

DHAKA TUESDAY NOVEMBER 10, 2009, E-MAIL: science&amp;life@thedailystar.net

## NEW FINDINGS

## Smart technology that mimics nature

## OUR LEADING LIGHTS

## Mount Kilimanjaro melting



Kilimanjaro's glaciers at their margins, the surface of these massive ice fields have begun eroding as temperatures rise.

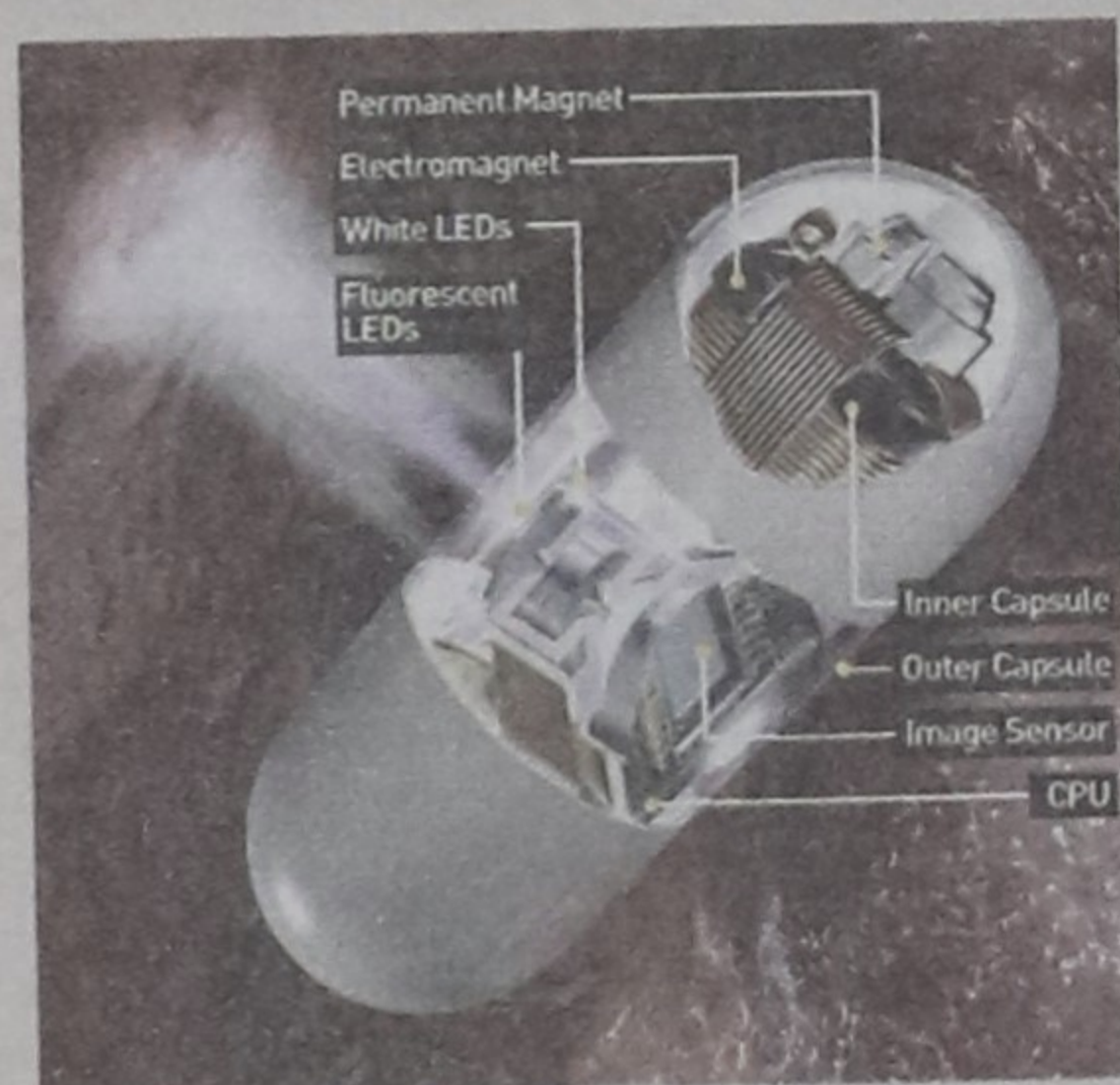
THE African mountain's white peak made famous by writer Ernest Hemingway is rapidly melting, researchers report. The snows capping Mount Kilimanjaro, Africa's tallest peak, are shrinking rapidly and could vanish altogether in 20 years, most likely due to global warming, a US study published recently said.

