Infoteca's E-Journal

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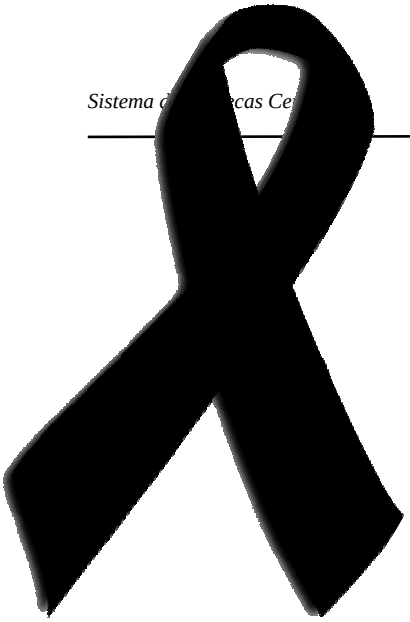
CONTENTS



Last struggle is over for Nobel laureate Aleksandr Solzhenitsyn

Tony Halpin in Moscow

He was the conscience of a nation whose writings exposed the horrors of the Communist Gulag and galvanised Russian opposition to the tyranny of the Soviet Union. Aleksandr Solzhenitsyn's long struggle for his beloved Russia ended last night at his home in Moscow, 14 years after he had returned in triumph from exile imposed by the Soviet regime that he had helped to bring down. His son Stepan said that the Nobel laureate had suffered heart failure, aged 89.

The former dissident had been in failing health for some years. He lived long enough to be fêted by a Kremlin that had once condemned him to slave labour. The former Russian president, Vladimir Putin, once a KGB officer, travelled to Solzhenitsyn's home to present him with the State Prize for humanitarian achievement last year, thanking him for "all your work for the good of Russia". Solzhenitsyn won the Nobel Prize for Literature in 1970 after writing in harrowing detail about the system of Soviet labour camps in works such as *One Day in the Life of Ivan Denisovich* and *The Gulag Archipelago*.

A project to publish Solzhenitsyn's complete works in his homeland for the first time was begun in 2006. The author hinted at the time that he did not expect to live to see the 30-volume project completed in 2010. The literary celebration would have been unthinkable in 1974, when Solzhenitsyn was expelled from the Soviet Union and stripped of his citizenship soon after the first part of *The Gulag Archipelago* appeared in the West. The three-volume work, which took a decade to complete, forced many Western sympathisers to revise their views of the Soviet regime.

Solzhenitsyn spent eight years in labour camps for criticising Stalin in letters to a schoolfriend in 1945 after serving in the army throughout the Second World War. On his release in 1953, he was sent into internal exile in Kazakhstan, where he developed cancer. His experiences formed the basis of the novels*The First Circle*and *Cancer Ward*. An edited version of *One Day in the Life of Ivan Denisovich* was published in the Soviet Union in 1962 during the cultural thaw under Nikita Khrushchev.

The censors rejected other manuscripts, however, as the KGB placed Solzhenitsyn under increasing scrutiny for "antiSoviet" activity. His Nobel Prize for Literature was denounced as an act of political hostility, but he continued to smuggle work out to the West while underground *samizdat* copies circulated in Russia.

The cellist Mstislav Rostropovich protested against Solzhenitsyn's persecution and sheltered the writer in the early 1970s. His support attracted official harassment that forced Rostropovich to flee to Paris in 1974. Solzhenitsyn moved to Germany and Switzerland after his expulsion before settling in the US in 1976. Mikhail Gorbachev restored his citizenship in 1990 and he returned to Russia in 1994, where he professed himself shocked at the impoverished condition of the people.

He was strongly critical of the new Russian society that emerged from Communism, attacking corruption and calling for a return to traditional patriotism. He was noticeably warmer about Mr Putin, however, saying that he had taken steps to "save Russia's statehood". In a video message recorded in response to his award from Mr Putin, Solzhenitsyn said that he hoped his work would help Russia to avoid "destructive breakdowns" in future.

Days in the life of . . .

1941 Solzhenitsyn graduates from Rostov University with a degree in mathematics, before joining the army to fight in the Second World War, achieving the rank of captain

1945 Corresponding with a friend, he makes derogatory comments about Stalin. The letters are intercepted and he is arrested

1945-53 He serves eight years in detention camps, an experience that formed the basis of his novella *One Day in the Life of Ivan Denisovich*

1962 Following a relaxation of censorship, the novella is published in the USSR, on the personal permission of President Krushchev. It is one of the first Russian works to criticise the Stalinist regime

1970 Awarded the Nobel Prize for Literature. Solzhenitsyn does not accept in person – fearing that he would not be let back into the USSR

1972 He smuggles out a Nobel speech describing a "Gulag Archipelago" where "it was my fate to survive, while others – perhaps with a greater gift and stronger than I – have perished". Two years later he is expelled from the USSR

1990 With the crumbling of the old Soviet Union, Gorbachev restores Solzhenitsyn's citizenship

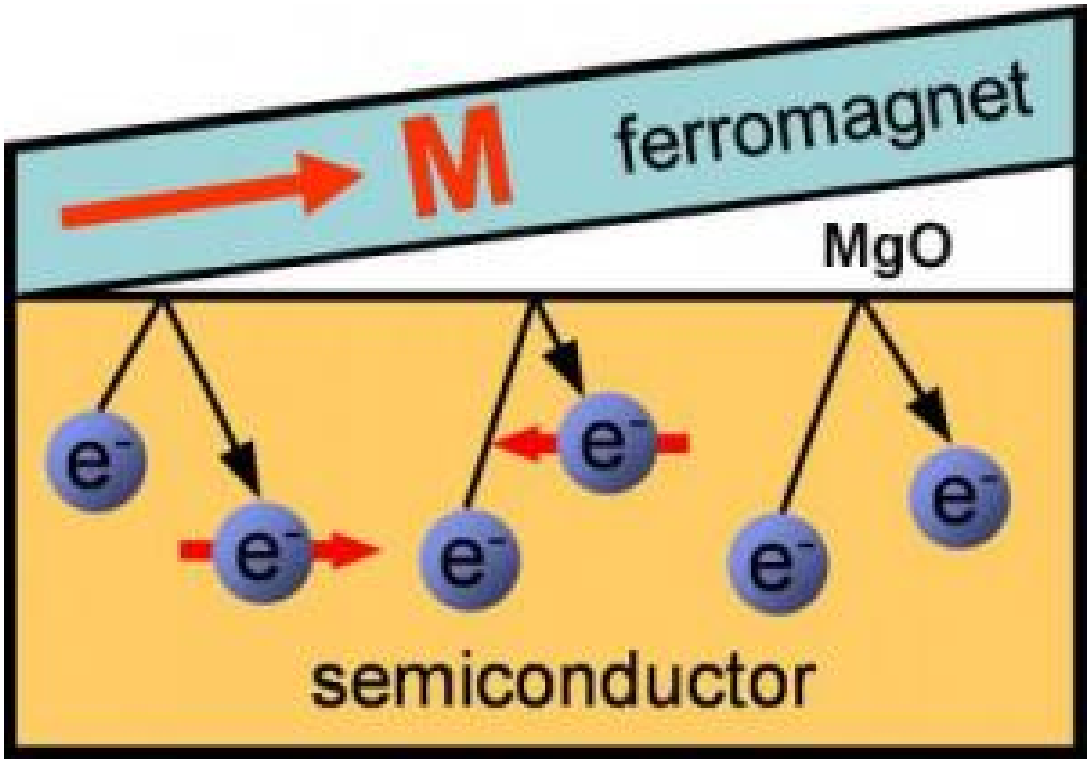
1994 Solzhenitsyn returns to Russia

1998 Refuses state award from Boris Yeltsin, blaming him for the country's ruinous economy

Source: Nobel Prize Committee, Britannica

http://www.timesonline.co.uk/tol/news/world/europe/article4454809.ece

Accidental Discovery Could Enable Development Of Faster Computers



Sketch of a ferromagnet/semiconductor structure. When the MgO interface is very thin, spin up electrons, represented in this image with an arrow to the right, are reflected back to the semiconductor. At an intermediate thickness of the interface, spin down electrons are reflected back to the semiconductor, resulting in a "spin reversal" that can be used to control current flow. (Credit: Kawakami lab, UC Riverside)

ScienceDaily (June 25, 2008) — Physicists at UC Riverside have made an accidental discovery in the lab that has potential to change how information in computers can be transported or stored. Dependent on the "spin" of electrons, a property electrons possess that makes them behave like tiny magnets, the discovery could help in the development of spin-based semiconductor technology such as ultrahigh-speed computers.

The researchers were experimenting with ferromagnet/semiconductor (FM/SC) structures, which are key building blocks for semiconductor spintronic devices (microelectronic devices that perform logic operations using the spin of electrons). The FM/SC structure is sandwich-like in appearance, with the ferromagnet and semiconductor serving as microscopically thin slices between which lies a thinner still insulator made of a few atomic layers of magnesium oxide (MgO).

The researchers found that by simply altering the thickness of the MgO interface they were able to control which kinds of electrons, identified by spin, traveled from the semiconductor, through the interface, to the ferromagnet.

Study results appear in the June 13 issue of Physical Review Letters.

Experimental results

The spin of an electron is represented by a vector, pointing up for an Earth-like west-to-east spin; and down for an east-to-west spin.

In the researchers' experiment with the FM/SC structures, both spin up and spin down electrons were allowed to travel from the semiconductor to the ferromagnet.The researchers found that when the structure's MgO interface is very thin (less than two atomic layers), spin down electrons pass through to the ferromagnet, while spin up electrons are reflected back, leaving only spin up electrons in the semiconductor.

They also found that when the interface is thicker than six atomic layers, both spin up and spin down electrons are reflected back, leaving electrons with zero net spin in the semiconductor.But the surprising result for the researchers was that at an intermediate thickness, ranging from two to six atomic layers, the selectivity of the interface completely changes.

"We see a dramatic and complete reversal in the spin of electrons that pass through the interface," said Roland Kawakami, an assistant professor of physics who led the research team. "This time, spin up electrons pass through while spin down electrons are reflected back to the semiconductor. In other words, the thickness of the MgO interface determines whether spin up or spin down electrons are allowed to pass through it."According to his research team, such a "spin reversal" can be used to control current flow.

Significance of the discovery

"Electron spins are oriented at random in an ordinary electric circuit, and, therefore, do not affect current flow," explained Yan Li, the first author of the research paper, who made the discovery. "But if spin is polarized, that is, aligned in one direction, you can manipulate the flow of current and the transport of information -- a feature that would be of great interest to the semiconductor industry. What is amazing is that only a couple of atomic layers of MgO can completely reverse the spin selection of the interface. This is unexpected because MgO is not a magnetic material."

Li, a graduate student in the Department of Physics and Astronomy working toward her doctorate in physics, said the research team will work next on making electronic devices based on the spin reversal. "This will not only test its feasibility for applications, but also help determine the cause of the spin reversal, which is still unclear," she said.Kawakami's lab is one of very few labs in the world that perform both the advanced material synthesis and pulsed laser measurements needed for experiments with FM/SC structures.

"Without the strong interplay between the materials development and optical measurements, the type of discovery we made probably would not have been possible," Kawakami said.

A new area of research, spintronics already has helped develop disk-drive read heads and non-volatile memory chips. Researchers believe spintronics also will make "instant-on" computers one day, as well as chips that can store and process data.

Kawakami, who also is a member of UCR's Center for Nanoscale Science and Engineering, and Li were joined by UCR's Y. Chye, Y.F. Chiang, K. Pi and W. H. Wang; and UC Santa Barbara's J.M. Stephens, S. Mack and D.D. Awschalom.Grants from the Office of Naval Research, the National Science Foundation and the Center for Nanoscience Innovation for Defense supported the two-year study.

Adapted from materials provided by University of California - Riverside, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080623175329.htm

Prions Are Not Degraded By Conventional Sewage Treatment Processes

Wastewater treatment plants do not reduce harmful proteins called prions that cause incurable brain infections, such as Mad Cow disease, scientists report. (Credit: Courtesy of Katherine McMahon)

ScienceDaily (June 25, 2008) — Scientists in Wisconsin are reporting that typical wastewater treatment processes do not degrade prions.

Prions, rogue proteins that cause incurable brain infections such as Mad Cow disease and its human equivalent, variant Creutzfeldt-Jakob Disease, are difficult to inactivate, resisting extreme heat, chemical disinfectants, and irradiation. Until now, scientists did not know whether prions entering sewers and septic tanks from slaughterhouses, meatpacking facilities, or private game dressing, could survive and pass through conventional sewage treatment plants.

Joel Pedersen and colleagues used laboratory experiments with simulated wastewater treatment to show that prions can be recovered from wastewater sludge after 20 days, remaining in the "biosolids," a byproduct of sewage treatment sometimes used to fertilize farm fields.

Although emphasizing that prions have never been reported in wastewater treatment plant water or biosolids, the researchers note that existing tests are not sufficiently sensitive to detect the extremely low levels of prions possible in those materials. Their report appears in a paper scheduled for the July 1 issue of the American Chemical Society's *Environmental Science & Technology*.

Journal reference:

1. Hinckley, Glen T., Johnson, Christopher J., Jacobson, Kurt H., Bartholomay, Christian, McMahon, Katherine D., McKenzie, Debbie, Aiken, Judd M., and Pedersen, Joel A. **Persistence of Pathogenic Prion Protein during Simulated Wastewater Treatment Processes**. *Environ. Sci. Technol.*, Web Release Date: June 10, 2008 DOI: 10.1021/es703186e

Adapted from materials provided by American Chemical Society, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080623093029.htm

Life On The Edge: To Disperse, Or Become Extinct?

Plants at range limits produce seeds with larger wings, Dr. Eckert discovered. (Credit: Queen's University)

ScienceDaily (June 25, 2008) — The hardiest plants and those most likely to survive the climatic shifts brought about by global warming are now easier to identify, thanks to new research findings by a team from Queen's University. Plants existing at the edges of their natural habitats may enhance survival of the species during global warming, says Queen's University professor.

"Predicting the speed at which plants are likely to migrate during climate warming could be key to ensuring their survival," says Queen's Biology professor Christopher Eckert.

Populations of plants growing at the outer edges of their natural "geographic range" exist in a precarious balance between extinction of existing populations and founding of new populations, via seed dispersal into vacant but suitable habitat. "Policy makers concerned with preserving plant species should focus not only on conserving land where species are now, but also where they may be found in the future," says Dr. Eckert.

This observation stems from his recent study -- published in the scientific journal New Phytologist -- which shows for the first time that natural selection gives a boost to the seed dispersal traits of those plants growing at the edges of their natural ranges.

If species are going to persist in the face of a changing climate, they must move to stay within the climate zone to which they are best adapted, Dr. Eckert explains. Their ability to relocate with shifts in regional climate brought about by global warming will largely depend on their capacity for dispersal, especially in populations near the limit of their geographical distributions.

With undergraduate student Emily Darling and PhD student Karen Samis, Dr. Eckert studied the geographic distribution and dispersal biology of Abronia umbellata (pink sand verbena), a flowering plant endemic to the Pacific coastal dunes of North America. By surveying plants throughout the 2000-km geographic range, and measuring seed dispersal with a wind tunnel in the Faculty of Applied Sciences, they showed that plants at range limits produce seeds with larger wings, thus increasing dispersal in the winds that commonly buffet costal habitats.

"The way evolution works at range limits has been brought into sharper focus by the debate over how species will respond via migration to climate warming," says Dr. Eckert. "It's clear that these marginal populations are adapted in ways that more central populations aren't."

According to Cornell University biologist Monica Geber, in an editorial focused on this new research, the Queen's team has "flipped the question of dispersal limitation on its head to ask whether range-edge populations have diverged, through adaptive evolution, from central populations to increase their colonizing ability."

There has been considerable debate as to whether these northern peripheral populations are worth conserving, Dr. Eckert notes. If they possess adaptations that will enhance their ability to expand their range during climate change, then the answer is yes, he says. His team has recently shown that in Vaccinium stamineum (deerberry) -- a threatened plant related to the blueberry -- the capacity for seed dispersal appears to increase sharply towards the range limit in Canada.

In addition, some threatened Canadian populations produce high-quality seeds that exhibit rapid germination and particularly high seedling growth.

"These observations are consistent with our work on coastal dune plants, suggesting that our results may have general relevance and significance for species conservation in changing global environments" says Dr. Eckert.

Adapted from materials provided by Queen's University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080623113715.htm

Understanding The Migration Of Cancer Cells

ScienceDaily (June 24, 2008) — Lamellipodia are veil-shaped protrusions of the plasma membrane, that can turn into upward-curled ruffles if they fail to adhere to the substrate. A dendritic meshwork of short and highly branched actin filaments might constitute their main structural component. The other type of protrusion, the filopodia, are finger-like and consist of parallel, long and unbranched actin filaments.

Interestingly, fast-crawling cells mainly form lamellipodia/ruffles while poorly migrating or non-motile cells often show the coexistence of both lamellipodial and filopodial protrusions. These observations suggest that the lamellipodia-to-filopodia selection might regulate cell migration. Moreover, the pivotal contribution of lamellipodial and filopodial protrusions to important developmental and homeostatic processes certainly requires tight regulatory mechanisms.

Unfortunately, while the microscopic morphology, dynamic development and protein signature of both lamellipodia/ruffles and filopodia have been investigated, little is known about the mechanisms whereby cells co-ordinate these actin-based extensions. Therefore, we urgently need to better understand this basic process to ultimately increase our therapeutic intervention arsenal against the metastatic progression of cancers.

It is known that the activity of regulatory proteins for the growth of the actin cytoskeleton Arp2/3 complex along with WAVE and mDia2 produce a burst of actin polymerization required for the formation of lamellipodia/ruffles and filopodia, respectively.

In the forthcoming issue of Nature Cell Biology Metello Innocenti and coworkers report that, starting from the unexpected observation that mDia2, WAVE and Arp2/3 form a complex, they discovered how filopodia extensions are generated and integrated with lamellipodia/ruffles in human cancer cells. At the molecular level, WAVE and Arp2/3 jointly promote lamellipodia/ruffles outgrowth and cell migration and at the same time inhibit mDia2-dependent filopodia formation.

Moreover, emission of filopodia occurs only after the disassembly of the mDia2-WAVE-Arp2/3 complex. Thus, it is likely that suppression of filopodia by the ruffling-making machinery is needed for cancer cells to move efficiently.

Their results pave the way to a cogent molecular analysis of the interplay between lamellipodia/ruffles and filopodia in regulating both the migratory and invasive abilities of cancer cells. The researchers anticipate that new and more specific therapies to counteract cancer will be developed exploiting these exciting findings.

Adapted from materials provided by Goethe University Frankfurt, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080623105027.htm

Paradox Discovered About General Anesthesia: It Can Increase Post-surgical Pain

ScienceDaily (June 24, 2008) — The general anesthesia that puts patients into unconscious sleep so they do not feel surgical pain can increase the discomfort they feel once they wake up, say researchers from Georgetown University Medical Center. They say their findings, the first to scientifically explain what has been anecdotally observed in the clinic, may lead to wider use of the few anesthetics that don't have this side effect, or to the development of new ones.In the June 23rd issue of the Proceedings of the National Academy of Sciences (PNAS), the scientists report that "noxious" anesthesia drugs - which most of these general anesthetics are - activate and then sensitize specific receptors on neurons in the peripheral nervous system. These are the sensory nerves in the inflammation and pain pathway that are not affected by general anesthesia drugs that target the central nervous system -- the brain and the spinal cord.

"The choice of anesthetic appears to be an important determinant of post-operative pain," says the study's lead investigator, Gerard Ahern, Ph.D., an assistant professor in the Department of Pharmacology at Georgetown University Medical Center. "We hope these findings are ultimately helpful in providing more comfort to patients."It has long been known that general anesthetics cause irritation at the infusion site or in the airways when inhaled, Ahern says. And investigators have also known that while they suppress the central nervous system, they can activate so called "pain-sensing" or nociceptive nerve cells on the peripheral nervous system -- in fact, anesthesiologists often first use a drug to suppress inflammation and pain before delivering the anesthesia to put the patient to sleep.

But what has not been understood is the specific mechanism by which anesthetics affect sensory neurons, or that they can continue to cause pain and inflammation even as they are being used during surgery, he says.The researchers tested the hypothesis that two specific receptor on the nerves cells (TRPV1 and TRPA1) which are often expressed together and which also react to other irritants, such as garlic and wasabi, were the ones activated by the noxious drugs."Plants produce chemicals such as capsaicin, mustard and garlic that were meant to stop animals from eating them. When they are eaten, the two main receptors that react to them are TRPV1 and TRPA1," he says. In fact, TRPA1 is more commonly known as the mustard-oil receptor, and is a principal receptor in the pain pathway, Ahern says.

Experiments showed that general anesthetics appear to regulate TRPA1 in a direct fashion, and are thus responsible for the acute noxious effects of the drugs. Perhaps the strongest evidence is that mice bred without TRPA1 genes demonstrate no pain when the drugs are administered and used, Ahern says. "Most general anesthetics activate the mustard oil receptor, and animals that don't have the receptor don't have irritation," he says.The research team also found that nerve-mediated inflammation was greater when pungent (chemical irritants) versus non-pungent inhaled general anesthetics were used.What both findings suggest is that sensory nerve stimulation throughout the body just before and during surgery adds to the pain that is felt after the patient is awake, Ahern says. "This is a provocative finding in terms of the clinical setting, because it was not really recognized that use of these drugs results in release of lots of chemicals that recruit immune cells to the nerves, which causes more pain or inflammation."

Some general anesthetics do not activate the mustard-oil receptor, but they may not be as effective in other ways, Ahern says. "This tells us that there is room for improvement in these drugs."The study was funded by National Institutes of Health and the National Multiple Sclerosis Society. Co-authors include José Matta Ph.D., Paul Cornett Ph.D., Rosa Miyares B.A., Ken Abe, Ph.D., and Niaz Sahibzada, Ph.D., from Georgetown University.

Adapted from materials provided by Georgetown University Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080623175431.htm

Ancient Fort Opens New Chapter In First Nations' History

Cluny Fortified Village site. (Credit: Image courtesy of University of Calgary)

ScienceDaily (June 24, 2008) — A fortified village that pre-dates European arrival in Western Canada and is the only one of its kind discovered on the Canadian plains is yielding intriguing evidence of an unknown First Nations group settling on the prairies and is rekindling new ties between the Siksika Nation (Blackfoot) and aboriginal groups in the United States.

This spring, students from the U of C's Department of Archaeology are spending several weeks working on a dig near Cluny, about 120 kilometres east of Calgary, as part of a project that is expected to continue for several years unearthing one of Alberta's most significant archaeological sites. Known as the Cluny Fortified Village, the site on the Siksika First Nation reservation next to the Bow River is more than 250 years old and is an enigma to archaeologists who say it may have been home to a small band of normally-sedentary people from North Dakota.

"Tipi camps whose remains are the rings of tipi-anchoring stones left behind after the camps were abandoned were the usual dwelling sites in Alberta for thousands of years," said Dale Walde, director of the U of C's field school who is overseeing the excavation. "This site has no tipi rings, instead it looks more like villages 1,500 kilometres away on the Missouri River in southern North Dakota."

Similar to the fortified villages of agrarian First Nations groups in central and eastern North America, the Cluny Fortified Village includes evidence of a living area surrounded by a trench and wooden palisade along with pits often seen in communities where farming was a way of life. This year's archaeology field school uncovered bone and stone tools, arrowheads, pottery and glass trading beads that also point towards the inhabitants being descended from the Middle Missouri region people.

"The pottery from Cluny is quite unlike other prehistoric pottery found in Alberta, but it may be distantly related to ceramics from the Eastern Woodlands and the Middle Missouri region," Walde said. "The big mystery of Cluny is: Why is this village site so different from everywhere else?"

The site's existence has long been known to elders of the Siksika Nation but prior to this year, the only archaeological excavation took place in 1960 by a team led by Dick Forbis, a Glenbow Museum archaeologist who later helped establish the U of C's Department of Archaeology. Walde's field school was invited by the Siksika Nation to work on the site as part of the tribe's new Blackfoot Crossing Historical Park, which opened last year.

According to Blackfoot oral histories, the village belonged to a peaceful group that broke from a tribe in the United States and settled on Blackfoot territory for six years, moving to a new settlement each year. Combined with archaeological evidence, scholars believe the group may have descended ultimately from the Hidatsa culture.

"We're still unraveling the story and this site is like a gold mine," said Jack Royal, president of the Blackfoot Crossing Historical Park. "This is a very unique and valuable project because everything is uncovered, documented and prepared by the university and then it comes to our interpretive centre to be stored and used to teach the public about our history and culture."

Royal said reviving archaeology at the site is a priority for the Siksika Nation because it can help strengthen ties the nation has already forged with groups in the United States.

"Several years ago we visited the Mandan tribe in North Dakota and had a pipe ceremony in one of their traditional earthlodges and we knew there was a connection and relationship between us before European contact," Royal said. "It was a very emotional ceremony because it was like meeting relatives you've never met before but knew were out there, and this is helping to re-establish that relationship."

The project is also providing a valuable opportunity for U of C students to be involved in making discoveries important to Canadian archaeology and is especially rewarding for some students who are learning about their heritage by being involved in the dig.

"As an archaeology student of Metis heritage, I feel privileged to be part of the team that is researching this fascinating site," said student Leanne Gladstone, who took part in the initial excavation work last year and is the field school's teaching assistant this spring. "Not only has this been a journey of learning, but it has also been an opportunity to gain a deeper spiritual connection and understanding of my First Nation roots."

Adapted from materials provided by University of Calgary.

http://www.sciencedaily.com/releases/2008/06/080619090739.htm

The End of Theory: The Data Deluge Makes the Scientific Method Obsolete

By Chris Anderson ✉06.23.08

Illustration: Marian Bantjes

THE PETABYTE AGE:

Sensors everywhere. Infinite storage. Clouds of processors. Our ability to capture, warehouse, and understand massive amounts of data is changing science, medicine, business, and technology. As our collection of facts and figures grows, so will the opportunity to find answers to fundamental questions. Because in the era of big data, more isn't just more. More is different.

"**All models are wrong**, but some are useful."

So proclaimed statistician George Box 30 years ago, and he was right. But what choice did we have? Only models, from cosmological equations to theories of human behavior, seemed to be able to consistently, if imperfectly, explain the world around us. Until now. Today companies like Google, which have grown up in an era of massively abundant data, don't have to settle for wrong models. Indeed, they don't have to settle for models at all.

Sixty years ago, digital computers made information readable. Twenty years ago, the Internet made it reachable. Ten years ago, the first search engine crawlers made it a single database. Now Google and like-minded companies are sifting through the most measured age in history, treating this massive corpus as a laboratory of the human condition. They are the children of the Petabyte Age.

The Petabyte Age is different because more is different. Kilobytes were stored on floppy disks. Megabytes were stored on hard disks. Terabytes were stored in disk arrays. Petabytes are stored in the cloud. As we moved along that progression, we went from the folder analogy to the file cabinet analogy to the library analogy to — well, at petabytes we ran out of organizational analogies.

At the petabyte scale, information is not a matter of simple three- and four-dimensional taxonomy and order but of dimensionally agnostic statistics. It calls for an entirely different approach, one that requires us to lose the tether of data as something that can be visualized in its totality. It forces us to view data mathematically first and establish a context for it later. For instance, Google conquered the advertising world with nothing more than applied mathematics. It didn't pretend to know anything about the culture and conventions of advertising — it just assumed that better data, with better analytical tools, would win the day. And Google was right.

Google's founding philosophy is that we don't know why this page is better than that one: If the statistics of incoming links say it is, that's good enough. No semantic or causal analysis is required. That's why Google can translate languages without actually "knowing" them (given equal corpus data, Google can translate Klingon into Farsi as easily as it can translate French into German). And why it can match ads to content without any knowledge or assumptions about the ads or the content.

Speaking at the O'Reilly Emerging Technology Conference this past March, Peter Norvig, Google's research director, offered an update to George Box's maxim: "All models are wrong, and increasingly you can succeed without them."

This is a world where massive amounts of data and applied mathematics replace every other tool that might be brought to bear. Out with every theory of human behavior, from linguistics to sociology. Forget taxonomy, ontology, and psychology. Who knows why people do what they do? The point is they do it, and we can track and measure it with unprecedented fidelity. With enough data, the numbers speak for themselves.

The big target here isn't advertising, though. It's science. The scientific method is built around testable hypotheses. These models, for the most part, are systems visualized in the minds of scientists. The models are then tested, and experiments confirm or falsify theoretical models of how the world works. This is the way science has worked for hundreds of years.

Scientists are trained to recognize that correlation is not causation, that no conclusions should be drawn simply on the basis of correlation between X and Y (it could just be a coincidence). Instead, you must understand the underlying mechanisms that connect the two. Once you have a model, you can connect the data sets with confidence. Data without a model is just noise.

But faced with massive data, this approach to science — hypothesize, model, test — is becoming obsolete. Consider physics: Newtonian models were crude approximations of the truth (wrong at the atomic level, but still useful). A hundred years ago, statistically based quantum mechanics offered a better picture — but quantum mechanics is yet another model, and as such it, too, is flawed, no doubt a caricature of a more complex underlying reality. The reason physics has drifted into theoretical speculation about *n*-dimensional grand unified models over the past few decades (the "beautiful story" phase of a discipline starved of data) is that we don't know how to run the experiments that would falsify the hypotheses — the energies are too high, the accelerators too expensive, and so on.

Now biology is heading in the same direction. The models we were taught in school about "dominant" and "recessive" genes steering a strictly Mendelian process have turned out to be an even greater simplification of reality than Newton's laws. The discovery of gene-protein interactions and other aspects of epigenetics has challenged the view of DNA as destiny and even introduced evidence that environment can influence inheritable traits, something once considered a genetic impossibility.

In short, the more we learn about biology, the further we find ourselves from a model that can explain it.

There is now a better way. Petabytes allow us to say: "Correlation is enough." We can stop looking for models. We can analyze the data without hypotheses about what it might show. We can throw the numbers into the biggest computing clusters the world has ever seen and let statistical algorithms find patterns where science cannot.

The best practical example of this is the shotgun gene sequencing by J. Craig Venter. Enabled by high-speed sequencers and supercomputers that statistically analyze the data they produce, Venter went from sequencing individual organisms to sequencing entire ecosystems. In 2003, he started sequencing much of the ocean, retracing the voyage of Captain Cook. And in 2005 he started sequencing the air. In the process, he discovered thousands of previously unknown species of bacteria and other life-forms.

If the words "discover a new species" call to mind Darwin and drawings of finches, you may be stuck in the old way of doing science. Venter can tell you almost nothing about the species he found. He doesn't know what they look like, how they live, or much of anything else about their morphology. He doesn't even have their entire genome. All he has is a statistical blip — a unique sequence that, being unlike any other sequence in the database, must represent a new species.

This sequence may correlate with other sequences that resemble those of species we do know more about. In that case, Venter can make some guesses about the animals — that they convert sunlight into energy in a particular way, or that they descended from a common ancestor. But besides that, he has no better model of this species than Google has of your MySpace page. It's just data. By analyzing it with Google-quality computing resources, though, Venter has advanced biology more than anyone else of his generation.

This kind of thinking is poised to go mainstream. In February, the National Science Foundation announced the Cluster Exploratory, a program that funds research designed to run on a large-scale distributed computing platform developed by Google and IBM in conjunction with six pilot universities. The cluster will consist of 1,600 processors, several terabytes of memory, and hundreds of terabytes of storage, along with the software, including Google File System, IBM's Tivoli, and an open source version of Google's MapReduce. Early CluE projects will include simulations of the brain and the nervous system and other biological research that lies somewhere between wetware and software.

Learning to use a "computer" of this scale may be challenging. But the opportunity is great: The new availability of huge amounts of data, along with the statistical tools to crunch these numbers, offers a whole new way of understanding the world. Correlation supersedes causation, and science can advance even without coherent models, unified theories, or really any mechanistic explanation at all.

There's no reason to cling to our old ways. It's time to ask: What can science learn from Google?

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http://www.wired.com/science/discoveries/magazine/16-07/pb_theory

Biofuel use 'increasing poverty'

The replacement of traditional fuels with biofuels has dragged more than 30 million people worldwide into poverty, an aid agency report says.

Oxfam says so-called green policies in developed countries are contributing to the world's soaring food prices, which hit the poor hardest.

The group also says biofuels will do nothing to combat climate change.

Its report urges the EU to scrap a target of making 10% of all transport run on renewable resources by 2020.

Oxfam estimates the EU's target could multiply carbon emissions 70-fold by 2020 by changing the use of land.

The report's author, Oxfam's biofuel policy adviser Rob Bailey, criticised rich countries for using subsidies and tax breaks to encourage the use of food crops for alternative sources of energy like ethanol.

"If the fuel value for a crop exceeds its food value, then it will be used for fuel instead," he said.

"Rich countries... are making climate change worse, not better, they are stealing crops and land away from food production, and they are destroying millions of livelihoods in the process."

Opportunity - or crime?

Biofuels are a divisive issue with strong arguments on both sides.

Leaders such as Brazilian President Luiz Inacio Lula da Silva have suggested the biofuel boom provides developing nations with a great opportunity.

He says it creates a profitable export for energy crop producers in Africa, Central America and the Caribbean that could enable them to claw their way out of poverty.

But several aid agencies and analysts have warned of the possible downside of biofuel crop cultivation.

