

DHAKA TUESDAY JANUARY 5, 2010, E-MAIL: science&amp;life@thedailystar.net



## HABITAT LOST!

## Desert tortoises flee home



On a strip of California's Mojave Desert, two dozen rare tortoises could stand in the way of a sprawling solar-energy complex in a case that highlights mounting tensions between wilderness conservation and the nation's quest for cleaner power.

Oakland, Calif.-based BrightSource Energy has been pushing for more than two years for permission to erect 400,000 mirrors on the site to gather the sun's energy. It could become the first project of its kind on U.S. Bureau of Land Management property, leaving a footprint for others to follow on vast stretches of public land across the West.

The construction would come with a cost: Government scientists have concluded that more than 6 square miles of habitat for the federally threatened desert tortoise would be permanently lost.

The Sierra Club and other environmentalists want the complex relocated to preserve what they call a near-pristine home for rare plants and wildlife, including the protected tortoise, the Western burrowing owl and bighorn sheep.

"It's actually a good project. It's just located in the wrong place," said Ileene Anderson of the Center for Biological Diversity, a Tucson, Ariz.-based environmental group.

Source: AP



## Finalists focus on the Moon, Venus, or an asteroid Nasa space contest

THE US space agency Nasa has selected three projects as finalists for its next celestial mission.

The projects aim to either probe the atmosphere and surface of Venus, return an asteroid fragment to Earth, or send back rocks from the Moon's south pole.

## The three proposals

The Surface and Atmosphere Geochemical Explorer, or Sage, would gather information about Venus' atmosphere during the descent of a lander, which would then scratch at the planet's surface to determine its chemical and mineral composition in detail.

The Origins Spectral Interpretation Resource Identification Security Regolith Explorer, or Osiris-Rex, would initially orbit an asteroid, landing on it to collect about 60g of material that would be returned to Earth.

The Lunar South Pole-Aitken Basin Sample Return Mission would land near the Moon's southern pole, returning about a kilogram of material that scientists believe has risen from the moon's interior to the surface.

Each team has been given \$3.3m (£2.1m) to further flesh out the details of their proposals over the coming year.

The first, New Horizons, was launched in 2006 and is bound for a Pluto fly-by in 2015. The second, dubbed Juno, will be the first craft to orbit Jupiter from pole to pole after it launches in August 2011.

Source: BBC



## SCIENCE QUIZ

## Quiz 1

This famous inventor was refused a patent for his invention.

What was the invention?

- Telescope.
- Telephone.
- Telegraph.

## Quiz 2

This invention was inspired by counting the number of threads in fabric.

What was the invention?

- X-ray.
- Magnetic Resonance Imaging.
- Microscope.

## Answers to last Quiz

Quiz 1: b) Telephone.

Quiz 2: b) Microscope.

## PROF. YUSUF'S CONTRIBUTION TO BRAIN RESEARCH

## The weird chemistry of memory

S. ASHRAF AHMED, PhD

OUR failure to recall a memory of the past may be related to a Japanese demonstration of brain's newborn cell function, reported on last November 13. Incidentally two days earlier, Bangladesh lost one of her best scientists, Professor Harun Kader Mohammad Yusuf, an internationally recognized authority of human brain's biochemistry. It is therefore worth recalling his contributions before discussing the new findings. Harun bhai worked out the detailed bio-molecular composition of our brain, and effect of malnutrition on its development. Until his untimely death, he was Chairman of the Bangladesh National Nutritional Council.

As a PhD student at the University of Surrey in UK, he studied several dozen brains of children who died of starvation and malnutrition. The three easily separable parts of the animal brain, forebrain, cerebellum and brain stem, have distinct patterns of development. Although plenty was known about smaller mammal brains, he was

one of the pioneers in establishing the development pattern in the 3 regions from 13-week fetus to 26-month toddlers. These regions are made up of largely two types of cells.

