



ALL IN ALL

What's New at the Frontiers of
Science, Technology
and
Exploration

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Way Faster Than a Speeding Bullet

When it comes to computational capacity, man has always triumphed over machine. Human brains possess about a quadrillion (a million billion) synapses that relay signals between neurons and function much like transistors in computer chips. Until recently, there was no computer that could process as much data, so fast.



But the US\$133 million Roadrunner supercomputer at the Los Alamos National Laboratory in New Mexico works at petaflop speeds. This means it can process a quadrillion calculations every second, just like human brains, to make it the fastest computer in the world. In testing, scientists developed a program dubbed "PetaVision" which allowed it to mimic the

way the eye converts images so the brain can understand them. It will also be used to model reactions inside a nuclear weapon. But it's not all computational destruction. "We're hoping Roadrunner will have predictive capability for the environment. We're hoping to be able to say what will happen," says lab spokesman James Rickman.



Disco Power

At most nightlife venues around the world, there's a lot of chemistry between people on the dance floor. Now, at two new clubs in Europe, dancers will be generating electricity as well. Both Surya in London and WATT in Rotterdam make use of unique dance floors that produce electrical currents through the vibrations of dancers. Surya employs a technology known as piezoelectricity whereby the underside of the floor is fitted with a series of crystals. As the clubbers bounce to the beat, they compress the crystals, generating an electrical charge.



At WATT, compressions on the dance floor use mechanical linkages to turn magnetic dynamos to produce electric current. Both venues funnel the generated electricity to batteries used to power various club operations like lights. In addition to dance floors that turn dance steps into true power moves, both eco-clubs take additional steps to protect the environment. WATT uses rainwater to flush its toilets while Surya waives the entry fee to anyone who can demonstrate that they used public transport, bicycles or their own two legs to get to the club. It also donates all club profits to the environmental group Friends of the Earth, which lends credence to the phrase it has adopted as its motto: "All you have to do is dance to save the world."



LICK YOUR WOUNDS

Human saliva may not always get the respect it deserves but this humble fluid has been shown to have powerful antifungal, antibacterial and antiviral properties. One study conducted by French researchers in 2006 identified a painkiller in saliva called opiorphin which is reportedly six times more potent than morphine. Considering these traits, a new discovery by Dutch-based scientists at the Academic Centre for Dentistry in Amsterdam makes perfect sense. They have isolated a compound in human saliva called histatin that greatly speeds the healing of wounds. According to Gerald Weissmann, editor-in-chief of *The Federation of American Societies for Experimental Biology Journal*, which published the results, the findings explain "why wounds in the mouth, like those of a tooth extraction, heal much faster than comparable wounds of the skin and bone. It also directs us to begin looking at saliva as a source for new drugs." Because saliva is a virtually unlimited resource, wound-healing drugs could be mass-produced with relative ease. The researchers are particularly hopeful that their findings will mean good news for people like diabetics and burn victims who suffer from hard-to-heal wounds.

PHOTOS: FRANK HANSHUIJK (DISCO POWER); DAVID TROOD AND CORBIS (LICK YOUR WOUNDS)

LONGEST RAIL TUNNELS ① Seikan, Tsugaru Strait, Japan: 53.9km ② Channel Tunnel, English Channel: 50km ③ Iwate Ichinohe, Tanigawa Mountains, Japan: 25.8km

STRENGTH IN NUMBERS

Bacterial invaders are relatively easy to destroy when floating loose in a liquid like blood or water. Which is probably why over 99 percent of them form protective colonies known as biofilms. When bacteria attach to a surface and are joined by their buddies, they undergo

a metamorphosis that turns them into a unified organism with a strong survival system. These biofilms (such as tooth plaque) are extremely difficult to remove. Scientists at the Helmholtz Centre for Infection Research in Germany have also found that they not only resist attacks, but actually fight back.

Some marine bacteria, when organised as a biofilm, produce a pigment called violacein. When an invading amoeba eats the biofilm, the violacein kills it. As amoebae are distant relatives of human disease pathogens, the hope is that biofilms will be used to produce violacein-like chemicals that could kill harmful invaders in our bodies.