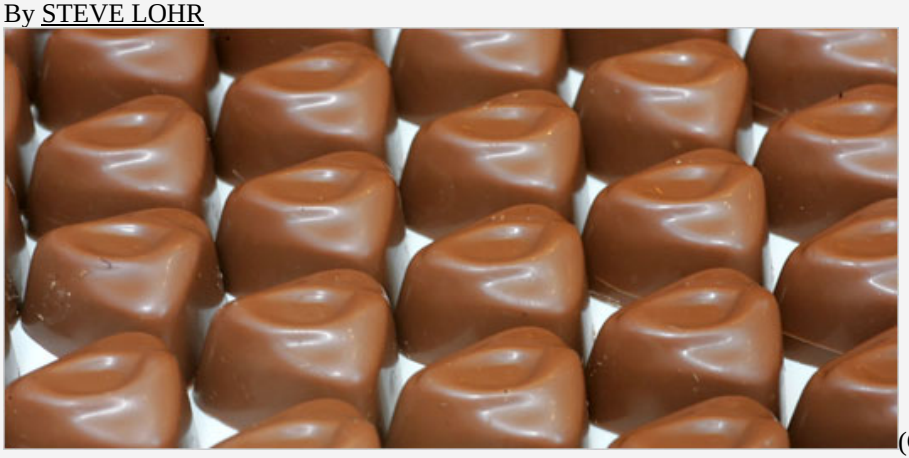
One UN adviser went as far as describing biofuels as a "crime against humanity".

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/europe/7472532.stm

Published: 2008/06/25 00:51:59 GMT

A Genetic Quest for Better Chocolate

By STEVE LOHR

 (Credit: Ruby Washington/The New York Times)

(UPDATED 6/26/08 10:33 a.m.| Corrected reference to cocoa trees' lack of presence in the United States. They do grow in Hawaii.)

At a time when world food prices are soaring and the hungry are protesting in the streets in developing nations, the challenges of growing cocoa, the key ingredient in chocolate, might seem no great priority.

But Mars, the giant candy maker (think M&M's and Snickers bars), takes cocoa very seriously. Tropical diseases, pests and climate change, Mars says, are among the threats — not only to the globe's collective sweet tooth but also to the livelihood of more than 6.5 million cocoa growers, mostly families working their small farms, about 70 percent in Africa.

So to protect its long-term supplies and help sustain cocoa farmers, Mars approached researchers at the United States Department of Agriculture and then sought big-time computing firepower at I.B.M. Labs. The result, to be formally announced Thursday, is a five-year project to sequence and analyze the entire cocoa genome.The goal is to deploy the most advanced tools of computational biology to discover the genetic building blocks of traits like disease and pest resistance, drought tolerance and perhaps flavor. The potential payoff is not just discovery but also faster improvements in cocoa crops, said Howard-Yana Shapiro, global director of plant science at Mars, in a telephone interview Wednesday from Rome, where he was attending a conference at the Food and Agriculture Organization of the United Nations.

Computational biologists and supercomputers can drastically accelerate the pace at which promising new strains of cocoa trees come out of the greenhouse, from the traditional length of five to seven years down to 18 months or so, Dr. Shapiro said.Isidore Rigoutsos, manager of the bioinformatics and pattern discovery group at I.B.M. Labs, explained, "You still need the basic biology and work in the greenhouse, but we can help plant experts zoom in. At the end of the day, the desirable traits being sought in cocoa are all genetic sequences."

CORRECTED|Cocoa trees, to be sure, do not grow in the mainland United States (they do grow in Hawaii). But the government's agriculture agency has a team of experts in breeding tropical plants, and for every dollar of cocoa imported, between one and two dollars of domestic agricultural products are used in making chocolate products. Mars, for example, is the nation's largest purchaser of whole peanuts, as well as a big buyer of milk products and sweeteners.

The results of the research will be freely available to anyone through the Public Intellectual Property Resource for Agriculture http://www.pipra.org/ .

http://bits.blogs.nytimes.com/2008/06/25/a-genetic-quest-for-better-chocolate/index.html?th&emc=th

Fossil fills out water-land leap

By Matt McGrath
BBC science correspondent

Scientists say a fossil of a four-legged fish sheds new light on the process of evolution.

The creature had a fish-like body but the head of an animal more suited to land than water.

The researchers' study, published in the journal Nature, says *Ventastega curonica* would have looked similar to a small alligator.

Scientists say the 365-million-year-old species eventually became an evolutionary dead end.

Counting digits

About one hundred million years before dinosaurs began to roam the Earth, *Ventastega* was to be found in the shallow waters and tidal estuaries of modern day Latvia.

According to lead author, Professor Per Ahlberg, from Uppsala University, Sweden, this creature had the head of a tetrapod, an animal adapted to live on land. The body, though, was fish-like but with four primitive flippers.

"From a distance, it would have looked like an alligator. But closer up, you would have noticed a real tail fin at the back end, a gill flap at the side of the head; also lines of pores snaking across head and body.

"In terms of construction, it had already undergone most of the changes from fish towards land animal, but in terms of lifestyle you are still looking at an animal that is habitually aquatic."

Experts believe that *Ventastega* was an important staging post in the evolutionary journey that led creatures from the sea to the land. Scientists once believed that these early amphibious animals descended in a linear fashion, but this discovery instead confirms these creatures diversified into different branches along the way.

Professor Ahlberg points to the discovery of a fossil called *Tiktaalik* in Canada in 2004. It is believed to be the "missing link" in the gap between fish and land mammals. *Ventastega* is a later species but is a more primitive form of transition animal.

" *Ventastega* fills the gap between *Tiktaalik* and the earliest land based mammals. All these changes in these creatures are not going in lockstep; it's a mosaic with different parts of animal evolving at different rates. *Ventastega* has acquired some of land-animal characteristics, but has not yet got some of the other ones."

For instance, the creature had primitive feet - but with a high number of digits.

Superb sands

"I would draw the inference that *Ventastega* probably had limbs very much like *Acanthostega* (another transitional species). These were little things sticking out of the sides, with a strangely high number of digits. You would have seven, eight, maybe even nine toes per foot, rather than five or so which you would expect to find in modern day animals," the Uppsala scientist explained.

Unfortunately for *Ventastega,* a multitude of toes does not inevitably lead to evolutionary success. It eventually died out. Other creatures went on to become our very distant land-living ancestors.

Scientists are delighted with the quality of these Latvian fossils, saying they are really well preserved. Professor Ahlberg believes it is due to some of the geological characteristics of the area.

"This region has had a very quiet geological history since that time, and as a result the rocks have not been folded or squashed up to form mountains.

"We still find sediments not yet properly turned to rock. These fossils were found in compact, wet sand. It's not sandstone, it's sand; you dig it with a breadknife.

"Once you take it back to the lab very carefully, you can remove the remainder of the sand with brushes and needles. These fossils are fragile but superbly preserved. They are actually three dimensional, not flat. It makes it very easy to interpret the skeleton."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7473470.stm

Published: 2008/06/25 18:00:09 GMT

Aids epidemic a 'global disaster'

By Imogen Foulkes
BBC News, Geneva

The Aids epidemic in some countries is so severe that it should be classified as a disaster, the Red Cross and Red Crescent (IFRC) has warned.

The crisis fits the UN definition of a disaster as an event beyond the scope of any single society to cope with, says the IFRC.

The IFRC's annual report on world disasters usually focuses on specific natural disasters such as earthquakes.

The report says much of the money spent on Aids is not reaching those in need.

This year, the International Federation of Red Cross and Red Crescent Societies (IFRC) is departing from tradition with its world disasters report, to focus on what it says is one of the most long term and complex problems facing the world: the HIV/Aids epidemic.

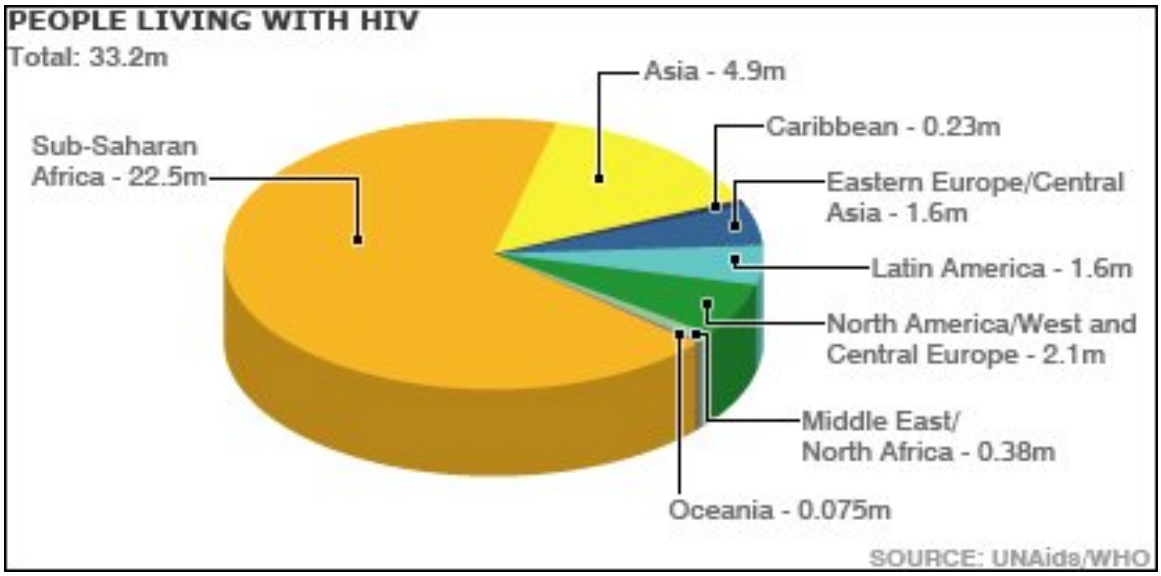
'Easy options'

By any standard, the epidemic is a global disaster: 25 million deaths, 33 million people living with HIV/Aids, 7,000 new infections every day.

The IFRC finds the world's response wanting.

There may be billions of dollars to spend on the fight against Aids, but the report warns that much of the money has not been targeted properly and is not reaching those most in need.

"When the history of HIV and Aids is written I think the people will say that we just went for the easier options," says Dr Mukesh Kapila, the IFRC's special representative on HIV/Aids.



General education and general awareness have been done, he says, but people at risk such as sex workers and injecting drug users are difficult for many governments to tackle.

Another area where the IFRC believes our response is lacking is in our approach to HIV/Aids during natural disaster or conflict.

The risk factors for the disease may rise, while at the same time - in the rush to bring in emergency relief - the needs of HIV/Aids patients may be forgotten.

Relief workers need to factor those needs into their relief programmes, Dr Kapila says.

HAVE YOUR SAY Although Aids has impacted on millions of people it's not something that can be sorted out by throwing money at it. Andrew Hunt, UK

After the South Asian tsunami hit Aceh in Indonesia in 2005, he says, "we had a rise in the risk factors like sexual and gender based violence, so we saw a situation where there was high vulnerability and HIV and other conditions can flourish in those circumstances."

The IFRC says Kenya is a good example of such an integrated approach.

When 300,000 people were displaced during post-election violence, health workers acted quickly to make sure Aids patients continued to get anti-retroviral drugs.

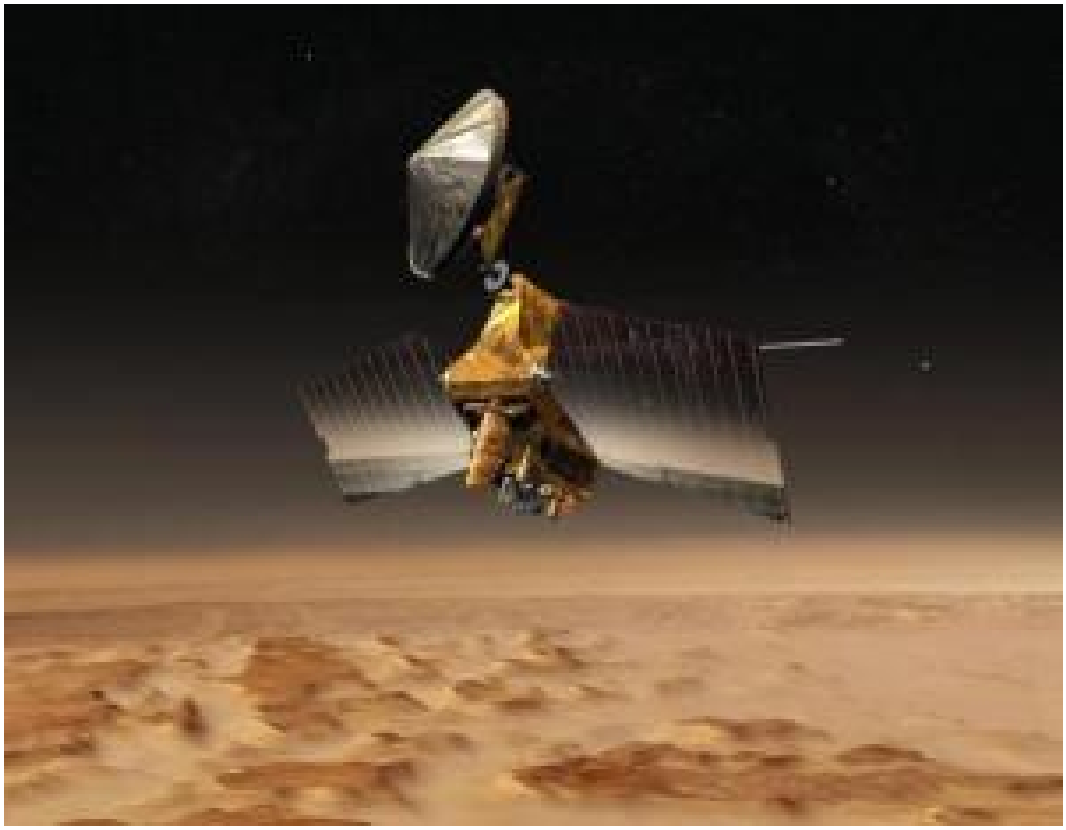
Patients in camps for the displaced were traced, and a free hotline was set up with details of the nearest Aids clinics.

That is the kind of swift and targeted response which is needed, the IFRC says, to a global disaster which will be with us for years to come.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7474600.stm

Published: 2008/06/26 02:05:36 GMT

Largest Crater In Solar System Revealed By NASA Spacecraft



Artist's concept of Mars Reconnaissance Orbiter. (Credit: NASA/JPL)

ScienceDaily (June 26, 2008) — New analysis of Mars' terrain using NASA spacecraft observations reveals what appears to be by far the largest impact crater ever found in the solar system.

NASA's Mars Reconnaissance Orbiter and Mars Global Surveyor have provided detailed information about the elevations and gravity of the Red Planet's northern and southern hemispheres. A new study using this information may solve one of the biggest remaining mysteries in the solar system: Why does Mars have two strikingly different kinds of terrain in its northern and southern hemispheres? The huge crater is creating intense scientific interest.

The mystery of the two-faced nature of Mars has perplexed scientists since the first comprehensive images of the surface were beamed home by NASA spacecraft in the 1970s. The main hypotheses have been an ancient impact or some internal process related to the planet's molten subsurface layers. The impact idea, proposed in 1984, fell into disfavor because the basin's shape didn't seem to fit the expected round shape for a crater. The newer data is convincing some experts who doubted the impact scenario.

"We haven't proved the giant-impact hypothesis, but I think we've shifted the tide," said Jeffrey Andrews-Hanna, a postdoctoral researcher at the Massachusetts Institute of Technology in Cambridge.

Andrews-Hanna and co-authors Maria Zuber of the Massachusetts Institute of Technology, and Bruce Banerdt of NASA's Jet Propulsion Laboratory in Pasadena, Calif., report the new findings in the journal Nature this week.

A giant northern basin that covers about 40 percent of Mars' surface, sometimes called the Borealis basin, is the remains of a colossal impact early in the solar system's formation, the new analysis suggests. At 8,500 kilometers (5,300 miles) across, it is about four times wider than the next-biggest impact basin

known, the Hellas basin on southern Mars. An accompanying report calculates that the impacting object that produced the Borealis basin must have been about 2,000 kiolometers (1,200 miles) across. That's larger than Pluto.

"This is an impressive result that has implications not only for the evolution of early Mars, but also for early Earth's formation," said Michael Meyer, the Mars chief scientist at NASA Headquarters in Washington.

This northern-hemisphere basin on Mars is one of the smoothest surfaces found in the solar system. The southern hemisphere is high, rough, heavily cratered terrain, which ranges from 4 to 8 kilometers (2.5 to 5 miles) higher in elevation than the basin floor.

Other giant impact basins have been discovered that are elliptical rather than circular. But it took a complex analysis of the Martian surface from NASA's two Mars orbiters to reveal the clear elliptical shape of Borealis basin, which is consistent with being an impact crater.

One complicating factor in revealing the elliptical shape of the basin was that after the time of the impact, which must have been at least 3.9 billion years ago, giant volcanoes formed along one part of the basin rim and created a huge region of high, rough terrain that obscures the basin's outlines. It took a combination of gravity data, which tend to reveal underlying structure, with data on current surface elevations to reconstruct a map of Mars elevations as they existed before the volcanoes erupted.

"In addition to the elliptical boundary of the basin, there are signs of a possible second, outer ring -- a typical characteristic of large impact basins," Banerdt said.

JPL manages the Mars Reconnaissance Orbiter for NASA's Science Mission Directorate, Washington. For more information about the mission, visit: http://www.nasa.gov/mro.

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com:80/releases/2008/06/080625223036.htm

Hurried Doctor Visits May Leave Patients Feeling Forgetful

ScienceDaily (June 26, 2008) — Have you ever been whisked through a doctor's visit, and afterward were unable to remember what the doctor said? A University of Rochester Medical Center study disclosed that doctors don't often take the steps necessary to help patients recall medical instructions.

The study, published online in this month's Journal of General Internal Medicine, investigated how frequently physicians repeat themselves, write down information, summarize instructions or take other steps to help patients remember the doctor's advice. The results suggest that doctors do not use these tools effectively or consistently. In fact, not one of the 49 doctors who took part in the study summarized their treatment recommendations.

"It's common for patients to forget half of what they're told in a medical visit," said the study's lead author, Jordan Silberman, a second-year University of Rochester medical student. "Obviously, this is cause for concern. As noted by the British researcher Philip Ley, 'if the patient cannot remember what he is supposed to do, he is extremely unlikely to do it.' No matter how effective a treatment is, it can be rendered useless by poor recall."

Researchers sent unannounced standardized patients (actors trained for this study) into primary care physician practices across Rochester, N.Y., with hidden recording devices. The actors complained of typical heartburn symptoms. Researchers then coded the recordings to determine how often doctors reinforced their instructions in some way.

Only about a third of the physicians wrote down instructions for patients. About half of the physicians repeated their recommendations, but some only repeated about 10 percent of the information.

Very few of the doctors made sure the patient understood by asking him or her to repeat it back to the doctor -- a technique cited in research literature as one of the best ways to help patients recall medical advice. For example, Silberman said, the doctor might say, "We've talked about a lot of things today and I want to make sure you understand everything. Can you explain to me what you're going to do when you get home?"

Lack of time may be the biggest obstacle for doctors, researchers believe. The next step is to develop a new approach to improve patient recall that can be applied in today's busy practices, and then to study the techniques in the context of what is feasible for doctors.

The Agency for Healthcare Research and Quality funded the study, which was conducted at the Rochester Center to Improve Communication in Health Care, part of the URMC Department of Family Medicine. Co-authors include: Aleksey Tentler, a recent URMC graduate, Rajeev Ramgopal, a research coordinator at the VA Pittsburgh Healthcare System, and Ronald Epstein, M.D., URMC professor of Family Medicine and Psychiatry.

Adapted from materials provided by University of Rochester Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080625105632.htm

How Ritalin Works In Brain To Boost Cognition, Focus Attention

ScienceDaily (June 25, 2008) — Stimulant medications such as Ritalin have been prescribed for decades to treat attention deficit hyperactivity disorder (ADHD), and their popularity as "cognition enhancers" has recently surged among the healthy, as well.

What's now starting to catch up is knowledge of what these drugs actually do in the brain. In a paper publishing online this week in Biological Psychiatry, University of Wisconsin-Madison psychology researchers David Devilbiss and Craig Berridge report that Ritalin fine-tunes the functioning of neurons in the prefrontal cortex (PFC) - a brain region involved in attention, decision-making and impulse control - while having few effects outside it.

Because of the potential for addiction and abuse, controversy has swirled for years around the use of stimulants to treat ADHD, especially in children. By helping pinpoint Ritalin's action in the brain, the study should give drug developers a better road map to follow as they search for safer alternatives.

At the same time, the results support the idea that today's ADHD drugs may be safer than people think, says Berridge. Mounting behavioral and neurochemical evidence suggests that clinically relevant doses of Ritalin primarily target the PFC, without affecting brain centers linked to over-arousal and addiction. In other words, Ritalin at low doses doesn't appear to act like a stimulant at all.

"It's the higher doses of these drugs that are normally associated with their effects as stimulants, those that increase locomotor activity, impair cognition and target neurotransmitters all over the brain," says Berridge. "These lower doses are diametrically opposed to that. Instead, they help the PFC better do what it's supposed to do."

A behavioral disorder marked by hyperactivity, impulsivity and the inability to concentrate, ADHD has been treated for more than a half-century with Ritalin, Adderall and other stimulant drugs. New reports also indicate these meds have lately been embraced by healthy Americans of all ages as a means to boost mental performance.

Yet, despite their prevalence, we know remarkably little about how these drugs work, especially at lower doses that have been proven clinically to calm behavior and focus attention in ADHD patients, says Berridge. In 2006, his team reported that therapeutic doses of Ritalin boosted neurotransmitter levels primarily in the PFC, suggesting a selective targeting of this region of the brain. Since then, he and Devilbiss have focused on how Ritalin acts on PFC neurons to enhance cognition.

To answer this, the pair studied PFC neurons in rats under a variety of Ritalin doses, including one that improved the animals' performance in a working memory task of the type that ADHD patients have trouble completing. Using a sophisticated new system for monitoring many neurons at once through a set of microelectrodes, the scientists observed both the random, spontaneous firings of PFC neurons and their response to stimulation of an important pathway into the PFC, the hippocampus.

Much like tiny microphones, the electrodes record a pop every time a neuron fires, Devilbiss explains. Analyzing the complex patterns of "voices" that emerge is challenging but also powerful, because it allows study of neurons on many levels.

"Similar to listening to a choir, you can understand the music by listening to individual voices," says Devilbiss, "or you can listen to the interplay between the voices of the ensemble and how the different voices combine."

When they listened to individual PFC neurons, the scientists found that while cognition-enhancing doses of Ritalin had little effect on spontaneous activity, the neurons' sensitivity to signals coming from the

hippocampus increased dramatically. Under higher, stimulatory doses, on the other hand, PFC neurons stopped responding to incoming information.

"This suggests that the therapeutic effects of Ritalin likely stem from this fine-tuning of PFC sensitivity," says Berridge. "You're improving the ability of these neurons to respond to behaviorally relevant signals, and that translates into better cognition, attention and working memory." Higher doses associated with drug abuse and cognitive impairment, in contrast, impair functioning of the PFC.

More intriguing still were the results that came from tuning into the entire chorus of neurons at once. When groups of neurons were already "singing" together strongly, Ritalin reinforced this coordinated activity. At the same time, the drug weakened activity that wasn't well coordinated to begin with. All of this suggests that Ritalin strengthens dominant and important signals within the PFC, while lessening weaker signals that may act as distractors, says Berridge.

"These results show a new level of action for cognition-enhancing doses of Ritalin that couldn't have been predicted from single neuron analyses," he says. "So, if you're searching for drugs that might replace Ritalin, this is one effect you could potentially look for."

He and Devilbiss also hope the research will help unravel an even deeper mystery: exactly how neurons encode complex behavior and cognition.

"Most studies look at how something that impairs cognition affects PFC neurons. But to really understand how neurons encode cognitive function, you want to see what neurons do when cognition is improved," says Berridge. "So this work sets the stage for examining the interplay among PFC neurons, higher cognition, and the action of therapeutic drugs."

The work was funded by the National Institute on Drug Abuse, the National Institute of Mental Health and the UW-Madison Discovery Seed Grant Program.

Adapted from materials provided by University of Wisconsin-Madison.

http://www.sciencedaily.com/releases/2008/06/080624115956.htm

How To Attract Young People To Engineering: 'Make A Difference' Message Is Key

ScienceDaily (June 25, 2008) — Encouraging young people to make a difference in the world through an engineering career is more likely to attract them than emphasizing the challenge of math and science skills, says a new report from the National Academy of Engineering that identifies messages for improving public understanding of engineering.

The report, Changing the Conversation: Messages for Improving Public Understanding of Engineering, recommends that the engineering community begin using tested messages in a coordinated communications strategy.

The four messages that tested best are:

- Engineers make a world of difference.
- Engineers are creative problem-solvers.
- Engineers help shape the future.
- Engineering is essential to our health, happiness, and safety.

"Improving public understanding of engineering will enable people to make more informed decisions about technology, encourage students to consider engineering careers, and ultimately sustain the U.S. capacity for technological innovation," said Don Giddens, dean of engineering at the Georgia Institute of Technology and chair of the committee that wrote the report.Each year, the engineering community spends hundreds of millions of dollars to increase public understanding of engineering. However, most of these outreach efforts are ad hoc, local in scope, poorly coordinated, and not evaluated for effectiveness. The NAE project represents the first-ever effort to use market research techniques to improve the public image of the engineering profession.

The report presents and discusses findings from qualitative and quantitative research, including an online survey of 3,600 people. In addition to testing the appeal, believability, and relevance of a handful of different messages, the project also collected data on a set of taglines, or slogans. Because African Americans and Hispanics are underrepresented in engineering schools and careers, the survey included large numbers of both groups."There are concerns about a possible shortage of engineers in the United States," said Giddens, "and it is clear that the engineering profession needs to attract a more diverse mix of the most capable students."

While less than 15 percent of adults or teens described engineers using the common stereotypes, such as "boring" or "nerdy," the research showed that many students don't enjoy math and science enough to become engineers.Using the committee's research and expertise in engineering education and communications, the report offers tested messages that reposition engineering as a satisfying profession that involves creative ideas and teamwork -- not just personal benefits and technical skills. It also recommends strategies and tools that the engineering community may use to conduct more effective outreach. The study was sponsored by the National Science Foundation with additional support from the Georgia Institute of Technology. The National Academy of Engineering is an independent, nonprofit institution that serves as an adviser to government and the public on issues in engineering and technology. Its members consist of the nation's premier engineers, who are elected by their peers for their distinguished achievements. Established in 1964, NAE operates under the congressional charter granted to the National Academy of Sciences in 1863.

The report is available at: http://www.nap.edu/catalog.php?record_id=12187

Adapted from materials provided by The National Academies.
http://www.sciencedaily.com/releases/2008/06/080624145221.htm

'Neglected Infections Of Poverty' In United States Disable Hundreds Of Thousands Of Americans Annually

ScienceDaily (June 25, 2008) — An analysis published June 25th in the open-access journal PLoS Neglected Tropical Diseases highlights that diseases very similar to those plaguing Africa, Asia, and Latin America are also occurring frequently among the poorest people in the United States, especially women and children. These diseases -- the "neglected infections of poverty" -- are caused by chronic and debilitating parasitic, bacterial, and congenital infections.

While most Americans have never heard of neglected tropical diseases (NTDs), the analysis estimates that these infections occur in hundreds of thousands of poor Americans concentrated primarily in the Mississippi Delta (including post-Katrina Louisiana), Appalachia, the Mexican borderlands, and inner cities. These diseases represent a major cause of chronic disability, impaired child development, and adverse pregnancy outcomes, yet many of them are preventable.

"The fact that these neglected infections of poverty represent some of the greatest health disparities in the United States, but they remain at the bottom of the public health agenda, is a national disgrace," says Peter J. Hotez , MD, PhD, author of the analysis and President of the Sabin Vaccine Institute, Executive Director of Global Network for Neglected Tropical Diseases, and Walter G. Ross Professor and Chair of the Microbiology, Immunology, and Tropical Medicine department at George Washington University.

Hotez notes that the common features of these neglected infections include their highly disproportionate health impact on minorities and people living in poverty; their chronic, largely insidious, and disabling features; and their ability to promote poverty because of their impact on child development, pregnancy outcome, and productive capacity. He calls upon policy makers to make these infections a priority on the public health agenda.

"Control of these neglected infections is both a highly cost-effective mechanism for lifting disadvantaged populations out of poverty and consistent with our shared American values of equity and equality," Hotez says. "We need a national dialogue about these very important, but neglected conditions that afflict the poorest people in the United States. Neglected infections of poverty are understudied and not well known even by physicians and public-health experts. This lack of understanding and knowledge points to the urgent need to increase surveillance for these infections; use cost-effective existing drug control and treatment efforts; implement newborn screenings; and develop new drugs, diagnostics, and vaccines for these infections."

Journal reference:

1. Hotez PJ. **Neglected Infections of Poverty in the United States of America**. *PLoS Negl Trop Dis*, 2008; 2(6): e256 DOI: 10.1371/journal.pntd.0000256

Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080624110934.htm

'Directed Thinking' Increases Time Spent Exercising

ScienceDaily (June 25, 2008) — "Directed Thinking" involves asking people to think about information related to a topic that they already know which directs them to action. A study in the Journal of Applied Biobehavioral Research shows how "directed thinking" led to an increase in exercise performance and fitness in sedentary college students.

Laura L. Ten Eyck, PhD, Dana P. Gresky, PhD, and Charles G. Lord, PhD, studied 61 college students who did not exercise on a regular basis or exercised inconsistently. Researchers asked students to think about ideas that fell into either the "reasons" category or the "actions" category. For example, some participants were asked to list the reasons why they should increase the performance of a target cardiovascular exercise they had previously selected, such as to be healthier or lose weight. Other participants were asked to list actions they could take to increase exercise performance, such a joining a gym or working out with a friend.

Having the students for eight weeks bring to mind and list actions they could take to increase exercise performance led to an increase in exercise and improved cardiovascular fitness. However, having students repeatedly bring to mind the reasons why they should do the target exercise did not increase time spent exercising.

"Our results suggest that people who are out of shape and at risk for serious health problems may be able to think their own way out of their unhealthy lifestyle and onto the path towards better physical fitness," the authors conclude. "It could change the way that people think about motivating themselves and others."

Journal reference:

1. Laura L. Ten Eyck, Dana P. Gresky, Charles G. Lord. **Effects of Directed Thinking on Exercise and Cardiovascular Fitness**. *Journal of Applied Biobehavioral Research*, 2007; 12 (3-4): 237 DOI: 10.1111/j.1751-9861.2008.00023.x

Adapted from materials provided by Wiley-Blackwell.

http://www.sciencedaily.com/releases/2008/06/080624110909.htm

Raw Materials of a Life, Revealed by Sculpture

By HOLLAND COTTER

Spirals abound in Louise Bourgeois's art. She says they make her think of control and freedom, and of strangling someone. So it's perfect that her retrospective, seen in London and Paris, is now in the looping rotunda of the Guggenheim Museum. It looks great there, clean but organic — fecund, tumid, enwrapping — and unclassically classical.

Ms. Bourgeois, 96, has been prolific. For her art is not a job; it is a life. It is what you do when you get up in the morning, and what you continue to do all day, through headaches and phone calls, breakups and breakdowns, silences and celebrations. It is what you keep doing after dark, and when you can't sleep at night.

We have been looking at the products of that life for some time, solidly for the past 25 years, since her watershed 1982 survey at the Museum of Modern Art, and sporadically for decades before. Her art is a museum staple. She is an art-world presence, a personality and a loquacious one, ever ready to share her history.

From that history we know of her childhood in France, and how she learned to draw and sew while restoring antique tapestries in her family's business. We've learned of the psychic damage inflicted by her father's marital infidelities (the person she wants to strangle is his mistress); of her marriage to the American art historian Robert Goldwater; of motherhood (they had three sons); of making her way as an artist in an all-male game; and of her struggles with depression, anger, insomnia, agoraphobia, guilt and other lacerating but paradoxically stimulating disabilities.

We've heard about all of this many times, and that's O.K. "There is one story and one story only that will prove worth your telling," says the poet. The trouble is, even the most intriguing story has its limits, its fixed set of characters and situations. And Ms. Bourgeois's story — Robert Storr makes this point in the exhibition catalog — has been the sole lens through which her art is viewed, so faithfully and consistently that you would be very surprised to find any surprises in a retrospective.

But there are surprises, beginning with what the exhibition reveals about the shape of her long career, and specifically, its departure from the linear shape that "career" implies.

The Guggenheim's chief curator, Nancy Spector, has arranged the work more or less by date, from early to late, up the rotunda ramp. And some clear period markers are evident. Oil-on-canvas painting drops out of the account right away. Ms. Bourgeois abandoned the medium in 1949, and with it overt links to the European Surrealists she knew, and had mixed feelings about, in New York during World War II. (She had moved to the city, where she still lives, with Mr. Goldwater in 1938.)

Certain materials came and went with time. Many early sculptures, like some of the tall, rail-thin, on-tiptoe "Personages" from the 1940s, were carved from construction wood found on Manhattan streets. Free and portable, it was just the thing for an artist on a budget, whose studio space was an apartment-building roof. In the 1980s and 1990s came ponderous stone and metal work, requiring cranes and moving crews. Late sculptures high on the Guggenheim's ramps are made of stitched fabric, light and soft, suggesting practical concessions to age.

But in terms of ideas, the career doesn't fit the standard learning curve of developmental progress. If anything, it is an example of antiprogress, a process of doing, then undoing, rethinking and revisiting. Over the show's 60-year span Ms. Bourgeois doesn't get "better" as much as she gets different. As you walk through, you spend far less time working out the logic of how this came from that than wondering, "What will she think of next?"

She is a restless and inventive maker. She has said that she works in response to emotions: fury at the past and fear of the present among them. But on the evidence of the survey, she is equally impelled by formal options — what she can do with her hands. That includes drawing, etching, molding, carving in stone, casting in metal, constructing with wood, sewing, embroidering, and turning antique shop and Dumpster salvage into walk-in assemblages.

Those installations, called "Cells," show Ms. Bourgeois at her most obviously theatrical, though it is her objects that deliver the keenest shock: a squashy, fecal-like little abstraction hollowed like a pot ("Lair," 1963); a multibreasted, hermaphroditic beast carved from pink marble ("Nature Study," 1984-94); a latex-and-plaster penis that is also a vagina and floats like a mobile ("Filette," 1968).