Nerve cells (or neurons) receive, process, store and send out information to various parts of the body in the form of electric signals. Among many functions, glial (glue-like) cells make a protective covering around neurons so that signals are not lost, and also prevent a short circuit. Neurons can be compared to a copper wire while glial cells as outer plastic layer in the familiar electric cables. Glial cells are made of several types of fat (lipid) molecules, such as myelin, cholesterol, ganglioside, phospholipid, and others. Professor Yusuf determined the relative amount of these molecules in various parts of the brain, whose disproportionate occurrence (due to malnutrition) make the information processing erroneous. He published his results in several prestigious British and American journals.

Rats serve as a model for humans. At Dhaka University, he fed pregnant rats housed in specially designed cages, with a diet poor in protein. This diet remained same or modified for



Late Professor HKM Yusuf

the mothers and newborns for 0-40 days after stopping feeding on mother's milk. By analyzing lipid composition of the brain, he concluded that malnutrition at any time during early age affect "...myelin development, and nutritional rehabilita-

tion of animals malnourished in early life cannot fully correct this developmental gap". As a rare scientist, he published the results in highly acclaimed international journals, from work done in Bangladesh. His book, "Understanding the Brain and Its Development: A Chemical Approach", published by the World Scientific Publishing in 1992, was used as a text book at foreign Universities. His later fame with iodine malnutrition in Bangladesh will require a separate volume to write.

Different parts of the brain have defined functions. For example, neurons of an inner part, known as

hippocampus, store short term memory such as what happened in the last few days, while another region, called neocortex, stores long term memory such as that of childhood. The Japanese group blocked formation of new neurons at the hippocampus. They taught mice to be scared of electric shock. The animals with normal neuron formation helped the hippocampus cells to 'forget' the short term scary (shock) memory at hippocampus, yet when tested after 28 days, were scared to "freeze", because they retrieved the memory from long term storage area. On the other hand, the memory stayed in the hippocampus neurons (that normally gets lost over time) in those lacking new neurons. The new cells might transfer memory from short to long term storage area. In effect, the new results suggest that failure of new neuron formation will lead to problems because the brain's



Hippocampus

short-term memory is literally full. Their results were described in the journal, Cell.

Some health professionals believe that physical, as well as brain exercise by learning new knowledge, help develop new neurons. Extending the Japanese findings, one can expect that with the help of these new neurons, we should not forget the precious gifts we received from our leaders in the scientific and social arena.

The author, a former Dhaka University teacher, is a biomedical scientist working in the USA.



## FROM THE BACKYARD

## Chitin: Drug from fishery wastes



BAZLUL KARIM AKANDA

CHITIN flakes or powder, prepared from shrimp shell, is a polysaccharide used in food, medicine, cosmetics, paper and in the purification of water and preservation of fruit, sandwich, cheese etc. Chitin is also used as chitin-xanthate in the surgical thread.

More than four decades have elapsed since this biopolymer had aroused much interest in the scientific community around the world for its extensive biomedical applications. Prospect for this biopolymer is vast. It forms the basis of the hard shell of crustaceans such as crab, lobster, shrimp etc.

The scientists of the 'Carbohydrate Section' of the Bangladesh



Council of Scientific and Industrial Research (BCSIR) have converted shrimp shell, once neglected as a waste material from shrimp processing industries, into valuable chitin (poly N-acetyl glucosamine, so called for its chemical structure). Scientists observed that products like glucosamine and chitosan can be prepared after modification of chitin by chemical processes.

Glucosamine is found in cartilage (the strong white flexible substance to be found between the joints in the body) and provides an important function in joint lubrication. As the body ages, deterioration of the cartilage begins resulting in osteoarthritis and inflammation of the joints. Glucosamine is used as an active ingredient of medicine for the treatment of osteoarthritis. Chitosan is usually used to

reduce obesity and serum cholesterol. It is highly valued as a natural ingredient for cosmetics like shampoo, nail polish, cream, lotion etc. Among the scientists involved in this research are Md. Asaduzzaman, former Chief Scientific Officer, Shudangshu Kumar Roy, principal Scientific Officer and Dr. Shah Md. Masum of the 'Carbohydrate Section' of the BCSIR Laboratories. Scientists also have experimentally shown that heavy metals like chromium and cadmium can be removed from the contaminated water by the treatment of chitosan. It may be mentioned that heavy metals are harmful for health.

