RESEARCH HIGHLIGHTS

Selections from the scientific literature

ASTRONOMY

Stars reach their limits

Stars seem to have a size limit of 100–150 times that of the Sun; the reason for this has been the subject of debate. Some astronomers think that a large star's own radiation blows away the gas it needs to grow, whereas others suggest that a star's progenitor cloud fragments.

A new simulation bolsters the fragmentation theory. Thomas Peters at the University of Heidelberg in Germany and his colleagues simulated the birth of massive stars in a cloud of gas and found that other, smaller stars formed from the fragmenting gas before the largest one could grow too big. The simulations are supported by some observations, and should lead to a better understanding of how big stars form.

Astrophys. J. 725, **134–145 (2010)**

H. BORTMAN

MICROBIOLOGY

Bacteria that thrive on arsenic

A bacterium discovered in a lake high in arsenic not only metabolizes the normally toxic element, but also seems to incorporate it into its DNA and other molecules in place of phosphorus. This hints at a biochemistry very different from that long thought to underlie life on Earth.

Felisa Wolfe-Simon at the US Geological Survey in Menlo Park, California, and her colleagues found the microbe in California's Mono Lake (pictured). When cultured in arsenate with only trace amounts of phosphate, the organism grew at a rate equal to 60% of that it achieves in phosphate.

Using radiolabelling and mass spectroscopy, the team found arsenic in cellular fractions of the bacterium's proteins, lipids, metabolites and nucleic acids in amounts similar to those expected for phosphate in normal cell biochemistry. X-ray analysis suggested that the arsenic takes the form of arsenate, and bonds with carbon and oxygen similarly to phosphate.

Science **doi:10.1126/science.1197258 (2010)**

For details of the mixed reactions to this surprising finding see p.741.

ZOOLOGY

Scorpions glow to sense

Scorpions' fluorescence under ultraviolet (UV) light may help them to detect and avoid the light. Because night-time levels of UV light correlate with the Moon phase, this could enable the creatures to detect moonlight and remain obscured on moonlit nights.

Carl Kloock and his team at California State University in Bakersfield reduced the glow of 15 female *Paruroctonus becki* scorpions (**pictured**) by exposing them to 16 hours of low-level UV light per day. The authors placed the creatures, along with 15 control, fluorescing scorpions, in Petri dishes that were painted black across one half. The scorpions were then exposed to infrared (IR) light only, IR and UV, or IR and white light.

The team found that, when exposed to UV light, the fluorescent scorpions were less active than the reduced-fluorescent ones, moving less often between the light and dark parts of the Petri dishes.

J. Arachnol. 38, **441–445 (2010)**

J. MARC-MOHAMED

MATERIALS SCIENCE

Antiseptic silver slivers

Silver is toxic to bacteria, and nanoparticles of the element offer promise as a coating for medical devices. But silver nanoparticles readily oxidize and clump together, losing their antibacterial activity. Chunhai Fan at the Chinese Academy of Sciences in Shanghai and his colleagues solved this problem by growing the particles on biocompatible silicon nanowires. This avoids the need for toxic or expensive chemicals to stabilize the silver nanoparticles.

The researchers show that exposure to a 10% solution of silver-coated nanowires froze population size in the bacteria *Escherichia coli* and *Bacillus subtilis* throughout a two-day test period.

Adv. Mater. **doi:10.1002/adma.201001934 (2010)**

OPTICS

Taking wing on a beam of light

A beam of light has been used to provide lift to a micrometre-sized curved rod in a manner analogous to that by which air passing over a wing provides lift to birds and aeroplanes.