Such images surely relate to the childhood trauma; she seems to have resigned herself long ago to being a lifer in that psychic prison. But they point to other narratives too. The big one for me is the story of how one artist figured out that by staying personal and getting messy with opposites — exquisiteness and grossness, Bernini and bathroom jokes — and being willing to go "too far" without being reckless, she could make art that was the equivalent of a certain kind of diary writing: purgative, but rigorously poetic. (Ms. Bourgeois herself is a lifelong daily diarist.)

What she was doing initially had scant connection with the concerns of the larger art world, but she was by no means isolated from that world. Just the opposite: she was deeply networked. The catalog is sprinkled with snapshots of her posing with superstars, all of them men. Yet when it came to work, she was out there on a limb, doing her own thing.

Many artists since have taken notice of what she did. If you squint, the Guggenheim survey can start to look like a big group show, a Louise Bourgeois homage. There's a Bruce Nauman, a Carl Andre, a Kiki Smith, a Paul Thek, a Zoe Leonard, a Robert Gober, as well as contributions by most of the hip young international figures who were in "Unmonumental: The Object in the 21st Century" at the New Museum last year.

The point is, Ms. Bourgeois was there. And she too is a product of influences, from specific figures like Brancusi, Léger and Duchamp, to whole art historical fields (Baroque and Hellenistic sculpture, Surrealism, African art). She's quick to acknowledge them because she knows that being influenced is unimportant. It's how you personalize influence — reshape it, mock it, brutalize it, tickle it, lift it up — that counts.

Her unorthodoxies did not make for easy going. By the 1960s and ’70s, when the woman’s movement was turning cultural givens inside out, she was already a resistance veteran. People saw this and made a hero of her, and she played along. She seems to like acting the sage — there are worse crimes — and she is very good at it.

And now she is part of the liberation, less for what she says than for how she lives her life, which is her work. Certain artists inspire by formal example, other by giving permission. Ms. Bourgeois is a permission-giver.

Your daily life is propelled by fear? Draw fear. You can. Impossible to sleep at night? Make night your studio, the cloth you embroider with needs and dreams. The past is an obsession you can neither embrace nor release? Make an image of obsession, any image will do. And you’ll feel better for a while. Ms. Bourgeois has made many such images. One at the Guggenheim is a bronze sculpture of a tiny, childlike, nude figure engulfed in the anaconda squeeze of a wrap-around phallus. The piece is titled “Spiral Woman” (1984). Ms. Bourgeois calls it a self-portrait.

It is hilariously cruel, this cartoon of suffocation, a sick joke the artist has turned on herself and on the world. It is also beautiful — petite, delicate, burnished a gleaming gold. It is probably heavy, but suspended by a cord, it looks like a cloud, a twisty cloud, floating free.

“Louise Bourgeois” continues through Sept. 28 at the Guggenheim Museum, 1071 Fifth Avenue, at 89th Street; (212) 423-3500; guggenheim.org.

http://www.nytimes.com/2008/06/27/arts/design/27bour.html?_r=1&th&emc=th&oref=slogin

Cascades, Sing the City Energetic

By ROBERTA SMITH

When Walt Whitman crossed the East River on the Brooklyn Ferry, the sheer ecstasy of the trip made him see the future. It was us, the coming generations of urban dwellers who would draw the same energy he did from his wonderful town and its waterways.

Whitman imagined an essence of city life that is still palpable — and intoxicating — no matter how many changes we lament. But I doubt he could have conjured one thing that we can see for the next three and a half months: the waterfalls in our midst. Four of them, to be exact. Together they form a mammoth work of shoreline land art called “The New York City Waterfalls.” It is the brainchild of the Danish-Icelandic artist Olafur Eliasson working with the tireless Public Art Fund and a host of public and private organizations and donors. Between 90 and a 120 feet high and up to 80 feet across, they cascade into Whitman’s beloved East River from four dense, plumbed scaffolding structures on or just off the coasts of Manhattan, Brooklyn and Governors Island, making some of New York’s most thrilling waterside vistas more so.

Sometimes Mr. Eliasson’s falls are almost miragelike, especially after dark, when unobtrusive lighting makes them shimmer white against the muffled cityscape. It is at night that you have the greatest chance of hearing them from a distance, otherwise the rush of water is drowned out by the city. But their quiet heightens their strangeness, day or night. It is as if they were in their own movie, a silent one. And in a way they are. They could almost fool King Kong into thinking he is back home. They are the remnants of a primordial Eden, beautiful, uncanny signs of a natural nonurban past that the city never had.

Sometimes when the wind is brisk, and the steel scaffolding is especially visible, the falls inspire more nuts-and-bolts associations. They can send the mind to the Cyclone of Coney Island and those towers from which daredevil riders and their hapless steeds used to jump, or to old Times Square with its ambitious billboards. If you get really close to them, you’ll see that the water is carried upward by what are essentially common New York apartment-building plumbing risers (18 inches in diameter, and occurring every 10 feet across).

The waterfalls run every day, from morning until 10 at night. Which is to say that they can be turned off, unlike the city that never sleeps. (They do turn off automatically if the wind is too strong.) Unlike real waterfalls, they continuously recirculate river water, meaning that they are, technically speaking, fountains. In the same vein the work's very title is an oxymoron. After all, it was the relative dearth of real waterfalls that fostered New York's nearly instant success and glamour as a port city.

But "The New York City Waterfalls" is also one of the largest works of art, public or otherwise, of our modern era. (Let's not get in a shouting match with ancient civilizations, where autocratic rule made all sorts of things possible.) The piece is an heir to the monumental site-specific artworks whose most spectacular examples were made (and in some cases still are being made) in the distant reaches of the Nevada and Utah deserts starting in the late 1960s and the '70s by earth artists like Robert Smithson, Walter De Maria, James Turrell and Michael Heizer. Ever since, younger, less isolationist artists have figured out ways to do something similar in the urban environment, within reach of a large public. In this they have followed the example of Christo and Jeanne-Claude, whose 2005 "Gates" ostentatiously swathed Central Park in orange.

The waterfalls are an astounding feat of engineering, municipal coordination and fund-raising (given their $15 million price tag). But they are also actually relatively unobtrusive and brilliantly insidious. They go against the grain of the often spectacular nature of quite a bit of the best-known public art, including some made by Mr. Eliasson himself. Mr. Eliasson likes to think big about ways to enhance the experience of light, space, scale, nature and community. His best known work is the 2003 "Weather Project," an immense installation of the jaw-dropping kind. Using bright yellow fluorescent lights behind a scrim and a mirrored ceiling, it created an immense glowing sun on the end wall of Tate Modern's vast Turbine Hall, while also mechanically adding bits of mist and fog to the view.

For months Londoners basked in the work's artificial glow, often while stretched out on the ground gazing up at their tiny reflections. Sometimes they collaborated on performance pieces visible to everyone, arranging their prone bodies in words of greeting or protest or in abstract designs. Some people hated the work, seeing it as a dwarfing spectacle with fascist overtones; others complained that it turned the museum into a giant playpen.

Here Mr. Eliasson takes a more subtle tack. The falls don't bowl you over or dwarf you until you get close to them, and even then not always. Mostly they accumulate in a way art purists may welcome with buzzwords like "de-centering" and "discursive." Despite its size, the work has to be assembled and reassembled by individual viewers who will see its parts from hundreds of different vantage points along the river.

Even when you go to one of the places where all four waterfalls are visible at once, the spectacular character of the piece builds slowly. From the top level of the Pier 17 building in the South Street Seaport, for example, the widest fall, spouting from beneath the Brooklyn Bridge and veiling the Brooklyn-side pylon in sheets of white water, is easy enough to spot. The others , smaller and more distant, must be picked out one by one. To the right, the second Brooklyn falls, on the Brooklyn Piers, can almost get lost in the jumble of buildings. Up river a bit the Manhattan falls stand out on the short Pier 35 yet seem a little dwarfed, like a water slide without its slide. To the far right, the falls on Governors Island are especially beautiful. Rising above the relatively low-lying profile like a tropical vision, they seem to waiting for the jungle to grow up around them.

The experience of Mr. Eliasson's artful addition to the urban landscape depends on everything around it — the city's changing pace, light and (real) weather. And on you. The falls can be looked at from near or far, alone or in groups, on foot or bike, from boats and bridges, in snatched glimpses on the move or staying-in-place contemplation. They fake natural history with basic plumbing, making little rips in the urban fabric through which you glimpse hints of lost paradise and get a sharpened sense of Whitman's, the one you already inhabit.

http://www.nytimes.com/2008/06/27/arts/design/27wate.html?ref=design

Reflections Through a Surrealistic Eye: Dalí and the Camera

By ROBERTA SMITH

Nearly 80 years on, the famous image from "Un Chien Andalou," which Salvador Dalí and his art-school friend Luis Buñuel cobbled together in Paris in April 1929, remains one of the most shocking in all cinema. A woman's face fills the screen. A man's left hand widens the lids of her left eye; his right begins to draw a straight razor across it. Then there is, as it were, a jump cut. The razor slices through the eye of a dead cow and gelatinous ooze tumbles forth. Yick, and whew.

Such special effects are crude by today's digital standards. But the high point of the first genuinely Surrealist film can still be churning no matter how often you see it.

At the moment that can be as often you please, thanks to "Dalí: Painting and Film," a strangely piecemeal, open-ended and inspiring exhibition at the Museum of Modern Art. Organized by the Tate Modern in London in cooperation with the Fundació Gala-Salvador Dalí in Figueres, Spain, it has been overseen by Jodi Hauptman, a curator of drawings at MoMA, and is accompanied by an extensive film program selected by Anne Morra, an assistant curator in film. The show tracks the traffic of images, themes and ideas between Dalí's films, both realized and not, and his more static efforts, including paintings, drawings, letters, illustrated notes, scenarios and other ephemera.

"Un Chien Andalou" is projected continuously in the show's first gallery, following a batch of paintings, collages and ink drawings that Dalí made from 1922 through 1931. They include a stately portrait of Buñuel from 1924 done in Picasso's neo-Classical style, and hints of things to come. A painting and drawing from 1927 feature a severed hand, like the one seen in "Un Chien Andalou" lying on a busy Parisian street being poked with a stick by a moody young woman.

The penchant for decaying flesh so present in Dalí's art is literalized quite bluntly in "Un Chien Andalou." It takes the form of two dead donkeys laid out on the strings of grand pianos. Those are harnessed to a young man trying to force his attentions on the young woman who earlier dodged the

straight razor, holding him back like a combination of guilt, social constraint and fear. The cluster of scurrying ants — like that stream from the stigmatalike wound in another hand in the film — recur throughout the exhibition, migrating across faces, gathering in corners, exploring bodily orifices. (Also on view is a detailed letter from Buñuel about how to transport ants from Spain to Paris and have them lively enough for purposes of filming.)

Born in the Catalan town of Figueres in 1904, Dalí was endowed with a litany of textbook neuroses. He was named for an older brother who died the year before he was born, and he never lived down the notion that he was a poor substitute; he learned early on to use outrageous behavior to mask his shyness, inferiority complex and sexual ambivalence.

At an early age he recognized painting as his salvation, demonstrating a gift for rendering that suggested Van Eyck's exacting skill softened by the subtle lusciousness of Vermeer. He read Freud word for word, devoured avant-garde magazines. Inspired by Bosch, de Chirico and Miro, he began to paint Surrealism's most optically precise and psychologically disturbing images almost before he ever went to Paris. His vast pristine plains interrupted by jagged mountains, architectural ruins and variously grotesque, fraught and sexual signs of life are among painting's most convincing portraits of the mind and its discontents.

But Dalí's devotion to painting was not exclusive. There was the continuing performance that was Dalí himself, with his gift for publicity and controversy, his relentless narcissism and frenetic imagination. There is his enormous body of writing: a novel, poetry, an autobiography and numerous theoretical essays. There were set designs, beginning in 1927 with those for "Mariana Pineda," a play by another close art-school friend, the poet Federico García Lorca, and later for ballets by Massine and Balanchine.

He gravitated to film as soon as movies began to be shown regularly in theaters throughout Europe (including Figueres) in the late 1910s and early '20s. Like many avant-garde artists in both Europe and America, he admired the work of Buster Keaton, Harold Lloyd and the Marx Brothers, especially Harpo, the silent and, for him, most Surreal sibling. (Groucho Marx noted that Dalí "is in love with my brother — in a nice way.")

But mainly Dalí grasped that film's capacities — for depicting irrationality in action; for dissolving, continually mutating images; and for an intensely real unreality — were all ready-made for his sensibility and his desire to reach a mass audience. Dalí's pristine, limitless plains were lifted almost verbatim from the implicitly surreal landscape of his beloved Catalonia, but they also had the artificiality of a Hollywood soundstage.

Nicely, the show at MoMA doesn't sequester the films in pitch-black rooms. Their grainy or silvery grisailles flicker in full sight of Dalí's often small, intensely colored paintings, which sit on the walls like brilliant boxed jewels.

As the exhibition ebbs and flows, the drawings and films gradually supersede the paintings. Subsequent galleries display nonstop projections of "L'Age d'Or," which Buñuel and Dalí made in 1930, and the somewhat questionable "Destino," the sprightly animated short of love and loss that Dalí worked on energetically for Walt Disney in 1946, only to have Disney pull the plug. It was resuscitated and completed in consultation with John Hench, one of Dalí's original collaborators at Disney, in 2003, but a large batch of Dalí's original sketches attest to the attempt to remain true to his ideas.

In the final gallery "Chaos and Creation," a 1960 video of a Happening that Dalí staged with the photographer Philippe Halsman, involves some nearly naked women, a few very clean pigs and an intense dislike of Mondrian. It is both a period piece and a testament to an artist striving to keep up with his times.

"Adventures in Upper Mongolia — Homage to Raymond Roussel," a largely abstract film conceived by Dalí and made by the Spanish director José Montes-Baquer in 1975 is more original. The narration of the film's veil-like layers and suspended patches of rusts, golds and blues concerns a journey in search of

hallucinogenic mushrooms. The label informs us that the motifs are microscopic images, much enlarged, of the oxidation on the brass details of some fountain pens, and moreover that Dalí urinated on them every day to accelerate the oxidation process. The film could have been made by a young Pictures appropriation artist in the 1980s.

The show's drop-dead gallery is dominated by an enormous projection of the dream sequence Dalí designed for "Spellbound," Alfred Hitchcock's 1944 suspense classic starring Ingrid Bergman and Gregory Peck. One scene of a man with a giant pair of scissors cutting a huge curtain painted with multiple eyes echoes "Un Chien Andalou." (In fact it had been planned before Dali signed on.) In her catalog essay about the film, Sara Cochran rightly considers this an indication of how completely contemporary culture and especially Hollywood had assimilated the style and motifs of Surrealism. For all its violence, the razor scene in "Un Chien Andalou" announced an intention not only to shock but to "open" the eye to a new way of seeing. MoMA's fragmentary yet haunting show provides a fresh view of how Dalí, for all his outrageousness, never stopped trying to live according to the ambition he so brutally visualized.

"Dalí: Painting and Film" continues through Sept. 15 at the Museum of Modern Art; (212) 708-9400, moma.org.

http://www.nytimes.com/2008/06/27/arts/design/27dali.html?ref=design

A Trip Through the Revolving Doors of Perception

By KEN JOHNSON

Paul McCarthy fans are in for a shock. They will find almost nothing of what this Los Angeles master of transgressive provocation is famous for in "Central Symmetrical Rotation Movement: Three Installations, Two Films" at the Whitney Museum of American Art. No psychotic clowning, no scatological food play, no pornographic vaudeville, no raunchy political satire, no gross self-abnegation.

What they will discover instead is a smart, tightly focused study of the formal and conceptual underpinnings of Mr. McCarthy's art: his work stripped to its bare, abstract yet still metaphorically resonant essentials. Organized by Chrissie Iles, a Whitney curator, the show of about 22 works dating from 1966 to the present includes three major sculptures, two early short films and assorted drawings, photographs and videos.

Two basic motifs connect the various pieces: the room and rotational movement, or spinning. An early example is a three-minute black-and-white film from 1971 ("Spinning Camera, Walking, Mike Cram Walking") that Mr. McCarthy made by rotating a camera on a tripod in a mostly empty room. The view goes round and round, alternating bright windows and dark walls and occasionally giving a glimpse of a man walking in circles in the room.

A recent effort is "Mad House," which was conceived in 1999 and completed this year. It consists of a large steel-framed wooden box mounted on a powerful motor. A door in the box reveals a room with a padded seat inside. (There are also three square windows.) When turned on, the room rotates at high speed while inside the chair rotates too, though not necessarily in the same direction or at the same velocity.

"Mad House" is intended as a ride, but as it is now set up, it is too dangerous for anyone to try it because it's going too fast. Regardless, a viewer naturally imagines himself seated in the spinning chair in the spinning room — a scary thought.

Besides the formal tension between the containing structure of the room and the centrifugal dynamism of spinning, a preoccupation with perceptual experience links "Spinning Camera" and "Mad House." In the film you have the sense of looking out through the eyes of someone who is spinning around in a room. "Mad House," with its two eyelike windows, also suggests the idea of being in someone's head — someone whose mind is spinning out of control.

For “Couple” (1966), a 15-minute film that is the exhibition’s earliest piece, Mr. McCarthy set the focus on his camera at two feet and then roamed around a room with it, creating a blurry, aimless tour. Two naked people, a man and a woman, appear intermittently. It is like seeing through the eyes of a restless infant who has not yet learned to focus.

In “Spinning Room,” which was conceived in 1970 and also completed this year, things get really complicated. Four video cameras rotate on a gleaming high-tech machine within a square, walk-in enclosure made of rear-projection screens. Images recorded by the cameras pass through computers and then to projectors stationed outside the enclosure. The projectors direct streaming video pictures of people inside onto the screens.

If that sounds complicated, wait, there’s more: The rotating pictures on the screens may be live, delayed, upside down, reversed or in photographic negative. Different image streams are layered over one another, and overhead lights are going on and off. All these feedback loops create a trippy, kinetic Cubism reflecting a distinctively modern delirium of perceptual and cognitive overload.

In the design of the exhibition Mr. McCarthy has amplified everything by making one long wall bisecting the Whitney’s second floor into a mirror, visually doubling the show and turning it into a bewildering fun house.

The exhibition’s third major sculpture, the scary and noisy “Bang Bang Room” (1992), adds to the atmosphere of a mad carnival. It does not spin, but it has four hinged, motorized walls that open and close like giant butterfly wings, imparting a slight illusion of propellerlike rotation. Each wall has a door that keeps opening and banging shut. Step into the room; as the walls close around you and the doors of perception slam wildly, you’ll feel like you’re in a surrealistic horror movie.

Those experienced with Mr. McCarthy will note his influences, including the filmmaker Michael Snow, and the sculptors and video makers Bruce Nauman, Vito Acconci and Dan Graham. Unconcerned with stylistic uniqueness, Mr. McCarthy is a cheerful, unabashed borrower of forms and ideas.

But his project has its own gripping mission. Over and over Mr. McCarthy returns to the human fact that we are inescapably at the mercy of what our senses tell us about the world and what our brains manage to make of that information. We may go out of our minds, but we can never get out of our heads.

Paul McCarthy’s “Central Symmetrical Rotation Movement: Three Installations, Two Films,” is on view through Oct. 12 at the Whitney Museum of American Art, 945 Madison Avenue, at 75th Street, (800) 944-8639, whitney.org.

http://www.nytimes.com/2008/06/27/arts/design/27mcca.html?ref=design

As Africa's Horrors Rage, Suffer the Little Children

By JANET MASLIN

SAY YOU'RE ONE OF THEM

By Uwem Akpan

Illustrated. 358 pages. Little, Brown & Company. $23.99.

It's Christmastime in Kenya in "An Ex-Mas Feast," the first short story in Uwem Akpan's startling debut collection, "Say You're One of Them." The narrator is Jigana, an 8-year-old boy. His 12-year-old sister is a prostitute, which makes her Jigana's most fortunate family member by a long shot. His 10-year-old sister wants to follow the older girl's example. There are also 2-year-old twins and a baby who's used as a prop for begging. The family's most precious Christmas gift is a container of sniffable glue.

These conditions are so dire that it's possible to misunderstand the author's tone, at least initially. "An Ex-Mas Feast" is so relentless that it almost has the makings of macabre humor. Only after the patriarch has been able to steal a cache of party presents, including gift-wrapped insecticide, and trade them for dubious treasure (zebra intestines and three cups of rice) is it clear that Mr. Akpan is not striving for surreal effects. He is summoning miseries that are real.

Ever since "An Ex-Mas Feast" appeared in The New Yorker's 2005 debut fiction issue, Mr. Akpan has been received as a critics' darling. A Jesuit priest with an M.F.A. in creative writing from the University of Michigan, he is comfortable on many kinds of terrain. He fuses a knowledge of African poverty and strife with a conspicuously literary approach to storytelling, filtering tales of horror through the wide eyes of the young. In each of the tales in "Say You're One of Them" a protagonist's childlike innocence is ultimately savaged by the facts of African life.

If Mr. Akpan reiterates this same idea, he does it in widely varying locations and formats. Two of this book's five pieces are novella-length; the other three stories are relatively short. Geographical references include Ethiopia, Kenya, Nigeria, Rwanda and Gabon. This last country is the supposed destination of the brother and sister who appear in "Fattening for Gabon," and it takes many pages for the children to grasp what is signaled to the reader early on. Kotchikpa and Yewa are not bound for a life of wealth and happiness in the country of the title. "Selling your child or nephew could be more difficult than selling other kids": that is the blunt line with which "Fattening for Gabon" begins.

But their uncle, known as Fofo Kpee, cons these children with a flashy motorbike. He says it's a sign of the life they will have when they sail from Benin to Gabon. Since the children have long been separated from their parents, who have AIDS, the motorbike looks that much more tempting. Mr. Akpan is at his bleakly surreal best when he loads the bike with five people, along with yams, pineapples, oranges, a rooster and five rolls of toilet paper for a joyride.

"My chest swelled with pride," says Kotchikpa, "and my eyes welled up with tears, which the wind swept onto my earlobes."

Imagery like that is far more vibrant than the mechanical ways in which these stories move toward doom. With his trajectory always a fait accompli, Mr. Akpan fares better with small, evocative details than with broad strokes. The phony new caretakers who ask Kotchikpa and Yewa to call them Mama and Papa, and who ply the kids with foods that will make them more valuable as slaves, can be little more than caricatures. Far more memorable is one of the feasts these people provide.

"A pot of pepper soup was studded with chunks of bushmeat, each held together with white string, some of the meat still carrying the pellets that had brought down the animal," Kotchikpa observes, "which was the kind of stuff our people liked a lot."

Mr. Akpan also uses dialect to strong effect. ("Joy full my belly today because my broder and wife done rewarded me, say I do deir children well well," the treacherous Fofo says of his value as an uncle.) Throughout this collection he succeeds far better in summoning individual voices than in capturing more generalized conflict. In "An Ex-Mas Feast," which is still this author's most audacious story, the matriarch of Jigana's street family comes fully to life only when the family starts fighting.

"This boy has grown strong-head," she says of her son. "See how he is looking at our eyes. Insult!" Mr. Akpan also sets his scene vividly with "loose cobbles that studded the floodwater like the heads of stalking crocodiles in a river." The most ambitious story is "Luxurious Hearses," a crowded microcosm of Nigeria in turmoil. The title refers to the bus on which the teenage protagonist, a Muslim named Jubril, hopes to escape into Niger. But to travel safely, he must pretend to be a Christian. Jubril's disguise is compromised as much by his aversion to secular influences like television and "hell-destined women" as it is by the fact that he has had his right hand cut off as a form of Sharia punishment.

When Mr. Akpan stalls the bus in limbo and loads it with a cross-section of passengers, many of the forces that roil African nations are represented. Religious war, tribalism, the power of the military and the influence of oil money are among the many facets here; conflicts in Liberia and Sierra Leone are among those specifically invoked. Despite such dramatic density, the arc of the story is as self-evident as the epiphany that comes to Jubril.

"He felt connected to his newfound universe of diverse and unknown pilgrims, the faceless Christians," Mr. Akpan writes. "The complexity of their survival pierced his soul with a stunning insight: every life counted in Allah's plan."

Mr. Akpan makes the lives of children count most of all. In the title story a Rwandan girl of mixed Hutu and Tutsi lineage witnesses the most horrific sight any child could ever see. In the face of an encroaching bloodbath, "Say you're one of them" is a command from a desperate parent. The girl is being told to do what, in these stories, is all but impossible: find a way to stay alive.

http://www.nytimes.com/2008/06/27/books/27book.html?ref=books

Exploring What Lies Beyond Manifest Destiny

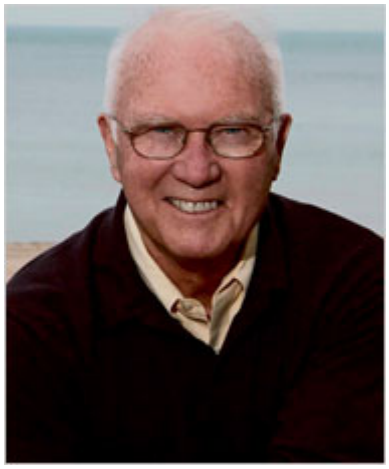
By JOHN STEELE GORDON

HABITS OF EMPIRE

A History of American Expansion

By Walter Nugent

Illustrated. 387 pages. Alfred A. Knopf. $30.



Confined at its birth to the area east of the Mississippi River, by 1867 the United States reached all the way to the Bering Strait. Never has a nation grown so large so quickly.

The United States is today the third-largest country in the world, behind only Russia and Canada. More than that, its territory could hardly be richer, more diverse or more advantageously placed on the globe. While much of the land of Russia and Canada is arctic or subarctic, most American territory is in the Temperate Zone. The United States is the only great power with coasts on both the Atlantic and Pacific, placing it effectively at the center of the world.

How this immense and fecund national territory came to be assembled is the story of "Habits of Empire" by Walter Nugent, a professor for many years at Notre Dame and earlier at Indiana University. He divides this history into three phases. The first, which he calls Empire I, takes up most of the book and is concerned with what is now the lower 48 states. While most people remember maps from school and the occasional catchy phrase, like "Fifty-Four Forty or Fight!" and "manifest destiny," the details are probably hazy at best. And these details are often fascinating and well delineated by Professor Nugent.

The United States acquired much of its present territory by aggressive means, notably what is now the Southwest, when it defeated Mexico in a war and forced it to cede a huge chunk of its almost empty northern reaches (although to be sure America paid Mexico more than it had paid France, in an arm's-length deal, for the Louisiana Purchase). But United States aggression also failed in some cases, notably Canada. Thomas Jefferson thought that its acquisition would be "a mere matter of marching" and that the Canadians would greet the Americans with open arms. They did not, and the United States was very lucky to get out of the War of 1812 with a burned capital and a draw.

In other cases, like those of Florida and Texas, the land was acquired by the simple expedient of American settlers pouring into largely unsettled areas. Spain, facing incipient revolt in both Mexico and South America, realized that it could not hold Florida anyway and sold it. Mexico, a few years later, tried to hold Texas but, led by a remarkably incompetent general, Santa Anna, lost it at the Battle of San Jacinto, where Santa Anna was captured and his army soundly defeated by Sam Houston and his Texas militia.

By 1853 the continental United States was complete and what Professor Nugent calls Empire II began. Empire I had been acquired with the idea of settlement, which occurred in the American West with astonishing speed. Empire II, however, was not meant for settlement, at least at first. The biggest part of Empire II was Alaska, which became American for much the same reason that Louisiana had about 60 years earlier: a European empire wanted to be rid of it and didn't want Britain to get it.

The rest of Empire II was added in the late 19th century and, except for the Philippines, consisted mostly of small islands in the Pacific, like Guam, American Samoa and Hawaii. Puerto Rico and, finally, the Virgin Islands, bought from Denmark in 1917, rounded out this overseas empire.

But a major part of Empire II was the control the United States exercised over foreign countries that were nominally independent. American protectorates were established in many countries in the Caribbean basin, with the Marines sent to keep peace (and, of course, safeguard American commercial interests). But with the end of World War I the American taste for foreign empire began to evaporate. By the middle of the 1930s the Marines were out of places like Nicaragua, and the Philippines was self-governing and on its way to independence.

Up to this point "Habits of Empire" is both a readable and valuable work in American history. Unfortunately the author felt compelled to add a postscript, "The Global Empire," on the United States in the post-World War II world. He calls this phase of American history Empire III, and his depiction of it is somewhere between highly tendentious and simply, well, silly.

For one thing, he covers 63 years of enormous global change in a mere 12 pages, which doesn't leave much room for explaining extremely complex events or providing context. For instance, Professor Nugent writes, quoting with obvious approval another historian (Robert Kagan), that globalization is simply " 'a process whereby American-style market economics engulfed nearly the entire world' in a manner similar to how white Americans put Indians' land 'to better use' in the 1800s." To describe globalization as nothing more than American economic imperialism is ludicrous. He might at least have noted that globalization has enormously enriched the entire world, not just the United States.

For another, he is often wrong on his facts. He writes that "there was no significant peace dividend" after the fall of the Berlin Wall and the collapse of communism, and that there were no military base closings. In fact the total Department of Defense budget, in constant dollars, fell by more than 30 percent between 1989 and 1998, and there have been five rounds of base closings, enacted despite considerable political pain.

In short, he buys completely into the visceral anti-Americanism, seeing American self-aggrandizing imperialism everywhere while scarcely noting that the free world was engaged in a decades-long, worldwide struggle against a ruthless tyranny.

In all, "Habits of Empire" is an excellent book as long as one ignores the historical claptrap of the postscript, which is an embarrassment to the author and publisher and an insult to the reader.

John Steele Gordon is the author of "An Empire of Wealth: The Epic History of American Economic Power" (HarperCollins, 2004).

http://www.nytimes.com/2008/06/26/books/26gord.html?ref=books

Bored by the view? Why not take your flat for a spin?
Jonathan Glancey
Thursday June 26, 2008

'It's the first building that rotates, moves, and changes shape," says David Fisher, architect of the Dynamic Tower, the latest proposal for a wacky and costly building in downtown Dubai. The 420-metre-high tower is designed to house 80 flats selling from between £2m and £20m. These will turn independently on a central axis, affording residents 360-degree views of the building sites of Dubai. The power to spin the flats around like some architectural funfair ride will be generated not by the burning of costly Saudi oil, but by wind-driven turbines set between each floor.

Fisher's computer animation of the tower in action is compelling. "This building never looks the same," he claims, "not once in a lifetime." There are plans to build a similar structure in Moscow. And Fisher should consider putting in bids for Blackpool, Brighton and Clacton-on-Sea. His whizzy towers would certainly be more fun than boring British super-casinos and "luxury" executive housing.

Will the Dynamic Tower ever happen? Is Fisher's animated design all spin and no substance? With enough money, there's no reason why it can't work. Whether it will make residents and people looking up at it dizzy is another matter, as is the question of who will look after this mechanical wonder when it falls from fashion and no one can be bothered to keep it turning.

The idea of moving buildings is not new. Who remembers the revolving restaurant, run by Butlins, at the top of the Post Office (now the BT) tower in central London? This offered diners Peckham with the prawn cocktail, Romford with the rump steak and Barnet with the black forest gateau. At much the same time, a group of young London architects, Archigram, dreamed up an entire "walking city"; bored by Southend, residents could press a lever and, before you could say Billy Butlin or Buckminster Fuller, its telescopic legs would carry them off to Southwold.

Hunger for architectural novelty is growing, so I can imagine the Dynamic Tower going ahead, as long, that is, as the developers don't get themselves into a twist over practicalities beforehand, and - inshalla - Dubai's prevailing sandstorms can be held at bay.

http://arts.guardian.co.uk/art/architecture/story/0,,2287328,00.html?gusrc=rss&feed=40

The Fight For The Best Quantum Bit (Qubit)

ScienceDaily (June 27, 2008) — Post Doc Henrik Ingerslev Jørgensen from the Nano-Science Center, located at the Niels Bohr Institute at the University of Copenhagen, has come an important step closer to the quantum computer.

"Our results give us, for the first time, the possibility to understand the interaction between just two electrons placed next to each other in a carbon nanotube. A groundbreaking discovery, which is fundamental for the creation of a quantum mechanical bit, a so-called quantum bit – the cornerstone of a quantum computer," explains Henrik Jørgensen, who is one of the many researchers competing on an international level to be the first to make a quantum bit in a carbon nanotube.

The ability to produce a quantum computer is still some years ahead in the future, the implementation will, however, mean a revolution within the computer industry. This is due to the quantum mechanical computation method, which quickly will be able to solve certain complicated calculations that on an ordinary computer would take more than the lifetime of the Universe to calculate.

Who will be first?

Over the past years there has been a tremendously increasing interest in developing a quantum computer within the international world of researchers. The production of a quantum computer is enormously challenging and demands development of new theories and new technologies by research-groups all over the world. Henrik Jørgensen's results have been developed in close collaboration with the Hitachi Cambridge Laboratory in England.

Adviser and Vice-Chairman at the Nano-Science Center, Professor Poul Erik Lindelof, says – We have been studying the quantum mechanical properties of carbon nanotubes for ten years, and today we are one of the leading laboratories within this field of research. I believe Henrik Jørgensen's experimental work can prove to be just the right way forward.

Kasper Grove Rasmussen is joint author of the article. He says – We use carbon nanotubes due to their unique electronic and material properties and not least due to the absence of disturbing magnetism from the atom nuclei which is found in certain competing materials.

At present it is not possible to say which material will be the most suitable for the quantum computer, or who will be the first to realize a quantum bit in a carbon nanotube, but the researchers at the Nano-Science Center are a big step closer to the solution.

This research was recently published in the journal Nature Physics.

Adapted from materials provided by University of Copenhagen, via AlphaGalileo.

http://www.sciencedaily.com:80/releases/2008/06/080625092700.htm

Fire Under Arctic Ice: Volcanoes Have Been Blowing Their Tops In The Deep Ocean

A "lonely" seismometer drifts with the sea ice. (Credit: Vera Schlindwein, Alfred Wegener Institute)

ScienceDaily (June 26, 2008) — A research team led by the Woods Hole Oceanographic Institution (WHOI) has uncovered evidence of explosive volcanic eruptions deep beneath the ice-covered surface of the Arctic Ocean. Such violent eruptions of splintered, fragmented rock--known as pyroclastic deposits -- were not thought possible at great ocean depths because of the intense weight and pressure of water and because of the composition of seafloor magma and rock.