Some 85 percent of the ice that made up the mountaintop glaciers in 1912 was gone by 2007, researchers led by paleoclimatologist Lonnie Thompson of Ohio State University said in a report to the Proceedings of the National Academy of Sciences. And more than a quarter of the ice present in 2000 was gone by 2007.

If current conditions continue, "the ice fields atop Kilimanjaro will not endure," the researchers said.

The Kilimanjaro glaciers are both shrinking, as the ice at their edges melts, and thinning, the researchers found.

Source: AFP



## Nano camera in gut

A PillCam video capsule is an ingestible capsule device containing a miniature video camera and a light source on one end, batteries, a radio transmitter and antenna to visualize the small intestine. The capsule, called PillCam SB, once swallowed it transmits approximately 50,000 images over the course of an 8-hour period (about 2 images per second) to a data recording device attached to a belt worn around the patient's waist. The small bowel images are then downloaded into a computer where a physician can review the images in order to make a diagnosis. The entire procedure takes about eight hours to complete.

PillCam SB is a disposable capsule. It makes its way through the rest of the gastrointestinal tract and then passes naturally and painlessly from the body, usually within 24 hours.

The capsule is 11 mm x 26 mm and weighs less than 4 grams.

## Mexico's mystery



A mask titled Malinaltepec (350-500) is on display at the Quai Branly museum in Paris.

