RESEARCH HIGHLIGHTS

Selections from the scientific literature

BOTANY

Plant fertilization protein found

Fertilization in flowering plants is dependent on a protein that is secreted by the egg cell and activates incoming sperm.

Stefanie Sprunck at the University of Regensburg in Germany and her colleagues show that, in the model plant *Arabidopsis thaliana,* the arrival of sperm cells near the egg causes the release of a protein they call EGG CELL 1 (EC1). This triggers the redistribution of a second protein — one linked to fusion of the sex cells, or gametes — from inside the sperm to the sperm cell surface.

Sperm cells interacting with mutant *Arabidopsis* eggs that have faulty *ec1* genes failed to fuse, and the plant's pollen tubes continued to deliver sperm into the embryo sac. These results suggest that EC1 controls gamete fusion.

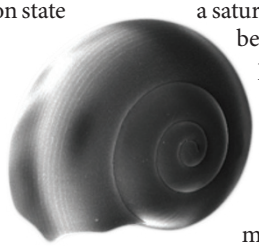
Science 338, **1093–1097 (2012)**

CLIMATE CHANGE

Carbon drop in snail shell shock

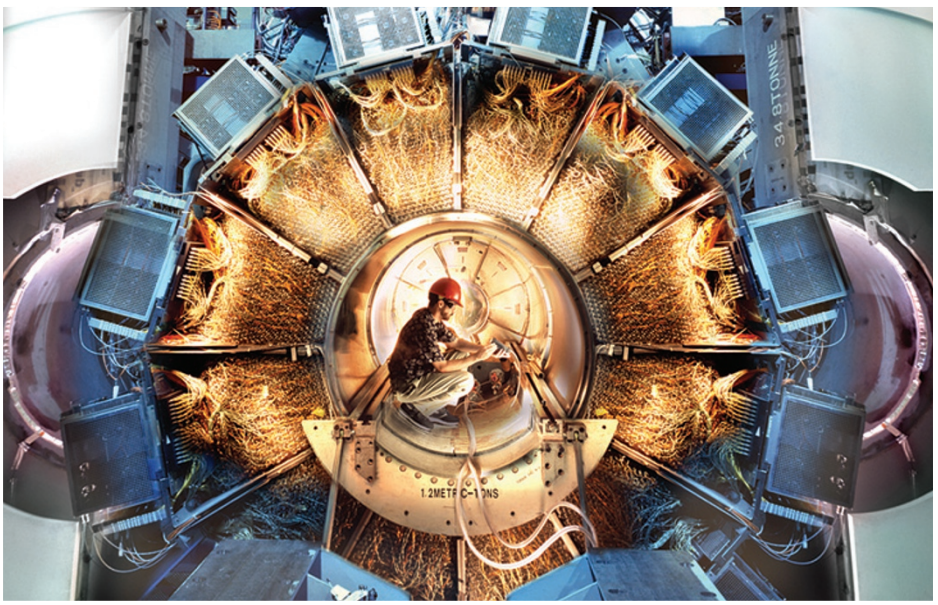
Free-swimming snails show shell damage in water conditions that are likely to become more prevalent as the climate warms. By 2050, the top 200 metres of the Southern Ocean are likely to become under-saturated in a form of calcium carbonate called aragonite — a component of many shells. If aragonite structures are placed in waters in which the saturation state is less than one, they gradually dissolve.

Geraint Tarling of the British Antarctic Survey in Cambridge, UK, and his team analysed the shells of *Limacina helicina antarctica* pteropods (**pictured**) captured from the top 200 metres in an upwelling region of the Southern Ocean in 2008. Their shells were thinner and more porous than those captured elsewhere. In the laboratory, eight days of immersion in waters with a saturation state of between 0.94 and 1.12 produced similar levels of damage. Aragonite-shelled animals, important to food and carbon cycles, may decline sooner than expected in the Southern Ocean, the authors say.



NINA BEDNARŠEK/BERTRAND LÉZÉ

Nature Geosci. **http://dx.doi.org/10.1038/ngeo1635 (2012)**



SLAC NATL ACCELERATOR LAB.

PARTICLE PHYSICS

Time's arrow in B mesons

A cornerstone of theoretical particle physics — the idea that not all processes run in the same way forwards in time as they do backwards — has been observed directly for the first time.

Members of the BaBar Collaboration trawled data from their experiment (pictured), which ran at the SLAC National Accelerator Laboratory in Menlo Park, California, from 1999 to 2008. The researchers identified B-meson decay chains that were time reversals of each other, and a comparison of the decay rates revealed a strong asymmetry. Earlier experiments have caught hints of time-reversal violation but failed to distinguish it clearly from violations of other fundamental symmetries.

Phys. Rev. Lett. 109, **211801 (2012)**

For a longer story on this research, see go.nature.com/258vei

ZOOLOGY

Blue whales roll with it

Blue whales (*Balaenoptera musculus*) can perform 360° rolls, an impressive manoeuvre for the largest animal ever to have lived.

Jeremy Goldbogen of the Cascadia Research Collective in Olympia, Washington, and his colleagues tagged blue whales off the coast of California with sensors that provided information regarding the animals' speed, depth and body orientation. Of 22 whales tagged for an average of 6.7 hours, 11 were recorded performing rolls. In total, 44 rolls were observed, all during foraging.

The authors suggest that these rolls serve a dual purpose, allowing the animal both to re-orient its body to capture the maximum amount of krill prey, and to better visualize the prey and its surroundings.

Biol. Lett. **http://dx.doi.org/10.1098/rsbl.2012.0986 (2012)**