to the left or right. These add energy to the bridge's natural wobble. Once a critical number of people start trying to balance in this way, that extra energy becomes significant, and increases the bridge's sway.

GEOCHEMISTRY

Oh molybdenum!

Nature Geosci. doi:10.1038/ngeo366 (2008)

A lack of the silvery metal molybdenum limits nitrogen fixation in tropical soils. The finding comes from the work of Lars Hedin at Princeton University in New Jersey and his colleagues, and calls into question the role phosphorus was thought to have in the process.

Hedin and his team looked at the activity of nitrogenase — the enzyme that converts atmospheric nitrogen into ammonium, which plants can use — in the top layer of soil in a tropical forest floor in Panama. The plots had been given fertilizers rich in nitrogen, phosphorus or micronutrients including molybdenum over a period of seven years. The researchers also measured the short-term effects of molybdenum and phosphorus on nitrogenase activity.

Results from both experiments suggest that molybdenum alone can trigger nitrogenase activity, and that contamination by this element might underlie the efficacy of commercial phosphorus fertilizers, Hedin says.

MATERIALS SCIENCE

Hitting a nerve gas

Angew. Chem. Int. Edn doi:10.1002/anie.200802932 (2008)

Protective clothing can provide a first line of defence against chemical-warfare agents such as mustard gas, but the relief is limited if the perilous substance remains on the fabric.

Valérie Keller of Louis Pasteur University in Strasbourg, France, and her colleagues have a solution. They show that cotton textiles coated by dipping or spraying with photocatalytic particles can burn up simulants of blistering and nerve agents within minutes when irradiated with artificial solar-like light. The particles consist of titanate nanotubes encrusted with crystals of tungsten trioxide, and their light-induced degradation of organic molecules resembles that of self-cleaning tiles and glass coated with titanium dioxide.

GENOMICS

25 to life

Proc. Natl Acad. Sci. USA **105,** 20404–20409 (2008)

Edging their way towards the construction of a synthetic organism, Daniel Gibson at the J. Craig Venter Institute in Rockville, Maryland, and his colleagues have performed a one-step assembly of an entire bacterial genome inside yeast.

In early 2008, the team reported that they had manufactured the 592-kilobase genome of *Mycoplasma genitalium* using several steps to sew together chemically synthesized DNA fragments (D. G. Gibson *et al. Science* **319,** 1215–1220; 2008). In the new simplified version, they show that yeast can take up 25 DNA fragments and splice them together correctly on its own. The technique could make it easier to assemble 'designer' genomes.

B. MILLER

ZOOLOGY

Breathing deep

Proc. R. Soc. B doi:10.1098/rspb.2008.1489 (2008)

Antarctic sea spiders (pictured above), some up to 90 centimetres long, are giants compared with their 1–10-millimetre-long tropical cousins. Researchers have had a simple hypothesis for this 'polar gigantism', but results from a research team co-led by Arthur Woods of the University of Montana, Missoula, have complicated the picture.

Polar water has a higher level of dissolved oxygen, and cold-water arthropods have lower metabolic rates than their warm-water counterparts. The big spiders were thus expected to perform worse in low-oxygen environments.

Woods's team repeatedly flipped over spiders from 12 species that encompassed the small, medium and large varieties for an hour each, to see how long they took to right themselves. Overall, the giants were no more sluggish than the tiny ones. This result suggests that scientists must search for other possible evolutionary or ecological mechanisms for polar gigantism.

JOURNAL CLUB

Stephen Curry, Imperial College, London

A crystallographer takes a jaunt into immunology.

Although I spend most of my time exploring a landscape formed by atoms and bonds, I know it is healthy to make occasional journeys into less familiar territories, and I was intrigued to spot a paper on the curious interplay between infection and immunity in cattle with foot-and-mouth disease virus (FMDV).

FMDV, a highly contagious pathogen that can cause lameness, low weight and decreased milk production, is a scourge of agricultural livestock around the world. Although the acute phase of infection is rarely fatal, infection may persist in animals that have apparently recovered, creating a viral reservoir that some fear could contribute to the spread of disease. Nicholas Juleff and colleagues, from the United Kingdom's Institute for Animal Health, report a fascinating discovery that may have unlocked the secret of FMDV persistence.

They used an array of molecular techniques to search for traces of virus in tissues from the mouths and throats of infected cattle (N. Juleff *et al. PLoS ONE* **3,** e3434; 2008). In a carefully controlled study, they found evidence of intact, non-replicating virus particles trapped by immune cells called follicular dendritic cells within the germinal centres of lymph nodes. Strikingly, virus was present for at least 38 days post infection, even though it was undetectable in surrounding tissues.

The retention of intact virus within germinal centres is likely to have a role in stimulating the long-lasting immune response of white blood cells that is characteristic of viral infections (but not current vaccine preparations) and echoes a pattern previously seen for HIV infection. The authors suggest that this capture may inadvertently also be responsible for preserving intact viruses capable of infecting susceptible cells as they come into contact with germinal centres. A causal relationship has yet to be firmly established but the paper illuminates a clear pathway by which to check this out.

Discuss this paper at **http://blogs.nature.com/nature/journalclub**

© 2009 Macmillan Publishers Limited. All rights reserved