Researchers found jagged, glassy rock fragments spread out over a 10 square kilometer (4 square mile) area around a series of small volcanic craters about 4,000 meters (2.5 miles) below the sea surface. The volcanoes lie along the Gakkel Ridge, a remote and mostly unexplored section of the mid-ocean ridge system that runs through the Arctic Ocean.

"These are the first pyroclastic deposits we've ever found in such deep water, at oppressive pressures that inhibit the formation of steam, and many people thought this was not possible," said WHOI geophysicist Rob Reves-Sohn, lead author and chief scientist for the Arctic Gakkel Vents Expedition (AGAVE) of July 2007. "This means that a tremendous blast of CO_2 was released into the water column during the explosive eruption."

The paper, which was co-authored by 22 investigators from nine institutions in four countries, was published in the June 26 issue of the journal Nature.

Seafloor volcanoes usually emit lobes and sheets of lava during an eruption, rather than explosive plumes of gas, steam, and rock that are ejected from land-based volcanoes. Because of the hydrostatic pressure of seawater, ocean eruptions are more likely to resemble those of Kilauea than Mount Saint Helens or Mount Pinatubo.

Making just the third expedition ever launched to the Gakkel Ridge--and the first to visually examine the seafloor--researchers used a combination of survey instruments, cameras, and a seafloor sampling platform to collect samples of rock and sediment, as well as dozens of hours of high-definition video. They saw rough shards and bits of basalt blanketing the seafloor and spread out in all directions from the volcanic craters they discovered and named Loke, Oden, and Thor.

They also found deposits on top of relatively new lavas and high-standing features--such as Duque's Hill and Jessica's Hill--indications that the rock debris had fallen or precipitated out of the water, rather than being moved as part of a lava flow that erupted from the volcanoes.

Closer analysis has shown that the some of the tiny fragments are angular bits of quenched glass known to volcanologists as limu o Pele, or "Pele's seaweed." These fragments are formed when lava is stretched thin around expanding gas bubbles during an explosion. Reves-Sohn and colleagues also found larger blocks of rock--known as talus--that could have been ejected by explosive blasts from the seafloor.

Much of Earth's surface is made up of oceanic crust formed by volcanism along seafloor mid-ocean ridges. These volcanic processes are tied to the rising of magma from Earth's mantle and the spreading of Earth's tectonic plates. Submerged under several kilometers of cold water, the volcanism of mid-ocean ridges tends to be relatively subdued compared to land-based eruptions.

To date, there have been scattered signs of pyroclastic volcanism in the sea, mostly in shallower water depths. Samples of sediment and rock collected on other expeditions have hinted at the possibilities at depths down to 3,000 meters, but the likelihood of explosive eruptions at greater depths seemed slim.

One reason is the tremendous pressure exerted by the weight of seawater, known as hydrostatic pressure. More importantly, it is very difficult to build up the amount of steam and carbon dioxide gas in the magma that would be required to explode a mass of rock up into the water column. (Far less energy is needed to do so in air.) In fact, the buildup of CO2 in magma in the sea crust would have to be ten times higher than anyone has ever observed in seafloor samples.

The findings from the Gakkel Ridge expedition appear to show that deep-sea pyroclastic eruptions can and do happen. "The circulation and plumbing of the Gakkel Ridge might be different," said Reves-Sohn. "There must be a lot more volatiles in the system than we thought." The research team hypothesizes that excess gas may be building up like foam or froth near the ceiling of the magma chambers beneath the crust, waiting to pop like champagne beneath a cork.

"Are pyroclastic eruptions more common than we thought, or is there something special about the conditions along the Gakkel Ridge?" said Reves-Sohn. "That is our next question."

Support for the Arctic Gakkel Vents Expedition and for vehicle development was provided by the National Science Foundation's Office of Polar Programs; the NSF Division of Ocean Sciences; the Gordon Center for Subsurface Sensing and Imaging Systems, an NSF Engineering Research Center; the NASA Astrobiology Program; and the WHOI Deep Ocean Exploration Institute.

Adapted from materials provided by Woods Hole Oceanographic Institution, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/06/080625140649.htm

With Security at Risk, a Push to Patch the Web

By JOHN MARKOFF

Since a secret emergency meeting of computer security experts at Microsoft's headquarters in March, Dan Kaminsky has been urging companies around the world to fix a potentially dangerous flaw in the basic plumbing of the Internet.

While Internet service providers are racing to fix the problem, which makes it possible for criminals to divert users to fake Web sites where personal and financial information can be stolen, Mr. Kaminsky worries that they have not moved quickly enough.

By his estimate, roughly 41 percent of the Internet is still vulnerable. Now Mr. Kaminsky, a technical consultant who first discovered the problem, has been ramping up the pressure on companies and organizations to make the necessary software changes before criminal hackers take advantage of the flaw.

Next week, he will take another step by publicly laying out the details of the flaw at a security conference in Las Vegas. That should force computer network administrators to fix millions of affected systems.

But his explanation of the flaw will also make it easier for criminals to exploit it, and steal passwords and other personal information.

Mr. Kaminsky walks a fine line between protecting millions of computer users and eroding consumer confidence in Internet banking and shopping. But he is among those experts who think that full disclosure of security threats can push network administrators to take action. "We need to have disaster planning, and we need to worry," he said.

The flaw that Mr. Kaminsky discovered is in the Domain Name System, a kind of automated phone book that converts human-friendly addresses like google.com into machine-friendly numeric counterparts.

The potential consequences of the flaw are significant. It could allow a criminal to redirect Web traffic secretly, so that a person typing a bank's actual Web address would be sent to an impostor site set up to

steal the user's name and password. The user might have no clue about the misdirection, and unconfirmed reports in the Web community indicate that attempted attacks are already under way.

The problem is analogous to the risk of phoning directory assistance at, for example, AT&T, asking for the number for Bank of America and being given an illicit number at which an operator masquerading as a bank employee asks for your account number and password.

The online flaw and the rush to repair it are an urgent reminder that the Internet remains a sometimes anarchic jumble of jurisdictions. No single person or group can step in to protect the online transactions of millions of users. Internet security rests on the shoulders of people like Mr. Kaminsky, a director at IOActive, a computer security firm, who had to persuade other experts that the problem was real.

"This drives home the risk people face, and the consumer should get the message," said Ken Silva, chief technology officer of VeriSign, which administers Internet addresses ending in .com and .net. "Don't just take for granted all the things that machines are doing for you."

When Mr. Kaminsky, 29, announced the flaw on July 8, he said he would wait a month to release details about it, in the hope that he could spur managers of computer systems around the world to fix them with a software patch before attackers could figure out how to exploit it.

Last week, however, accurate details of the flaw were briefly published online by a computer security firm, apparently by accident. Now security experts are holding their breath to see whether the patching of as many as nine million affected computers around the world will happen fast enough.

"People are taking this pretty seriously and patching their servers," Mr. Silva said.

Major Internet service providers in the United States this week indicated that in most cases, the software patch, which makes the flaw much more difficult to exploit, was already in place or soon would be.

Comcast and Verizon, two of the largest providers, said they had fixed the problem for their customers. AT&T said it was in the process of doing so.

But the problem is a global one, and the length of time required to fix it could leave many Web users vulnerable for weeks or months. And there are millions of places around the world where people might find themselves vulnerable to potential attacks, ranging from their workplaces to an airport lounge or an Internet cafe.

Individuals and small companies with some technical skills can protect themselves by changing the network preferences of their computer settings so that they use the domain name servers of a Web service called OpenDNS (www.opendns.com).

Some computer systems are immune to the flaw. About 15 percent of domain name servers in the United States and 40 percent in Europe, including those at major Internet providers like America Online and Deutsche Telekom, use software from a Dutch company called PowerDNS, which is not vulnerable.

Still, much of the Internet remains vulnerable. "I'm watching people patch, and I realize this is not an easy thing to do," Mr. Kaminsky said in an interview.

The flaw, which Mr. Kaminsky stumbled across in February, had been overlooked for more than two decades. The eureka moment came when he was idly contemplating a different security threat. He suddenly realized that it would be possible to guess crucial information about the protocol that domain name servers use to convert the numerical Web addresses.

Mr. Kaminsky worried about his discovery for several days and then contacted Paul Vixie, a software engineer who runs the Internet Systems Consortium and is responsible for maintaining a widely used version of software for domain name servers, known as BIND. Almost immediately, software engineers who looked at the vulnerability realized that Mr. Kaminsky had found a significant weakness.

In March, Microsoft held the secret meeting at its headquarters in Redmond, Wash. Sixteen representatives from security organizations and companies, including Cisco, talked about ways to combat the potential threat.

But after several delays while vendors fixed their software, Mr. Kaminsky went public.

For Mr. Kaminsky, the discovery and his subsequent warning to the Internet community were the culmination of an almost decade-long career as a security specialist. He was spotting bugs in software for Cisco and contributing to a book on computer security while still in college.

“I play this game to protect people,” he said.

He thinks that it is necessary to publish information about security threats to motivate system operators to protect themselves. Otherwise, “You don’t get to tell the river you need more time until it floods,” he said.

He said that he had initially hoped to give the Internet community a head start of a full month to fix the problem, but his plan was foiled when technical details were briefly posted online last week. “I would have liked more time, but we got 13 days and I’m proud of that,” he said.

The new flaw has sharpened the debate over how to come up with a long-term solution to the broader problem of the lack of security in the Domain Name System, which was invented in 1983 and was not created with uses like online banking in mind.

While Mr. Kaminsky is being hailed as a latter-day Paul Revere, Internet experts like Bruce Schneier, a member of the insular community that guards online security, said flaws like this were a routine occurrence and no reason to stay off the Internet.

“If there is a flaw in your car, it will get fixed eventually,” said Mr. Schneier, the chief security technology officer for British Telecom. “Most people keep driving.”

http://www.nytimes.com/2008/07/30/technology/30flaw.html?_r=1&th&emc=th&oref=slogin

Massive Greenhouse Gases May Be Released As Destruction, Drying Of World Wetlands Worsen

Pantanal wetlands of Brazil. Leading world scientists are convening near the Panatanal wetlands in Brazil amid growing concern that evaporation and ongoing destruction of world wetlands could cause them to exhale billows of greenhouse gases. (Credit: iStockphoto/Torsten Karock)

ScienceDaily (July 21, 2008) — Leading world scientists convene in Brazil July 21-25 amid growing concern that evaporation and ongoing destruction of world wetlands, which hold a volume of carbon similar to that in the atmosphere today, could cause them to exhale billows of greenhouse gases.

Meeting in the city of Cuiaba on the edge of South America's vast Pantanal, the largest wetland of its kind, some 700 experts from 28 nations at the 8th INTECOL International Wetlands Conference will prescribe measures urgently needed to better understand and manage these vibrant ecosystems, ranked among the planet's most threatened, and slow their decline and loss.

Warming world temperatures are speeding both rates of decomposition of trapped organic material and evaporation, while threatening critical sources of wetlands recharge by melting glaciers and reducing precipitation.

Covering just 6% of Earth's land surface, wetlands (including marshes, peat bogs, swamps, river deltas, mangroves, tundra, lagoons and river floodplains) store 10-20% of its terrestrial carbon. Wetlands slow the decay of organic material trapped and locked away over the ages in low oxygen conditions.

These waterlogged (either seasonally or year-round) areas contain an estimated 771 gigatonnes (771 billion tonnes) of greenhouse gases -- both CO_2 and more potent methane -- an amount in CO_2 equivalent comparable to the carbon content of today's atmosphere.

"Humanity in many parts of the world needs a wake-up call to fully appreciate the vital environmental, social and economic services wetlands provide -- absorbing and holding carbon, moderating water levels, supporting biodiversity and countless others," says conference co-chair Paulo Teixeira, Co-ordinator of

the Cuiaba-based Pantanal Regional Environmental Programme, a joint effort of the United Nations University and Brazil's Federal University of Mato Grasso (UFMT), which will host the event.

Says UN Under Secretary-General Konrad Osterwalder, Rector of UNU: "Too often in the past, people have unwittingly considered wetlands to be problems in need of a solution. Yet wetlands are essential to the planet's health -- and with hindsight, the problems in reality have turned out to be the draining of wetlands and other 'solutions' we humans devised."

If the decline of wetlands continues through human and climate change-related causes, scientists fear the release of carbon from these traditional sinks could compound the global warming problem significantly, says Prof. Paulo Speller, Rector of UFMT. Drained tropical swamp forests release an estimated 40 tonnes of carbon per hectare per year. Drained peat bogs release some 2.5 to 10 tonnes of carbon per hectare per year.

Adds Prof. Speller: "This landmark conference beside the Pantanal will gather an overview of the status of global wetlands, identify knowledge gaps, create greater collaboration and consistency in wetland science worldwide, and offer a plain-spoken policy prescription for decision makers with an appeal to adopt it with urgency."

German expert Wolfgang Junk says the impact of climate change on wetlands is small so far compared to the damage caused by poor management at the local level.

"Lessening the stress on wetlands caused by pollution and other human assaults will improve their resiliency and represents an important climate change adaptation strategy," he says. "Wetland rehabilitation, meanwhile, represents a viable alternative to artificial flood control and dredging efforts that may be needed to cope with the larger, more frequent floods predicted in a hotter world."

Prof. Junk, of the Max-Planck-Institute for Evolutionary Biology, notes that maintenance of wetlands is much cheaper than rehabilitation and that poorer countries will have fewer means to rehabilitate their wetlands to cope with climate change. Wetland-friendly development alternatives must be elaborated in developing countries, therefore, to minimize losses of their many benefits, he says.

He notes too that while pressure on wetlands in poorer countries has risen dramatically in recent years, they have not suffered nearly as much damage as those in the developed world.

Some 60% of wetlands worldwide -- and up to 90% in Europe -- have been destroyed in the past 100 years, principally due to drainage for agriculture but also through pollution, dams, canals, groundwater pumping, urban development and peat extraction.

Notwithstanding recent efforts in such countries as Australia and the U.S. (which has lost 50 million of an estimated 90 million hectares of wetlands 500 years ago) to protect wetlands and reverse past damage, at a world scale they continue to shrink.

"Wetlands act as sponges and their role as sources, reservoirs and regulators of water is largely underappreciated by many farmers and others who rely on steady water supplies," says Prof. Junk. "They also cleanse water of organic pollutants, prevent downstream flood inundations, protect riverbanks and seashores from erosion, recycle nutrients and capture sediment."

Typically high in nutrients, wetlands also offer rich habitats for small organisms which feed fish and other water life, which in turn nourish mammals and birds. Many wetlands feature biodiversity comparable to that of rainforests or coral reefs.

Conference organizers say efficient protection of wetlands requires complex, long term management plans that cover their entire catchment areas, often involving agreements between states or countries.

These agreements need to cover activities that affect wetlands both directly and indirectly, such as the use of water and soils, development, waste treatment and disposal, but also harmonization of environmental legislation for protection of wetlands and all that lives in them.

Background information

- Wetlands along the flood-prone Mississippi once stored 60 days of the river's floodwater; today they can store only 12 days' worth.
- Around Africa's Lake Victoria, wetlands are so degraded they can no longer filter nitrate and phosphate runoff from surrounding land. The result: eutrophication and an explosive growth of lake-clogging water hyacinth.
- In Malaysia, 90 percent of freshwater swamps have been drained for rice cultivation.
- A study of a large wetland in arid northern Nigeria found it yielded an economic benefit in fish, firewood, cattle grazing lands and natural crop irrigation 30 times greater than the yield of water being diverted from the wetland into a costly irrigation project.
- At US$15 000 per hectare per year, the economic value of flood prevention and other ecological services provided by wetlands is greater than any other ecosystem -- seven times that of the next most valuable, tropical rainforests, according to a recent study.
- The peat bogs of Siberia, North America and Scandinavia contain a third of all carbon in the world's soils. Those in Scotland contain more than 90 percent of the carbon in British soils and forests.
- The US will spend $700 million over two decades to revive the Florida Everglades. It will include six artificial wetlands ("storm water treatment areas"), to receive and cleanse excess nutrients from neighbouring farm districts.
- The world's most threatened wetlands include those around the Mediterranean, where for two millennia the population has been draining wetlands and floodplains for agriculture -- and more recently for urban areas, tourist developments, and to eradicate malarial mosquitoes.
- Both Spain and Greece drained 60 percent of their wetlands in the last century. Pumping of groundwater for agricultural irrigation is drying Spanish wetlands such as the Doñana reserve, one of Europe's top sanctuaries for wintering birds, where the water table is falling one meter every two years.
- Wetlands constitute an estimated 20% of South America but they are poorly mapped or classified by characteristics.
- The vast, remote and relatively pristine Pantanal, spanning 160,000 square km, is confronted by increasing development pressure. Its catchment area straddles Brazil, Bolivia and Paraguay, while Uruguay and Argentina are downstream.

Adapted from materials provided by United Nations University, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/07/080720150209.htm

Archaeologists Trace Early Irrigation Farming In Ancient Yemen

In the remote desert highlands of southern Yemen, a team of archaeologists have discovered new evidence of ancient transitions from hunting and herding to irrigation agriculture 5,200 years ago. (Credit: Image courtesy of Michael Harrower, University of Toronto)

ScienceDaily (July 21, 2008) — In the remote desert highlands of southern Yemen, a team of archaeologists have discovered new evidence of ancient transitions from hunting and herding to irrigation agriculture 5,200 years ago.

As part of a larger program of archaeological research, Michael Harrower from the University of Toronto and The Roots of Agriculture in Southern Arabia (RASA) team explored the Wadi Sana watershed documenting 174 ancient irrigation structures, modeled topography and hydrology, and interviewed contemporary camel and goat herders and irrigation farmers.

"Agriculture in Yemen appeared relatively late in comparison with other areas of the Middle East, where farming first developed near the end of the last ice age about 12,000 years ago," says author Michael Harrower, Department of Anthropology, University of Toronto.

"It's clear early farmers in Yemen faced unique environmental and social opportunities and challenges. Our findings show farming in southern Yemen required runoff diversion technologies that were adapted to harness monsoon (summer) runoff from the rugged terrain along with new understandings of social landscapes and rights to scarce water resources."

The researchers used computer Geographic Information Systems (GIS) mapping to determine that ancient forager-herders developed expert knowledge of hydrology and targeted particular small watersheds and landforms for irrigation. Studies of contemporary land and water rights, including principles enshrined in

Islamic law, suggest their origins lie at the very beginnings of water management as tribal principles of water equity intertwined with changing ideologies and culture.

These and other discoveries in southern Arabia have recently helped document the diversity of transitions from foraging to agriculture that in Yemen later gave rise to powerful ancient cities and states with advanced irrigation technologies that transformed deserts into lush, bountiful oases.

The study findings are published in the current issue of the journal Current Anthropology.

Adapted from materials provided by University of Toronto.
http://www.sciencedaily.com/releases/2008/07/080716140918.htm

Childhood Diarrhea: Treat With Zinc Over 6 Months Of Age, Study Suggests

ScienceDaily (July 21, 2008) — Zinc supplementation benefits children suffering from diarrhoea in developing countries, but only in infants over six months old, Cochrane Researchers have found. Their study supports World Health Organization (WHO) guidelines for the treatment of diarrhoea with zinc, although not in the very young.

"Zinc is clearly of benefit to children with diarrhoea," says lead researcher Marzia Lazzerini, who works at the Unit of Research on Health Services and International Health in Trieste, Italy.

Diarrhoea is a common cause of death for children in the developing world, occurring most often in children aged between six months and five years. It is estimated that two million children die every year as a result of the disease. Zinc is a micronutrient that plays a critical role in physical growth as well as in gastrointestinal and immune function. Its main dietary sources are red meat, fish and dairy products, but these are costly and in short supply in many developing countries. Currently the WHO advises treating a child with zinc for between 10 and 14 days, as well as giving oral rehydration salts to reduce the risk of death due to dehydration.

The Cochrane Researchers identified 18 trials of zinc treatment that together involved 6,165 people from Asia, South America and Africa. Collectively the trials show that zinc is effective in reducing the duration of diarrhoea in children aged between six months and five years. Below six months, two large trials involving 1,334 children, in three continents found no effect.

"These studies back up previous research that shows zinc can play an important role in restoring children with diarrhoea to full health. No conclusions regarding zinc's impact on hospitalisation or death could be drawn form the trials, but given these results it's expected that a policy of zinc supplementation during diarrhoea in the community could also reduce hospitalisation rate and mortality," says Lazzerini.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/07/080715204829.htm

Greatest Value Of Forests Is Sustainable Water Supply

Forest in West Virginia, U.S. Preserving and managing forests may help sustain water supplies and water quality from the nation's headwaters in the future, but forest management is unlikely to increase water supplies. (Credit: Michele Hogan)

ScienceDaily (July 21, 2008) — The forests of the future may need to be managed as much for a sustainable supply of clean water as any other goal, researchers say in a new federal report -- but even so, forest resources will offer no "quick fix" to the insatiable, often conflicting demands for this precious resource.

This new view of forests is evolving, scientists say, as both urban and agricultural demands for water continue to increase, and the role of clean water from forests becomes better understood as an "ecosystem service" of great value. Many factors -- changing climate, wildfires, insect outbreaks, timber harvest, roads, and even urban sprawl -- are influencing water supplies from forests.

Preserving and managing forests may help sustain water supplies and water quality from the nation's headwaters in the future, they conclude, but forest management is unlikely to increase water supplies.

"Historically, forest managers have not focused much of their attention on water, and water managers have not focused on forests," said Julia Jones, a professor of geosciences at Oregon State University, and vice chair of a committee of the National Research Council, which today released a report on the hydrologic effects of a changing forest landscape. "But today's water problems demand that these groups work together closely.

"Because forests can release slightly more water for a decade or so following timber harvest, there have been suggestions that forests could be managed to increase water supplies in some areas," Jones said. "But we've learned that such increases don't last very long, and often don't provide water when you need it most."

The science of how forest management affects water quantity and quality, Jones said, has produced a solid foundation of principles. But forests in the United States are changing rapidly, and additional research may reveal ways to provide a sustainable flow of fresh, clean water.

Changes in water supplies from forests due to climate change, the researchers said, are a particular concern, and water supplies may already be affected by increased fire frequency and insect or disease epidemics. Many such factors require more study, they said.

Among the findings of the report:

- Forests cover about one-third of the nation's land area, and although they have roles in timber production, habitat, recreation and wilderness, their most important output may be water.
- Forests provide natural filtration and storage systems that process nearly two-thirds of the water supply in the U.S.
- Demand for water continues to rise due to population growth, while forest acreage is declining and remaining forest lands are threatened by climate change, disease epidemics, fire and global climate change.
- Forest vegetation and soils, if healthy and intact, can benefit human water supplies by controlling water yield, peak flows, low flows, sediment levels, water chemistry and quality.
- Increases in water yield after forest harvesting are transitory; they decrease over time as forests re-grow, and in the meantime water quality may be reduced.
- Impervious surfaces such as roads and road drainage systems increase overland flow, deliver water directly to stream channels, and can increase surface erosion.
- Forest chemicals, including those used to fight fire, can adversely affect aquatic ecosystems, especially if they are applied directly to water bodies or wet soil.
- One of the biggest threats to forests, and the water that derives from them, is the permanent conversion of forested land to residential, industrial and commercial uses.

The report also outlined a number of research needs for the future, especially to improve specific predictions about the implications of forest harvests, disturbances by fire, insects and disease, climate change, land development, and shifts in forest species composition.

Modern forest practices have helped to protect streams and riparian zones, but more needs to be learned about the implications of such practices as thinning or partial cuts -- development of "best management" practices could help balance timber harvest with sustainable water flow and quality.

And global warming, which affects timing and amount of snowmelt runoff, wildfires, and insect and disease outbreaks, is a huge variable.

The study also cited the value of watershed councils and citizen groups in getting more people involved in water, stream and land management issues at a local level, increasing the opportunities for all views to be considered, and conflicts avoided.

Support for this project, which involved numerous representatives from academia and private industry in the U.S. and Canada, was provided by the U.S. Department of the Interior and the Department of Agriculture. The National Research Council is operated by the National Academy of Sciences. This is one of the first major studies on forests and water since a U.S. Forest Service project in 1976, the authors noted.

"Times have changed," the authors wrote in the report. "Thirty years ago, no one would have imagined that clearcutting on public lands in the Pacific Northwest would come to a screeching halt; or that farmers would give up water for endangered fish and birds; or that climate change would produce quantifiable changes in forest structure, species and water supplies."

Those changes demanded a new assessment of current conditions, an understanding of rising tensions, and an evaluation of future needs, the researchers said.

Adapted from materials provided by Oregon State University.
http://www.sciencedaily.com/releases/2008/07/080714162600.htm

Mind Over Matter In Chronic Disease Treatment

ScienceDaily (July 21, 2008) — A study by QUT sleep psychologists is shedding light on why some people with life-threatening conditions do not adhere to medical treatment, even when "it's for their own good".

Dr Simon Smith, from Queensland University of Technology's Centre for Accident Research & Road Safety - Queensland (CARRS-Q), studied people newly diagnosed with obstructive sleep apnoea (OSA) and found they were more likely to take up, and stick to, treatment when they believed they could do so, regardless of how severe their condition was.

OSA is a serious condition in which sufferers stop breathing throughout the night, only starting to breathe again when their brain registers lack of oxygen and wakes them up.

OSA causes sufferers to fall asleep during the day or at the wheel of their car, puts a strain on their hearts which can lead to heart attack and stroke, and has been linked to Type-II diabetes.

The treatment is to wear a mask at night attached to a machine that keeps the airway open and maintains normal breathing. Losing weight through diet and exercise can also have a significant effect in reducing the symptoms and can even do away with the need for the mask.

"From other research we know between 15 and 20 per cent of people diagnosed with OSA won't accept treatment at all. Of those who start treatment, up to 50 per cent don't use it enough, that is right through the night, or they give up using it," Dr Smith said.

He found psychological factors had a powerful effect on whether people would accept effective medical treatment.

"Surprisingly, people with the most serious disease aren't any more likely to stick to the treatment.

"We found a person's beliefs about the treatment's effectiveness, their confidence in sticking to the treatment, and their understanding of the condition's health risks, were more important than the severity of the disease."

Dr Smith said it was often only the urging of family and friends that caused OSA sufferers to see a doctor because the cost to their health, like other chronic diseases, might be some way down the track.

"A person with OSA might fall asleep during the day, but if they aren't working or don't drive much, this might not worry them enough to seek treatment or stick to treatment.

"But if a spouse or family members pressure them to do something about the loud stop-start snoring that accompanies OSA, which is keeping them awake, the sufferer is more likely to do something about it.

"After they have seen the doctor and been offered treatment, psychological factors, including the threat to important relationships, are what motivates them into complying with treatment."

Dr Smith said the research would lead to new programs to get people motivated to change their health behaviours, and help them to adhere to treatments that would alleviate chronic health conditions.

Adapted from materials provided by Queensland University of Technology.
http://www.sciencedaily.com/releases/2008/07/080717210304.htm

Digital Cameras, Remote Satellites Measure Crop Water Demand

Measurement of canopy cover on 2-year-old almond orchard using the TetraCam camera on a 6.1-m stand. (Credit: Photo by Thomas Trout)

ScienceDaily (July 21, 2008) — Horticultural crops account for almost 50% of crop sales in the United States, and these crops are carefully managed to ensure good quality. But more information is needed about the crops' growth and response to seasonal and climatic changes so that management practices such as irrigation can be precisely scheduled. Existing research can be difficult to generalize because of variations in crops, planting densities, and cultural practices.

Determining growth stage, size, and water needs are especially important for horticultural crops because most crops are grown in limited water environments and require irrigation. The measurement of "canopy light interception" is a primary means of determining water and irrigation needs.

Fractional canopy cover (CC) is a relatively easily measured property that is a good indicator of light interception. Canopy cover, the percent of the soil surface covered by plant foliage, is an important indicator of stage of growth and crop water use in horticultural crops. Methods of using remote sensors to determine canopy cover in major crops have been studied for years, but the studies have not included most horticultural crops.

Thomas J. Trout, Research Leader at the U.S. Department of Agriculture's Agricultural Research Service, along with colleagues from the NASA Earth Science Division, recently published a study that addresses the relationship of remotely sensed normalized difference vegetation index (NDVI) relative to canopy cover of several major horticultural crops in commercial fields.

The research team measured canopy cover of 11 different annual and perennial horticultural crops in various growth stages on 30 fields in California's San Joaquin Valley with a handheld multispectral

digital camera. Canopy cover was compared with NDVI values calculated from Landsat 5 satellite imagery. According to Trout, "The NDVI was highly correlated and linearly related with measured CC across the wide range of crops, canopy structures, and growth stages, and predicted CC with mean absolute error of 0.047 up to effective full cover. These results indicate that remotely sensed NDVI may be an efficient way to monitor growth stage, and potentially irrigation water demand, of horticultural crops."

The research indicates that NDVI can potentially provide field-specific and regional estimates of CC for horticultural crops with minimal requirement for supporting information. This new information may also be useful to improve estimates of crop growth stage and water use.

Journal reference:

1. Trout, Thomas J., Johnson, Lee F., Gartung, Jim. **Remote Sensing of Canopy Cover in Horticultural Crops**. *HortScience*, 2008 43: 333-337 [link]

Adapted from materials provided by American Society for Horticultural Science.
http://www.sciencedaily.com/releases/2008/07/080717140409.htm

Solar Cooling Becomes A New Air-conditioning System

Air-conditioning system. (Credit: Image courtesy of Universidad Carlos III de Madrid)

ScienceDaily (July 20, 2008) — Scientists from the Universidad Carlos III of Madrid (UC3M) and the Consejo Superior de Investigaciones Científicas (CSIC) have developed an environmentally friendly cooling technology that does not harm the ozone layer. This is achieved by using solar energy and therefore reducing the use of greenhouse gases.

A research team has designed and built an absorption chiller capable of using solar and residual heat as an energy source to drive the cooling system. The technology used in this machine, which looks like an ordinary air-conditioning system, minimises its environmental impact by combining the use of a lithium bromide solution, which does not damage the ozone layer or increase the greenhouse effect, with a reduction in the use of water by the machine.

The team, managed by Professor Marcelo Izquierdo from the Department of Thermal Engineering and Fluid Mechanics of the UC3M, who is also a researcher at the Instituto de Ciencias de la Construcción Eduardo Torroja (IETCC) of the CSIC, is building a solar cooling system that unlike the existing machines on the market, uses an improved absorption mechanism capable of producing cold water at a range of temperatures from 7º C to 18º C when the exterior temperature ranges from 33º C to 43º C.

Residential use

Professor Marcelo Izquierdo states that the conclusions reached by a study with a commercial air condensed absorption machine prove that given an outside temperature ranging from 28ºC and 34ºC, the machine can produce cold water at a range of 12 to 16ºC, with a source temperature at the generator between 80ºC to 95ºC. Under these conditions, the cold water produced can be used for climate control applications in houses by combining it with a water-to-air heat exchanger (fan coil).

Quoting Raquel Lizarte, a researcher at the Department of Thermal Engineering and Fluid Mechanics of the UC3M, “There are few absorption machines at a commercial level that are adapted for residential

use", and since it is very hard to go without climate control, it is important to find a cooling technology that has minimal environmental impact. "The machine that we're studying produces enough cold water to cool down a room of 40 m2 of floor area and with a volume of 120 m3", she states.

In 2007, 191 countries were involved in the Montreal protocol; a signed agreement to avoid the use of ozone depleting substances such as the HCFC refrigerants used in the air-conditioning industry as well as to set a limit such that by the year 2010 the energy consumption should be just 25% of the level that was allowed in 1996. Also, by the year 2020 all the HCFC refrigerants used in developed countries will have to be replaced with substitutes. This protocol makes research into this kind of technology extremely important for the near future.

The study has been published in the current edition of the magazine Applied Thermal Engineering under the title: 'Air conditioning using an air-cooled single effect lithium bromide absorption chiller: Results of a trial conducted in Madrid in August 2005'. In this investigation scientists from the Universidad Carlos III of Madrid and Universidad Nacional de Educación a Distancia have collaborated under the coordination of the Instituto de Ciencias de la Construcción Eduardo Torroja-CSIC.

Adapted from materials provided by Universidad Carlos III de Madrid, via AlphaGalileo.
http://www.sciencedaily.com/releases/2008/07/080714151427.htm

Even Toddlers Get It: Data 'Chunks' Are Easier To Remember

Lisa Feigenson working with a toddler. In the team's experiment, the 14-month-olds were shown four toys which were then hidden in a box. (Credit: JHU)

ScienceDaily (July 20, 2008) — Which is easier to remember: 4432879960 or 443-297-9960? The latter, of course. Adults seem to know automatically, in fact, that long strings of numbers are more easily recalled when divided into smaller "bite-sized chunks," which is why we break up our telephone and Social Security numbers in this way.

Now researchers at The Johns Hopkins University have discovered that children as young as 14 months old can -- and do -- use the same technique to increase their working memories, indicating that "chunking" information in this way is not a learned strategy, but is, instead, a fundamental aspect of the human mind.

"Our work offers evidence of memory expansion based on conceptual knowledge in untrained, preverbal subjects," said Lisa Feigenson, assistant professor of psychological and brain sciences in the university's Krieger School of Arts and Sciences, who worked on the study with colleague Justin Halberda. "What we have basically done is show that very young children, who can usually only keep track of about three objects at once, can keep track of more if they use the kind of conceptual, linguistic, perceptual and spatial cues adults also use."

An article on this research appears in the July 14 issue of the Proceedings of the National Academy of Sciences.

In the team's experiment, the 14-month-olds were shown four toys which were then hidden in a box. The children then were allowed to search for the missing toys. Sometimes, two of the four toys were secretly withheld in another place. The researchers observed how long the youngsters continued to search the box, the idea being that they would search longer if they remembered there were more toys yet to be found.

