



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

Contributed by MICHAEL FRANCO AND DANIEL WEISS

The Golden Rule

For thousands of years, stained-glass windows have served to draw the eyes of worshippers heavenward, inspiring them with scenes of religious sacrifice, miracles and parables, and helping them attend to their spiritual health.

Now, a discovery by associate professor Zhu Huai Yong from the Queensland University of Technology in Australia has revealed that these masterpieces in glass might be attending to the health of the body as well. As sunlight streams through the colourful windows, it causes gold nanoparticles to resonate with an energy that in effect turns them into tiny whirlwinds that can blast impurities in the air.

"The electromagnetic field of the sunlight can couple with the oscillations of the electrons in the gold particles and create a resonance ... which breaks apart the pollutant molecules in the air," says Zhu.

Such pollutants include volatile organic chemicals which are the chemicals that come from furniture, carpets and paint, and give off that unmistakable "new" smell. The discovery has applications beyond keeping the air fresh enough to discourage dozing during sermons.

"This technology is solar-powered, and is very energy efficient because only the particles of gold heat up. In conventional chemical reactions you heat up everything which is a waste of energy," Zhu says. "Once this technology can be applied to produce speciality chemicals at ambient temperature, it heralds significant changes in the economy and environmental impact of chemical production."

Star Burst

Most of the really spectacular images of space are brought to us through super-powerful telescopes. But recently, the light from an exploded star more than half-way across the visible universe was briefly able to be seen with the naked eye.



“No other known object or type of explosion could be seen by the naked eye at such an immense distance,” said Stephen Holland of NASA’s Goddard Space Flight Center in the US state of Maryland.

“If someone just

happened to be looking at the right place at the right time, they saw the most distant object ever seen by human eyes without optical aid.”

Technically, the exploded star is known as a gamma ray burst and occurs when a star’s core collapses and forms a black hole. When this happens, two jets blast into space, causing cosmic gases to glow in a spectacular interstellar light show called an afterglow.

The afterglow of this burst was 2.5 million times brighter than any that had come our way before.

Powerful Pill

Exercise is known to lower blood pressure, strengthen bones, bolster the heart, lower cholesterol and, of course, strengthen the body. The only problem with it is that it’s ... well ... exercise.

Now, scientists working at the Salk Institute in La Jolla, California may have found a way to get some of the benefits of exercise with none of the sweat. They gave a synthetic protein called Aicar to mice and after just four weeks, the rodents’ performance on a treadmill increased by 44 percent.

It is believed Aicar worked by converting fast-twitch muscle fibres into slow-twitch fibres, which are better at burning fat and producing energy, and help endurance athletes. The drugs show promise for those suffering from obesity or muscular dystrophy. Not to mention for couch potatoes the world over.



Stemming The Tide

Red tide. When it hits, it's like an ancient prophecy brought to life - the sea turns the colour of blood and dead fish wash up on the beach by the hundreds.

This damaging phenomenon occurs when, due to certain environmental conditions, an algae called *Karenia brevis* jumps from a presence of 1 percent in seawater to 90 percent. As the algae - which has a reddish-brown colour - blooms, it produces a toxin that works on the central nervous system of fish, paralyzing them so that they cannot swim or breathe.

Shellfish such as clams, oysters and mussels accumulate these toxins as they filter the sea water. People who then eat the fish can fall prey to a condition known as paralytic shellfish poisoning which causes severe allergy-like symptoms.

Researchers led by Julia Kubanek of the Georgia Institute of Technology in the United States, have figured out how to wage war on the harmful red critters by using another type of algae known as diatoms - single-celled organisms with hard, plate-like coatings made of silica. They found that one diatom in particular, *Skeletonema costatum*, seems to have the ability to render harmless many of the toxins *Karenia brevis* produces.

According to Kubanek, "this diatom, *S. costatum*, is able to undermine these toxins produced by the red tide, as well as the brevetoxins that are known to kill vertebrate animals like fish and dolphins."

It is estimated that red tide costs US\$20 million per bloom off the coast of Florida alone, so a remedy would be extremely well-received by the tourism and seafood industries.



A satellite image shows a **bloom of red tide** attacking the **Adriatic coast of Italy**.



Twirling Tower

The new **Dynamic Tower** currently being constructed in Dubai will be a tall, sleek, clean-lined structure gleaming in the desert sun.

Wait ... actually, the new Dynamic Tower will be a jagged jumble of a building with sunlight glinting off a series of sharp corners.

Then again, on closer look, the Dynamic Tower will really resemble an orderly strand of DNA cast in glass and steel. So, which is it?

All of them. The 80-storey structure, conceived by New York-based architect David Fisher, will rarely look the same because each floor will rotate independently of the others.

Not only is it the world's first rotating skyscraper, it's also the first to be prefabricated before being assembled

on site. The tower is also designed to produce its own power through the placement of horizontal wind turbines between each storey and solar cells on the top side of each level.

The Dubai structure and a second rotating building in Moscow are due to be completed

by the end of 2010. Dubai's tower is taking reservations for tenants with apartments ranging from US\$4 million to \$40 million.

Residents who purchase at the higher end will be able to drive their cars into an elevator and drive out to a parking space on their private floor.

The man behind the Dubai Dynamic Tower, **David Fisher**, says he hopes to build the third rotating tower in **New York City**.

