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SCIENCE & LIFE

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Mammals that beat dinosaurs

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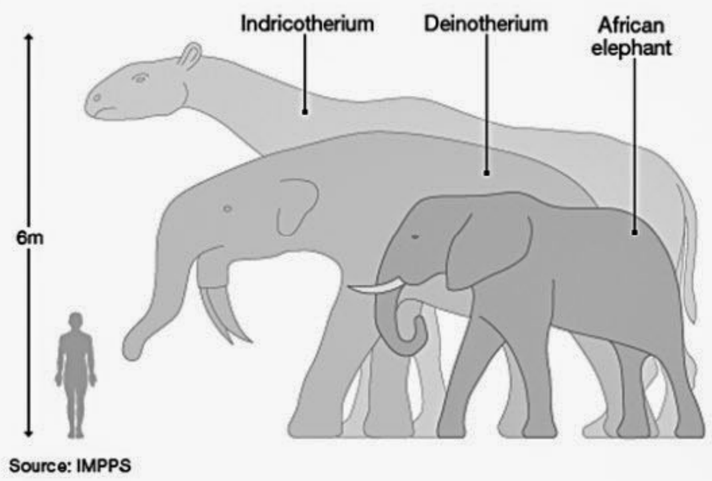
A new research headed by University of New Mexico Biology Associate Professor Felisa Smith revealed that the ancient dinosaurs were not the only gigantic creatures the olden world. The study, the details which have been published in November 26th edition of the journal, Science, explains that the very extinction of dinosaurs 65 million years ago paved the way for the surviving mammals to get, bigger. In fact almost a 1000 times bigger than they had been in the first place! The study titled, "The Evolution of Maximum Body Size of Terrestrial Mammals" involved an international team of paleontologists, evolutionary biologists and macro-ecologists, who carefully studied the mammalian fossils from Africa, Eurasia and South America in order to quantitatively examine the patterns of body size of mammals after the great demise of the mighty dinosaurs. It must be mentioned here that, it's already understood that the creatures that roamed the earth after the dinosaurs were fairly big, but, how they got this "big" was still a subject of speculations.



The largest land mammals that ever lived, Indricotherium and Deinotherium, would have towered over the living African Elephant

The extinct Paraceratherium, which lived 30 million years ago, weighed some 15 tonnes

Before the extinction of the dinosaurs, many mammals were part of the formers food chain if not battling larger reptilians for necessary sustenance. But once the massive beasts became extinct, within 25 million years, which is fast in geologic terms, the overall modest-sized land mammals of these regions grew to their maximum size. And that is from being a mammal weighing 1 to 10 kilograms that is 2 to 22 pounds (when they were sharing the world with the dinosaurs) to a maximum of 17 tons and as tall as 18 feet high at the shoulder. Ancient mammals like the hornless rhinoceros, Indicotherium transouralicum are sure testament of that primeval biological evolution. But how it all happened? Co-author Dr. Jessica Theodor of Dept. of Biological Sciences at the University of Calgary explains, "Basically, the dinosaurs disappear and all of a sudden there is nobody else eating the vegetation. That's an open food source and mammals start going for it, and it's more efficient to be an herbivore when you're big." In other words, these quick-metabolizing mammals no longer had to battle the larger reptilian dinosaurs for food and for the first time ever, they encountered the unlimited and undisrupted access to the prehistoric rations bazaar. And this all eating frenzy and pattern of genetic evolution ended about 40 millions years ago, the time when the mammalian creatures of all continents reached their peak size and just stopped growing. And as for why just stopped growing, scientists tried to answer that as well.