The researchers found the children would search longer when the four toys consisted of two groups of two familiar objects, cats and cars, and one of each type had been withheld. That indicated that the youngsters were using mental chunking as a way to recall more items at a time.

The team also found that 14-month-olds can use spatial grouping cues (the researchers grouped six identical orange balls in three groups of two before hiding them) to expand memory, in the same way that adults group digits when remembering phone numbers. When provided with such cues, the little ones could remember up to six objects.

These results suggest that memory is not merely a passive storage system that makes a "carbon copy" of our experiences. Instead, Feigenson says, the results show that from at least early toddlerhood onward, memory is constantly being restructured and reorganized to maximize its efficiency. The researchers' results may have implications for educational strategies or for helping those who suffer short-term memory problems. But more directly, they show that the memory systems of young infants are surprisingly similar to those of adults.

This research was supported by the National Institute of Child Health and Human Development and a James S. McDonnell Foundation Scholar Award.

Adapted from materials provided by Johns Hopkins University.
http://www.sciencedaily.com/releases/2008/07/080714172155.htm

Semantics Gives The Web Meaning – For Machines

ScienceDaily (July 20, 2008) — Where would we be without the web? It is such an immense and rich source of information; we feel that every answer is out there. All it takes is a bit of searching...

But internet searches are often fruitless – even Google's eight billion indexed web pages and vast store of data and documents. Text-based searches do what they say on the box: they find keywords within documents. But what kind of web search could quickly give you a list of foods triggering adverse reactions in elderly women taking medication for high blood pressure?

"The current web is a web of text and pictures," says Frank van Harmelen, a researcher in the Department of Artificial Intelligence at the Free University of Amsterdam. "Data is everywhere, but most of it is locked in inaccessible databases behind websites, locked within documents, or held within silos so it can't be linked to related data elsewhere."

What's more, computers are unable to understand the data that they find. To a computer, the number 00352 is just a series of digits. Type this into Google and the top hits are an eclectic collection of unrelated pages (usually because the number 0352 features somewhere within a code number or filename).

But a new era of the web is upon us. The 'semantic web' codes data in a way that gives meaning to words and digits in a way that computers can understand. Given just a little bit of context, applications can now recognise when 00352 is actually an international dialling prefix.

And by linking unrelated data sources, the semantic web might be able to tell you the name of the person you are calling, their email address, the cheapest carrier for calls to Luxembourg, and even link to profiles of several of your contact's friends and colleagues.

"The semantic web is a web of data," van Harmelen continues, "It realises the vision for interoperability between data sources on the web and it gives the data meaning in a way that computers can understand and reason with it."

From trumped-up to joined-up data

Tim Berners-Lee, the beknighted father of the web, famously said: "I have a dream for the web [in which computers] become capable of analysing all the data on the web – the content, links, and transactions between people and computers."

European research has long sought to materialise that dream. Since before 2000, Europe has driven research on the semantic web and taken a strong lead on the development of concepts, underlying standards and, more recently, software and services for the semantic web. But the semantic web is not just some European pipedream. Other big forces in the world are also hearing the 'semantic call'.

Indeed, in February 2008, Yahoo announced that its indexing would support the semantic web's RDF format (see below) in web-page metadata and open database sources. Yahoo undoubtedly hopes that, by using semantic datasets, its searches will become much more powerful, finding links between disparate data sources, and delivering better results in the top few search hits. Better because they will be better structured with all the relevant bits presented in a coherent whole after having been extracted from diverse independent sources.

RDF (Resource Description Framework) is an internationally agreed model for representing the meaning of data (e.g. 'telephone number') and how it relates to (e.g. 'has the value') the data value (e.g.

'00352...'). These are known as RDF triples; and a single item of data could have several triples (e.g. 'telephone number'… 'is the switchboard number of'… 'the European Commission').

Wise moves

Europe is perfectly poised to meet the growing demand for semantic technologies that Yahoo's move will undoubtedly stimulate. The European Union's investment in semantic web research has already far surpassed other regions and countries, including the USA.

The EU's Sixth Framework Programme (FP6, 2002-2006) for research has funded 17 semantic web projects and about €50m annually is allocated to continued research in this area under FP7, which runs until 2013. With some ten years of experience in this field, Europe has a firm 'first-mover' status on the semantic web and a large pool of talent working on it.

One of Europe's biggest contributions in the early days has been its involvement in the engineering of ontologies. Ontologies are like the vocabulary of the semantic web, collections of related concepts used to assign meaning to data and describe the relationships between them.

Several earlier projects (e.g. OntoWeb, WonderWeb) focused on how to build ontologies and were closely linked with international efforts to standardise the increasingly prevalent OWL ontology language.

Ontology research in Europe remains strong; ongoing projects focus on making ontologies 'user friendly', for example by developing tools (e.g. NeOn) that reduce the costly and time-consuming process of ontology construction and maintenance – ontologies evolve over time just like computer programs.

Information, extraction not abstraction

But an ontology is just the beginning because it is very time consuming and expensive to convert data manually into RDF or OWL formats. With structured information (i.e. information in databases) automatic conversion is relatively straightforward. But what about the data embedded in unstructured sources, like free text?

As the market ripens for semantic web tools and services, the rest of the world is starting to understand why this conversion makes good sense. Yahoo's announcement earlier this year and Reuters' recently launched 'Open Calais' deal with the supply-side of the semantic web are testimony to this.

Web developers can 'plug in' to Open Calais for free and use the service to extract company and financial data from documents and text, and embed the extracted information as semantically expressed data.

Open Calais and similar commercially available tools use natural language processing to make sense of words and numbers – extracting 'meaning' – and encode the information according to semantic web standards.

European research into natural language processing stems back a decade. Today, projects are building automated semantic extraction engines. BootStrep, for example, is using medical dictionaries, thesaurus-like features and biological fact databases to build vast biological lexicons which, combined with natural language processing, can pull facts and semantic entities from documents.

Yet more European teams have developed technologies to analyse and mark different media formats (for example, image and audio files) automatically in order to produce semantic metadata tags.

Unlock, define… and now reason

Unlocked databases, better-defined 'entities' and their relationships, information extracted from text and multimedia files… Is that enough for the semantic web to really meet its potential? Not really.

With all this data now on the web, computing now turns to the question of 'reasoning', or 'reasoning engines', to be precise.

Two new projects look set to make a global impact on the semantic web.

First, the REWERSE network has worked on a set of interoperable reasoning languages for advanced web systems and applications. These languages – the first of their kind – will be submitted to bodies, such as the World Wide Web Consortium (W3C), as the main basis for international standards.

Second, the LarKC project is looking at semantic reasoning to solve a fundamental problem of the semantic web: its size.

"Now the semantic web is taking off for real – with billions of facts available – scale is becoming a problem," explains Frank van Harmelen who is working on LarKC. "The tools we have are fine for small-scale applications, but we need large-scale infrastructure, to break away from toy applications."

LarKC will be a platform for massive, distributed, incomplete reasoning. It will achieve scalability both through its lack of completeness (it decides when it has queried 'enough' data) and its parallel processing (on clusters of high-performance computers or through a distributed network of 'home' computers).

Van Harmelen hopes that this kind of approach could get web technology to the point where, as you drive into town, an application spots a space in a nearby car park, calculates how long and what route to get there, and that no one else is closer.

We are not there yet, but as Yahoo's support for the RDF format shows, the semantic web is about to make it big. Companies will find it easier to integrate datasets and access information – internal and external – while consumers should find their web searches are more fruitful and web services more functional.

The technology behind the semantic web may remain hidden to most, but the results it achieves will not fail to impress.

Adapted from materials provided by ICT Results.
http://www.sciencedaily.com/releases/2008/07/080716154917.htm

Obesity Is Number One Health Concern For Kids In 2008

According to a report released today by the University of Michigan C.S. Mott Children's Hospital National Poll on Children's Health, obesity is now the No. 1 health concern for kids in 2008. (Credit: Image courtesy of University of Michigan Health System)

ScienceDaily (July 20, 2008) — As children's waistlines continue to grow, so have concerns about childhood obesity.

According to a report released July 14 by the University of Michigan C.S. Mott Children's Hospital National Poll on Children's Health, childhood obesity is now the No. 1 health concern for kids in 2008, topping smoking and drug abuse. In 2007, childhood obesity ranked third among parents' top 10 overall health concerns for kids.

"The National Poll on Children's Health report clearly shows that adults in America are very concerned about the problem of childhood obesity and its causes," says Matthew M. Davis, M.D., M.A.P.P., director of the National Poll on Children's Health. "While recent studies have suggested that the childhood obesity epidemic may be leveling off, the results of this poll reveal that adults in the U.S. are still very much concerned about this issue."

The National Poll on Children's Health, which asked adults to rate 20 different health problems for children living in their communities, reveals that bullying also now ranks among the public's top concerns for children's health, ahead of teen pregnancy and alcohol abuse. Other new topics added to this year's list are Attention Deficit/Hyperactivity Disorder and environmental toxins.

Also making the public's overall list of top 10 health concerns for kids in 2008: Internet safety, abuse and neglect, sexually transmitted infections, and lack of opportunities for physical activity for kids. The top 10 health concerns for 2007 that did not make this year's list: Motor vehicle accidents and school violence.

Top 10 overall health concerns for U.S. children in 2008

1. **Childhood obesity**. Thirty-five percent of adults ranked childhood obesity as their top overall health concern for children. In 2007, it was ranked No. 3. Although other research has shown that Hispanic youth are at greater risk for obesity, this problem was rated lower by Hispanic adults than white adults and black adults.

2. **Drug abuse**. Drug abuse is viewed as a bigger health concern among Hispanic adults (50 percent) than white adults (29 percent) and black (35 percent) adults. It also was more likely to be listed as a top health concern among adults with lower incomes.

3. **Smoking**. Ranked No. 1 in 2007, smoking now holds the No. 3 position in 2008, with 32 percent of U.S. adults rating it as a major overall health concern. Among Hispanic adults, however, smoking is still rated as the No. 1 health concern for kids (52 percent).

4. **Bullying**. New to this year's list, bullying was rated highly by both adults with and without children in their homes. Adults from middle-income households were more likely than adults with lower-income or higher-income households to rate bullying as big problem.

5. **Internet safety**. Adults with household incomes of $100,000 or more per year were more likely to view Internet safety as a big problem for children in their community. Overall, 27 percent of adults polled rated Internet safety as big health concern for kids.

6. **Child abuse and neglect**. This issue, which was ranked No. 10 in 2007, was rated as a top health concern for kids among 25 percent of adults polled.

7. **Teen pregnancy**. Black adults continue to rate teen pregnancy as the top health concern for youth in their community, with 35 percent reporting it's a major health concern compared with only 21 percent of white adults and 33 percent of Hispanic adults.

8. **Alcohol abuse**. For the 2008 poll, 23 percent of adults listed alcohol abuse as a health concern for kids. In 2007, alcohol abuse was ranked fourth overall.

9 (tie). **Attention Deficit/Hyperactivity Disorder**. AD/HD, also new to this year's list, was a much greater concern among adults with low-income households than adults with middle-income and high-income households. Overall, 21 percent of adults polled rated it as a health concern for kids.

Sexually transmitted infection. Sexually transmitted infections among youths continue to be considered a big problem affecting children's health, with 21 percent of adults rating it as a top health concern. This issue also was ranked ninth in 2007.

10 (tie). **Chemicals in the environment**. The issue of environmental toxins was added to this year's list, largely due to concerns among Hispanic adults and adults with low-income households. More than 30 percent of Hispanic adults and 25 percent of adults in the lowest income group felt environmental toxins in their communities pose a threat to children's health.

Not enough opportunities for physical activity. "Having this issue among the 2008 top 10 health concerns underscores the importance placed on childhood obesity as a major problem in adults' minds," notes Davis. Nineteen percent of adults rated this issue as a top health concern.

Issues that did not rank among the top 10 overall health concerns, but were included in the National Poll on Children's Health include: driving accidents, depression, asthma, eating disorders, neighborhood safety, school violence, autism and suicide.

The National Poll on Children's Health also found that adults who did not have children in their households were more likely than parents to list drug abuse, smoking and tobacco use, Internet safety, and sexually transmitted infections as top health concerns. Additionally, adults from low-income households (less than $30,000 per year) viewed drug abuse, smoking and tobacco use, and teen pregnancy as the biggest health concerns for kids. Adults, however, with higher household incomes (more than $100,000 per year) were more likely to rate obesity, Internet safety and drug abuse as major issues.

"We found multiple difference in the priority of health problems for kids in the minds of adults by race, ethnicity, income or some other characteristic. What this tells us is that there is no 'one-size-fits-all' public health approach to these issues," says Davis, associate professor of general pediatrics and internal medicine at the U-M Medical School, and associate professor of public policy at the U-M Gerald R. Ford School of Public Health. "So as doctors, nurses and public health officials work to find ways to help their community deal with health issues, it's important that they remember to tailor their approach to the priorities of the community."

For its report, the National Poll on Children's Health used data from a national online survey conducted in April 2008 in collaboration with Knowledge Networks Inc. The survey was administered to a random sample of 2,064 adults, ages 18 and older, who are a part of Knowledge Network's online KnowledgePanelSM. The sample was subsequently weighted to reflect U.S. population figures from the U.S. Census Bureau. About three-fourths of the sample were households with children.

For the complete report and podcast about poll results, visit the C.S. Mott Children's Hospital National Poll on Children's Health online at http://www.med.umich.edu/mott/npch.

The C.S. Mott Children's Hospital National Poll on Children's Health – funded by the Department of Pediatrics and Communicable Diseases and part of the CHEAR Unit at the U-M Health System – is designed to measure major health care issues and trends for U.S. children.

Adapted from materials provided by University of Michigan Health System.
http://www.sciencedaily.com/releases/2008/07/080714170957.htm

Baseball: 2008 All-star Game Was Mathematical Marvel

ScienceDaily (July 20, 2008) — The 2008 All-Star Game was the game of a lifetime, and a Gettysburg College professor can prove it mathematically. “What happened Tuesday night was definitely a rare occurrence and one we should not expect to see again in our lifetimes,” said Gettysburg College mathematics professor Darren Glass.

His research suggested that there was a 0.2% chance of a 15-inning game occurring and that a game like this would happen only once out of every 500 games. Glass along with Phil Lowry, a professor at the City University of New York, researched the distribution of baseball scores to answer the question, “What is the probability that a given baseball game will last a given number of innings?” Their research recently appeared in Mathematics Magazine.

According to Glass, an All-Star game should last fewer innings because the batters are better than average. But he admits that other factors such as different game strategies used or the talent level of the pitchers changes his predictions. It should be that a game between two bad teams would last longer.

The longest major league ballgame on record was played between Brooklyn and Boston in 1920 and lasted 26 innings. The longest minor league ballgame was between Rochester and Pawtucket in 1981 and lasted 33 innings. In the last decade, there have been 155 games that have lasted 15 innings or more. 73 of those lasted exactly 15 innings. In all of major league baseball history through 2006, there have been 980 games, which have lasted 15 innings or more. 426 of those lasted exactly 15 innings.

Last night’s All-Star game ended in the bottom of the 15th inning with a walk-off sacrifice fly. The game lasted 290 minutes and used 23 pitchers. Every player on both rosters was used. In terms of length of time, it was the longest All-Star game in MLB history.

“This year the American League has averaged 4.61 runs per game and the National League has averaged 4.48 runs per game. Plugging these numbers into our model predicts that there was a .0022 probability that the game would last exactly 15 innings, and a .0049 probability that it would last at least 15 innings. In other words, if these two teams played each other 1,000 times, then we would expect the game to still be tied after 14 innings in 5 of those games and to end in the 15th inning in two of those games.”

Glass stands by that what happened this year was a mathematical marvel.

Adapted from materials provided by Gettysburg College.
http://www.sciencedaily.com/releases/2008/07/080717221609.htm

Bullying And Being Bullied Linked To Suicide In Children, Review Of Studies Suggests

A review of studies from 13 countries found connections between being bullied and suicidal thoughts among children. (Credit: iStockphoto/Nick Schlax)

ScienceDaily (July 19, 2008) — Researchers at Yale School of Medicine have found signs of an apparent connection between bullying, being bullied and suicide in children, according to a new review of studies from 13 countries.

"While there is no definitive evidence that bullying makes kids more likely to kill themselves, now that we see there's a likely association, we can act on it and try to prevent it," said review lead author Young-Shin Kim, M.D., assistant professor at Yale School of Medicine's Child Study Center.

In the review, Kim and colleague Bennett Leventhal, M.D., analyzed 37 studies that examined bullying and suicide among children and adolescents. The studies took place in the United States, Canada, several European countries (including the United Kingdom and Germany), South Korea, Japan and South Africa.

Almost all of the studies found connections between being bullied and suicidal thoughts among children. Five reported that bullying victims were two to nine times more likely to report suicidal thoughts than other children were.

Not just the victims were in danger: "The perpetrators who are the bullies also have an increased risk for suicidal behaviors," Kim said.

However, the way the studies were designed made it impossible for researchers to determine conclusively whether bullying leads to suicide, Kim said. In addition, the authors report that most of the studies failed to take into account the influence of factors like gender, psychiatric problems and a history of suicide attempts.

Kim said her interest in bullying grew several years ago when she visited South Korea and heard several new slang terms referring to bullies and their victims. The words reflected "an elaborated system of bullying," she said.

According to international studies, bullying is common and affects anywhere from 9 percent to 54 percent of children. In the United States, many have blamed bullying for spurring acts of violence, including the Columbine High School massacre.

In the United States, many adults scoff at bullying and say, "Oh, that's what happens when kids are growing up," according to Kim, who argues that bullying is serious and causes major problems for children.

Kim is currently studying whether being bullied actually leads to suicide, although she acknowledges it will be difficult for researchers to get a firm grasp on a cause-and-effect relationship. She said that to confirm a definitive link, researchers would have to rule out the possibility that some unknown factor makes certain children more susceptible to both bullying and suicide.

For now, Kim said, the existing research should encourage adults to pay more attention to bullying and signs of suicidal behavior in children. "When we see kids who are targets of bullying, we should ask them if they're thinking about hurting themselves," she said. "We should evaluate and prevent these things from happening."

Citation: Int J Adolesc Med Health 20 (2), 2008.

Adapted from materials provided by Yale University.
http://www.sciencedaily.com/releases/2008/07/080717170428.htm

Caesarean Section: No Consensus On Best Technique

ScienceDaily (July 19, 2008) — Despite the routine delivery of babies by caesarean section, there is no consensus among medical practitioners on which is the best operating method to use. In a systematic review published in The Cochrane Library, researchers call for further studies to establish the safest method for both mother and infant.

"Caesarean section is a very common operation, yet there is a lack of high quality information available to inform best practice," says researcher Simon Gates of the Clinical Trials Unit at the University of Warwick.

Techniques used during caesarean section operations depend largely on the preferences of individual surgeons. Their personal preference can affect the length of the operation, amount of blood lost, risk of infection and the level of pain experienced by a woman following surgery.

The review includes 15 trials that together involved 3,972 women. Although results from several of these trials suggest that single layer closure of the uterus after delivery reduces blood loss and operation times compared to double layer closure, there was no information on other important outcomes such as infection and subsequent complications. The researchers found only very limited data on incision techniques and instruments, as well as methods used to close the uterus. They were therefore unable to make recommendations as to the most appropriate surgical procedure.

"Future research on Caesarean techniques needs to focus on the most suitable methods for uterine incision and closing. We need more high quality studies that address the most important outcomes such as pain, infections and complications" says Gates.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/07/080715204812.htm

Research Publications Online: Too Much Of A Good Thing?

ScienceDaily (July 19, 2008) — The Internet gives scientists and researchers instant access to an astonishing number of academic journals. So what is the impact of having such a wealth of information at their fingertips? The answer, according to new research released July 18 in the journal Science, is surprising--scholars are actually citing fewer papers in their own work, and the papers they do cite tend to be more recent publications. This trend may be limiting the creation of new ideas and theories.

James Evans is an assistant professor of sociology at the University of Chicago, who focuses on the nature of scholarly research. During a lecture on the influence of private industry money on research, a student instead asked how the growth of the Internet has shaped science. "I didn't have an immediate answer," Evans said in an interview last week.When he reviewed the research on the Internet and science, Evans discovered that most of it focused on much faster and broader the Internet allows scholars to search for information, but not how the medium itself was impacting their work. "That's where this idea came from. I wanted to know how electronic provision changed science, not how much better it made it," he said.

After receiving support from the National Science Foundation to pursue this question, Evans analyzed a database of over 34 million articles and compared their online availability from 1998 to 2005 to the number of times they were cited from1945 to 2005. The results showed that as more journal issues came online, few articles were cited, and the ones that were cited tended to be more recent publications. Scholars also seemed to concentrate their citations more on specific journals and articles. "More is available," Evans said, "but less is sampled, and what is sampled is more recent and located in the most prominent journals."Evans's research also found that this trend was not evenly distributed across academic disciplines. Scientists and scholars in the life sciences showed the greatest propensity for referencing fewer articles, but the trend is less noticeable in business and legal scholarship. Social scientists and scholars in the humanities are more likely to cite newer works than other disciplines.

So what is it about doing research online versus in a bricks-and-mortar library that changes the literature review so critical to research? Evans has identified a few possible explanations. Studies into how research is conducted show that people browse and peruse material in a library, but they tend to search for articles online Online searches tend to organize results by date and relevance, which leads allows scholars and scientists to pick recent research from the most high profile journals. Some search tools like Google factor the frequency with which other users select an item during similar searchers to determine relevance. Online, researchers are also more likely to follow hyper-linked references and links to similar work within an online archive. Because of this, as more scholars choose to read and reference a given article, future researchers more quickly follow.

Does this phenomenon spell the end of the literature review? Evans doesn't think so, but he does believe that it makes scholars and scientists more likely to come to a consensus and establish a conventional wisdom on a given topic faster. "Online access facilitates a convergence on what science is picked up and built upon in subsequent research." The danger in this, he believes, is that if new productive ideas and theories aren't picked up quickly by the research community, they may fade before their useful impact is evaluated. "It's like new movies. If movies don't get watched the first weekend, they're dropped silently," Evans said.Evans plans to work with linguists and computer scientists to explore how ideas are expressed in articles to better understand what the consequences of losing old ideas are and how they can be retrieved and resurrected, a challenge he sees as being important in the pursuit of knowledge. "With science and scholarship increasing online, findings and ideas that don't receive attention very soon will be forgotten more quickly than ever before."

Adapted from materials provided by National Science Foundation.
http://www.sciencedaily.com/releases/2008/07/080717144445.htm

Big Argus Is Watching You

Want an extra set of eyes on your syllabus for the fall semester? Like it or not, you may be getting one.

The National Association of Scholars announced on Tuesday the launch of the Argus Project — named for the figure of Greek mythology whose body was covered with eyes — to recruit volunteers to monitor college campuses nationwide. The volunteers, a mix of faculty members and private citizens, "have begun to look into whether that college conducts politicized teaching, requires ideological adherence, or sustains slights to conservative students," said the association's announcement.

Stephen H. Balch, president of the association, said that about 30 such volunteers are in place, and that they will not necessarily identify themselves to campus officials. Many more will soon join the network. They will provide reports to the association's staff members, who will review any material before it is used. Balch said that Argus was a way for the association to monitor many more campuses than its small staff could do by itself.

Asked whether some might view the idea of monitors as intrusive, Balch compared the Argus volunteers to "freelance journalists" and said that they would be dealing with "publicly available information." Will the efforts to identify "politicized teaching" include sitting in on classes? Balch said that "if people can walk in on their own, they can do it, but it's not something we would encourage." He added that "my own notion of etiquette is that if you are going to go to someone's classroom, you should get permission."

The National Association of Scholars has always insisted that it is not a conservative organization, but rather one that is committed to a set of traditional and nonpartisan academic values. To recruit Argus volunteers, however, the association sent invitations to readers of Townhall.com, a conservative Web site whose education section features such articles as "Evolutionists Fear Academic Freedom," "The Liberal's Agenda — Antichrist or Just Anti-Christ?," "Quit Whining and Study," and "A Lawsuit a Day Keeps the Leftist at Bay."

Townhall readers who responded were given a questionnaire and then some were selected for the program. Asked if using such an ideological Web site for recruitment might raised questions about the association's balance, Balch jokingly asked back whether he should have recruited *Salon* readers. Asked whether he might have recruited from both sites, he said that "we needed a place where we could get volunteers. They have an electronic database of a quarter of million people. We thought it was a cost effective way of reaching people." Balch added that the association's view of itself stands as a group that "stands for principles that a very broad spectrum could find perfectly satisfying."

The blog Free Exchange on Campus — whose members include numerous faculty and civil liberties groups — is less than impressed with the arrival of Argus. A posting called "Informants R Us" speculated that Townhall's readers were drafted as "eagle-eyed, no doubt incredibly judicious informants" because David Horowitz's readers at Frontpagemag.com "already had other projects on their plates."

— Scott Jaschik

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/07/30/argus.

Killer Children

By KATHRYN HARRISON

REAL WORLD

By Natsuo Kirino.

Translated by Phillip Gabriel. 208 pp.

Alfred A. Knopf. $23.95.

“Sprinkle in some Dostoyevsky or Nietzsche or whatever. ... Then sort of wrap it up like ‘Evangelion,’” the popular animated television series that pits paramilitary teenagers against enemy angels bent on destroying humankind. Worm, the cipher at the center of Natsuo Kirino’s disquieting and suspenseful novel “Real World” and a juvenile killer on the run, is directing Terauchi, one of the four girls who become his accessories, to write a manifesto to fit the crime he has committed. He’d like it to be “something creative” rather than “introspective,” a “cool” and “incomprehensible” poem or story. Otherwise, his readers might conclude he isn’t the disaffected nihilist he imagines himself to be. “It doesn’t have to be long,” Worm tells Terauchi, but it does have to be “better than what that killer Sakakibara wrote.”

“Real World” begins with a matricide. No longer willing to cooperate with the expectations of the “total idiot” who forced him to attend a prestigious high school even though he lacked the aptitude to succeed in such an environment, Worm bludgeoned his mother to death in what Terauchi, whose worldview allows

no possibility of forgiveness or salvation, dismisses as a mindless, infantile response to frustration. Once Worm is on the run from the police, however, his photograph multiplying across the front pages of newspapers and broadcast on television — once he has time to contemplate his crime and the growing curiosity about his motive — his lazy anomie is dismantled by an intensifying self-consciousness. To answer his audience, he models himself on the infamous real-life killer whose literary efforts he wants Terauchi to surpass.

In 1997, a 14-year-old student from Kobe known by the pseudonym Sakakibara Seito beheaded an 11-year-old retarded boy with a handsaw and left the head at the entrance to his special school. After his capture, Sakakibara confessed to another murder, that of a 10-year-old girl whose head he had crushed with a pipe. Although he had exhibited the typical psychopathic precursors to murder, including the torture and killing of animals, Sakakibara sent a letter to the police claiming to be the product of Japan's system of compulsory education. In the 1990s the crimes of Sakakibara amplified Japan's growing anxiety about what it called a youth crisis, a fear that the increasing stresses imposed on adolescents could precipitate their becoming criminally insane.

Welcome to present-day Tokyo, where "air pollution advisories" announce the arrival of summer vacation and where vacation isn't a holiday from the 11-month academic year, but a break to be spent in cram schools taught by brainwashed college students who advocate studying hard enough to "spit up blood" as the avenue to a "tremendous confidence ... you can build on for the rest of your life." For the contestants in this dystopic steeplechase, a cultural reference more potent than "Crime and Punishment" or "The Will to Power" is the homegrown "Evangelion." And to "wrap it up like 'Evangelion'" would be to drive a violent plot to apocalypse.

"Real World" is peopled by children. Adults are peripheral — alcoholic fathers, adulterous mothers, prying detectives, predatory marketing drones, pedophiles on the prowl for schoolgirls, none of whom merit the trust of adolescents who must submit to the wishes of parents they consider hypocrites and despise. Styling themselves as peroxided "Barbie Girls," hard-studying loners or promiscuous "Good Time girls," replacing their given names with ones of their own devising, like "Dahmer," after the American serial killer, they worship the rare iconoclast who takes a stand against an educational system so oppressive that it sacrifices the development of character to scholastic achievement. In a society that values conformity — as the saying goes, "The nail that sticks out gets hammered down" — what matters isn't that Worm arrives at fame through conscienceless violence, but that he manages to rebel. As Terauchi's little brother observes, being "an elite kid who fell" is all that's required to become "a hero."

As she did in "Out," the first of her dark tales of murder to be published in English, Kirino presents her readers with four distinct female types: Terauchi, the intellectual who declares herself "above human relationships"; Toshi, Worm's next-door neighbor, who wants "to wear ordinary clothes and not stand out"; Yuzan, struggling to come to terms with both her homosexuality and her mother's death; and Kirarin, a sexual adventurer with a fatal taste for excitement. United first by friendship and second, like the older women in "Out," by their inability to resist involvement in a murderer's attempt to evade capture, the girls keep in touch with the fleeing Worm by cellphone, Kirarin joining his flight from the authorities. Among the four, Terauchi reveals a distinctly Dostoyevskian conscience, judging her implacable rage at her mother for taking a young lover as evidence of depravity deeper than Worm's. "In my heart I'd murdered my own mother long ago," she confesses as she reviews the impulsive nature of Worm's crime, one she decides is less "irreparable" than the malice that has "devoured" her soul.

Noir fiction generally posits a moral universe as deliberate and stark as that in the novels of Dostoyevsky, its plots unfolding in a moody urban landscape marked by corruption and incontinence, a setting that transcends its role as stage to become player. As Dostoyevsky did in "Crime and Punishment," Kirino pushes her antihero to murder as a means of philosophical statement and communicates an authorial anxiety that contemporary social ills will destroy humanity. But while Dostoyevsky sets up a contest between Christian love and a pernicious nihilism that inspires barbarity, Kirino's "Real World" offers no possibility of god or redemption.

A significant inversion, one that suggests an evolutionary difference between Dostoyevsky's and Kirino's visions, is that of cause and effect. Raskolnikov theorizes that certain "extraordinary" individuals have the right to act outside of conventional morality in service to a greater good. The murder he commits, of a parasitic moneylender, exposes the fallacy of what turns out to be less philosophical breakthrough than conceit, jeopardizing his sanity and his soul. Kirino's Worm, on the other hand, child of a post-Nietzsche, consumer-driven society that has yet to address the ethical vacuum created by the Death of God, murders without considering the meaning or consequences of his actions. Only in retrospect, aware of his emptiness and lack of conviction, does he attempt to invent a philosophy to explain his crime.

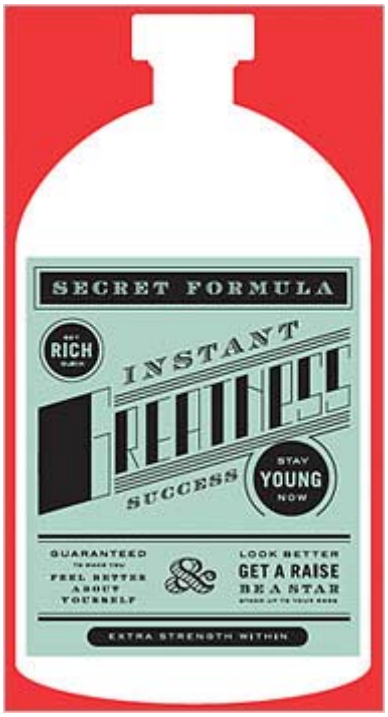
From a writer who has declared Flannery O'Connor her favorite American author — one of the few whose obsessive focus on violence, epiphany and redemption equals Dostoyevsky's — readers can expect a tour through the grotesque and the extreme. Together, Worm and his four female accessories maximize a dangerous situation's potential for further destruction and mayhem. And the blood-soaked denouement of "Real World" does push one character a degree toward moral consciousness and transformation. As for Worm, he may kill off his fictional mother, but he serves his living creator devotedly. Novels "show you the real world with one layer peeled away," he says for Kirino, "a reality you can't see otherwise."

Kathrun Harrison's most recent book is "While They Slept: An Inquiry In to the Murder of a Family."

http://www.nytimes.com/2008/07/20/books/review/Harrison-t.html?_r=1&8bu&emc=bua1&oref=slogin

Advice Squad

By VIRGINIA HEFFERNAN



Why look down on self-help books? Don't you want to be kinder, look better and get rich? From Hesiod's "Works and Days" and the Book of Proverbs to "The Pilgrim's Progress," Nietzsche's "Thus Spake Zarathustra," Simone de Beauvoir's "Second Sex" and Malcolm Gladwell's "Blink," the history of literature is the history of self-help.

If you're ready to submit to the genre, you must first risk being seen with shiny new titles, since the genre styles itself as a science, complete with routine Copernican breakthroughs. Active listening, for example — "I experience you as being angry" — was once mandatory for couples in trouble; now it's considered the royal road to divorce. We also used to believe that you shouldn't wait for a man to sweep you off your feet, when it turns out you should. Bedrock beliefs are debunked as dangerous delusions, only to be rebunked and then revealed as myths yet again. That's the metacycle of self-help, as efficient as a Ben Franklin day.

Because advice authors claim to exemplify their own philosophies, an exquisite tautology pervades their arguments. The slimness, vast wealth and eternal lives known to the authors of best-selling advice books come only to those who ... write best-selling advice books. After decades spent buying self-help guides, then, I now dream of selling my own. To this end, I have studied the top 10 books on The Times's advice, how-to and miscellaneous best-seller list from March 9, 2008, in much the same way that Gore Vidal (in 1973) and Anthony Lane (in 1994 and again in 1995) studied the top 10 novels. Those cerebral spidermen discovered such daffy ideologies and pitiful rhetorical tricks that they seem to have become ashamed to be readers. (Vidal's piece is a shudder at the predilections of "the new illiterates"; Lane chuckles at the widespread reliance on "chardonnay" as a proxy for class and hides the sappy "Bridges of Madison County" in a paper bag, like porn.)

I tried to turn up howlers, too, but couldn't keep my head as clear as they did, nor harden my heart to the cheap solace of buttery, oaky prose. Popular books put me under their despotic sway and often render me incapable of making fun of them. The books on the March 9 list proved no different.