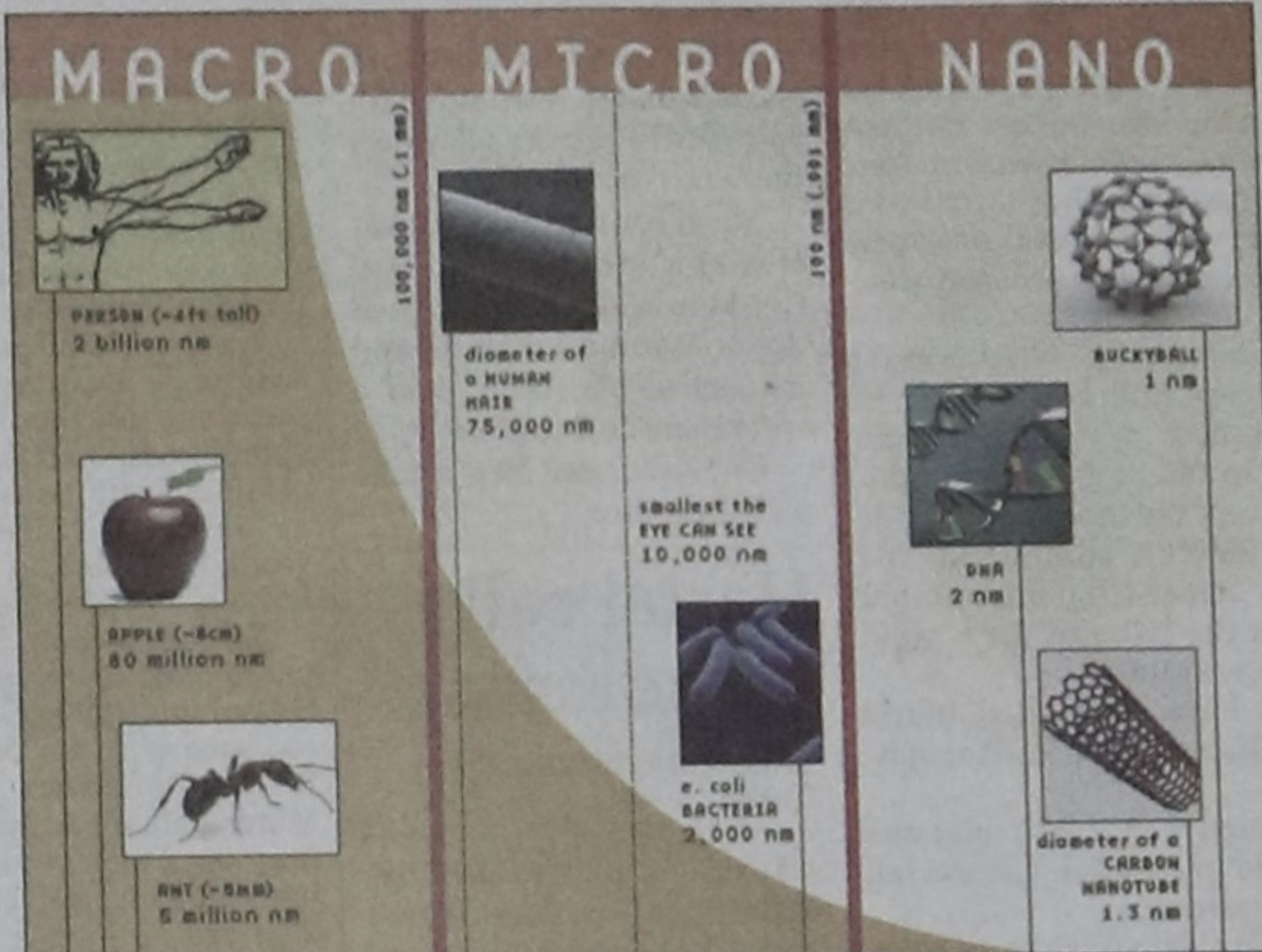
DR. FARSEEM M. MOHAMMEDY

NANOTECHNOLOGY is the control and manipulation of atoms and molecules in the atomic scale. The length scale associated with nanotechnology is between 1 nm to 100 nm. One nanometer is one-billionth of a meter scale. Ten hydrogen atoms put side by side constitute one nanometer. It is anticipated that once this atom by atom manipulation and control is achieved, this will yield unprecedented material properties that can be used in a host of attractive biological, medical, electronic and sensing applications.

In one sense, nanotechnology is the imitation of biology in silicon.

Nature had been doing nanotechnology for eons within the boundary of cells with amino acids and proteins. Scientists are beginning to realize with awe and wonder the preciseness of such age-old processes. The nanotechnology of biology is so called "wet" nanotechnology. For high speed electronics and sensors, scientists need a "dry" version. Chemists and biologists are interested in the 'wet' part, whereas engineers, physicists and applied scientists are interested with the 'dry' part of nanotechnology.

Moore's law predicts that in each



chips, will reach a scale that further shrinking is limited by the technology of the day. At the same time, the science that rules solid-state devices will also change. At the atomic scale, quantum mechanics of individual atoms shall have to be considered. At the macro-scale, the individual atomic properties become fuzzy and the rule of average dominates. In the bulk, the

