a cyclooctyne, which was linked to a fluorescent probe. The cyclooctyne reacted with the azide group, leaving a traceable label in the heart, liver and other tissues, seemingly with no toxic effects. Crucially, the authors' technique does not rely on the copper catalyst usually used in these sorts of reactions.

ECOLOGY

Asocial invaders

Proc. R. Soc. B doi:10.1098/rspb.2009.2128 (2010)
Invasive species can have devastating effects on the ecosystems that they encroach upon. Experiments on mosquitofish (*Gambusia affinis*), considered one of the world's worst invasive species, suggest that an individual's personality may influence its tendency to disperse and form invasive colonies.

Julien Cote and his colleagues at the University of California, Davis, measured four personality traits in the fish: sociability, boldness, activity and exploration. For example, sociability was measured as the amount of time spent by a fish in close proximity to a group of strangers in a new environment. The team then examined how far individuals dispersed from their initial release point in an experimental stream, and found that the more asocial fish travelled farther. The authors say that invaders may have distinct personalities that could help to explain their often negative ecological effects.

GEOSCIENCE

Blowin' in the wind

Geology **38,** 19–22 (2010)
The composition of dust blowing into the Mediterranean Sea from North Africa varies according to season and, new work suggests, is also influenced by broader oceanic and atmospheric cycles. As a result, dust may help researchers to reconstruct past regional climates.

Tom Jilbert of Utrecht University in the Netherlands and his colleagues used a high-resolution spectroscopy system to analyse the composition of a sediment core from off the coast of southern Greece.

Variable levels of aluminium, silicon and other elements indicate two dust sources. The team proposes that periods of low air pressure during Mediterranean summers bring about westerly winds, which carry in dust from Tunisia and Algeria. Periods of high pressure block dust from that area, leading to a relative increase in dust from the south.

The group also found that dust deposition rates correlated with regional sea surface temperatures, which serve as a surrogate for broader climate and ocean-cycle trends.

EVOLUTIONARY BIOLOGY

Sperm signals

Ecol. Lett. doi:10.1111/j.1461-0248.2009.01419.x (2009)
Sexual ornaments on birds, such as brightly coloured plumages, are thought to signal sperm quality, but how the two are linked has not been clear. Work by Fabrice Helfenstein at the University of Bern and his team confirms that more-colourful males are better able to protect their sperm from oxidative stress.

The authors followed a breeding population of great tits (*Parus major*). They ramped up the birds' workload, and thus their oxidative stress, by adding two nestlings to each brood.

Sperm from less-colourful males (pictured below, right) exhibited a greater drop in motility and more lipid damage than did sperm from their more-colourful counterparts (left). In addition, the sperm quality of less-colourful males improved when their diet was supplemented with antioxidant carotenoids.

M. COSLOVSKY (LEFT), M. FISCHER

NEUROPHARMACOLOGY

Beating depression

Neuron **65,** 40–52 (2010)
Many antidepressants increase levels of the neurotransmitter serotonin in the brain. But the drugs don't work in all patients. It has been suggested that a particular gene variant of the human serotonin receptor 5-HT_{1A} increases the risk of depression and decreases response to treatment. Where these receptors occur on serotonin-releasing neurons they function as 'autoreceptors', inhibiting serotonin release when levels rise.

René Hen of Columbia University in New York and his colleagues have developed a mouse model in which they can control the levels of these autoreceptors without affecting the other type of 5-HT_{1A} receptor.

Mice with high autoreceptor levels behaved in a manner typical of depression when subjected to stress, and their behaviour was unaltered by long-term treatment with the antidepressant fluoxetine. However, when their autoreceptor levels were lowered before treatment, they responded to the drug.

JOURNAL CLUB

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A neuroscientist learns about algorithms for motor learning.

Under what conditions do people learn most effectively? This question is pertinent to several fields and to many neuropsychiatric disorders involving aberrant learning and memory. In motor neurobiology, understanding how people learn new movements may yield insight into the brain's motor-control algorithms and could help with physical training or rehabilitation.

A recent study by Maurice Smith at Harvard University in Cambridge, Massachusetts, and his colleagues suggests that the neural codes underlying motor control may help to dictate which movements are inherently more difficult to learn than others (G. C. Sing *et al. Neuron* **64,** 575–589; 2009).

They had volunteers grasp a robotic arm and make targeted, forward-reaching movements while the robot applied a perturbing force in a direction perpendicular to that of the reach. Volunteers learned to compensate for these perturbations most quickly when the magnitude of the disrupting force correlated positively with both arm position and velocity. Compensations involving only one of these factors took longer to learn and were learned less accurately. Even more challenging were disturbances in which the position and velocity contributions were negatively correlated to each other. Errors were systematically biased, as if the brain expected positive correlations.

The findings fit well with previous physiological recordings revealing that neural elements of motor control often encode information about limb position and velocity along positively correlated spatial directions. This aspect of the neural code for movement may impose constraints on how humans learn motor tasks and bias motor errors. More generally, many aspects of human behaviour might be shaped by underlying neural codes that affect the ease with which some behaviours are learned.

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