First off is the wunderkind Timothy Ferriss, at No. 10, with The 4-Hour Workweek (Crown, $19.95). In only his early 30s, Ferriss suffers from a relative lack of hard knocks; he resorts to citing birth trauma to prove his intimacy with suffering. In his short life, he has nonetheless become rich peddling pills scarily called BrainQuicken and BodyQuick. Do you want to do the same? Precisely the same? Pay attention, then: in this book, Ferriss gives instructions for recreating his own life. Forget "follow your dreams." Ferriss recommends creating intellectual property by searching Writer's Market for obscure magazines with 15,000-plus circulations whose readers spend money in the same consumer patterns as, say, bass fishermen, then asking the magazines' advertising directors to e-mail you rate cards while you search back issues for repeat advertisers who sell directly to consumers via 1-800 numbers and Web sites. I'm not kidding. That's Step 1.

Unlike the stern advicemen who follow the 1970s self-help giant M. Scott Peck in insisting that "life is difficult," Ferriss, whose maxim is "life doesn't have to be so damn hard," is above all pro-hokum. In his vertiginous free time, he crash-diets, cheats at kickboxing and persuades people to give him money. He leads the new generation of advice-mongers in proposing to hack the whole American way. Eventually, what he pushes is search-engine optimization — the art of gaming Google by, say, inventively conjoining terms and selling a passworded file that will be the top result retrieved by searches using the conjunction. Once people shell out $4.95 for an electronic document with a title that brings together "lose weight" and "at my computer," you can sell the suckers longer, more expensive documents. Maybe a T-shirt, too, or protein jelly beans. This stuff is diabolical, and only the young have the stomach for it. As Ferriss points out, Google-testing is how he settled on the title and subject for his real cash cow, "The 4-Hour Workweek."

That reader trap — you bought the book, and thus helped save the book's author, and now all you can do is write a book so that others might save you — springs in every one of the advice best sellers. The nostalgic Dangerous Book for Boys (Collins/HarperCollins, $24.95), at No. 9, also pushes writing as the solution to humanity's biggest problems — in this case, man's domestication in childhood. The authors, Conn Iggulden and Hal Iggulden, don't make you want to actually do the Tom Sawyer stuff they advocate so much as to talk, read and write about it.

Like a bright lad with a chemistry set, "The Dangerous Book" generates a reaction with a smart mix: one part conservative polemic and one part simple-pleasures fable. It's a rejection of the namby-pamby parenting of the 1970s. In its place, the authors evoke a peculiar, if fun, British Empire boyhood, one in which sturdy boys are expected to strive to "conquer worlds." The book sells its thrills hard, and it certainly made this reader swoon at the idea of a son who recites "Ozymandias" and knows celestial navigation.

Just don't let minors know about the sleight of hand. Knot-tying and stickball take up three pages here, but many more are devoted to pastimes that don't skin knees, including grammar, poetry, etymology, courtship and Latin. I don't care what any brawling boys'-rights champion says, a kid who learns to grind an italic nib, marble paper and handle the ablative case is training to be a writer, not a fighter pilot.

The life-jacket-orange advice best seller at No. 8 seems like a parody, with its nauseating title: Does This Clutter Make My Butt Look Fat? (Free Press, $25). Sadly, it's a dead serious diet book by Peter Walsh, the host of "Clean Sweep" on TLC and a frequent talk-show guest. When Walsh's original protégées cleaned their houses, they evidently lost weight. So he's back to remind us to clean. There's no more to it than that, and the case studies are so vague as to inspire no one. Walsh merely quotes unsigned letters: "Hi, my house is cluttered and I'm fat. Should I clean up?" Page after page, Walsh answers "yes."

At No. 7, One Month to Live: Thirty Days to a No-Regret Life, by Kerry and Chris Shook (WaterBrook, $19.99), is hard-core. For all the claims that self-help has been entirely Oprahfied — a group hug between

hardcovers — our noblest self-help paradigms are still austere. The Shooks, the husband-and-wife team behind the wildly successful multi-site church Fellowship of the Woodlands, start brutally: “Your time on earth is limited.” Oof. I can hear the hoofbeats now.

No amount of subsequent encouragement about living passionately or like Jesus eased that solar-plexus blow, at least for me. Through instructions to love, keep a journal, write letters and make lists (the no-regrets life requires grueling paperwork), the Shooks’ macabre bottom line stuck in my nut. It seemed rude, really, and at odds with the function of advice books, which is not to get real but rather to shore up the bereft. The truly bad news comes soon enough: “Satan knows the dream starts in your heart, so he’s committed to wounding your heart, taking it out of action and freezing your God-given dream with soul-numbing cold.”

A single tick up the advice best-seller list, at No. 6, is another America entirely, the one in which Satan lives in nasolabial folds. This is How Not To Look Old (Springboard, $25.99), by Charla Krupp, a blonde who looks decidedly not-old. Whether mammalian age even pertains to beauties like Krupp I’m not sure; she seems to be on another biological trip altogether. Krupp insists that her youthfulness comes from avoiding dark lipstick, granny glasses and inner-rim eyeliner — and embracing bleach, self-tanner and pink lip gloss. Oh, you didn’t know that was the formula? Think My Little Pony, in Joe’s Jeans, with a side-swept forelock, and you’ve got the Krupp paragon.

No transition is necessary to No. 5, YOU: Staying Young, by Michael F. Roizen and Mehmet C. Oz (Free Press, $26). By going straight for the second-person jugular, and adding science, the YOU series (previous entries: “YOU: The Owner’s Manual,” “YOU: On a Diet”) is flattering at first: two rushed but eminent doctors have been assigned to my case! I started folding down the corners of the pages — move three football fields from the road, do qi-gong, irrigate your nose with a neti pot — only to find so many cricked that I returned to none of them. If I did everything I needed to do to stay YOU young, I rapidly calculated, I wouldn’t have even four hours left for MY workweek.

Yes, even the horrific news about deteriorating brains and toxic hearts is delivered with the happy corniness of a nice rabbi. But halfway through, I was already reminiscing about “How Not to Look Old.” To have good skin, according to Roizen and Oz, you have to meditate constantly, replace all your kitchen sponges with 10 bleached dishcloths and drink at least 14 cups of green tea a week. In “How Not to Look Old,” you order pink stuff from Sephora.

Become a Better You (Free Press, $25), at No. 4, sells mainly on the strength of its author’s name. Joel Osteen is a hit televangelist, veteran best seller and pastor of Lakewood Church in Houston, reportedly the biggest church in the country. If he says shape up, you shape up, because he’s got the gleamingest pulpit.

Osteen opens by crediting Frank Lloyd Wright — whose favorite design, he said, was always “my next one” — with having become a better him. In Osteen’s metric, you don’t have to be brutally aware of your mortality or rich in omega-3s or pastel hues to succeed; you just have to be happy. What a relief! His seven keys to a better life restate that point (“stay passionate,” “be positive”), and by the end of the book I found myself smiling like a fool. Now that’s self-help. If your husband is a slob, don’t be a freak about it, but don’t spend hours doing yoga, either. Pick up his shoes and be cool. Bounty and love surround you both! He’s probably being cool about your issues, too.

The time is ripe for a Deepak Chopra takedown — or definitive apotheosis — if only because with the book at No. 3, The Third Jesus: The Christ We Cannot Ignore (Harmony, $24), he has now published more than 50 books. But I can’t do it; I’m in thrall. Chopra — a medical doctor and proponent of mind-body treatments — preaches with the authority of a healer, mystic and celebrity on virtually everything, including love, sleep, energy, weight, money, reincarnation, heaven, peace, yoga, desire, physics, addiction and success. His ideas are either saving us from ruin or slowly poisoning us, but they’re in the water.

Still, I don't really get "The Third Jesus." Even its title is a head-scratcher. With the first Jesus still pretty hazy to most people, the idea of a third one — an arbitrary concept of goodness that might be wrested from Christianity — is not even an interesting mystery. "One Jesus is historical, and we know next to nothing about him," Chopra writes. "Another Jesus is the one appropriated by Christianity. He was created by the Church to fulfill its agenda. The third Jesus, the one this book is about, is as yet so unknown that even the most devout Christians don't suspect that he exists." Let me guess: Chopra knows.

Trying to follow Chopra's schema through decontextualized passages of Scripture, I resentfully wonder why this was classified as an advice book. There's no "YOU," only droning "we" stuff. (I guess this is what the listmakers mean by "miscellaneous.") Chopra says we need to heed some newfangled, nothingburger Jesus straight out of Acme Spirituality Inc. What do you mean we, Mr. Deepak Chopra Man?

Turning too quickly to No. 2, Women and Money: Owning the Power to Control Your Destiny (Spiegel & Grau, $24.95), might bring on whiplash. While Chopra grows delirious in his graphomaniacal spirit realm, Suze Orman, the personal-finance drill sergeant, lives happily with the profane: 401(k) plans, I.R.A.'s and FICO scores. In addition to promoting Owning, Power, Control and Destiny, she also takes pains to demonstrate her emotional investment in your success. "I would be thrilled," she writes, "if you had a revocable living trust with an incapacity clause."

What a strange, and yet rousing, way to put it. I really do want to thrill you, Suze, with my durable power of attorney for health care.

Orman believes that a mental block — composed of fear, shame and confusion — prevents women from engaging in intelligent money management. Blessedly, her pep talk doesn't dive too deep, and she sticks to cheering on the reader: blow that block to smithereens and call a halt to home economics based on credit card debt and crumpled singles at the bottom of a Chloé bag! You'll feel a hell of a lot better when you have savings and investments and pin money, Orman promises. I believe her.

And if I had stopped right there, with "Women and Money," I might have stopped paying credit card interest and started maxing out my 401(k). But that's all too literal to me now that I've read, and reread, The Secret, by Rhonda Byrne (Atria/Beyond Words, $23.95), the very special No. 1. Byrne won me over with her promise that if you think it, it will come. Instead of shopping around for home insurance, I can simply suppress thoughts of building collapses and fires set by left-on burners. Instead of paying off credit cards, I can ask the universe for a windfall. Then I imagine all the credit cards I've ever had turning into silvery butterflies in the blue summer air, and flying to South Africa, and bringing back blood diamonds on their wings, along with the address of a local diamond-buyer who's paying top dollar.

When Byrne wants to lose weight, she posts a low number on her scale and, presto, she's lighter. Controversially, it works backward too: if you have seasonal allergies or worse, you must have asked for them. And if you have written a best seller, it's because you visualized it scaling the list on its little book legs.

"The Secret" is not really a book but a series of misquotations from historical figures and fraudulent maxims from no-count hucksters. And yet something in that gooey red waxy seal on the front of "The Secret," and the book's believe-in-magic glitter, takes me to a happy place.

"The Secret," which envisions fame and fortune for the once down-and-out Byrne, has become the vehicle of her success. I'm impressed. And ready. Self-helped beyond my wildest dreams, and close to euphoria, I sit down to compose my "Secret." Miraculously, I discover I've already written it — lyrically, lucratively and entirely in my mind, which is suddenly good enough.

Virginia Heffernan writes The Medium, a column about digital culture, for The Times Magazine.

http://www.nytimes.com/2008/07/20/books/review/Heffernan-t.html?8bu&emc=bua2

I Married a Maori

Reviewed by ALISON McCULLOCH

COME ON SHORE AND WE WILL KILL AND EAT YOU ALL

A New Zealand Story.

By Christina Thompson.

270 pp. Bloomsbury. $24.99.

In June 1942, a United States naval convoy arrived in New Zealand, beginning a friendly invasion that would last two years and involve around 100,000 American soldiers and sailors. To help the visitors adapt, the New Zealand government published a booklet that made a useful point: "New Zealanders have been well trained by your movies," it said, "so we cotton (catch) on to most of your ordinary slang. But as we don't export films to Hollywood you won't know ours." That one-way flow of American culture has only gained momentum since then, which is why Christina Thompson's account of her own first visit to New Zealand strikes a jarring note.

It's sometime in the 1980s, and Thompson has stopped off on her way from Boston, her hometown, to graduate school in Australia. In a pub north of Auckland she meets a group of Maoris — New Zealand's indigenous Polynesians — having a beer after a day out diving for crayfish. "I have often thought of that night as a contact encounter," she writes in "Come on Shore and We Will Kill and Eat You All," explaining that "'contact' is what we call it when two previously unacquainted groups meet for the very first time."

Thompson persists with this meeting-of-alien-peoples theme as the tenuous link between the memoir part of her book, in which she is cast as a kind of explorer charting new cross-cultural territory in her

relationship with a Maori ("I was small and blond, he was a 6-foot-2, 200-pound Polynesian. I had a Ph.D., he went to trade school"), and the history part (the European discovery and colonization of New Zealand). The late-20th-century pub incident, for example, segues into accounts of 18th-century encounters between Maoris and explorers like James Cook and Marc-Joseph Marion du Fresne. Both of them were ultimately killed by the Polynesians they met; Thompson married hers.

Later, the story of Omai, the first Polynesian to set foot in England, is woven into an account of Thompson's return home with her new husband, "for many people in Boston ... the first person they had ever met of his kind." In 1770s London, Omai was a hit — with one young lady asserting that "he is so polite, attentive & easy, that you would have thought he came from some foreign court." In modern-day Boston, Thompson's husband, known as Seven, attracted "a similar sort of admiration," something she found surprising. "He, after all, had little idea how things were done among people like my parents and could no more have been expected to know what passed for good manners among them than they would have known the protocol for being invited onto a Ngati Rehia marae." Really? I can see how middle-class Bostonians might not be steeped in the etiquette of the Maori meeting place, but there's been nowhere to hide from all things American — even in New Zealand — for quite a few decades now.

We don't learn here of Omai's fate, though in her fine account of Captain Cook's voyages ("The Trial of the Cannibal Dog"), Anne Salmond rounds off his remarkable tale. After two years entertaining scientists and society ladies, Omai joined Cook's final South Pacific journey, eventually making it back to his home near Tahiti. There, he was set up with a house, a garden and a collection of animals including horses, sheep, turkeys, cats and a monkey. A few years later, though, Omai succumbed to a fever, all but one of his animals also having died, even the monkey, which was killed falling out of a coconut palm. As for Seven, at book's end he is still in Massachusetts, where the family settled and Thompson works as editor of Harvard Review. She wonders sometimes if he gets homesick. "'Don't you want to go back to New Zealand?' I would ask him. 'Not really,' he always said."

Although Thompson's "contact encounter" parallels are strained, her observations about the enduring effects of colonization can be penetrating. She puts her vantage point of insider-outsider (she's never lived in New Zealand yet has an intimate connection with it) to good effect, tracing the genealogy of racial stereotypes and cutting through some of New Zealand's most cherished myths about itself. Like the one about how injustices of the past have been addressed, or that, unlike Australia, New Zealand is not racist. "What, after all, does the cluster of social indicators that includes low life expectancy, poor health, high unemployment and low levels of educational attainment suggest, if not poverty?" she asks. "And what is the root cause of Maori poverty, if not colonization?" Thompson now has interests on both sides of the postcolonial divide, feeling the dispossession suffered by her husband's (hence her children's) people as well as that perpetrated by her own. ("It was the Dakotas and Pennacooks and Pawtuckets who paid the price of our family's prosperity.")

A difficulty with explorer stories, however, is that the voice of the explored is usually missing, and this is certainly the case here. Thompson explains it as a deliberate decision, a "gesture of respect." "It is not their story I am telling," she says of Seven's family, "it is mine." Actually, it is both — it's her story about herself and her story about them.

Alison McCulloch, a former editor at the Book Review, lives in New Zealand.

http://www.nytimes.com/2008/07/20/books/review/McCulloch-t.html?8bu&emc=bua2

Live fish caught at record depth

By Anna-Marie Lever
Science and Nature reporter, BBC News

A live deep-sea fish has been caught at a record depth of 2,300m on the hot vents of the Mid-Atlantic Ridge.

Three shrimp species were also pulled to the surface, researchers report in the journal Deep-Sea Research.

Scientists have engineered a new device that allows recovery of live animals under their natural pressure at greater depths than previously achieved.

Next they hope to be able to transfer the animals into an experimental lab to study their normal biology.

"Pressurised recovery has been around for the past 30 years, but this is the deepest fish-capture under pressure - the previous record was 1,400m. This is also the first time pressurised capture has occurred at a hydrothermal vent," said Dr Bruce Shillito, marine biologist at the Universite Pierre et Marie Curie, Paris, France.

The shrimp species were caught at 1,700m (5,600ft; *Mirocaris fortunata* and *Chorocaris chacei*) and 2,300m (7,500ft; *Rimicaris exoculata*) at two vent fields, Lucky Strike and Rainbow, on the Mid-Atlantic Ridge.

Dr Shillito explains: "At depths of over 1,000m, it is difficult to recover animals alive. Catching with no pressure is as good as catching dead. Fish are the most fragile - even a fisherman with a 100m line will probably reel in a catch whose gas bladder is in its mouth."

Although the fish caught by the team was a zoarcid (*Pachycara saldanhai*) and had no gas bladder, it was sensitive to full decompression.

At the surface, under pressure, the fish was active and remained upright, however upon release of pressure its movement became uncoordinated and within a few minutes it was totally motionless.

A similar effect, caused by decompression, was also observed in the shrimp species. At the surface, under pressure, most shrimps were in an upright position and swimming actively and continuously.

When a separate shrimp sample was caught and pulled to the surface without pressure, the animals jerked violently, and after a few hours were dead.

The samples were examined onboard the ship "Pourquoi Pas?" during the Momareto cruise, which was organised by Ifremer, the French Research Institute for Exploitation of the Sea.

Please turn on JavaScript. Media requires JavaScript to play.

First deep-sea shrimps caught around hydrothermal vent

The next step for Dr Shillito's team is to be able to transfer its catch from the sampling device into a better equipped experimental tank, without decompression, allowing the scientists to observe the animals' normal behaviour and responses to different environments.

"We are particularly interested in the Pompeii worm (*Alvinella pompejana*), a vent worm which is thought to be the most thermo-tolerant marine organism, yet remains to be recovered in good enough shape. It is intriguing to find out how heat-resistant this animal is," Dr Shillito told BBC News.

Despite covering about 60% of the Earth's surface, the deep-sea floor ecosystem is poorly understood. Dr Shillito says: "We urgently need to find out more about the place we are destroying."

He adds: "At a time when we are over-fishing the depths of the ocean, we know more about cooking recipes than the biological features of deep-sea fauna."

A new device

The new sampling system for pressured recovery, which has been named Periscop, was developed by Dr Shillito in conjunction with Mr Gerard Hamel, a mechanics engineer at the Universite Pierre et Marie Curie.

It received funding from Exocet/d, a large European research programme.

It has three compartments which perform different tasks - capture at depth, recovery of the deep-sea species under natural pressure, and transfer to the lab with no decompression.

"In most previous attempts involving pressurised recovery, a single container fulfilled these three tasks - this may lead to contradictory technical requirements," explains Dr Shillito.

The plastic capture box is attached to a submersible arm which allows movement and suction for sampling. The animal is then transferred into a pressurised box. This is kept at the same pressure as the sampling depth during ascent by a pressure compensator.

"We used pressurised water to maintain pressure, which is a safer and a simpler alternative to gas. We hope this method of pressurised recovery will become standard," Dr Shillito said.

As well as pressure shock, when animals are pulled to the surface they suffer from changes in temperature.

"The temperature at depths below 2,000m is pretty constant all over the world - around 2-4C, yet the surface waters where we were sampling were 22-25C," explains Dr Shillito.

He adds: "Heating is difficult to prevent without getting out the heavy gear - using active cooling systems, requiring energy and computer controls - but at least we know that every sample has had the same temperature history; they have the same background story."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7525552.stm

Published: 2008/07/31 03:58:26 GMT

Olympic link to early 'computer'

A 2,100-year-old "computer" found in a Roman shipwreck may have acted as a calendar for the Olympic Games, scientists report in Nature journal.

The Antikythera Mechanism has puzzled experts since its discovery by Greek sponge divers in 1901.

Researchers have long suspected the ancient clockwork device was used to display astronomical cycles.

A team has now found that one of the dials records the dates of the ancient Olympiad.

This could have been to provide a benchmark for the passage of time.

The device is made up of bronze gearwheels and dials, and scientists know of nothing like it until at least 1,000 years later.

Social importance

Tony Freeth, a member of the Antikythera Mechanism Research Project, said he was "astonished" at the discovery.

"The Olympiad cycle was a very simple, four-year cycle and you don't need a sophisticated instrument like this to calculate it. It took us by huge surprise when we saw this.

"But the Games were of such cultural and social importance that it's not unnatural to have it in the Mechanism."

The technique of X-ray computed tomography gave the researchers a 3D view of its 29 surviving gears. High-resolution imaging provided them with a close-up of tiny letters engraved on the surface.

The device's "subsidiary dial" was once thought to be a 76-year "callippic" calendar.

However, Mr Freeth and his colleagues have now been able to establish from its inscriptions that it displays the 4-year Olympiad cycle.

Instead of one Olympics as there is today, the ancient Olympiads, called the Panhellenic Games, comprised four games spread over four years.

'Eureka' moment

The four sectors of the dial are inscribed with a year number and two Panhellenic Games: the "crown" games of Isthmia, Olympia, Nemea and Pythia; and two lesser games: Naa (held at Dodona) and a second game which has not yet been deciphered.

In addition, the team was able to identify the names of all 12 months, which belong to the Corinthian family of months.

Corinth, in central Greece, established colonies in north-western Greece, Corfu and Sicily, where Archimedes was established.

Archimedes, whose list of exploits included an explanation for the displacement of water and a screw pump that bears his name today, died there in 212 BC.

The Antikythera Mechanism was "almost certainly made many decades" after his death, according to Alexander Jones, a professor at the Institute for the Study of the Ancient World in New York, US.

If it came from Syracuse, the dial could have been made by the school of scientists and instrument-makers he inspired.

The priceless artefact was found by a sponge diver amid other treasures on a wreck near the tiny island of Antikythera between Crete and the mainland. It is on display at the National Archaeological Museum in Athens.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7533457.stm

Published: 2008/07/30 22:26:08 GMT

Chemical clue to baby blues found

American scientists say they are closer to understanding why some mothers suffer post-natal depression.

They found mice lacking a chemical receptor in their brains developed similar symptoms.

The study suggests the receptor helps stop brain cells firing too often in response to changes in hormone levels during pregnancy and birth.

A British specialist said the research, published in Neuron, could lead to better treatments for the disorder.

> **It is fascinating to see something like this coming out after we have speculated about it for all this time**
> Dr Delia Belelli
> Dundee University

Between 5% and 25% of all new mothers are thought to suffer some form of post-natal depression, and can find it hard to cope with the demands of the baby, or even to form a bond with it.

The precise reasons why some women develop it and some do not are uncertain, but the team at the University of California in Los Angeles say they may have some more answers.

They focused their work on a chemical messaging system in the brain already known to play a key part in the regulation of mood and anxiety.

A chemical called GABA can decrease the activity of certain nerve cells after coming into contact with receptors on that cell's surface.

The Californian team noticed that a particular type of this receptor appeared to be highly active during pregnancy and the period after birth in mice.

Their theory is that this variety of receptor might help, in normal circumstances, to keep control over the brain's response to huge hormonal changes during and immediately after pregnancy.

Failure to do this effectively may be the root of some post-natal mood problems, they said.

Shunning newborns

To test this, they bred mice to have fewer of these receptors.

These genetically-altered mice behaved like mothers with post-natal depression, being more lethargic, and shunning their newborn pups.

When they were then given a drug known to boost the function of these receptors, the symptoms eased and pup deaths fell.

Dr Jamie Maguire, one of the researchers involved, said: "Targeting this subunit (receptor type) might be a promising strategy in developing new treatments for post-natal depression."

Dr Delia Belelli, from the University of Dundee, has studied the role of GABA in mood disorders for more than two decades.

She said it was possible that the drug used to boost receptor function might have a role in treatment of women.

She said: "It is fascinating to see something like this coming out after we have speculated about it for all this time.

"What they are suggesting is not surprising, and could in theory be applied not only to post-natal depression but to other mood disorders, such as those during the menstrual cycle in women."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7532483.stm

Published: 2008/07/31 01:42:28 GMT

UK student visa must be sponsored

Students coming to the UK from overseas will have to be sponsored by a college licensed by the UK Border Agency, under Home Office proposals.

The colleges will have to prove they are genuine education institutions - not just routes into low skilled work.

They will have to report students who are not attending their courses.

As part of the wider shake-up of the immigration system, applicants will need to have enough points before they can apply for a student visa.

Applicants will be fingerprinted and will need a biometric identity card.

Mutual benefits

The new licensing system, to be implemented next year, will replace the existing register of education training providers operated by the Department for Innovation, Universities and Skills.

INTERNATIONAL STUDENTS

There are about 240,000 non-EU students in UK higher education
International students form 14% of the full-time student population
They make up 43% of those at research postgraduate level
Source: Higher Education Statistics Agency

This was introduced only in 2004 as part of a crackdown on bogus colleges, but is regarded as ineffective.

In January it emerged that 256 of the 2,000 institutions on the register had been inspected since 2005 and 124 of them, almost half, had been struck off.

In a "statement of intent" announcing the new rules, the Home Office borders and immigration minister, Liam Byrne, said international students brought many benefits to the UK.

These included £2.5bn to the economy in tuition fees alone as well as cultural benefits, returning home with "an enhanced appreciation of British life".

"So we want good students. But we want to shut down bogus colleges operating 'courses' which are really a means to low skilled employment," he added.

Higher Education Minister Bill Rammell said: "I will not tolerate the minority of individuals who seek to damage the quality of our education system through bogus colleges. This is why we have introduced tighter checks to the current Register of Education and Training Providers.

"The new system will toughen this process further and give extra protection from the damage bogus colleges can cause."

Mr Byrne also said students acquired "a good command of the English language" while in the UK.

Concerns have been raised recently on this score by academics and other students who say sometimes overseas students are being awarded qualifications despite having little English.

Work after study

The chief executive of Universities UK, Diana Warwick, said: "Universities agree with the principles of the new system and welcome the plan to link visas to specific institutions.

"But we have been keen to ensure that there is sufficient time for the new processes to be understood by prospective students overseas and by colleagues in universities as well as to ensure rigorous testing of the new IT system that will underpin the points-based operation."

She said universities also liked the doubling of the time people may work in the UK after completing their studies.

"These arrangements will allow international graduates to apply to stay in the UK to work for up to two years after graduation," she said.

"We know international students are keen to build on their academic qualification with a period of work experience in the UK and post study work will ensure the UK remains an attractive destination for international students."

The government is consulting people on the changes with a view to publishing an implementation plan in October.

The new system is in two parts:

LICENCES FOR EDUCATION PROVIDERS

All colleges and universities that want to recruit foreign students will need a licence.

To get a Licence, all education providers will need to show they are inspected or audited or hold valid accreditation with one of the bodies approved by the UK Border Agency (UKBA):

Accreditation UK - which offers an accreditation service for English language centres.
BAC - the British Accreditation Council - which offers a more general accreditation service to cover a wide range of education providers.
ASIC - the Accreditation Service for International Colleges - which also offers a general accreditation service to cover a wide range of education providers.
Ofsted - the Office for Standards in Education, Children's Services and Skills.

Education providers will be expected to report students who fail to enrol or who stop attending.

TIGHTER RULES FOR STUDENTS

Adult students will be allowed in only "where they can demonstrate a proven track record in studying".

They will need an immigration sponsor - that is, the education provider that has accepted them on a course.

A sponsor's confirmation of acceptance for studies will account for 30 of the 40 points needed to get a student visa.

It will be a pre-requisite to getting the visa but no guarantee that someone will be granted one.

The other 10 points will come from checks by UK entry clearance officers that applicants have sufficient funds and that their documentation is genuine.

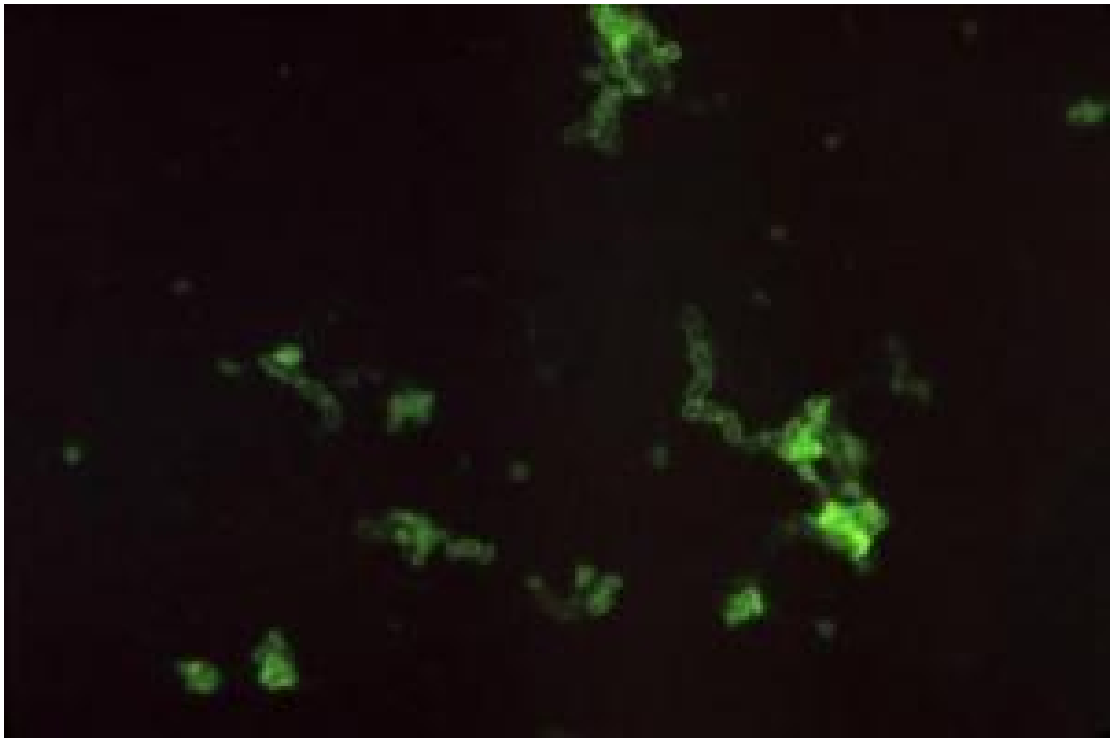
Students on courses of more than 12 months will have to show they can pay their first year of fees and have at least £9,600 for their first year in the UK.

Once in the UK students will face ongoing checks.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/7532688.stm

Published: 2008/07/30 09:53:46 GMT

Vaccine To Protect Against Black Plague Bioterror Attack Being Developed



Micrograph of Yersinia pestis bacteria, magnified 98x. (Credit: CDC/Dr. James Feeley)

ScienceDaily (July 31, 2008) — A University of Central Florida researcher may have found a defense against the Black Plague, a disease that wiped out a third of Europe's population in the Middle Ages and which government agencies perceive as a terrorist threat today.

UCF Professor Henry Daniell and his team have developed a vaccine that early research shows is highly effective against the plague. Findings of his National Institutes of Health and USDA funded research appear in the August edition of Infection and Immunity. The vaccine, which is taken orally or by injection, was given to rats at UCF and the efficacy was evaluated by measuring immunity (antibody) developed in their blood.

All untreated rats died within three days while all orally immunized animals survived this challenge with no traces of the plague in their bodies. The rats were exposed to a heavy dose of Yersinia Pestis bacteria, which causes the plague, at the U.S. Army Medical Research Institute of Infectious Diseases in Maryland. It is one of a few labs in the world authorized to store and work with the highly dangerous agent.

"We are very excited because it appears the oral vaccine is even more effective than traditional injectable vaccine," Daniell said. "This could really make a difference."

In the event of a bioterror attack, the oral form makes the vaccine practical, as the distribution of pills would be much quicker and likely more effective because no special skills or sterile needles are needed to administer them.

"It worked beautifully," Daniell said. "It's expensive to create an injectible vaccine. But with oral vaccines, it is quite cheap. You grow your plants and then you convert them into capsules."

The plague had a deadly impact on early Europe, it continues to make appearances today in places like Africa and Asia. The World Health Organization reports at least 2,000 cases of the plague annually. The

most recent outbreak in 2005 killed 56 people in the Congo and another 124 were infected before the epidemic was stopped. In the mid 1990s more than 400 people were infected in India.

Although human trials are still needed, Daniell is confident the vaccine will work for the bubonic and pneumonic plague based on animal studies. Pneumonic plague is spread through the air. Without treatment a person can die within days. Bubonic plague is the more common form and is transmitted through fleabites and kills about 70 percent of those infected within 4-7 days if not treated. It was the version that ravaged Europe. If the early findings hold true, this vaccine could mean an extra layer of protection against natural epidemics and man-made threats.

The Centers for Disease Control lists the pneumonic plague as a potential bioterrorism agent because of the speed of which it can be spread and its 60 percent fatality rate if not treated early enough with an aggressive array of antibiotics.

Daniell was inspired to investigate an oral vaccine for the plague because of his pioneering work in diabetes. He and his team genetically engineered tobacco and lettuce plants with the insulin gene and then administered freeze-dried plant cells to five-week-old diabetic mice for eight weeks. By the end of this study, the diabetic mice had normal blood and urine sugar levels, and their cells were producing normal levels of insulin.

Daniell figured the same approach might work with a vaccine. He genetically engineered plant cells with a protein found on the outside of Yersinia pestis. The vaccine was inside the plant cells, which were given to the rats. The vaccine was protected from digestion in the stomach and was then absorbed in the gut. It kick started the immune system into producing antibodies, which protects against the deadly disease. Three to five doses seem to do the trick.

Daniell, who was born and raised in India, has dedicated his life to finding treatments and cures to diseases that ravage poor countries. He is conducting research into seven of the top 10 diseases ranked by the World Health Organization and the Centers for Disease Control, which remain real issues developing nations.

"I've seen the need. There may be some very expensive treatments available," Daniell said. "But they are so expensive that developing countries can't access them. I want to help change that."