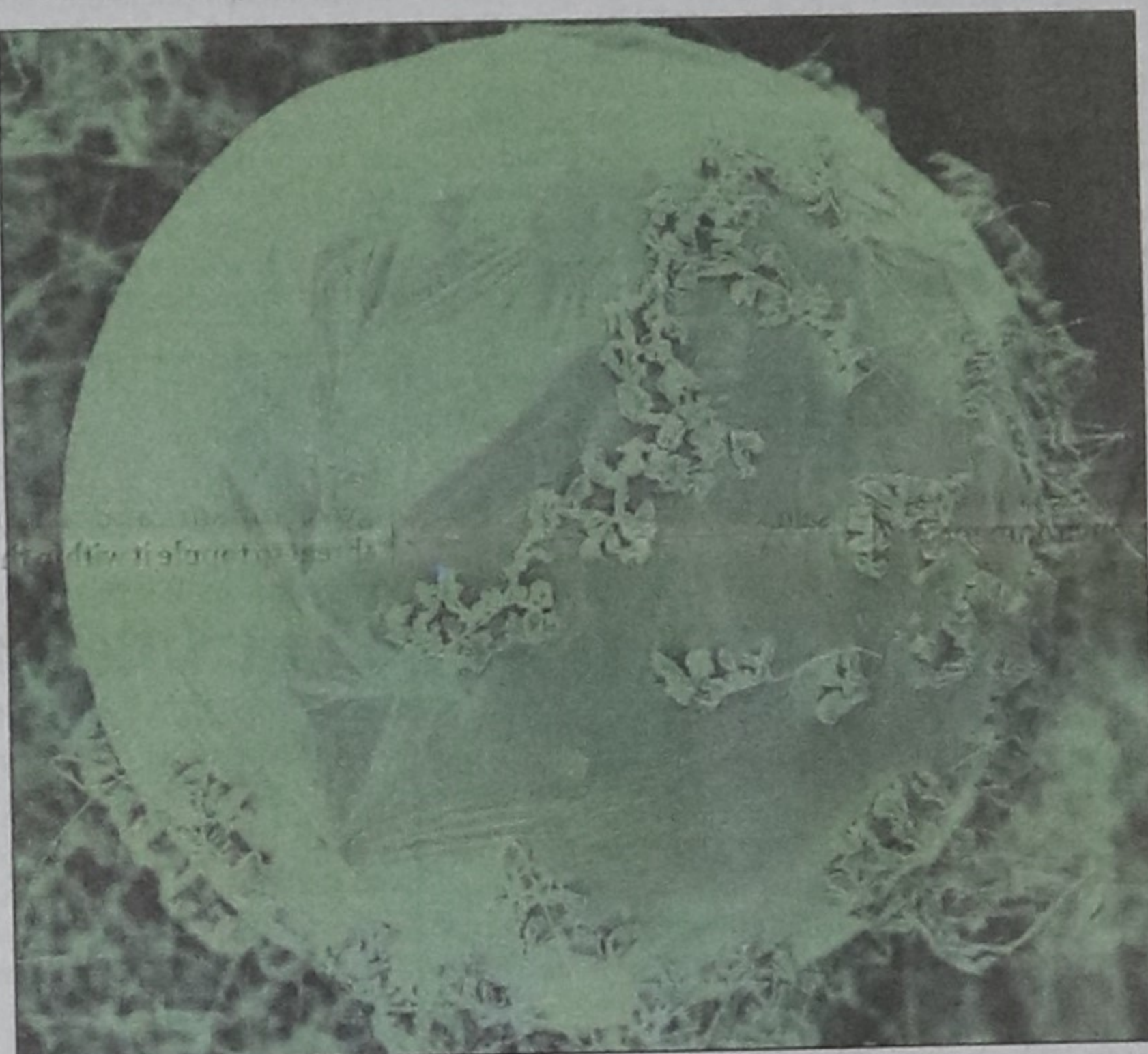
great practical concern for chips with nanotransistors to function properly without being burnt out.

There is carbon nanotube that has many remarkable properties, e.g. very high electrical conductivity, high resilience and high tensile strength. If the fabrication technology for these nanotubes can be controlled, these nanotubes can make many useful devices in the atomic scale. Recently, some researchers have developed a nanosize AM radio employing only a few carbon nanotubes.

In the field of medicine, nanotechnology has great opportunities. Quantum dots (3 dimensional confinement of electrons) can be used as 'tags' for studying and monitoring cancerous cells and molecular activities within human tissues. These quantum tags emit lights of various wavelengths depending on the dots' sizes. Also these nanotags can be made to attach to certain compounds and track those organic compounds within the organ or tissue that is affected. There is a push for better imaging, monitoring and diagnostic tools employing nano materials for the benefit of the health sector.

In not very far future, it might be possible to send a nanosize camera inside the human body, take snaps of the ailing tissue and do nanosurgery with the help of nanotools. That is the ultimate goal for nano medicine. Also drug-delivery is an important application. Nanoshells made of some nanomaterials can deliver useful drug right to the ailing cell/tissue. This will reduce the time for diagnostics and risks involved with conventional cancer chemotherapies.

The writer teaches at the Department of Electrical and Electronic Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka.



Nanoparticles are able to pass through cell membranes in biological organisms, and their effects are almost completely unknown.

eighteen months, computer speed doubles. This implies that the feature sizes in the electronic circuits shrink at an astonishing speed. If this trend continues, then by 2025-30 a stage will come when gate-lengths of transistors, the building blocks of computer

rule of the aggregate prevails. But in the atomic scale, even the basic unit of conduction (both heat and electricity) becomes discrete.

Besides, the engineers have to consider how to extract the heat generated in such miniscule transistors. This is of

## DAWN OF TIME

## Gazing into cosmic web

ASTRONOMERS in Chile and Japan have for the first time seen part of the "cosmic web" of galaxies that permeates the known universe in a gigantic assembly some seven billion light-years from Earth.

