RESEARCH HIGHLIGHTS

Waning woods

Science **323,** 521–524 (2009)

Trees in western North America are dying more quickly than they used to, but there is no corresponding increase in the number of new seedling trees. Mortality rates, which are currently of the order of 1% a year, have in many cases doubled in just a couple of decades.

The trend was picked out by a group led by Phillip van Mantgem and Nathan Stephenson, both then based at the US Geological Survey Western Ecological Research Center in Three Rivers, California. The increased mortality correlates with climate change in the region, which has warmed by an average of between 0.3 and 0.4 °C per decade since the 1970s.

N. STEPHENSON

ENVIRONMENT

The case for clean air

N. Engl. J. Med. **360,** 376–386 (2009)

Dirty air really can shorten your life. A drop of just 10 micrograms per cubic metre in the concentration of airborne particulate matter less than 2.5 micrometres in diameter extends human life by an average of almost 7.5 months, according to a team led by Arden Pope of Brigham Young University in Provo, Utah.

Comparing data from surveys carried out in 1979–1983 and 1999–2000, the researchers charted improvements in pollution levels in 51 US cities. They then correlated that data with changes in life expectancy over the same period, using census and health survey data to factor out other variables such as population density, income and smoking.

BIOGEOGRAPHY

On jaws and geography

Proc. R. Soc. B. doi:10.1098/rspb.2008.1785 (2009)

Two conflicting theories explain the heritage of New Zealand's current flora and fauna.

Sea levels rose 25 million–22 million years ago, and some believe that the landmass was completely submerged during this time and then repopulated later by transoceanic voyagers. Others hold that the land was only ever partly submerged, and that the ancestors of some of today's resident species have been there since New Zealand separated from other continents, 82 million–60 million years ago.

Marc Jones of University College London and his colleagues identified fossil jaw bones and teeth (pictured right) of a rhynchocephalian reptile, a relative of the extant New Zealand tuatara. Given the fossil's age — 19 million–16 million years — these lizard-like creatures would have had less time to repopulate the landmass than had previously been thought, suggesting that New Zealand was never fully underwater and has been home to the tuatara's ancestors since the time of the dinosaurs.

ROYAL SOCIETY

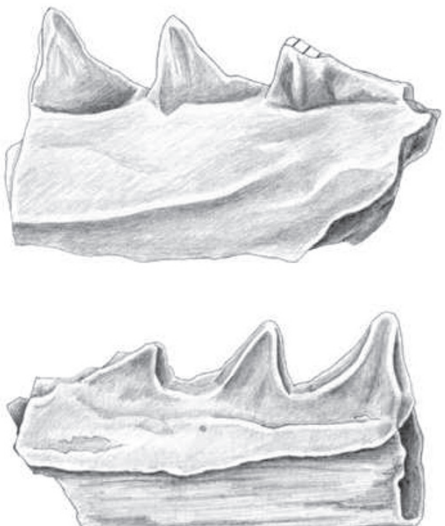
OCEANOGRAPHY

Rogue waves

Geophys. Res. Lett. doi:10.1029/2008GL036280 (2009)

In June 2008, a Japanese fishing boat, the *Suwa-Maru No. 58,* capsized in the Pacific in apparently moderate seas, killing 17 of the 20 crew members. The investigators conjectured that it was hit by sudden big waves.

Hitoshi Tamura and his colleagues at the Japan Agency for Marine-Earth Science and Technology in Yokohama have reconstructed the wind and sea conditions at the time of the event in a computer model to offer a plausible account of how hitherto mysterious freak waves can form. They say that the low- and high-frequency components of ordinary ocean waves interacted to channel their energy into a narrow frequency band, creating very large-amplitude waves.



ANALYTICAL CHEMISTRY

A cheap nose for TNT

J. Am. Chem. Soc. doi:10.1021/ja809104h (2009)

Despite recent advances, detecting trace explosives in a simple, portable and low-cost manner is a challenge. Jinghong Li of Tsinghua University in Beijing, Nongjian Tao of Arizona State University in Tempe and their colleagues have now created an effective sensing platform.

Their device uses an ionic liquid to pre-concentrate the explosives, electrochemical reactions to generate reaction products that absorb in the visible spectrum, and colorimetric methods to detect them. The authors tested the platform's power in detecting compounds such as TNT or picric acid down to a few tens of parts per trillion. The platform can distinguish these from potential red herrings such as vapour-producing household chemicals and personal care products.

ATMOSPHERIC SCIENCE

Dust devilry

Geophys. Res. Lett. doi:10.1029/2008GL035846 (2009)

Desert dust, kicked up from the Sahara of northern Africa, may make small cumulus clouds less likely to release their raindrops, according to Cynthia Twohy of Oregon State University in Corvallis and her colleagues.

The researchers measured the nucleation particles around which cloud droplets form, over the eastern North Atlantic Ocean. They