Daniell, who is the first UCF Board of Trustee Chair in Life Sciences, began teaching at UCF in 1998. His research led to the formation of UCF's first biotechnology company, called Chlorogen, for the commercial development of patented chloroplast genetic engineering technology. In 2004, he won UCF's Pegasus Professor Award, the top honor given to a faculty member who excels in teaching, research and service. Daniell also became only the 14th American in the last 222 years to be elected to the Italian National Academy of Sciences. In 2007 he was named a Fellow of the American Association for the Advancement of Science.

Adapted from materials provided by University of Central Florida.

http://www.sciencedaily.com:80/releases/2008/07/080730140829.htm

Say Goodbye To Virtual Bureaucracy

ScienceDaily (July 31, 2008) — Debit or credit card in hand, you're set to make a quick purchase online only to be greeted by yet another form asking for your personal details. You spend 10 minutes filling out the form and since you're new to the site, the online store asks you to choose your own unique password for the next time you shop at the site. You're then passed on to a security page which wants to check you're the legitimate owner of the bank card. Your password is requested.

If you haven't forgotten the password for the security check with your bank (you may have more than one credit card and the password isn't the same as your online banking password or your cash card pin), then you'll probably have forgotten your password to the online store the next time you shop there. Re-requesting all these user names and passwords slows us down from spending our own money or making a quick consultation on the Internet.

Simplifying the process

This is a source of frustration which Vincent Etchebarne, innovative services developer at France Telecom's Orange, understands. "When people go on the Internet, they must systematically fill in forms asking for their name and address. Our idea was to memorise all that information and make it mobile so it could be accessed at any PC, whether you were in an Internet café or at home," he says.

The challenge was to find a technical way to save and manage a customer's information – while keeping it secure from fraudsters on the lookout to steal our personal information. In 2005, Orange partnered up with three other European telecoms operators – TeliaSonera, Telenor and the then Amena (now Orange) to develop a solution. The investigation became a EUREKA project called Fidelity, which stands for Federated Identity Management based on LIBERTY. The operators partnered with telecoms software and hardware developers Ericsson, Axalto and Italtel, three SMEs (Moviquity, TB-Security and Linus) and the University of Oslo, which had specialist knowledge of development and integration in IT systems.

They decided to test a system where telecoms operators could act as "identity providers". They would have a customer's personal information and would give the necessary information to third parties after receiving the customer's permission. "A hotel site, for instance, will ask Orange for your details and then Orange will ask you if you're happy about sharing your details with the hotel," explains Etchebarne.

One of the advantages of the system is that customers can save time through having one password with their identity provider. A customer could visit a new website and it would be their identity provider who would handle the virtual paperwork on their behalf.

The secure solution

To make the process secure, the EUREKA partners decided the identity providers would operate within what they called a circle of trust – a circle to which the service providers (Internet stores or online news webpages, for example) would also belong, along with attribute providers which securely host the customers' personal attributes to be shared with service providers. The circle of trust would be a formal partnership where the members would sign a contract agreeing to certain terms such as how information should be exchanged, kept and deleted from databases at a customer's request.

"Since a contract exists, a customer can ask at any time to have their personal data removed from the records of a company," says Etchebarne. Customers can also decide to only give limited information to a company. They could decide to just give the information a company or organisation needs to provide them with the service.

"The system gives customers much more control," says Etchebarne. "Because everything linked, if you change your address, you just change it with your identity provider, not with every website you use."

Although a customer would have a single password with their identity provider, for extra security, when she visits a website and gives her permission for it to receive her personal data, she would be given a unique security identifier for that website. "In the future, the weather site would be able to recognise it is me from the identifier," says Etchebarne. "It knows where I live and every time I access the site automatically posts the weather for where I live. It won't know my name or address. It only needs to know where I live."

One of the most innovative aspects of FIDELITY is that a customer who is with one identity provider in one circle of trust can also use service providers in other circles of trust. Etchebarne says the identity providers would sign agreements with each other in a similar way to the way in which mobile operators sign roaming deals so that customers continue using their phones abroad on another network.

A bright future

Since concluding the trials during the project which ended at the end of 2006, the FIDELITY partners have started putting the project to commercial use. Orange, for instance, has clinched a contract with the French government to build a web portal through which citizens will be able to access all their public services and share their data with the civil service departments. It will use the FIDELITY system on the portal.

Adapted from materials provided by Eureka, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/07/080729075113.htm

New Materials For Microwave Cookware That Heats Faster With Less Energy

Researchers are reporting new ceramics, such as the rice cooker above, that heat faster and stay hot longer than conventional microwave cookware. (Credit: Sridhar Komarneni)

ScienceDaily (July 30, 2008) — You may soon be enjoying microwave popcorn and other 'nuked' foods and beverages faster than ever before, while saving on electricity. Researchers in Pennsylvania and Japan report development of new ceramic materials that heat up faster and retain heat longer than conventional microwave cookware while using less energy.

Their report is scheduled for the August 26 issue of ACS' Chemistry of Materials, a bi-weekly Journal.

In the new study, Sridhar Komarneni, Hiroaki Katsuki, and Nobuaki Kamochi note that researchers long have sought a commercially feasible method for using microwaves in the production of new genres of sturdy-heat-resistant ceramic materials. However, no optimal process had been developed.

The scientists describe preparation of ceramic plates from mixtures of magnetite and petalite, two naturally occurring minerals. Those new composite plates heated faster and retained heat for longer periods than commercially available microwave cookware, researchers say. The materials also show promise as an energy-saving component in microwave-based systems for cleaning up organic toxic waste in the environment.

Journal reference:

1. Katsuki et al. **Novel Energy-Saving Materials for Microwave Heating**. *Chemistry of Materials*, 2008 DOI: 10.1021/cm801138n

Adapted from materials provided by American Chemical Society, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080728220041.htm

Lightweight Urban Transit Bus Has Double The Fuel Efficiency Of Conventional Hybrid Buses

Fisher Coachworks' lightweight hybrid bus, which achieves twice the fuel economy of current hybrid buses, has some Oak Ridge National Laboratory roots. (Credit: Image courtesy of DOE/Oak Ridge National Laboratory)

ScienceDaily (July 30, 2008) — Insight from Oak Ridge National Laboratory, commitment from two Michigan companies and funding from the Department of Energy have led to the commercialization of a lightweight urban transit bus with double the fuel efficiency of conventional hybrid buses.

This new green technology 40-foot bus features a high-strength stainless steel body and chassis and a hybrid power system that drives the bus primarily with stored electrical energy. This approach reverses the paradigm of conventional parallel hybrid designs that use electric energy only to supplement the acceleration and torque requirements of a diesel engine.

At the heart of the bus is a chassis made of Nitronic 30, a nitrogen-strengthened stainless steel that is stronger and stiffer than conventional steel. These attributes translate into less material required for a chassis, resulting in reduced weight.

"Nitronic stainless steel is incredibly durable and enables our chassis designs to have significantly longer service life vs. ordinary steel vehicles," said Bruce Emmons, president of Autokinetics (http://www.autokinetics.com/) of Rochester, Mich., which developed the bus. "The fact that stainless is also 100 percent recyclable and more environmentally friendly to produce than aluminum makes this an ideal green raw material for vehicle structures."

Additional advantages of Nitronic 30 include excellent mechanical properties at sub-zero and elevated temperatures along with low-temperature impact resistance and superb resistance to high-temperature

oxidation. While this material is more costly than conventional steel, Emmons noted that the additional cost is offset by design innovation, parts consolidation and streamlined manufacturing processes.

"The benefits of improved strength-to-weight performance quickly compound to all other vehicles systems such as smaller tires, lighter brakes, batteries, motors and so on," Emmons said. "By optimizing the total vehicle we have been able to cut the weight almost in half, which has led to performance improvements, most notably fuel economy gains."

In addition to its reduced weight and hybrid power system, the bus will incorporate a number of advanced design features and advantages, said Gregory Fisher, chief executive officer of Fisher Coachworks (http://www.fishercoachworks.com/), which licensed the technology, has produced a prototype and plans full commercialization. The bus made its debut today and deliveries of the bus are expected to begin in 2009.

Some of the advantages are improved vehicle safety for passengers, lower cost, reduced noise and improved ride dynamics. The major advantage, though, will be in cost to operate, according to Fisher.

Specific contributions from ORNL included computer crash studies and infrared thermal imaging to evaluate the quality of some of the initial laser welds in the structure. Early tests showed some problems with the laser welding technique, so Autokinetics chose to use resistance spot welding in most places and tungsten inert gas welding for the remainder of the joining needs.

But even before its technical contributions, Emmons said ORNL had a huge impact.

"ORNL was the first to suggest the possibility of applying Autokinetics' light-weighting ideas and technologies to the bus field," Emmons said. "Without that insight, this program would never have happened."

Phil Sklad of ORNL's Materials Science and Technology Division served as the program manager and technical monitor and noted that DOE's $2.5 million investment in this project is being rewarded with a revolutionary bus.

"This is a perfect example of how the Department of Energy, a national laboratory and the private sector can collaborate to produce something that is potentially of great value to society," Sklad said.

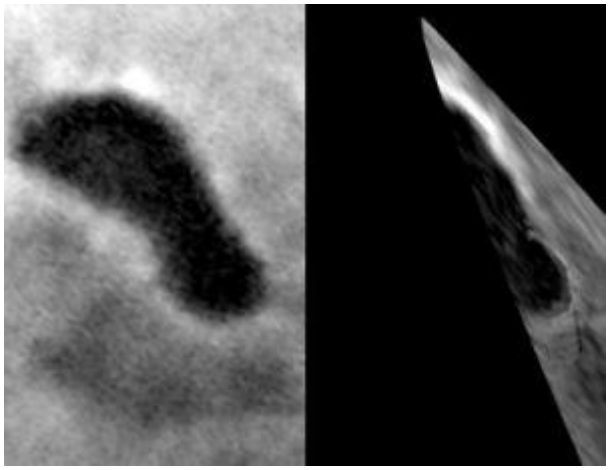
Fisher Coachworks, located in Troy, Mich., is planning to use this patented technology for transit buses and other commercial vehicle market segments that would benefit from vastly improved fuel economy in urban stop and start applications. Fisher Coachworks was formed in 2007 to focus on production of advanced hybrids using an ultra-lightweight stainless steel unibody construction.

Funding for this project was provided by DOE's Office of FreedomCAR and Vehicle Technologies Program. UT-Battelle manages Oak Ridge National Laboratory for the Department of Energy.

Adapted from materials provided by DOE/Oak Ridge National Laboratory.

http://www.sciencedaily.com/releases/2008/07/080728192944.htm

Saturn's Moon Titan Has Liquid Surface Lake



Right image: The visual and infrared mapping spectrometer (VIMS) aboard NASA's Cassini orbiter captured this detailed, partial view of Titan's Ontario Lacus at 5 microns wavelength from 1,100 kilometers away, or about 680 miles away, on Dec. 4, 2007. Only part of the lake is visible on Titan's sunlit side. What appears to be a 'beach' is seen in the lower right of the image, below the bright lake shoreline. Left image: Cassini's Imaging Science System took this image of Lacus Ontario in June 2005. (Credit: Right image - NASA/JPL/University of Arizona Left image - NASA/JPL/Space Science Institute)

ScienceDaily (July 30, 2008) — Scientists have confirmed that at least one body in our solar system, other than Earth, has a surface liquid lake. Using an instrument on NASA's Cassini orbiter, they discovered that a lake-like feature in the south polar region of Saturn's moon, Titan, is truly wet. The lake is about 235 kilometers, or 150 miles, long.

The visual and infrared mapping spectrometer, or VIMS, an instrument run from The University Arizona, identifies the chemical composition of objects by the way matter reflects light.

When VIMS observed the lake, named Ontario Lacus, it detected ethane, a simple hydrocarbon that Titan experts have long been searching for. The ethane is in liquid solution with methane, nitrogen and other low-molecular weight hydrocarbons.

"This is the first observation that really pins down that Titan has a surface lake filled with liquid," VIMS principal investigator and professor Robert H. Brown of UA's Lunar and Planetary Laboratory said. Brown and his team report their results in the July 31 issue of the journal Nature.

"Detection of liquid ethane in Ontario Lacus confirms a long-held idea that lakes and seas filled with methane and ethane exist on Titan," said Larry Soderblom of the U.S. Geological Survey, Flagstaff, Ariz.

The fact that the VIMS could detect the spectral signatures of ethane on the moon's dimly lit surface while viewing at a highly slanted angle through Titan's thick atmosphere "raises expectations for exciting future lake discoveries by the infrared spectrometer," Soderblom, an interdisciplinary Cassini scientist, said.

The ubiquitous hydrocarbon haze in Titan's atmosphere hinders the view to Titan's surface. But there are transparent atmospheric "windows" at certain infrared light wavelengths through which Cassini's VIMS can see to the ground. VIMS observed Ontario Lacus on Cassini's 38th close flyby of Titan in December 2007.

The lake is roughly 20,000 square kilometers, or 7,800 square miles, just slightly larger than North America's Lake Ontario, Brown said. Infrared spectroscopy doesn't tell the researchers how deep the lake is, other than it must be at least a centimeter or two, or about three-quarters of an inch, deep.

"We know the lake is liquid because it reflects essentially no light at 5-micron wavelengths," Brown said. "It was hard for us to accept the fact that the feature was so black when we first saw it. More than 99.9 percent of the light that reaches the lake never gets out again. For it to be that dark, the surface has to be extremely quiescent, mirror smooth. No naturally produced solid could be that smooth."

VIMS observations at 2-micron wavelengths shows the lake holds ethane. The scientists saw the specific signature of ethane as a dip at the precise wavelength that ethane absorbs infrared light. Tiny ethane particles almost as fine as cigarette smoke are apparently filtering out of the atmosphere and into the lake, Brown said.

Ethane is a simple hydrocarbon produced when ultraviolet light from the sun breaks up its parent molecule, methane, in Titan's methane-rich, mostly nitrogen atmosphere.

Before the Cassini mission, several scientists thought that Titan would be awash in global oceans of ethane and other light hydrocarbons, the byproducts of photolysis, or the action of ultraviolet light on methane over 4.5 billion years of solar system history. But 40 close flybys of Titan by the Cassini spacecraft show no such oceans exist.

The observations also suggest the lake is evaporating. The lake is ringed by a dark beach, where the black lake merges with the bright shoreline.

"We can see there's a shelf, a beach, that is being exposed as the lake evaporates," Brown said.

That the beach is darker than the shoreline could mean that the "sand" on the beach is wet with organics, or it could be covered with a thin layer of liquid organics, he said.

The VIMS measurements rule out the presence of water ice, ammonia, ammonia hydrate and carbon dioxide in Ontario Lacus.

The VIMS result gives researchers new insight on Titan's chemistry and weather dynamics.

Titan, which is one-and-a-half times the size of Earth's moon and bigger than either Mercury or Pluto, is one of the most fascinating bodies in the solar system when it comes to exploring environments that may give rise to life.

Cassini cameras and radar and the UA-built camera aboard the European Space Agency's Huygens probe that landed on Titan in January 2005 have shown that methane saturates and drains from Titan's atmosphere, creating river-like and lake-like features on the surface. Just as water cycles through the hydrologic regime on Earth, methane cycles through a methanological cycle on Titan.

Adapted from materials provided by University of Arizona, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080730140726.htm

In New Media Programs, Who Benefits?

Journalism schools have always had to contend with some amount of skepticism from academics on one side and working journalists on the other. Educators sometimes ask whether teaching practical skills justifies an entire degree, while arguing that broadening the curriculum so that students also grapple with ethical issues and delve into other subjects simply dilutes existing fields. Those in the industry, many of whom never studied journalism in college, might wonder what graduates gain in school that they wouldn't otherwise learn on the job.

Some of those concerns are resurfacing now that many journalism schools across the country are offering concentrations in what's alternatively being called new media, multimedia or interactive journalism — the still-evolving forms of media that are redefining how people produce and consume journalism on a mix of different platforms, from television to the Internet to mobile phones. Among the questions some are asking: What are the key new media skills needed today? Are journalism schools staffed to provide the training? Does training on the latest technology make any sense when the tools and industry are changing so fast that today's "cutting edge" may be tomorrow's electronic typewriter?

Many schools gradually branched into video editing, Web design and blogging, among other media, as they became more widely accepted over the years. More recently, courses are being organized into concentrations and in several high-profile cases, the programs are receiving significant backing from foundations seeking to improve and reform journalism education for the 21st century.

Branching into new territory last month, the Tow Foundation announced both a $5 million grant to the Columbia University Graduate School of Journalism and a $3 million grant to the City University of New York Graduate School of Journalism, each of which will require matching and, in Columbia's case, double funding from other sources. The CUNY grant will go toward a Tow Center for Journalistic Innovation intended as an "incubator" for entrepreneurship and a sort of new media think tank for emerging business models. Columbia's grant is focused more on education, establishing a "center dedicated to the research and teaching of professional journalism in new and emerging media."

"As traditional media, including print and broadcast, encounter tightening budgets and changing audience habits, new media are responding to the evolving needs and interests of the public," said the announcement last month. "The gift will help bolster and inform the existing curriculum for the new media specialization as well as other new media initiatives at the Journalism School."

And earlier this month, the University of Florida announced a new Center for Media Innovation and Research at its College of Journalism and Communications. "I don't think it's realistic for us to think that we could turn out students who can both turn out a great print journalism story and a first-rate network-quality piece of video, but it is not just reasonable but imperative that we turn out students who understand how both of those kinds of media are produced," said David Carlson, who will be the executive director of the program.

Broadly, each of these programs, and many existing ones, emphasize the need to focus on interdisciplinary collaboration, train students for the next generation of media outlets, prepare them with the necessary background in ethics and practice, and decouple journalism from any particular medium — ideally, to train journalists who can, if needed, write for the Web in the morning, deliver a TV report in the evening and produce multimedia, interactive projects in the meantime. Such skills imply a contrast with veteran working journalists, many of whom have been forced to learn — on the job — about the very technologies that are upending traditional media.

"I think one of the main benefits of encouraging convergence and learning how to tell stories not just through one medium but many media" — such as video cameras, cell phones, pen and paper, Twitter and other tools — is "creating an environment [in which] you are not just preparing a journalist to tell a story with one method," said Ellyn Angelotti, an adjunct faculty member at the Poynter Institute, a journalism think tank, and interactivity editor of its Web site.

"You're able to help a journalist tell a story and then figure out the best way to deliver that story. I think it kind of breaks down the craft a little bit more where before we were teaching the art of journalism in the context of writing a story [or shooting a story on video], but through convergence you're learning to add tools to your arsenal but you're also learning the craft of journalism and how to best serve that craft through different mechanisms."

Yet questions still remain. In today's landscape, defining "the media" isn't nearly as clear-cut as it used to be. Big-name newspapers and networks mingle with cable channels, all-purpose Web sites and blogs in the minds of the average news consumer, and for good reason: They are, in many cases, converging, with widely read blogs run by newspapers and online Web stories originating from cable networks. Meanwhile, a number of relatively new outlets have become powerful forces in their own right, taking advantage of the speed and connectivity of the Internet to scoop the mainstream media and blur the distinction between the producer and the consumer.Moreover, much of the new media eschews precisely the kinds of journalistic conventions still taught in school, preferring instead to apply pressure to ideological opposites, using blogs, crowdsourcing and other citizen media techniques to gather raw material for the next humorous or polemical viral video.

Maybe that's the point. Part of the Tow Foundation's mission in supporting the programs at Columbia and CUNY, said Emily Tow Jackson, the executive director, is to prepare students to do a "balanced and informed job of reporting the news" — something that, by implication, needs to be emphasized to the next generation of new media journalists as they uphold and build on the standards set by their forebears. Or in the words of Susan Robinson King, the director of the Carnegie-Knight Initiative on the Future of Journalism Education: "We don't care what medium they're working in. The values of journalism must stay the same."

But can that added value only be obtained from a degree in new media journalism? And whose values are the programs being tailored to — those of major news organizations? Influential blogs and Web sites that could increasingly hire new graduates? Or the foundations themselves?

The Journalism Pipeline

Statistics on how graduates of new media programs fare in the job market are hard to come by, since most of them are relatively new and many graduates don't end up in "media" but opt for jobs in public relations, graphic design or other related fields. Most J-schools like to tout their statistics for recent graduates, but they often encompass multiple industries over varying periods of time and it's hard to compare their performance with those of students who didn't study journalism at all.

"I think that what we're still very interested in are very smart, critically thinking people with excellent communication skills who obviously are early adopters in technology and online journalism, and more and more, we're seeing resumes that are multidisciplinary, and it helps to have exposure ... outside just traditional journalism," said Jennifer Carroll, vice president for new media content at Gannett's newspaper division. "But at the end of the day, it's still the curious mind and the critical thinking mind that is important. Because a lot of the other skills can be taught," and especially now, new hires come in with experience in video, RSS and other technology, she added.

In "some cases," she said, that means looking for students who have graduated from journalism programs focusing on converged or digital media, because they're "exposed to a much wider range of expertise" than graduates of traditional J-schools. But she added that the skills and experience — like, say, those of a student who built his or her own Facebook application — were what counted, whether or not they were obtained in a formal university program.

That said, Carroll works closely with journalism programs such as the Walter Cronkite School of Journalism and Mass Communication at Arizona State University, which this month won a $7.5 million grant from the Carnegie Corporation of New York and the John S. and James L. Knight Foundation to "direct a bold, experimental digital media program at 12 leading U.S. universities," including several that launched news "incubators" as part of the organizations' journalism education initiative in 2006. The Carnegie-Knight initiative has been at the forefront of a movement to bolster J-schools' stature

within universities and to broaden the curriculum so that students are introduced to subjects such as politics, economics, philosophy and the sciences.

“A lot of our newspapers and broadcast stations are in communities with strong universities, and we actually welcome having close ties and sharing with them what sorts of resources we need,” Carroll said.

Such collaboration between J-schools and industry suggests that these programs don’t just reflect an idealistic, philanthropic view of how to reform journalism education that’s divorced from reality. Nevertheless, it isn’t always clear that the news industry itself is fully aware of what kinds of people it needs — and where it needs to go.

“The point is not to try to prepare students for today’s news industry. The point is really to try to give them some of the tools [for] how to think about what the industry will be like in the future and quite frankly ... for some of them to be the leaders of that industry,” said Christopher Callahan, the Cronkite School’s dean.Since newsroom cultures can be somewhat “change-averse,” Callahan continued, much of the innovation in new media is coming (or should come) from journalism schools and digital incubators like the one at ASU. While he didn’t have quantitative data on graduates of the program who went on to work in new media, he said there was plenty of anecdotal evidence.

Angelotti, for one, graduated in 2005 from a converged journalism program at the University of Kansas, where she learned everything from how to write a press release or a news story to how to produce a radio interview and shoot a video. At the same time, she worked for a newspaper that was “reverse publishing” — producing content first for the Web that was then edited into printable form. “I think one of the best things that we can really teach young journalists ... is that they can’t be complacent with the media that [are] available to them right now, that there is going to be constant innovation,” she said.

J-Schools: Hotbeds of Innovation?

There’s only one problem with this formulation: Journalism schools haven’t historically led the way when it comes to new developments in the industry, and there is little history of innovation as there is for other sectors, notably business.“It has not been able to be that [source of innovation] for the news industry. I think there’s a lot of people who now realize it should and want to go there, and that’s good, but it takes more than good intentions,” said Jay Rosen, a journalism professor at New York University who frequently writes and comments on new media and citizen journalism.

“The journalism school has been very effective at reproducing within itself the culture of news work that prevails in big news organizations. The culture in journalism school is very similar to the newsroom culture,” Rosen continued — not surprisingly because many journalists leave at the end of their careers to teach. “That’s historically been the case. That culture right now is one of the biggest problems this industry has and the profession of journalism has.”

One notable exception, he added, was an effort at Northwestern University to essentially fund a year of study for faculty members to learn about new technologies and skills. “That’s pretty dramatic,” he said. “By trying to get caught up [with] innovation, the journalism school could really transform itself.” (Some critics worry that Medill’s most recent curricular reform places too much emphasis on public relations over journalism, potential technology innovations aside.)

But it will always be only one part of the pipeline for graduates to enter into journalism in the 21st century.

“Between 40 and 60 percent of the working profession has always been journalists who never went to journalism school,” Rosen said. “That’s been consistent. I think it’s about 55 now ... that tells you that of course it’s not necessary. No way. It can’t be.”

— Andy Guess

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/07/31/newmedia.

Questioning the Value of Remedial Education

Remedial education is expensive and controversial — but is it effective?

That's the question that two education researchers have attempted to answer based on an analysis of nearly 100,000 community college students in Florida. The scholars — Juan Carlos Calcagno of the Community College Research Center, at Teachers College of Columbia University, and Bridget Long of the Graduate School of Education at Harvard University — have decidedly mixed results to report. There is some positive impact of remedial education, they found, but it is limited. Their study has just been released by the National Bureau of Economic Research.

Florida is an ideal site for research on many education questions because the state has uniform requirements for community college students with regard to placement testing and remedial education — and the state also collects considerable data on what happens to students as they progress through higher education.

In looking at the impact of remedial education, the study found that — among those on the edge of needing remediation — being assigned to remedial math and reading courses has the effect on average of increasing the number of credits completed and the odds that students will return for a second year. But while those are important factors, the report finds no evidence that remedial education increases the completion of college-level credits or of degree completion.

"The results suggest that the costs of remediation should be given careful consideration in light of the limited benefits," the authors write.

At the same time, however, they note that there are benefits to students and society of having people experience even one year of college, some of it remedial. Further, they note that if remedial education encourages early persistence, colleges may have the "opportunity to reach students with other types of programming and skill development" beyond that offered now. In terms of figuring out whether the trade-offs favor remedial programs, the authors say that there still isn't enough evidence in, but that their study points to the need for more detailed analysis.

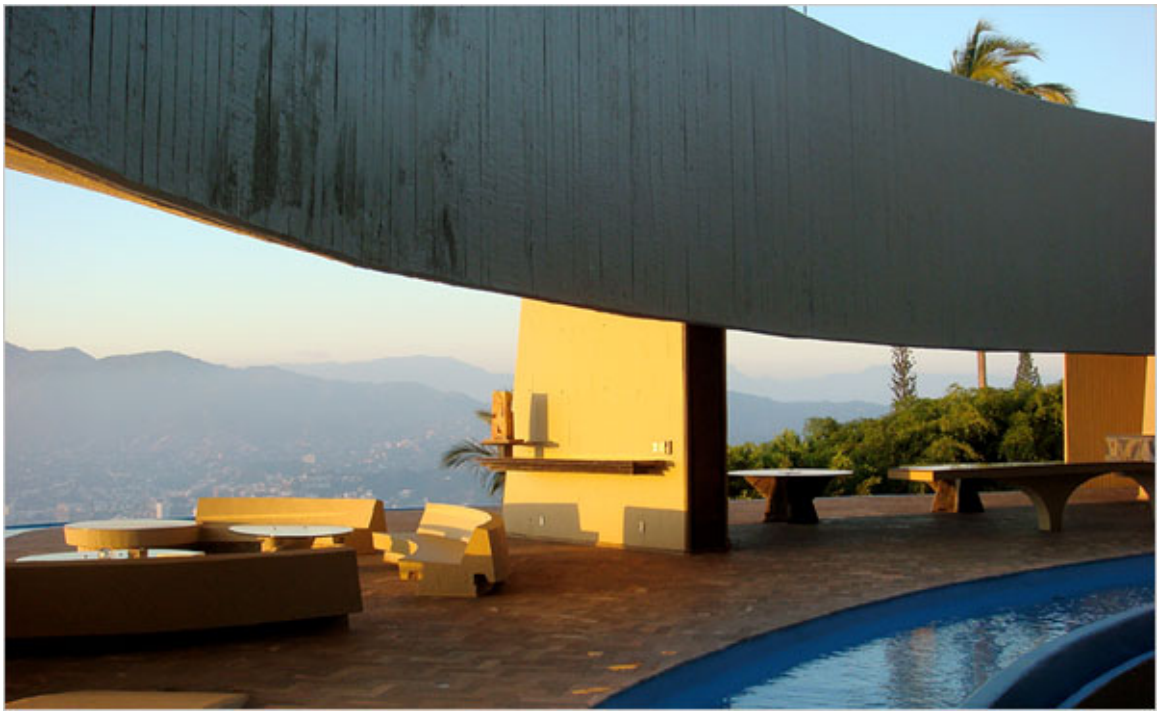
"More work is needed on the effects of remediation relative to its costs," the authors say. The authors open their paper by noting that conservative estimates hold that public colleges spend $1 billion to $2 billion annually on remedial education — and that level of cost is sure to attract more scrutiny.

— Scott Jaschik

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/07/31/remedial.

Bonding Humanity and Landscape in a Perfect Circle

By NICOLAI OUROUSSOFF



LOS ANGELES — For those who find consolation in visionary architecture, this city has always been a powerful antidepressant. Its wealth of 20th-century treasures, mostly private homes, reminds us that it is possible to find quiet corners of enlightenment in dystopian times.

"Between Earth and Heaven: The Architecture of John Lautner," an exhibition at the Hammer Museum here, makes a strong case that Lautner's role in forging that architectural legacy has been curiously underestimated. Organized by Frank Escher and Nicholas Olsberg, it presents about 120 plans, sections and renderings that counter his longstanding image as an architect who succumbed to Hollywood gaudiness and glamour. What we glean instead is a keen structural knowledge wedded to an environmental sensitivity — a seamless bond of nature, space and humankind.

Sadly, in their earnest effort to rehabilitate Lautner's reputation, the curators have toned down the fantasy and sensuality that make his houses so intoxicating. The play of light, air, water and materials that is intrinsic to his best work is often lost amid an abundance of coolly abstract technical drawings. An impressive work of scholarship, this is nonetheless an oddly dry show that may bore the average viewer.

Like other great Los Angeles architects before him, Lautner, who died in 1994, was a dreamer in a land that inspired outlandish fantasies. The Michigan-born son of an artist and a professor, he worked as an apprentice to Frank Lloyd Wright in the 1930s, when Wright was entering his most radical Modernist phase.

Attached to the woodlands and lakes of his birthplace, Lautner hated Los Angeles, which he viewed as a cultural wasteland obsessed with money and devoid of beauty. Yet few serious architects are as closely associated with the city's blend of pop culture and nature, rugged individuality and lush hedonism. Like the work of the great Brazilian architect Oscar Niemeyer, his buildings take their cues from their natural settings to such an extent that they are unimaginable elsewhere.

The show opens with a series of renderings of his earliest houses, mounted on the wall or on drab beige fiberboard stands. These look a bit like conventional real estate ads and lack the otherworldliness of, say, Wright's drawings. Yet all of Lautner's major themes are already here.

A drawing in graphite on paper depicts his low-slung Carling House (1947), embedded in the side of a hill. A triangular pattern of trusses supports the living-room roof from above, attesting to his early fascination with complex structural systems. In a precursor to the elaborate machinery incorporated into his later works, a mechanical wall swivels to open the interior to a stunning view of the city.

The show picks up steam with a design for the 1948 Sheats Apartments, Lautner's first built foray into what would become an obsession with circular structures. A tentative early sketch shows three cylindrical forms on a steep hillside site, the relation between them still crude and unresolved. In a later version the forms have gained in complexity, and the social relationships have become more nuanced. A narrow entry path leads to a small irregular courtyard that binds the structures into a coherent assembly; the upper-level residence has become a partial hexagon.

Viewed one after another, the drawings are a powerful expression of a creative mind at work, and of Lautner's struggle to strike a balance between individual and community, privacy and companionship.

That tension crystallizes in the 1960 Chemosphere, one of his most celebrated works. An octagon perched on a steep site in the Hollywood Hills, it is supported by a single wood mast, like the trunk of a tree; its low, round roof provides shade and a bit of privacy.

The design harks back to the mushroomlike columns of Wright's 1939 Johnson Wax headquarters in Wisconsin or Buckminster Fuller's 1927 design for the Dymaxion House. Lautner imagined dozens of his octagonal houses scattered across the Santa Monica Mountains, each in its own self-contained world enveloped in glass. The disclike form, hovering above the landscape, conjures both an oversize birdhouse and a flying saucer, embodying the technological bravura of the space age.

It also brings to mind the social fragmentation of the cold war years in Los Angeles and the culture of the suburban subdivision. Yet most of all it underscores Lautner's stubborn faith in the house as an expression of American individualism. Unlike Rudolph Schindler, whose Los Angeles houses were radical experiments in communal living, Lautner was less interested in exploring the reconfigured social relationships of the modern world than bonding the home dweller with the surrounding landscape and the universe beyond.

Sometimes Lautner risks slipping into a kind of literal-mindedness. His 1962 Garcia House on Mulholland Drive is an eye-shaped form clad in glass on either side. A deck hovers in the center of the eye, offering a sweeping view of the twinkling city lights.

In the Sheats-Goldstein House, completed in 1963, the sweeping concrete forms, vast expanses of glass and low built-in furniture border on over-the-top '60s cliché. Windows in the bedroom look into the depths of a swimming pool, transforming subtle transparency into voyeuristic fantasy.

Yet the level of innovation here cannot be denied. Lautner's undulating, curved shapes echo the curves of the surrounding landscape so that the two begin to bleed together into a whole. The houses' wildly cantilevered concrete roofs guide the eye to the distant horizon while resting on rough-hewn walls that root the dwellings in the landscape. In a masterwork built in Acapulco, Mexico, the 1973 Mar Brisas House, a swimming pool mirrors the arc of the beach below, as if the two were shaped by the same hand.

For me the great discovery in the show is the 1969 Walstrom House, in the Santa Monica Mountains. Built for an aeronautics engineer and his wife, it is a deceptively simple three-story wood box with a strikingly sloped roof. Lautner set the house into the side of a steep hill along a path that the couple used to hike up into the mountains. He even integrated the path into his composition, threading it through the rear section of the dwelling.

Entering the house, you can either turn and step up into the two-story living room or proceed out to the top of the hill. A balcony is perched in the upper corner of the living room, like a bird's nest; you feel as though you are wandering through the trees.