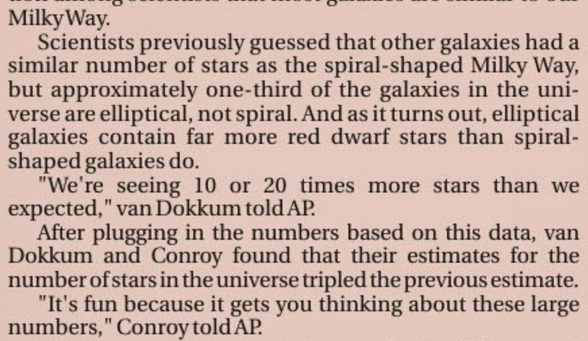
In order to get more detailed insight regarding how big the mammals grew after the dinosaurs' extinction, the researchers collected data on the maximum size for major groups of land mammals on each continent. And these include Perissodactyla, the odd-toed ungulates such as horses and rhinos; Proboscidea, which includes elephants, mammoth and mastodon; Xenarthra, the anteaters, tree sloths, and armadillos; along with a number of other extinct groups. Three years of data assembling process paved the way to the clues on what exactly set the limit on maximum body size of these mammals who once roamed on these ancient of lands. Scientists believe that any further growth was capped because of land availability and the climate they lived in. The study showed that the colder the climate was, the bigger the mammals were, since bigger animals conserve the heat better. Besides, it was also found that no one group of mam¬mals dom¬i¬nates the largest size class; the absolute largest mam¬mal belongs to different groups over time and space. In the words of Assoc. Prof. Smith, "The results were strik¬ing. Global tem¬per¬a¬ture and ter¬res¬trial land area set con¬straints on the upper limit of mam¬mal body size, with larger mam¬mals evolv¬ing when the earth was cooler and the ter¬res¬trial land area greater."

And as for how these giant mammals eventually met their demise, it is scientifically believed that either drastic change in climates or the wrath of early humans ultimately ended the age of these colossal mammals.

The contributor is a freelance science writer.

NUMBERS GAME

How many stars are there in cosmos?



A dark hole is seen next to the green cloud at the top of this infrared NASA image

300 sextillion stars populate the universe, new research suggests -- that's three times as many as scientists previously thought.

If you're having a hard time wrapping your brain around a number like 300 sextillion (or a 3 followed by 23 zeros), imagine multiplying 3 trillion by 100 billion. Or, just go ahead and consider it numerous beyond comprehension.

In a study published online in the journal Nature, scientists revealed the findings, based principally on the fact that red dwarf stars, in particular, appear to be even more ubiquitous than previously imagined.

The Associated Press reported that Yale University astronomer Pieter van Dokkum and Harvard astrophysicist Charlie Conroy questioned the widely-held assumption among scientists that most galaxies are similar to our MilkyWay.

Scientists previously guessed that other galaxies had a similar number of stars as the spiral-shaped Milky Way, but approximately one-third of the galaxies in the universe are elliptical, not spiral. And as it turns out, elliptical galaxies contain far more red dwarf stars than spiral-shaped galaxies do.

"We're seeing 10 or 20 times more stars than we expected," van Dokkum told AP.

After plugging in the numbers based on this data, van Dokkum and Conroy found that their estimates for the number of stars in the universe tripled the previous estimate.

"It's fun because it gets you thinking about these large numbers," Conroy told AP.

What do you think about the new findings? Comment below.

Source: ThirdAge.com

TELL-TALE TREMORS

Forecasting avalanche

Research on the Swiss peak Weisshorn reveals that tell-tale tremors in a glacier can alert scientists to an impending avalanche

UNLESS you're eating breakfast, hearing snap, crackle, and pop may be an early warning sign of an impending avalanche. Geologists listening in on "icequakes" that rumble through glaciers have developed a model that can predict a collapse up to 15 days before it happens, the team reports in a study posted on arXiv.org.

With that kind of heads up, villages could be evacuated and roads closed in avalanche-prone areas.

Though all glaciers groan and creak under stress, glaciers on an incline are especially creaky because gravity tugs on the top of the ice more than the base. Accumulating snow causes even more stress. These forces cause the glacier to fracture, sending tiny icequakes throughout. Eventually, if a glacier can't handle the stress, a large chunk will fall off, pummeling any unsuspecting villages below with a moving mass of snow and ice.

