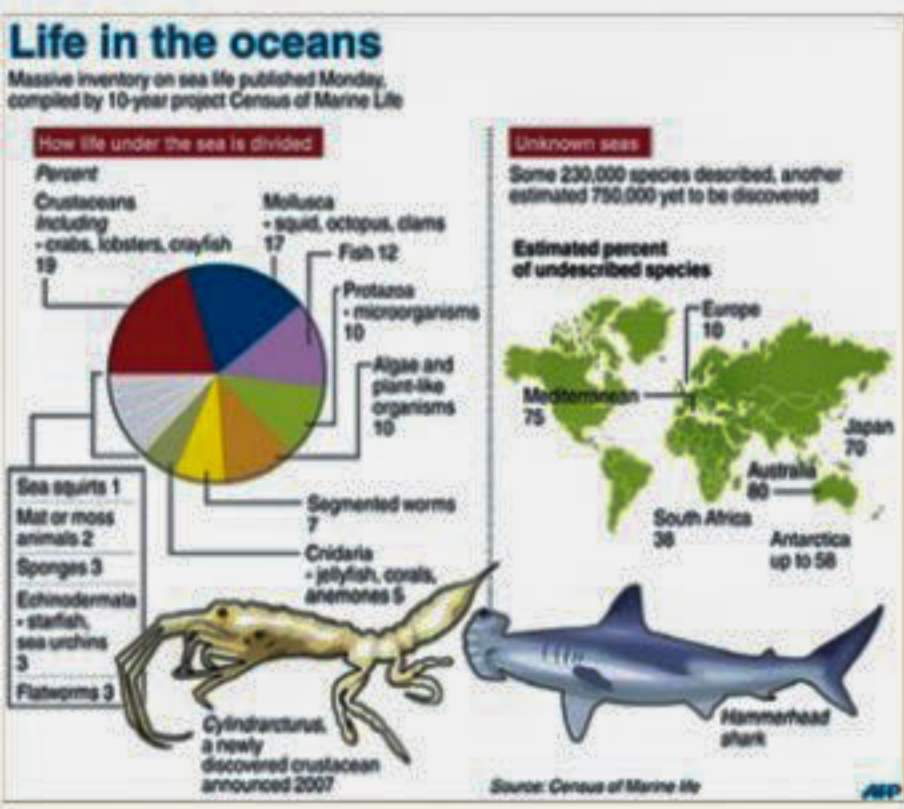


SCIENCE & LIFE

DHAKA TUESDAY OCTOBER 12, 2010, E-MAIL: science&life@thedailystar.net

Wonders of the oceans



Graphic on the findings from the first-ever global marine life census, a ten year collaboration involving 2,700 scientists from 670 institutions....

OBABUR RAHMAN

EARLIER this month, a team of international scientists wrapped up their decade-long study of the first ever global census of the sea-life. A massive project, the details of which have been published in the open access journal PLoS ONE, which documented a world within the world that turned out to be livelier and more jubilantly vibrant than ever imagined!

A \$650 million international research project that involved more than 2,700 researchers from 670 institutions from across 80 nations spent around 9,000 days at sea. That required at least 540 expeditions to create a register of species in 25 biologically representative

regions that ranges from the Antarctic through the temperate and tropical seas to the chilly oceans of the Arctic.

Described as the most comprehensive study of this kind, nearly 30 million observations of thousands of species were made according to Ocean Biogeographic Information System (OBIS), the global marine life database of the census. This massive collection of millions of species prompted researchers to identify more than 6,000 potentially new species, of which 1,200 have been formally described and around 5000 more species that have been collected are yet to be named or studied. And this also led the scientists to increase the estimate of known marine species from about 230,000 to almost 250,000. And this 250,000 species of marine plant and animals are just out of 1 million (some experts say, it could even reach much higher) that is thought to have existed out there in our oceans.

Indeed, vast arrays of sea-creatures have been discovered and many of them are quite extraordinary in nature. Like the "Jurassic shrimp" which was thought to be extinct for more than 50 million years. Some of the new species include, *Dinochelus ausubeli*, the blind lobster with a long, spiny, pincer, which was found 330 yards below the surface of Philippine Sea; sea spiders, a family of eight-legged creatures which rarely grow bigger than a fingernail in UK waters, have been discovered up to nine inches (23cm) across in Antarctic seas; the "Squid-worm", a new species of worm, was found living in the deep water of the Celebes Sea in south east Asia; a furry crab, named the Yeti Crab or *Kiwa hirsuta*, which was found beside a vent in the deep sea off Easter Island in the south Pacific.



