RESEARCH HIGHLIGHTS

Selections from the scientific literature

PLANETARY SCIENCE

Mercury's plasma belt

Like Earth, Mercury has a magnetosphere, a zone of interaction between its magnetic field and incoming plasma from the Sun. But scientists have been unsure about whether Mercury also has the concentration of charged particles around its equator that Earth does.

David Schriver at the University of California, Los Angeles, and his colleagues argue that Mercury does have such a quasi-trapped particle belt, citing simulations of the planet's dynamics and data from instruments aboard the MESSENGER spacecraft, which entered into orbit around Mercury in March 2011. The craft ploughed through an equatorial population of 1–10-kiloelectron-volt ions and electrons at a distance of about half the planet's radius from the surface.

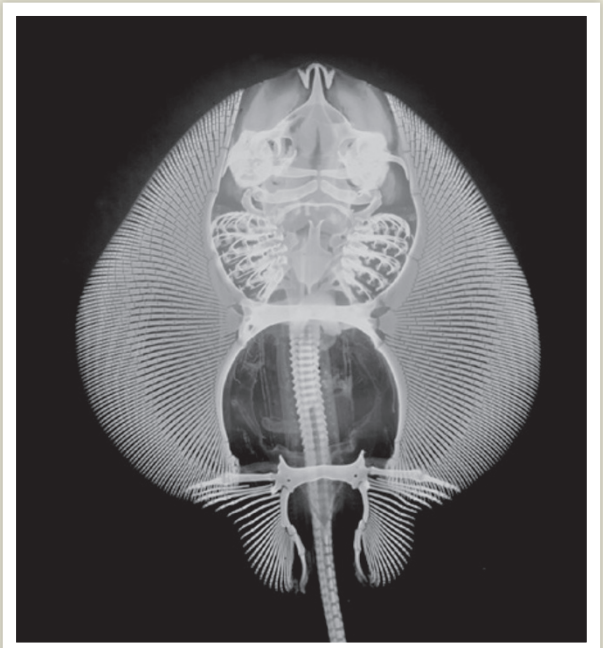
The authors compare the belt to Earth's ring current and say that it could influence the pattern of surface weathering and the formation of a thin atmosphere around Mercury.
Geophys. Res. Lett. **http://dx.doi.org/10.1029/2011GL049629 (2011)**

ZOOLOGY

Birds keep up with the Joneses

Determining how many eggs to lay is key to many birds' reproductive strategies, and at least one species seems to base its decision on the choices of another species. Before laying, the pied flycatcher (*Ficedula hypoleuca*) spies on competing bird species that have already laid their clutches.

Using simulated nests of great tits (*Parus major*), Jukka Forsman and his colleagues at the University of Oulu in Finland show that flycatchers nesting near neighbours with larger broods themselves invest in laying more eggs. The age of the female birds had the greatest influence on clutch size, with older females laying significantly more eggs in areas where tits looked to have produced 13 eggs than where they looked to have produced only four. That wasn't the only difference: where simulated nests contained more eggs, the average mass of eggs laid by the flycatchers was also higher.
Biol. Lett. **http://dx.doi.org/10.1098/rsbl.2011.0970 (2011)**



GENETICS

Case of a missing cluster

At least some sharks and skates have lost a collection of genes that was thought to be crucial to the survival of all jawed vertebrates.

Jawed vertebrates typically have four clusters of *Hox* genes, each containing up to 14 members, that are important in controlling embryonic development. Until now, complete deletion of any of these clusters had not been observed in a vertebrate.

Benjamin King of the Mount Desert Island Biological Laboratory in Salisbury Cove, Maine, and his colleagues found that the shark *Scyliorhinus canicula* and the skate *Leucoraja erinacea* (pictured) do not express genes found in one of these clusters, called *HoxC*. Sequencing of the *L. erinacea* genome confirmed that the genes were missing, as were two RNA fragments, called microRNAs, associated with the cluster.
Science 334, **1517 (2011)**

CELL BIOLOGY

The first microtubules

Bacteria make long protein chains that may be similar to the ancestors of microtubules, structures found in the cells of more complex organisms. Microtubules perform crucial cellular tasks, including pulling chromosomes apart during cell division.

Grant Jensen and Martin Pilhofer at the California Institute of Technology in Pasadena and their team captured cryo-electron micrographs of several species of *Prosthecobacter* bacteria, which contain multi-protein chains reminiscent of microtubules. These are forged from repeated spiral arrangements of proteins that are evolutionarily related to those in the microtubules of other organisms.

It is not clear what bacterial microtubules do. The authors suggest that the bacteria that gave rise to other, more complex organisms passed on proteins capable of forming microtubules.
PLoS Biol. 9, **e1001213 (2011)**

MICROBIOLOGY

Splitting a bacterial magnet

Compass-containing bacteria face a challenge when they come to divide: splitting their strong internal magnets. These bacteria use chains of organelles called magnetosomes to orient themselves with Earth's magnetic field, which provides guidance in the water column.

Dirk Schüler of Ludwig-Maximilians University in Munich, Germany, and his team used light and electron microscopy to track the marine

MOUNT DESERT ISLAND BIOL. LAB.