The writer heads Instrumentation & Calibration Service Laboratory (ICSL), a project of BCSIR.

## Notes

**Polysaccharides:** A class of carbohydrates, such as starch and cellulose

**Xanthates:** They can be produced by the reaction of alcohol with sodium or potassium hydroxide and carbon disulfide.

**Polymer:** A large molecule (macromolecule) composed of repeating structural units typically connected by covalent chemical bonds

**Biopolymers:** Polymers produced by living organisms



## IN STRAITS

## Bad year for biofuel



Picture shows a man holding a cup of refined home-made biodiesel that he made from used cooking oil in Seattle, USA

AN alternative fuel for diesel engines is off to a shaky start this year though it emits fewer pollutants and cuts down on petroleum use because it's made from environmentally friendly waste and vegetable oil.

A federal tax credit that provided makers of biodiesel \$1 for every gallon expired. As a result, some U.S. producers say they will shut down without the government subsidy.

Biodiesel's woes come on top of a year of problems for the fledgling biofuel industry an irony given the push to cut down on greenhouse gases and ease the nation's need for foreign oil. A key driver for the alternative fuel the high cost of oil disappeared as diesel prices dropped 18 percent since the beginning of the recession. Then in March the European Union placed import-killing tariffs on biodiesel and other biofuels.

It was a huge hit for U.S. biofuel makers, with Europe taking 95 percent of all global exports.

Biodiesel, which is usually blended with traditional fuel, had over the past few years been the fastest growing fuel among fleet vehicles like buses, snow plows and garbage trucks.

Those fleets, however, can shift to traditional fuel, as some have, when the prices of diesel drops.

The biodiesel industry is now operating at only 15 percent of its potential capacity, according to the National Biodiesel Board, largely because the price of traditional diesel has collapsed. There are close to 180 biodiesel plants operating in about 40 states.

The country's largest biodiesel refinery, in Houston, sits idle. Another major refinery in Hoquiam, Wash., that was restarted recently to meet alternative fuel mandates in Oregon and British Columbia was shut down after an explosion in December.

The loss of the tax credit, which helps pay salaries, buy new equipment and in good times to turn a profit, will hit small producers particularly hard.

A one-year extension of the biodiesel tax credit was included in a bill that was approved by the U.S. House recently, but it never made it through the Senate.

Lawmakers say the tax-credit will be retroactive if approved.

Production will cease in Valliant, Okla., where Dwight Francis created a biodiesel startup this year as the local timber economy tanked.

For each of the 12,000 gallons of biodiesel that Francis produces each week, he has received a \$1 tax credit to help keep operations going.

Source: AP



## LOST IN TIME

## Lord of Ucupe



FOUND in a treasure-filled tomb of the Moche culture in Peru in June 2008, this 1,500-year-old gilded-copper-and-seashell funerary mask was one of two that shielded the face of the so-called Lord of Ucupe.

As in his tomb, the Lord of Ucupe in life would have been covered nearly head to toe in shining metal, so as to dazzle and distract his subjects "This is the king of bling, literally," one archaeologist says.

Packed with treasure in the styles of two ancient orders, the 1,500-year-old tomb of the Moche Indian "king of bling" is like no other, according to archaeologist Steve Bourget.

Discovered in Peru at the base of an eroded mud-brick pyramid, the tomb gradually yielded its contents last summer.

Among the finds: 19 golden headdresses, various pieces of jewelry, and two funerary masks, as well as skeletons of two other men and a pregnant woman.

The tomb's mysterious contents and location far from known Moche capitals could shed new light on this little-known culture of Peru's arid northern coast, said Bourget, of the University of Texas at Austin.

Thriving between A.D. 100 and 800, the highly agricultural Moche Indians are known in large part by their stepped pyramids, jewelry-filled tombs, and exquisite pottery and art.

Source: National Geographic.