This undated photo released by Census of Marine Life and the Woods Hole Oceanographic Institution shows a transparent sea cucumber, *Enypniastes*

And not only this last one was entirely a new species but also part of a new family previously unknown to science.

Scientists also used sound, satellites and electronics to track the migratory routes of many species including large squids; the Pacific and Atlantic blue-fin tuna; humpback whales; puffins that covered the "longest-ever

electronically recorded migration" (a nearly 40,000-mile circle every year from New Zealand to Japan, Russia, Alaska, Chile and back); planktons and even seals. The census has also found another more basic connection in the genetic blueprint of life in the marine ecosystem. And that is just as chimps and humans share more than 95 percent of their DNA, the species of the oceans have most of their DNA in common, too. Another interesting discovery was the huge communities of different species of marine life-forms that was found to be scattered across the deep ocean floor, all living at the mouth of thermal vents and rifts that seep nutrients into the ocean. And previously, it was thought that deep sea floors are almost lifeless due to the huge pressure, pitch black conditions and cold water that are found at the oceanic depths of greater than 6,000 feet (1.8 km).

In the years to come, scientists believe more knowledge of the marine species will be learnt, mostly from the tropics, deep-seas and southern hemisphere.

Despite this "decade of discovery", scientists are still astonished by the extent of marine life-forms that are yet to be introduced in the realm of modern science. But at the same time, they are equally worried with the growing threats to the marine habitat which includes, over-fishing, loss of habitat, pollution, invasive species, rising water temperature and acidification, oil spill and low oxygen content of the seawater. Given the tragic state of global climate and the constant deterioration of the environment, the growing threat to the oceanic habitat surely is a concern for every land-dwelling earthling.

The contributor is a freelance science writer.

MEGHNAD SAHA

Genius that defied poverty

MALIHA AFRIN

MEGHNAD Saha, a pioneering physicist and educationist, was born on 6th October, 1893 in a remote village of Sheorati in the district of Dhaka. He was the 5th child of his parents, Sri Jagannath Saha and Sreemati. Bhubaneshwari Devi. His father was a grocer in the village. Meghnad passed his early life in extreme poverty. After finishing his primary education, he was admitted to a middle school which was seven miles away from his village. Meghnad pursued his education in that school due to the generosity of a local medical practitioner, Ananta Kumar Das, who provided him with boarding and lodging in his house. He stood first in the Dhaka Middle School test. He was admitted to Dhaka Collegiate School. Meghnad got involved in the turbulent politics of the time. In 1905, the British government decided to partition Bengal, but the public opinion was against the decision. At that time, B. Fuller was the governor of East Bengal. One day he came to visit the Collegiate School. Meghnad along with other students boycotted his visit. As a result, he was expelled from the school and his scholarship was cancelled. He got admitted to Kishorilal Jubilee School. In 1909, he passed the Entrance examination from this school and stood first from East Bengal with highest marks in English, Bengali, Sanskrit and Mathematics. He was admitted to Dhaka College and in 1911, he ranked third in the I.Sc examination from that college.



Meghnad Saha went to Calcutta and took admission in the Presidency College. In 1913, he graduated from that college and ranked second from the University of Calcutta. Meanwhile, Meghnad Saha joined Anushilan Samity to take part in the freedom movement and came in contact with revolutionary nationalists like Subash Chandra Bose and Rajendra Prasad. Bagha Jatin, a famous freedom fighter used to visit his hostel to organise student movement at that time. In 1915, Meghnad Saha along with Satyendranath Bose ranked first in M.Sc examination

Meghnad in Applied Mathematics and S.N. Bose in pure Mathematics. S.N. Bose was another great physicist of that time. In 1917, Meghnad Saha joined as a lecturer at the newly established Science College in Calcutta. He taught Quantum Mechanics in the college.

He jointly translated the works of Einstein and Minkowski on relativity with S.N. Bose into English from German. In 1919, his research paper titled "On selective radiation pressure and its application" was published in the American Astrophysical journal. He developed the "ionization formula," which explains the presence of the spectral lines. It proved to be a breakthrough in Astrophysics. He went abroad and worked for two years at Imperial College, London and at a research laboratory in Germany. In 1927, Meghnad Saha became a fellow of London's Royal Society. In 1947, he established the Institute of Nuclear Physics, which later was named after him as Saha Institute of Nuclear Physics.

For the development of science, he decided to join politics and was elected as a member of parliament in 1951. He died on Feb. 16, 1956.

The writer is a student of Home Economics College, Dhaka.

PRIMEVAL HAZE

THE COOKING PHASE!

Life came from sky?