To find early warning signs of a break-off, scientists in Switzerland placed seismic instruments on a glacier precariously hugging the northeast face of the Weisshorn, a mountain in the Swiss Alps that looms over the 400 inhabitants of the village of Randa, 2,500 meters below. Break-offs in the winter are especially dangerous because the glacier has accumulated snow, so that ruptures trigger avalanches. Weisshorn avalanches have claimed 51 lives since the 17th century.

"It's the first time icequakes have been used as a precursor to these break-offs," says glaciologist Fabian Walter of the Scripps Institution of Oceanography in La Jolla, Calif.

Icequakes are less complicated to study than earthquakes because waves travel through only one medium, as opposed to several layers of the Earth. But just as scientists haven't figured out how to predict earthquakes, predicting icequakes isn't possible either.

Source: Science News

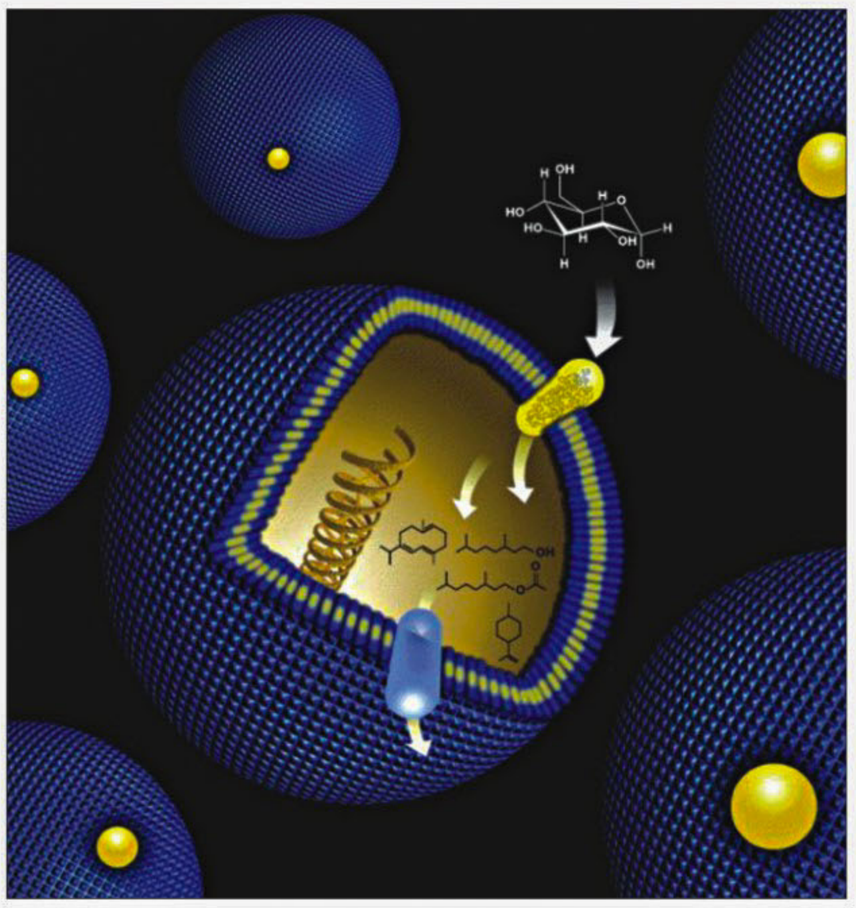
Era of designer cell and microbe

WILL we one day design and create molecules, cells and microorganisms that produce specific chemical products from simple, readily-available, inexpensive starting materials? Will the synthetic organic chemistry now used to produce pharmaceutical drugs, plastics and a host of other products eventually be surpassed by metabolic engineering as the mainstay of our chemical industries? Yes, according to Jay Keasling, chemical engineer and one of the world's foremost practitioners of metabolic engineering.

