Climate change

Ancient floods in New York

Geology **33,** 89–92 (2005)

The cold spells that interrupted the last deglaciation around 13,000 years ago are thought to have been initiated by massive releases of meltwater from ice sheets into the North Atlantic Ocean, with consequent effects on oceanic heat circulation.

Jeffrey P. Donnelly *et al.* now claim to have mapped the course of one such event 13,350 years ago. It seems that meltwater from the Laurentide Ice Sheet in North America gathered in several glacial lakes around the Hudson Valley of the northeastern United States. Radiocarbon dates of sediments imply that one lake, Glacial Lake Iroquois, drained into Glacial Lakes Vermont and Albany as the ice sheet receded. This input overwhelmed a dam of glacial deposits at the lower end of Glacial Lake Albany, now the narrows on the Hudson River in New York City, triggering a catastrophic flood down the Hudson Valley. A second influx of meltwater to the North Atlantic apparently came from Glacial Lake Candona, draining along the St Lawrence Valley.

Donnelly *et al.* estimate that the change in salinity of the North Atlantic would have been sufficient to reduce the ocean's thermohaline circulation, and trigger climate cooling. **Philip Ball**

Cell biology

Stress response

Science **307,** 935–939 (2005)

Endoplasmic reticulum (ER) stress is a feature of diabetes, Alzheimer's disease and viral infections. It is a consequence of cells' inability to fold proteins properly, ultimately resulting in cell death. After screening some 19,000 compounds, researchers have unearthed a molecule that protects rat cells from this untimely end.

The molecule, which Michael Boyce *et al.* have christened salubrinal, blocks the dephosphorylation of the α-subunit of eukaryotic translation initiation factor 2 (eIF2α). Phosphorylation of eIF2α is an early, protective part of the ER stress response. But it is usually only transient, and it seems that salubrinal helps to prevent the ensuing dephosphorylation.

Boyce *et al.* also show that salubrinal can slow the course of infection with herpes simplex virus. The virus's ability to make its own proteins is hampered if eIF2α is in the phosphorylated state — hence the ability of salubrinal to impede viral replication. **Michael Hopkin**

Anthropology

Climbing the social ladder

Proc. R. Soc. Lond. B doi:10.1098/rspb.2004.2970 (2005)

How many Christmas cards did you send last year — and how close are you to the recipients? W.-X. Zhou *et al.* have used their own data on this seasonal activity, along with other records, to study patterns in how people group together.

In different cultures all over the world, social clusters seem to fall into broad categories, always of roughly the same size: a core of 3–5 people who would be consulted at times of distress; a group of 12–20 individuals with quite close ties; bands of 30–50 people who for example work or (in traditional societies) camp together; and so on.

By analysing records gathered from many different countries and societies, both large and small, together with their Christmas-card data, Zhou *et al.* find that, no matter what the culture, each level of the social hierarchy seems to be about three times larger than the previous one.

Why such constraints might exist is puzzling. Perhaps group size is restricted by cognitive capacity (being able to remember everyone's relationships with everyone else, for example), or perhaps it is restricted merely by the time it takes to keep in touch with other people. **Helen Dell**

POPPERFOTO/ALAMY

Astrophysics

Galaxies flare up

Astrophys. J. preprint at http://arXiv.org/astro-ph/0501520 (2005)

The centres of active galaxies can generate large amounts of energy, up to a significant fraction of that of their host galaxy. These 'active galactic nuclei' (AGNs) are thought to be powered by matter falling into supermassive black holes.

Using the Subaru Telescope on the summit of Mauna Kea, Hawaii, Tomonori Totani *et al.* have found six very dim AGNs that emit flares of visible light on a timescale of a few days. AGNs generally vary over several months, although scientists have recently found that Sagittarius A*, the AGN at the centre of our own Galaxy, emits near-infrared flares that change from hour to hour.

Totani and colleagues' observations indicate that rapid flaring may be much more common than previously thought. The researchers believe that the AGNs are black holes around 100 million times heavier than the Sun. They suggest that the observed flares are coming from the event horizon, the very edge of the gravitational precipice that surrounds a black hole.

Rapid optical flaring activity may often be hidden in apparently normal galaxies, the authors say, and could be revealed by similar surveys that look for short-term variability in galaxies. **Mark Peplow**

Developmental biology

Youth gone by

Cell **120,** 383–393 (2005)

In fruitflies, cells can be diverted from making legs and instead form wing tissue. This switch in fate is called transdetermination, and Anne Sustar and Gerold Schubiger provide new insights into how it works.

The authors analysed imaginal disc cells in fruitflies. These cells are usually 'fated' to become a specialized type in adults (leg or wing cells, for instance). However, when the fly is injured, cells near the wound are stimulated to divide and form a 'regeneration blastema'. If the blastema arises in a defined region of the disc, the cells can switch their fate. But do they do so directly or by first regressing to a developmentally less mature starting point?

To find out, Sustar and Schubiger determined the proportion of blastema cells in the various different stages of the cell cycle. They point out that those undergoing transdetermination adopt an entirely new type of cell-cycle profile, which involves getting bigger and spending longer in the DNA-replication phase. The duo offers this as evidence that these cells do not have to revert to their youth in order to take on a different fate. The findings may provide clues to the developmental potential of adult stem cells. **Roxanne Khamsi**