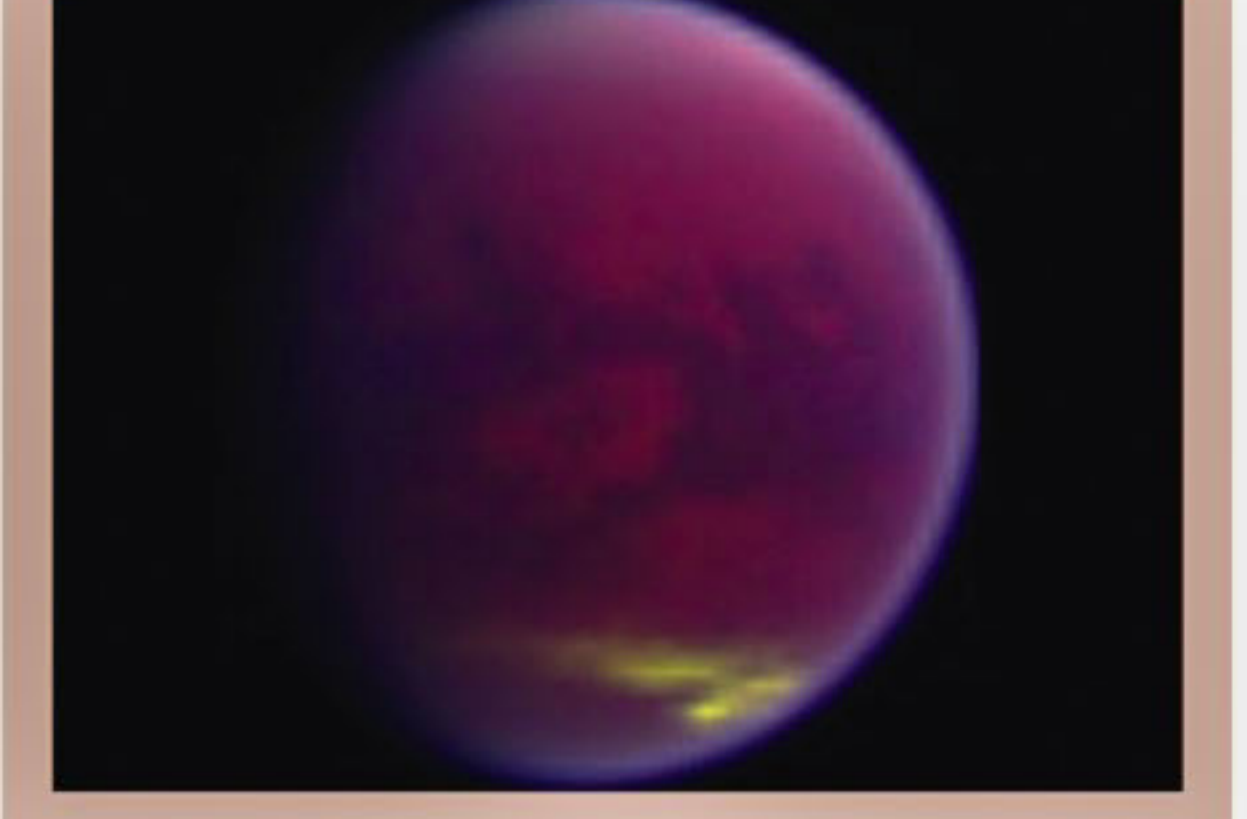
When it comes to determining exactly where in the solar system life began, things have never been so up in the air. Scientists over the past decade have suggested deep-sea hydrothermal vents, underground aquifers, partially frozen lakes and even comets as locations for the origin of life.

Now an experiment that simulates chemical reactions in the atmosphere of Titan, Saturn's haze-shrouded moon, adds a new location to the list of unexpected places where life could have begun in the sky.

The study used radio waves as an energy source, simulating the action of ultraviolet radiation from the sun that strikes the top of Titan's thick atmosphere and breaks apart molecules such as methane and molecular nitrogen. The experiment is the first to produce amino acids and the nucleotide bases that make up DNA and RNA the basic ingredients of life without the need for liquid water, says Sarah Hörst of the University of Arizona in Tucson. She and her colleagues presented the findings in Pasadena, Calif., October 7 at the annual meeting of the American Astronomical Society's Division for Planetary Sciences.

The results suggest that Titan's upper atmosphere, about 1,000 kilometers above the frigid moon's surface, produces compounds capable of supporting life. And because planetary scientists believe that Titan represents a frozen snapshot of the early Earth, the study also indicates that terrestrial life might have formed within a primordial haze high above the planet rather than in a primordial soup on the surface, Hörst says.