In a paper published in the journal Science Keasling discusses the potential of metabolic engineering -- one of the principal techniques of modern biotechnology -- for the microbial production of many of the chemicals that are currently derived from non-renewable resources or limited natural resources. Examples include, among a great many other possibilities, the replacement of gasoline and other transportation fuels with clean, green and renewable biofuels.

"Continued development of the tools of metabolic engineering will be necessary to expand the range of products that can be produced using biological systems, Keasling says. "However, when more of these tools are available, metabolic engineering should be just as powerful as synthetic organic chemistry, and together the two disciplines can greatly expand the number of chemical products available from renewable resources."

Keasling is the chief executive officer for the Joint BioEnergy Institute, a U.S. Department of Energy (DOE) bioenergy research center. He also holds joint appointments with the Lawrence Berkeley National Laboratory (Berkeley Lab), where he oversees that institute's biosciences research programs, and the University of California (UC), Berkeley, where he serves as director of the Synthetic Biology Engineering Research Center, and is the Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering.



Metabolic engineering - the practice of altering genes and metabolic pathways within a cell or microorganism

Metabolic engineering is the practice of altering genes and metabolic pathways within a cell or microorganism to increase its production of a specific substance. Keasling led one of the most successful efforts to date in the application of metabolic engineering, when he combined it with synthetic organic chemistry techniques to develop a microbial-based means of producing artemisinin, the most potent of all anti-malaria drugs. He and his research group at JBEI are now applying that same combination to the synthesis of liquid transportation fuels from lignocellulosic biomass. In all cases, the goal is to engineer microbes to perform as much of the chemistry required to produce a desired final product as possible.

Source: Science Daily

SCIENCE IN MAGIC

Magician's secret revealed

THERE is a place for magic in science. Five years ago, on a trip to Las Vegas, neuroscientists Stephen Macknik and Susana Martinez-Conde realized that a partnership was in order with a profession that has an older and more intuitive understanding of how the human brain works. Magicians, it seems, have an advantage over neuroscientists.

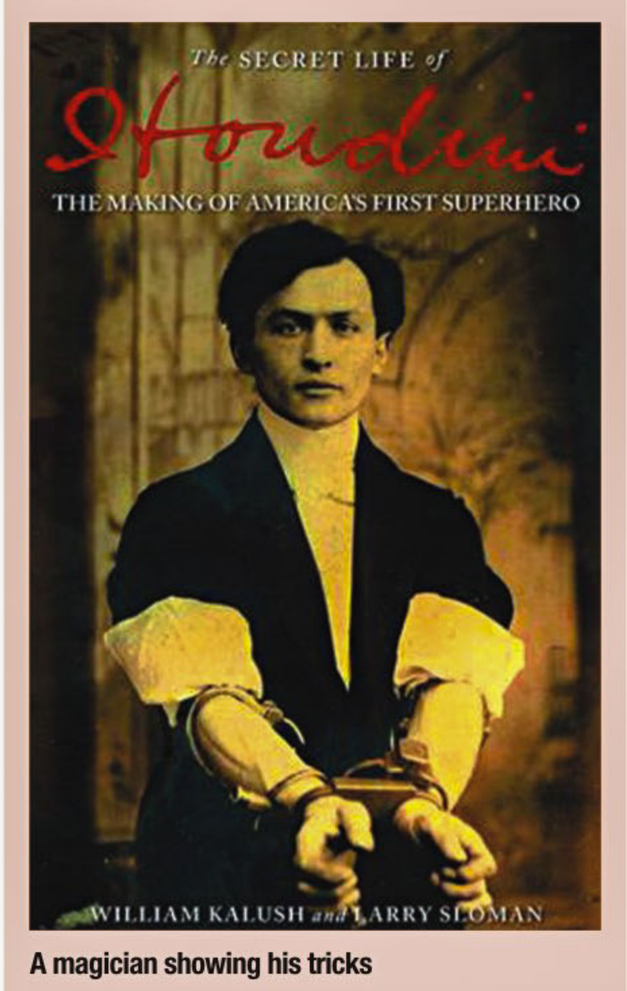
"Scientists have only studied cognitive illusions for a few decades. Magicians have studied them for hundreds, if not thousands, of years," Martinez-Conde told the audience during a recent presentation here at the New York Academy of Sciences. [Video: Your Brain on Magic]

