Mieke Thierens of University College Cork in Ireland and her co-workers examined sediments deposited in coral carbonate mounds off Ireland's south-west Atlantic coast. Inspection of the grains and chemical analysis of their provenance suggested that the debris was deposited by icebergs calving off from an ice cap covering Britain and Ireland as long ago as 2.6 million years.

Scotland was previously the most southerly area assumed to be glaciated at the time, but it seems that colder climates — driven by changes in the tilt of Earth's axis — spurred ice sheets to encroach on even lower latitudes.

Quatern. Sci. Rev. **doi:10.1016/j.quascirev.2010.12.020 (2011)**

STEM CELLS

The way to a beating heart

Mouse skin cells have been directly reprogrammed to become beating heart cells. The method used could be safer and more efficient than previously developed techniques, which can take weeks, yield low numbers of cells and may generate stem cells with the potential to cause cancer.

Sheng Ding at the Scripps Research Institute in La Jolla, California, and his team found a short cut that bypasses the stem-cell stage. The researchers briefly exposed the skin cells to three genes often used in cellular reprogramming and grew the cells in a special medium to avoid the generation of stem cells. Then, treatment with a cocktail of cardiac growth factors coaxed the cells into becoming beating heart cells. The method took just 11–12 days to generate the first beating cells and yielded more cells than previous direct cardiac cell reprogramming techniques.

Nature Cell Biol. **doi:10.1038/ncb2164 (2011)**

L. A. HEUSINKVELD/ALAMY

PALAEONTOLOGY

Bones made for walking

One of the earliest human ancestors had human-like foot arches that would have allowed it to walk effectively on two legs. The finding may help to resolve the debate about whether this species, *Australopithecus afarensis*, was completely adapted to terrestrial bipedalism or retained the ape-like ability to climb in the trees.

Carol Ward at the University of Missouri in Columbia and her team analysed a fossilized bone about 3.2 million years old from Ethiopia. The fossil, the fourth metatarsal, is one of the bones that makes up the mid-foot. In flat-footed, tree-climbing chimpanzees, the bone lies flat against the ground, whereas in humans it is twisted and angled — an indicator of stiff, arched feet well adapted for walking with a human-like stride. The *A. afarensis* bone was twisted and angled similarly to its modern human equivalent.

Science 331, **750–753 (2011)**

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

BIOMATERIALS

Nanofibre makes penguins blue

The colour that gives the blue penguin its name is produced by a protein nanostructure in the bird's feathers.

Matthew Shawkey at the University of Akron in Ohio, Vinodkumar Saranathan at Yale University in New Haven, Connecticut, and their colleagues analysed barbs on the feathers of blue penguins (*Eudyptula minor*; **pictured**). They found that a quasi-ordered structure made up of densely packed, parallel nanofibres of the protein β-keratin scatters light in a way that produces the blue tinge.

The structure is similar to ones made of collagen that are responsible for colours in the skin of some birds and mammals. Only two other non-iridescent colour-producing nanostructures have previously been reported in birds, the authors say, and both derive from β-keratin.

Biol. Lett. **doi:10.1098/rsbl.2010.1163 (2011)**

PALAEOCLIMATE

Mexico's history in tree rings

An analysis of thousand-year-old trees has linked megadroughts to upheavals in ancient Mexican civilizations.

David Stahle at the University of Arkansas in Fayetteville and his colleagues measured tree rings from 30 Montezuma baldcypress trees (*Taxodium mucronatum*, **pictured**) growing in a central Mexican gorge. They used the measurements to reconstruct the region's climate between 771 and 2008.

A severe drought in Central America also reached into Mexico between 897 and 922,

D. STAHLE

and may have contributed to the fall of the Mayan empire. Another dry spell stretching between 1149 and 1167 overlapped with the decline of the region's Toltec culture and the abandonment of its capital in around 1150. And the Spanish conquest of the Aztecs in 1521 was preceded by an extended drought that may have exacerbated disease epidemics.

Geophys. Res. Lett. **doi:10.1029/2010GL046472 (2011)**

COMMUNITY CHOICE

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NEUROSCIENCE

Shining a light on depression

HIGHLY READ on www.jneurosci.org in Dec 2010

A reduction in the activity of neurons in the brain's prefrontal cortex is probably a cause, rather than a consequence, of depressive behaviours.

Eric Nestler at Mount Sinai School of Medicine in New York and his colleagues found, at post-mortem, unusually low expression of key genes in parts of the prefrontal cortex of people with depression. Mice displaying depressive behaviours after being repeatedly defeated by aggressive mice showed similar gene-expression changes in the same brain region. However, some resilient animals showed neither these behaviours nor reduced gene activity.

The researchers then used light to directly activate cortical neurons in the mice, which had been engineered to overexpress a light-sensitive protein in these cells. The depressive behaviour of susceptible mice was reversed — without affecting other behaviours such as movement or social memory.

J. Neurosci. 30, **16082–16090 (2010)**

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