Planetary scientist Jonathan Lunine of the University of Arizona, who was not part of the study, notes that the compounds found in the experiment "are relatively simple precursor molecules to life, and so there are a lot of additional steps between such molecules and life itself, most of which will likely require a liquid, such as water or methane." However, he adds, everything that forms high in Titan's atmosphere ends up in the moon's lakes and seas of methane.



This false-color image shows cloud cover in yellow and the moon's thick, hazy atmosphere in magenta

Early universe was overheated

If you think global warming is bad, 11 billion years ago the entire universe underwent, well, universal warming.

The consequence was that fierce blasts of radiation from voracious black holes stunted the growth of some small galaxies for a stretch of 500 million years.

This is the conclusion of a team of astronomers who used the new capabilities of NASA's Hubble Space Telescope to probe the invisible, remote universe.

Using the newly installed Cosmic Origins Spectrograph (COS) they have identified an era, from 11.7 to 11.3 billion years ago, when the universe stripped electrons off from primeval helium atoms -- a process called ionization. This process heated intergalactic gas and inhibited it from gravitationally collapsing to form new generations of stars in some small galaxies. The lowest-mass galaxies were not even able to hold onto their gas, and it escaped back into intergalactic space.

Michael Shull of the University of Colorado and his team were able to find the telltale helium spectral absorption lines in the ultraviolet light from a quasar -- the brilliant core of an active galaxy. The quasar beacon shines light through intervening clouds of otherwise invisible gas, like a headlight shining through a fog. The beam allows for a core-sample probe of the clouds of gas interspersed between galaxies in the early universe.

The universe went through an initial heat wave over 13 billion years ago when energy from early massive stars ionized cold interstellar hydrogen from the big bang. This epoch is actually called reionization because the hydrogen nuclei were originally in an ionized state shortly after the big bang.

But Hubble found that it would take another 2 billion years before the universe produced sources of ultraviolet radiation with enough energy to do the heavy lifting and reionize the primordial helium that was also cooked up in the big bang.

This radiation didn't come from stars, but rather from quasars. In fact the epoch when the helium was being reionized corresponds to a transitory time in the universe's history when quasars were most abundant.



This diagram traces the evolution of the universe from the big bang to the present. Two watershed epochs are shown

The universe was a rambunctious place back then. Galaxies frequently collided, and this engorged supermassive black holes in the cores of galaxies with infalling gas. The black holes furiously converted some of the gravitational energy of this mass to powerful far-ultraviolet radiation that would blaze out of galaxies. This heated the intergalactic helium from 18,000 degrees Fahrenheit to

nearly 40,000 degrees. After the helium was reionized in the universe, intergalactic gas again cooled down and dwarf galaxies could resume normal assembly. "I imagine quite a few more dwarf galaxies may have formed if helium reionization had not taken place," said Shull.

Source: Science Daily

'I AM BECOME DEATH'

DO YOU KNOW?

The Trinity blast

The first atom bomb in history, dubbed "the gadget," was detonated at the Trinity Site near Alamogordo, N.M., in 1945, exploding with a force of roughly 20 kilotons of TNT. Scientist J. Robert Oppenheimer later said that while he watched the test, he thought of a line from the Hindu scripture the Bhagavad Gita: "I am become Death, the destroyer of worlds." Nuclear weapons later ended World War II and ushered in decades of fear of nuclear annihilation. Scientists recently found that civilians in New Mexico may have been exposed to thousands of times the recommended level of public radiation



The only color photograph available for the Trinity blast, taken by Los Alamos scientist and amateur photographer Jack Aeby from near Base Camp

Who is a plastinator?



The art of plastination deals with preservation of organs, tissues and whole beings. Plastination, unlike preservation through formalin, involves a series of processes that replace the fluids in the tissues and organs by reactive plastics such as silicon rubber, epoxy resin and polyester resin, in a special vacuum process.

This achieves the same objective as formalin, which is to prevent decay, and also retains the natural colour and texture of the specimen. Gunther von Hagens, research assistant at the Institute of Anatomy and Cellular Biology at the University of Heidelberg, in 1978, accidentally stumbled upon using plastics to preserve anatomical specimens.

A GIFT INDEED!

Gorillas gave us malaria

THE parasite that causes malaria, a scourge of the warmer parts of the world, evolved from a gorilla parasite thousands of years ago, a new study concludes.

Scientists envision that the finding might open the way for further insights into malaria, perhaps through research into whether certain factors might make gorillas more or less vulnerable to malaria-like diseases.

Also, "we can check and see whether transmission to humans takes place in areas where people live near" gorillas, said Beatrice Hahn of the University of Alabama, one of the investigators.