Viewed through the world's most powerful telescopes, the discovery "is the first observation of such a prominent galaxy structure in the distant universe, providing further insight into the cosmic web and how it formed," the European Southern Observatory (ESO) said recently.

The assembly of galaxies form filaments "millions of light years long and constitute the skeleton of the universe."

"Galaxies gather around them, and immense galaxy clusters form at their intersections, lurking like giant spiders waiting for more matter to digest," it added.

The filaments are located about 6.7 billion light-years away and extend over at least 60 million light-years, the scientists. The structure very likely stretches beyond the area they probed, warranting further observations.

"This is the first time that we have observed such a rich and prominent structure in the distant universe," said ESO's Masayuki Tanaka, who led the study.

"We can now move from demography to sociology and study how the properties of galaxies depend on their environment, at a time when the Universe was only two thirds of its present age," Tanaka informed.

Scientists have long theorized that galaxy clusters are not evenly distributed throughout the universe.

"The most widely accepted cosmological theories predict that matter also clumps on a larger scale in the so-called "cosmic web", in which galaxies, embedded in filaments stretching between voids, create a gigantic wispy structure," Tanaka said.

ESO said the discovery was "made possible by combining two of the most powerful ground-based telescopes in the world: the Very Large Telescope at Chile's Paranal Observatory, and the National Astronomical Observatory's Subaru Telescope, in Japan."

Source: AFP



One of the four optical telescopes that form the Very Large Telescope (VLT), at the European Southern Observatory (ESO) is seen in Paranal, some 1150 km north of Santiago, Chile.

## Soul dedicated to science

JAMAYET ALI

Dr. Quadrat-e-Khuda was born in May 1900 at Magram village in Birbhum district of West Bengal. He was born into a very respected Muslim family. His father Syed Shah Sufi Khandker Abdul Mukit was a university graduate. He was known as 'peer' for his piety.



Dr. Quadrat-e-Khuda

After achieving brilliant feats in the primary, secondary and college exams, Quadrat-e-Khuda gained admission to the Kolkata University. He stood first class first in MSc exam in 1924. He got state scholarship and went to London to study at the Imperial College of Science & Technology. In 1929, he obtained his DIC and DSc from the same college under the University of London.

He continued with his researches at the Presidency College, Kolkata and was awarded the rare Prem Chand Roy Chand scholarship and Gold Medal for his post-doctoral researches. He first experimentally proved the origin of stainless mono-cyclic ring. This research is believed to be the base of conformational theory in organic chemistry.

He was one of the pioneers for introducing Bengali in all spheres of national life. He wrote 27 scientific books in Bengali making them suitable for textbooks at school, college and university.

After establishment of East Regional Laboratories Dhaka (Now BCSIR Lab), in 1955, he became its founder director.

In 1966 he retired from the service and joined Bangla Unnayan Board as its Chairman. Since 1972, he was actively engaged with the Bangladesh Education Commission and took the initiative to prepare a report for improving the system of education in the country. This famous and widely discussed report is known as Quadrat-e-Khuda Education Commission Report. He submitted recommendation of this report to the government in 1975. He was appointed as the visiting professor, Department of Chemistry, Dhaka University in 1975 and served there until his death on November 3, 1977.



Researchers working in Lab at BCSIR.



## MYTHS &amp; FACTS

## Myth-1

In southern hemisphere water rotates backward while flowing down a sink

There is no hydrodynamic reason why water should behave that way in the South. In fact, this is a pure myth. If at all, it is the shape of the sink that determines which way the water would turn as it streams down the sink.

## Myth-2

Hair and nail grow even after a person dies

This is yet another popular myth. Hair and nail are also made of the basic unit of life, the cell. But what happens in reality is that the lower portion of nail or skin that remains hidden under the skin in a living person, gets exposed after the skin dries up and shrinks after her/his death. That makes the hair and the nail look longer in a dead body.

Collected



## SCIENCE QUIZ

## Quiz 1

Which inventor worked at a patent office?

- Nikola Tesla.
- Thomas Edison
- Albert Einstein.

## Quiz 2

This product was invented by a scientist working for this company. Which answer is correct?

- Krazy Glue was invented at Kodak.
- Velcro was invented at 3M.
- Bungee Cord was invented at Ford.

For answers see next issue

Answers to last week's Quiz

Quiz 1: b) They were developed from NASA Technology  
Quiz 2: b) They are teenagers.