RESEARCH HIGHLIGHTS

Selections from the scientific literature

PALAEONTOLOGY

Caimans ruled ancient wetland

A vast diversity of specialized crocodilian species dominated the mega-wetlands of South America before the Amazon River flowed, a remarkable fossil find has revealed.

Rodolfo Salas-Gismondi at the University of Montpellier in France and his colleagues found two bone beds in Peru containing seven species of crocodilian — the largest diversity of such species ever found in one place.

As well as two known large-bodied species, they found five animals that are new to science, including several caimans with teeth that seem to be specialized for consuming shellfish. The numbers of these animals declined as Amazon River systems began forming around 10.5 million years ago, draining the wetlands and allowing more-generalist caiman predators to dominate.
Proc. R. Soc. B 282, **20142490 (2015)**

IMMUNOLOGY

Invading bacteria trigger DNA alarm

Immune systems use a previously unrecognized DNA detector to identify invading bacteria.

White blood cells called neutrophils recognize bacterial DNA, triggering a response that eventually kills the invaders. Zusen Fan and his colleagues at the Chinese Academy of Sciences Institute of Biophysics in Beijing found that a DNA-binding protein called Sox2 is also part of this bacterial surveillance system in mice and humans.

They discovered that Sox2 binds to bacterial DNA, and that bacterial infections were worse in mice that had been engineered to have no Sox2 expression in neutrophils. Infections were also worse in mice lacking another protein called TAB2, which interacts with Sox2. The findings could suggest new ways of treating infections, say the authors.
Nature Immunol. **http://dx.doi.org/10.1038/ni.3117 (2015)**

PAUL DOMENICK/GETTY

ZOOLOGY

Eyelash length explained

The optimal length for mammalian eyelashes is one-third of the eye's width, which helps to retain moisture and keep out dust.

David Hu and his colleagues at the Georgia Institute of Technology in Atlanta measured the eyelash lengths of 22 species of mammals and found this ratio. They tested mock-ups of a mammalian eye in a wind tunnel to see how airflow changed depending on eyelash length. Lashes that were shorter than one-third of eye width were not optimal at blocking air from blowing onto the ocular surface. However, longer lashes directed more airflow towards the eye, making it susceptible to drying out. Understanding how eyelashes function could lead to devices that protect optical sensors, the authors say.
J. R. Soc. Interface **http://doi.org/2gk (2015)**

ANIMAL BEHAVIOUR

Birds allow kin to borrow nests

Female ducks recognize their kin and allow them to add eggs to their nests, but fight such attempts by non-relatives.

Many birds try to trick others of the same species into incubating their eggs to avoid the associated energy costs. Malte Andersson at the University of Gothenburg in Sweden and his colleagues studied this 'brood parasitism' by filming the nests of High Arctic common eiders (*Somateria mollissima*) for more than 4,100 hours.

They also analysed the proteins in egg albumen to determine the relatedness of the females that laid eggs in the nest, and found evidence for discrimination against non-relatives.

In 65 nests studied, 11 contained eggs from two different females. At eight of these nests there were fights, and the two females laying eggs in each nest were unrelated. At three nests no aggression was observed, and the laying females were significantly more closely related than in the other eight.
Behav. Ecol. **http://doi.org/2gj (2015)**

BACTERIOLOGY

Altruistic bacteria share their food

Starving bacteria can hook onto other bacterial species to share their nutrients.

Marie-Thérèse Giudici-Orticoni of Aix-Marseille University, France, and her colleagues cultured *Clostridium acetobutylicum*, which uses glucose to grow, and *Desulfovibrio vulgaris*, which uses lactate and sulfate, in a medium containing only glucose. *Desulfovibrio vulgaris* attached itself to *C. acetobutylicum*, allowing it to share the other bacterium's cytoplasm and proteins. This altered the metabolism of *D. vulgaris*, allowing it to grow with only glucose.

In a separate study, Christian Kost of the Max Planck Institute for