The findings are published in the Sept. 23 issue of the research journal Nature.

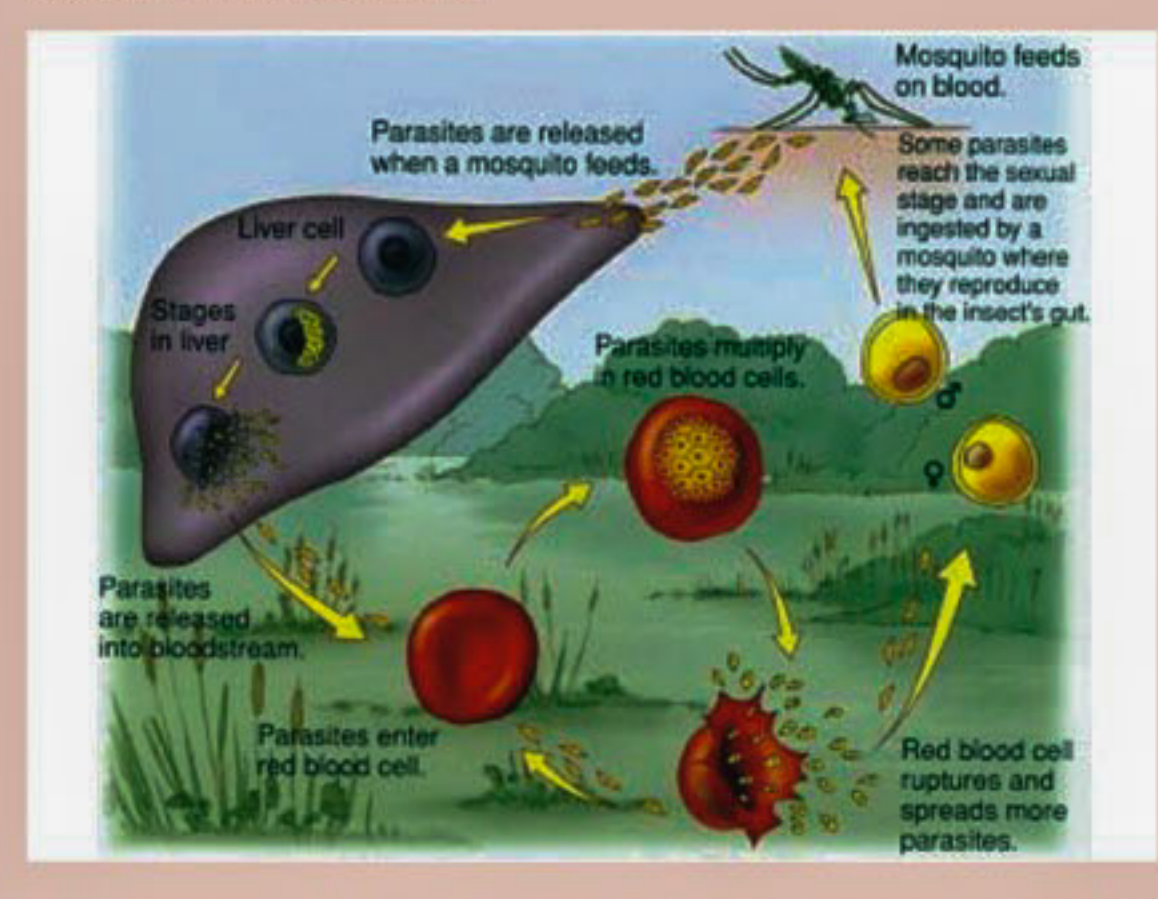
Caused by a parasite transmitted by mosquitoes, malaria kills an estimated one million people yearly out of more than 300 million new cases, according to the U.S. Centers for Disease Control. The illness is marked by repeated attacks of chills and fever. Most affected are people in the tropics and subtropics, as well as travelers to those regions.

Health officials have been working to fight malaria by handing out bed nets to help protect people from mosquito bites at night. Scientists are also working on a vaccine.

The origin of the main human malaria parasite, *Plasmodium falciparum*, has been much debated, with various theories proposing a chimpanzee, bonobo or ancient human origin. Hahn and colleagues analyzed almost 3,000 fecal samples from wild-living African apes in a search for relatives of *P. falciparum*, and concluded that the closest relatives were wild-living western gorillas. The actual effects of these parasites on apes are still unknown, Hahn said.

Transmission between gorillas and people "probably happened anywhere between 5,000 and 300,000 years ago," she added.

Source: World Science



A diagram of the life cycle of the parasite, which multiplies in the liver