She and Macknik, her husband, use illusions as a tool to study how the brain works. Illusions are revealing, because they separate perception from reality. Magicians take advantage of how our nervous systems our eyes, sense of touch, minds and so on are wired to create seemingly impossible illusions.

After their epiphany in Las Vegas, where they were preparing for a conference on consciousness, the duo, who both direct laboratories at the Barrow Neurological Institute in Arizona, teamed up with magicians to learn just how they harness the foibles of our brains. Their discoveries are detailed in their new book, "Sleight of Mind: What the Neuroscience of Magic Reveals about Our Everyday Deceptions" (Henry Holt and Company, 2010).

The psychological concepts behind illusions are generally better understood, but they treat the brain as something of a black box, without the insight into brain activity or anatomy that neuroscience can offer, they write.

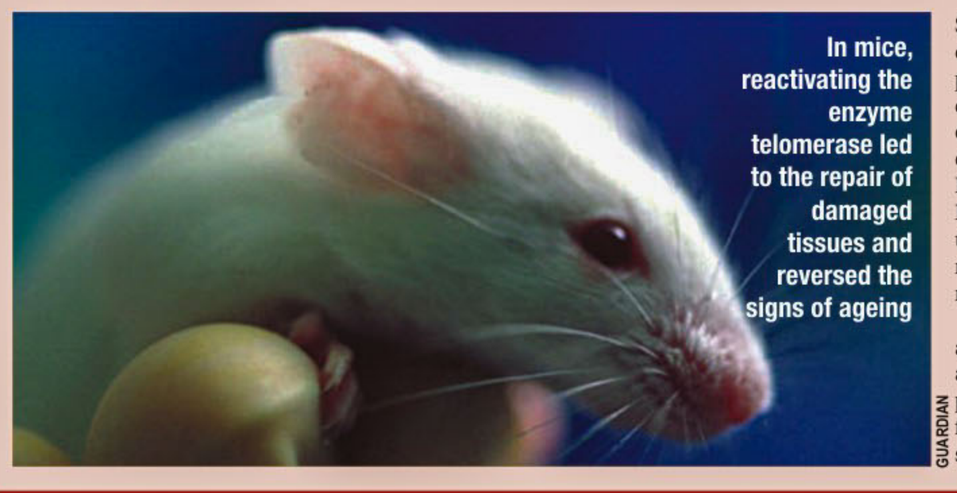
Source: Live Science



A magician showing his tricks

ALCHEMI ST'S DREAM

Ageing process reversed



In mice, reactivating the enzyme telomerase led to the repair of damaged tissues and reversed the signs of ageing

GUARDIAN

Scientists claim to be a step closer to reversing the ageing process after rejuvenating worn out organs in elderly mice. The experimental treatment developed by researchers at the Dana-Farber Cancer Institute, Harvard Medical School, turned weak and feeble old mice into healthy animals by regenerating their aged bodies.

The surprise recovery of the animals has raised hopes among scientists that it may be possible to achieve a similar feat in humans or at least to slow down the ageing process.

DID YOU KNOW?

How does an ant know its way home with no clues in a desert?

Experiments by German scientists on the Sahara desert ant, called cataglyphis fortis, have shown that the ant uses a method known as 'path integration' in its navigation. Path integration consists of measuring the extent of each turn, and remembering the direction of its nest, whenever the direction of its path changes, and then measuring the distance of travel in each direction.