With its asymmetrical forms and intentionally rough wood construction, the house anticipates the iconoclastic work of later architects like Frank Gehry. And it teases out the mythic themes of Los Angeles architecture: freedom from convention, stunning surroundings, the fleeting nature of man's imprint on the landscape.

It also underscores Lautner's intellectual breadth. His work is never a mere sculptural exercise; it always starts with an intimate understanding of the site, which prevents him from slipping into self-indulgence. That spirit of empathy, of context, unites all great architecture. Whatever the show's flaws, this revelation alone is worth the price of admission.

"Between Earth and Heaven: The Architecture of John Lautner" runs through Oct. 12 at the Hammer Museum, 10899 Wilshire Boulevard, Los Angeles; hammer.ucla.edu; (310) 443-7000.

http://www.nytimes.com/2008/07/31/arts/design/31laut.html?th&emc=th

Kuwait plans new £132bn metropolis

- **Owen Bowcott**

The proposed 'Silk City', planned for the head of the Gulf in Kuwait

Oil prices have so swollen Kuwait's national coffers that the petroleum-rich state is to invest $132bn (£66bn) on its ambitious "Silk City" at the head of the Gulf, it emerged yesterday.

The extraordinary scale of the metropolis - a 1,001-metre skyscraper, wildlife reserves, and homes for 700,000 people - is matched by a plan to also build an international rail network linking it to Damascus, Baghdad, Iran and China.

Inspired by Dubai's spectacular growth, the Madinat al-Hareer, or Silk City, is intended to create a trading future and a diversified economy in a city which would become a crossroads of the Arab world.

"We are not dreamers at all when we talk about investing $132bn," insisted Sami Alfaraj, president of the Kuwait Center for Strategic Studies and an adviser to the Gulf Cooperation Council, a group of six mostly oil-rich Gulf states.

"We're thinking on a different plane, because we cannot afford to think like everyone else. We're thinking about something that might seem unimaginable," he told Reuters in London, where he is holding meetings on the project. "We're going to outmanoeuvre everybody who is going to remain in the old mode of thinking about economic prospects." One aim of the project is to improve relations with Israel.

The London-based architects Eric R Kuhne & Associates have drawn up designs for the city, but said that they were unaware its budget had expanded so fast; earlier this year it was estimated at $86bn. The firm is awaiting Kuwaiti government approval to start construction, due to finish by 2023.

The name "City of Silk" evokes the prosperity of the medieval trade route linking Europe to China via the Middle East.

Kuwait wants to link its city by rail to Damascus, to Baghdad, to Iran and all the way beyond. "This is where we want to put our money. We want to build railways all the way to China," said Alfaraj, who also advises the government on security; he added that talks had been held with Iran since 1998, and with other countries.

"If we do not use oil or money to increase our influence in a peaceful way, we have no existence. People in the Gulf are smart enough to understand the impact of technology on their development, and they know that the technology is in Israel. If you look at the taboos of yesterday, they don't exist."

http://www.guardian.co.uk/business/2008/jul/23/oilandgascompanies.architecture?gusrc=rss&feed=artanddesign

At Libraries, Taking the (Really) Long View

One of the benefits of digitally encoded content is that it can't deteriorate. With files that consist of 1's and 0's, there are no pages to turn yellow or brittle, tape to demagnetize or bindings to snap. In theory, that would be a boon to libraries that devote boundless resources to preserving old documents, ancient texts and even videos recorded in Betamax.But as libraries shift more of their resources to holdings that either originate as digital or become digital through scanning, it's become clear that just because something lives in the virtual stacks doesn't mean it will be around forever. Anyone who's ever suffered through a hard drive crash (or tried futilely to save a scratched DVD) has faced the inherent physical limitations of digital storage. Now librarians are having to do the same as they determine how digital holdings fit into their central mission: preserving works so that they can be accessed not just today, not just tomorrow, but indefinitely.

And for anyone who's also worked through a mere "upgrade" in file formats or e-mail clients, it's probably not a stretch to assert that in computer time, 10 years might as well be infinity. What does that make 100?So, in a literal race against time — but one with a perpetually receding deadline — librarians from research universities and other institutions around the world are collaborating to tackle a whole host of problems that so far have no satisfactory solution. They include hardware complexities, such as constructing storage devices that continuously monitor and repair data while remaining easily scalable; redundancy measures, such as distributing and duplicating data across storage devices and even across the country; universal standards, such as formats that could conceivably remain readable in the distant future; and interfaces, such as open software protocols that manage digital holdings and make them accessible to the public.

Some of the solutions are still in development, while others are piecemeal. Various institutions are trying different approaches, and corporations are competing with each other as others collaborate on open-source approaches."For the most part, they're all untested. None of the solutions have withstood the test of time yet," said Michael Witt, an assistant professor of library science and interdisciplinary research librarian at Purdue University.

Coming Down to Earth

If worries about digital preservation seem premature or overly pessimistic about an eventual solution, it's worth comparing the success of restoring traditional holdings with comparable digital records. In 1975, NASA's Viking landers sent back reams of data from Mars, where they were scouring for possible evidence of extraterrestrial life. Unfortunately for scientists, the magnetic tapes used for storage became brittle and nearly unusable even after the space agency made considerable efforts to keep them in a properly controlled environment. Beyond the physical obstacles, moreover, scientists in the late 1990s found that they couldn't read the data format anyway — and they had to crack open the original (analog) printouts to retype them.

That experience, recounted in a 2006 report from Britain's Digital Preservation Coalition, was one of several that helped to jump-start a movement among librarians, information technology specialists and others concerned with the real possibility that much of today's digital material is not only in flux but in danger of being lost in the ether altogether."The state of things is that we're in the digital dark ages right now," Witt said. "We're losing a ton of valuable information that is electronic because of the transient nature of the Internet and of storage technology and how people use it."

Tom Cramer, the associate director of digital library systems and services at Stanford University, said that NASA's inadvertent discovery — that even machine-produced data can be lost to the environment or obsolescence — echoes his own experience. Closer to home, Stanford's library was tasked with helping the Monterey Jazz Festival preserve its historical recordings from decades ago. Out of hundreds of tapes taken from nearly 40 years of recording history, Cramer said, only one couldn't be recovered. But audio from a digital format the festival began using in the 1990s wasn't as reliable: out of scores of those tapes, covering about six years, six were damaged beyond recovery.

So digital preservation encompasses not only the problem of reliable storage and recovery but of how to finance it, how to manage it and how to make such systems sustainable over the long run. For that to happen, though, enough institutions have to participate. The British report, "Mind the Gap," found that although a slight majority of respondents in the United Kingdom said they had an institutional commitment to addressing the issue, only 20 percent said there was enough funding to tackle it, a third said there were "clear responsibilities" for handling it, and only 18 percent said there was a strategy for digital preservation at all.

Still, Stanford has been one of the pioneers in developing solutions to digital preservation, especially through its Silicon Valley ties to Sun Microsystems, which last year set up the Sun Preservation and Archiving Special Interest Group, or PASIG, to bring together leaders in research libraries, universities and the government to periodically meet and collaborate on digital archiving issues."We are trying to meet the needs of the evolving 'cybrarian' community that is grappling with storage and data management, workflow and high-level architecture trends in the area of preservation and archiving," said Art Pasquinelli, Sun's education market strategist, in the initial announcement.

One project Cramer has been working on is the Stanford Digital Repository, which he said currently hosts geospatial data as well as content from other scholarly sources. The SDR, according to its Web site, provides "a trusted environment for long-term digital information storage and preservation activities."

As the project's description implies, the trust issue is an important one for librarians. The fragility of partnering with companies was reinforced last month when Microsoft announced that it would discontinue its Live Search Books project that helped research universities scan books and journals to be accessed digitally. For many librarians, it was a signal — or a reminder — that corporate partnerships, while in many cases helpful financially, can raise questions not only of ownership, but of reliability over the short term (let alone the long view)."I wouldn't rely on [corporate sponsorships] as the sole source for digitizing and preserving and providing access to my materials. I think it's very dangerous to go down that road both for reasons of the integrity of the information, any kind of ethical ... issues that may arise," said Sarah Houghton-Jan, a blogger and the digital futures manager at the San Jose Public Library, which is run in partnership with San Jose State University.

So many developers have instead been taking the open-source route, collaborating and building on each other's code. Already, there are three established "repository" packages — software that manages, organizes and allows access to online materials. Fedora, one of the major ones, has about 130 registered institutions and logged about 25,000 downloads over the past 12 to 18 months, said Sandy Payette, a researcher at Cornell University and the executive director of the foundation that supports the software. (The other popular repository solutions are DSpace and EPrints.)"Some of the principles and elements of open source software communities really reinforce ... the principles of digital preservation," Cramer said, noting that "[y]ou don't want any black boxes ... because when someone starts taking your content and modifying it in ways that aren't apparent to you, you're kind of at the whims" of the company you're working with.

The Biggest Obstacle?

Technology aside, however, what may be the biggest obstacle to a universal, agreed-upon solution might sound familiar: "The biggest challenge is actually related to human beings," said Witt. Libraries need to acknowledge the problem they face and work it into their management structure.Already, he said, libraries are starting to hire "digital preservation officers.""But really, if you're going to have some assurance from an institutional standpoint that someone is stewarding these objects … [there's] a human resources issue."Houghton-Jan summed up the daunting task facing libraries like this: "The clarity is that there is no set course, and that things are very much in the air. It's nice to have clear uncertainty at the very least, I guess."

— Andy Guess

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/07/23/preservation.

'100 months to save the planet'

A "Green New Deal" is needed to solve current problems of climate change, energy and finance, a report argues.

According to the Green New Deal Group, humanity only has 100 months to prevent dangerous global warming.

Its proposals include major investment in renewable energy and the creation of thousands of new "green collar" jobs.

The name is taken from President Franklin D Roosevelt's "New Deal", launched 75 years ago to bring the US out of the Great Depression.

The new grouping says rising greenhouse gas emissions, combined with escalating food and energy costs, mean the globe is facing one of its biggest crises since the 1930s.

Its members include former Friends of the Earth UK director Tony Juniper, Green MEP Caroline Lucas and Andrew Simms, policy director of the New Economics Foundation (nef).

In an article for the BBC News website's Green Room series, Mr Simms warns that the combination of the current credit crunch, rising energy prices and accelerating emissions are "conspiring to create the perfect storm".

"The UK and the global economy are entering unchartered waters, and the weather forecast is not bad, but appalling.

"Instead of desperate bailing-out, we need a comprehensive plan and new course to navigate each obstacle in this new phenomenon."

The group's recommendations include:

- massive investment in renewable energy and wider transformation in the UK
- the creation of thousands of new "green collar" jobs
- making low-cost capital available to fund the UK's green economic shift
- building a new alliance between environmentalists, industry, agriculture and unions

The authors said their proposals drew inspiration from President Roosevelt's 1933 New Deal.

During 100 days, he sent a record number of bills to Congress, all of which went on to become law, including banking reforms and emergency relief programmes.

The prolific reforms were credited with turning around the US economy.

The authors say that that within "the very real timeframe of 100 months" the world will reach the point where the risk of "runaway" climate change became unacceptably high.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7513635.stm

Published: 2008/07/21 00:59:36 GMT

Cern lab goes 'colder than space'

By Paul Rincon
Science reporter, BBC News

A vast physics experiment built in a tunnel below the French-Swiss border is fast becoming one of the coolest places in the Universe.

The Large Hadron Collider is entering the final stages of being lowered to a temperature of 1.9 Kelvin (-271C; -456F) - colder than deep space. The LHC has thousands of magnets which will be maintained in this frigid condition using liquid helium.

The magnets are arranged in a ring that runs for 27km through the giant tunnel.

> **Exchanging a single component which today is cold, is like bringing it back from the Moon**
> Roberto Saban, Cern

Once the LHC is operational, two particle beams - usually consisting of protons accelerated to high energies - will be fired down pipes running through the magnets. These beams will then travel in opposite directions around the main ring at close to the speed of light. At allotted points along the tunnel, the beams will cross paths, smashing into one another with cataclysmic force. Scientists hope to see new particles in the debris of these collisions, revealing fundamental new insights into the nature of the cosmos and how it came into being.

The most powerful physics experiment ever built, the LHC will re-create the conditions just after the Big Bang. Currently, six out of the LHC's eight sectors are between 4.5 and 1.9 Kelvin, though all sectors of the machine have been down to 1.9 Kelvin at some stage over the last few months.

By comparison, the temperature in remote regions of outer space is about 2.7 Kelvin (-270C; -454F). Roberto Saban, the LHC's head of hardware commissioning, said that in order to obtain high magnetic fields without consuming too much power, the magnets were required to be "superconducting".

This is the property, exhibited by some materials at very low temperatures, to channel electrical current with zero resistance and very little power loss.

Helium exhibits spectacular properties at 2.2 Kelvin - becoming "superfluid". This allows it to conduct heat very rapidly, making it an extremely efficient refrigerant.

No particle physics facility on this scale has ever operated at such low temperatures. But, so far, the hardware was performing as predicted, Roberto Saban explained. "We have a very systematic process for the commissioning of this machine, based on very carefully designed procedures prepared with experience we have gathered on prototypes."

He added: "Our motto is: no short cuts... exchanging a single component which today is cold, is like bringing it back from the Moon. It takes about three to four weeks to warm it up. Then it takes one or two weeks to exchange. Then it needs three to six weeks to cool down again.

"So, you see, it is three months if we make a mistake."

Two sectors of the LHC are currently not cold enough for testing to proceed. Electronics that control the cryogenic systems in these sectors are being moved to an area where they will be better shielded against particles that shoot out of the machine during collisions.

Closing the circle

One sector of the ring is being run as if the LHC was operational and carrying a beam. This is so that crews can de-bug software and hardware and gain experience of running operating cycles. The LHC's magnets must also undergo electrical testing. Each sector of the machine contains about 200 electrical circuits. Each circuit may consist of as many as 154 magnets or as few as one.

They are being tested for their ability to handle very high currents - up to 12,000 Amps . "We power each circuit, making sure it goes to its design current. But above all, we are verifying that all the protection systems around it - which are there to detect an eventual quench - are operating as expected," said Roberto Saban.

A quench occurs when some part of the magnet starts to heat up, becoming resistant to electrical current. Engineers have built in a recovery system to detect these quenches before they affect the magnetic field bending particles around the ring and shut off the circulating beams. The machine's cool-down should take another two weeks to complete, provided no serious problems are found. Electrical testing of the magnets may take another couple of weeks.

Before the LHC is "switched on" for the first time, the proton beams have to be boosted to high energies in a chain of particle accelerators called the injectors. Once the machine is cold, operators will inject beams into the main ring, threading them through each independent sector of the LHC until they close the circle. A timing, or synchronisation, system is used to ensure each of these sectors behaves as if they were a single machine. When the LHC is switched on it will operate at an energy of five trillion electron-volts. It will then be shut down for the winter, so that the magnets can be "trained" to handle a beam run at seven trillion electron-volts.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7512586.stm

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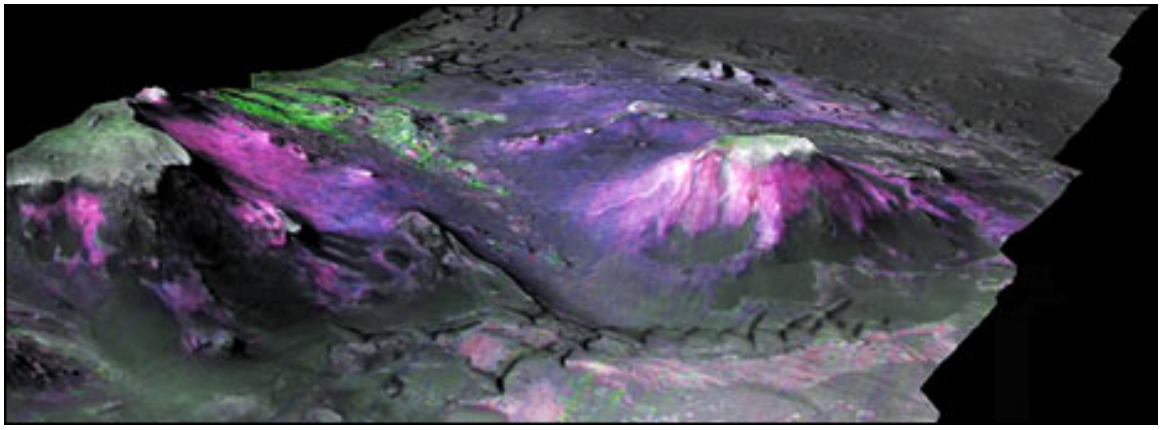
Water 'widespread' on early Mars

Water was once widespread on Mars, data from a Nasa spacecraft shows, raising the prospect that the Red Planet could have supported life.



Researchers found evidence of vast lakes, flowing rivers and deltas on early Mars, all of which were potential habitats for microbes.

They also discovered that wet conditions probably persisted for a long time on the Red Planet.

Details appear in the journals Nature and Nature Geoscience.

> **It wasn't this hot, boiling cauldron. It was a benign, water-rich environment for a long period of time**
> Jack Mustard, Brown University

One study shows that vast regions of Mars' ancient highlands, which cover about half the planet, contain clay minerals - which can form only in the presence of water.

Volcanic lavas buried the clay-rich regions during subsequent, drier periods of the planet's history, but impact craters later exposed them at thousands of locations across Mars.

The data comes from the CRISM (Compact Reconnaissance Imaging Spectrometer for Mars) instrument on the US space agency's Mars Reconnaissance Orbiter spacecraft.

CRISM works by "reading" over 500 colours in reflected sunlight to detect particular minerals on the Martian surface - including those that formed in the presence of water.

"The big surprise from these new results is how pervasive and long-lasting Mars' water was, and how diverse the wet environments were," said CRISM's chief scientist Scott Murchie, from the Johns Hopkins University Applied Physics Laboratory in Maryland.

Cosmic bombardment

The clay minerals, known as phyllosilicates, preserve a record of the interaction of water with rocks dating back to the Noachian period of Martian history, which lasted from about 4.6 billion years ago to 3.8 billion years ago.

This was a time in which the Earth, the Moon and Mars were being pummelled by comets and asteroids.

Rocks of this age have largely been destroyed on Earth by plate tectonics. They are preserved on the Moon, but were never exposed to liquid water.

So rocks containing phyllosilicates on Mars preserve a unique record of watery environments in the early Solar System, some of which could have been stable long enough for life to get started.

Importantly, CRISM detected hydrated silicates - so called because they contain water in their crystalline structure - within sediments that had been clearly deposited by water.

The clay minerals were found in fans and deltas within the Holden, Eberswalde and Jezero craters on Mars.

"In most locations the rocks are lightly altered by liquid water, but in a few locations they have been so altered that a great deal of water must have flushed though the rocks and soil," said Jack Mustard, professor of planetary geology at Brown University in Rhode Island.

"This is really exciting because we're finding dozens of sites where future missions can land to understand if Mars was ever habitable and if so, to look for signs of past life."

Deep and cool

The European and US space agencies have targeted several phyllosilicate-rich regions as potential landing sites for their next rover missions to Mars.

MSL LANDING SITE SHORTLIST
Nili Fossae Trough - 25km-wide linear trough with exposed clays and volcanic deposits
Holden Crater - 150km-wide crater once filled by a lake which experienced a massive flood
Mawrth Vallis - Valley with many exposed, clays deposited over a long time
Eberswalde Crater - 65km-wide depression once filled with water and featuring an ancient delta
Northern Meridiani - Region at equator rich in minerals that typically form in presence of water
Miyamoto Crater - Impact depression in Meridiani region with exposed clay minerals

The team also found phyllosilicate deposits in thousands of places in and around craters, including the pointed peaks located at the centres of some impact depressions.

This example suggests that water was present 4-5km below the ancient Martian surface, the researchers said.

Crater-causing collisions are thought to have excavated underground minerals that were then exposed on the crater peaks.

"Water must have been creating minerals at depth to get the signatures we see," Professor Mustard explained.

The clay minerals must have been formed at relatively low temperatures.

"What does this mean for habitability? It's very strong," explained Professor Mustard.

"It wasn't this hot, boiling cauldron. It was a benign, water-rich environment for a long period of time."

In a separate study published in the journal Nature Geoscience, a team led by Bethany Ehlmann, from Brown University, analysed sedimentary deposits in two deltas within Mars' Jezero crater - which once hosted a body of water measuring some 40km (25 miles) across.

The deltas suggest a river transported clay minerals into the basin from a watershed.

"Not only was water active in this region to weather the rocks, but there was enough of it to run through the beds, transport the clays and run into the lake and form the delta," said Ms Ehlmann.

She added that the deltas appeared to be excellent candidates for finding stored organic matter, because the clays brought in from the watershed and deposited in the lake would have trapped any organisms, leaving a "cemetery of microbes".

Nasa will send a robotic rover, Mars Science Laboratory (MSL), to the planet in September 2009 to look for signs of past or present life.

The European Space Agency (Esa) also plans to send a rover to investigate Mars' habitability. This mission, called ExoMars, is scheduled to launch in 2013.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7511523.stm

Published: 2008/07/17 13:28:15 GMT

Human blood vessels grown in mice

Scientists have used human cells to grow new blood vessels in a mouse for the first time, a US journal reports.

It could eventually help patients who had suffered heart attacks, they said.

A mixture of "progenitor" cells, taken from blood and bone marrow, made cells lining the vessels, and also those surrounding the lining.

A UK expert said that the Harvard research was "promising", and could eventually help lab-grown organs to be implanted successfully.

The ability to develop swiftly a new network of tiny blood vessels - known as capillaries - would be a prize for scientists.

There are dozens of potential applications in medicine, particularly in the treatment of conditions which involve damage to a tissue's blood supply, such as that to the heart muscle following a heart attack.

However, the complex structure of these vessels has slowed progress.

> **What's really significant about our study is that we are using human cells that can be obtained from blood or bone marrow rather than removing and using fully developed blood vessels**
> Dr Joyce Bischoff
> Harvard Medical School

The latest study, published in the journal Circulation Research, uses two types of "progenitor" cells, which have the ability, like stem cells, to form different cell types.

In this case, "endothelial" progenitor cells have the ability to form the cells which line blood vessels, while "mesenchymal" progenitor cells can form the cells adjacent to this lining, which help to support it.

Unlike more controversial stem cell therapies, which might require cells taken from an embryo, these progenitor cells can be harvested from the blood or bone marrow of an adult, or from the umbilical cord.

They were mixed together in growth-promoting chemicals in the laboratory, then implanted into mice whose immune systems had been weakened to avoid rejection.

Pig progress

Within seven days, a "vigorous network" of new vessels formed, joined up with the host animal's blood vessels and started transporting blood.

Dr Joyce Bischoff, who led the research team, said: "What's really significant about our study is that we are using human cells that can be obtained from blood or bone marrow rather than removing and using fully developed blood vessels."

Dr Nick Rhodes, from the UK Centre for Tissue Engineering at the University of Liverpool, said that the results were "interesting and promising".

He said: "It could certainly assist in the connection of other engineered organs to the body's blood supply.

"Although this approach is not yet suitable for clinical use, it is interesting that they have demonstrated you have all the elements you need to create a functional network of capillaries from a small amount of blood."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7514317.stm

Published: 2008/07/18 22:59:43 GMT

Tall, Dark and Fragile

By HOLLAND COTTER

Things falls apart. That's one of the facts of art. Material gets buried under other material. That's another art fact. They are both about the meeting — sometimes gradual, sometimes sudden — of aesthetics and physics, the moment when it becomes clear to the eye that a thing of beauty, while always a joy, will not last forever, at least in its original form.

At that point, among art experts, the focus of attention will shift from a study of art's creation to questions of preservation. How do you arrest gravity? How do you freeze time? It is at this point that art and science converge. You can see that convergence in action in "Imageless: The Scientific Study and Experimental Treatment of an Ad Reinhardt Black Painting," a small, engrossing, meditative exhibition at the Guggenheim Museum.

The show starts with a story. In 2000 the Guggenheim was given a gift, by the AXA Art Insurance Corporation, of a painting by the New York artist Ad Reinhardt (1913-1967). The picture, done sometime in the 1960s, was from Reinhardt's late series of "Black Paintings," which he sometimes referred to as "Ultimate Paintings," because he felt they took abstraction as far as it could go in terms of color and form.

Done in shades of black, with subliminal traces of underlying grids, these were endgame objects, versions of an absolutist art. They embodied no narratives, projected no emotions, broadcast no beliefs; they absorbed light, gave off no heat. The primary reward they offered was the experience of being with them, which, to be an experience (as opposed to a mere walk-by sighting), required patience and concentration.

Despite their visual and conceptual rigor, though, the black paintings are physically delicate in the extreme. The mere touch of a finger leaves a permanent imprint on their matte, suedelike surfaces. The accidental brush of an elbow could create a trail as conspicuous as a tear. Reinhardt was well aware of the paintings' fragility. Surely he knew that their precarious flawlessness was part of their mystique. It contributed to their being perceived, and valued, as pure things in a corrupted world.

To maintain this perfection, Reinhardt made himself readily available to repair paintings, or substitute fresh ones if necessary. When he offered to replace a damaged black painting in the Museum of Modern Art's collection, curators balked. But we want our painting, they said. So battles over authenticity — over what constituted an original Reinhardt, or a particular Reinhardt, or an imperfect-but-acceptable Reinhardt — began during his lifetime and have grown knottier since.

The Guggenheim's black painting is painful evidence of these wars: it is not just seriously battle-scarred, it is a ruin, a reject, not-art. Having acquired it in that parlous condition, bruised and overpainted, AXA was initially planning to warehouse it. Instead it gave the picture to the Guggenheim, not as an exhibitable work of art, but as an object for study and experimentation. The gesture was the equivalent of donating a body to science; dissection, not resurrection, was the goal.

The Guggenheim's conservation department, headed by Carol Stringari, who organized this show, has made excellent and extensive use of the gift. Over the past several years she and the other conservators on her team, among them Julie Barten of the Guggenheim and Chris McGlinchey from the Museum of Modern Art, have applied various kinds of investigative technology to the painting, both to discover its past and shape the future of paintings of its kind.

Some of that history was already available. Reinhardt documented his technique in notebooks and letters. We know how he siphoned off most of the oil from his oil paint to achieve a powdery, pastel-like, moisture-thirsty surface. We also know that he added small quantities of color to his blacks in order to differentiate them. And we know how he applied his paint in blocks, gradually, with carefully layered strokes to create the illusion of an unstroked surface.

To the conservators it was clear at a glance that the visible paint on the Guggenheim painting was not Reinhardt's. It looked too unstroked and seamless, and had a faint sheen. Chemical analysis identified the paint as acrylic; Reinhardt used only oil. A vertical slice of surface pigment placed under a microscope revealed several layers of acrylic paint sitting on top of Reinhardt's original oil layers, suggesting there had been more than one repainting during the picture's history.

X-rays revealed the probable motivation for these early freshenings-up to be the presence of stains and scratches on the original surface. At some point someone decided that having a clean surface was more important than having a marked-up Reinhardt surface. Such judgment calls are inherent to art conservation, a field that straddles science, aesthetics and ethics, as the conservators implicitly stand in for an artist who is no longer around to make decisions.

The most important and difficult investigative work, though, was on the question of how to reverse or remediate existing damage. Art conservation operates on two very basic procedural principles. The first, also familiar from medicine, is to do no harm. The second is to do nothing that cannot be undone.

But with work as vulnerable to harm as Reinhardt's, even these simple stipulations can leave a conservator's hands tied. Any intervention is a major one, and experimenting, which by definition entails the possibility of mistakes, is out of the question, particularly as the market value of Reinhardt's paintings, relatively low in his lifetime, has soared.

It is in this area that the AXA donation, which was accompanied by a conservation study grant, has been especially valuable. It meant that advanced but still tentative technologies could be applied to a "real" Reinhardt without the usual inhibiting precautions.

The most dramatic of these new approaches were laser technologies developed in Greece and the Netherlands, specifically for use on “imageless” monochromatic surfaces. In this case they were used to remove layers of unwanted paint without damaging Reinhardt’s original surface and to repair damage on that original surface.

The results were hit and miss. The removal of paint was uneven, the damage uncertainly repaired. And you can see the effects on the Guggenheim’s painting, which is displayed in the gallery, along with science-fair-style photographs and texts and an excellent video that delivers intense amounts of information with the dramatic pacing of an adventure story, and it is an adventure: after all, you are watching an object being taken apart, layer by layer, molecule by molecule, in an exhaustive, elusive and ultimately inconclusive quest for something — a living work of art — that may no longer be there.

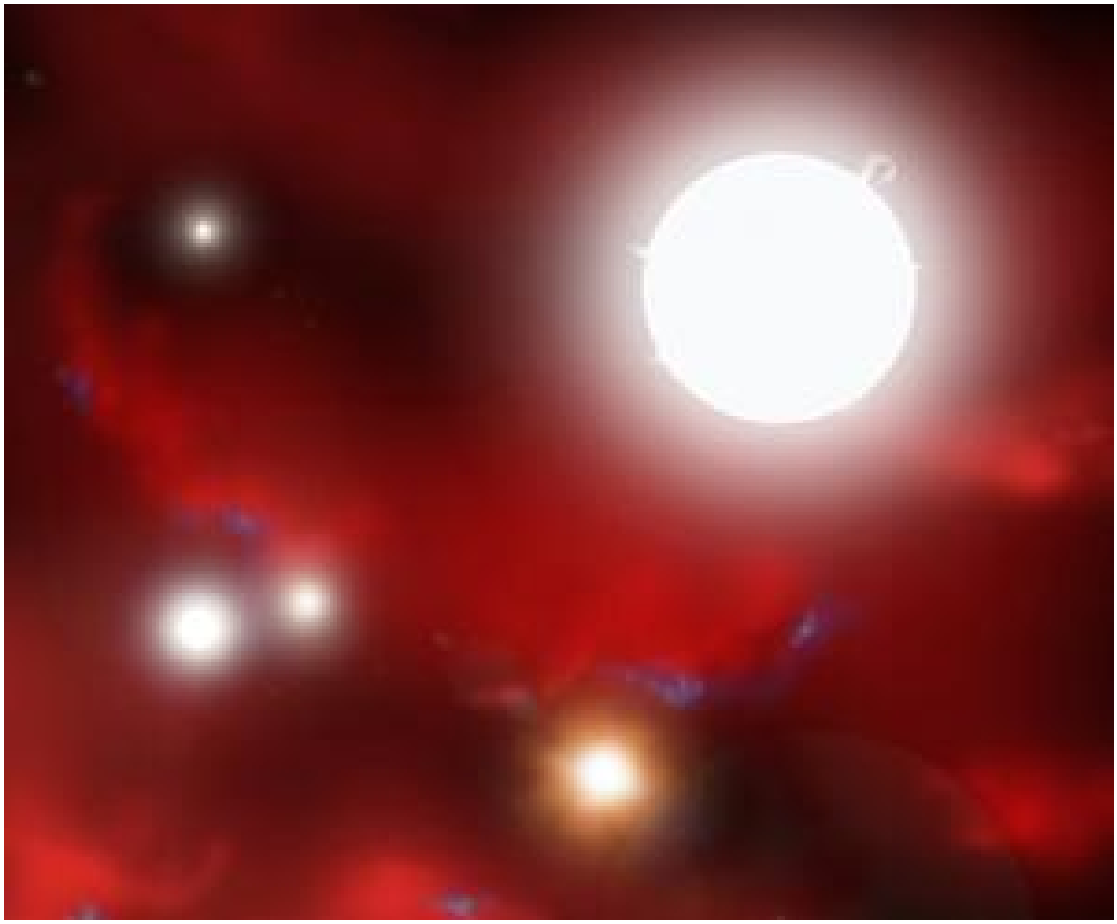
Yet at the Guggenheim, at least, the story has a sublime ending. Just off the main exhibition Ms. Stringari has installed a group of “Black Paintings” in apparently pristine condition in a plain room with a big bench, and with the low lighting Reinhardt stipulated. They don’t feel either particularly heavy or light, joyous or somber, perfect or imperfect.

You let your eyes rest on them, and what you see changes, constantly: blacks change shades; reds and blues appear and fade. One minute you think you are looking at a grid or a cruciform; the next at a cloudy sky or a Monet landscape, dark like the negative of a photograph. Your vision is changing things; you are changing. The paintings are not. But they are, perhaps, leaving their trace on your psyche and memory. The mark may be permanent, whatever permanent means.

“Imageless: The Scientific Study and Experimental Treatment of an Ad Reinhardt Black Painting” remains at the Guggenheim Museum, 1071 Fifth Avenue, at 89th Street, guggenheim.org, through Sept. 14.

http://www.nytimes.com/2008/08/01/arts/design/01blac.html?_r=1&th&emc=th&oref=slogin

How The First Stars In The Universe Came Into Existence



The first primordial stars began as tiny seeds that grew rapidly into stars one hundred times the mass of our own Sun. Seen here in this artist's impression, swirling clouds of hydrogen and helium gasses are illuminated by the first starlight to shine in the Universe. In the lower portion of the artwork, a supernova explodes, ejecting heavier elements that will someday be incorporated into new stars and planets. (Credit: Image courtesy of David A. Aguilar (CfA) via Science/AAAS)

ScienceDaily (Aug. 1, 2008) — Researchers believe that our universe began with the Big Bang about 13 billion years ago, and that soon after that event, matter began to form as small dust grains and gases.

How the first stars formed from this dust and gas has been a burning question for years, but a state-of-the-art computer simulation now offers the most detailed picture yet of how these first stars in the universe came into existence, researchers say.

The composition of the early universe was quite different from that of today, and the physics that governed the early universe were also somewhat simpler. Dr. Naoki Yoshida and colleagues in Japan and the U.S. incorporated these conditions of the early universe, sometimes referred to as the "cosmic dark ages," to simulate the formation of an astronomical object that would eventually shine its light into this darkness.

The result is a detailed description of the formation of a protostar -- the early stage of a massive primordial star of our universe -- and the researchers' computer simulation, which has been called a "cosmic Rosetta Stone," sets the bar for further investigation into the star formation process. The question

of how the first stars evolved is so important because their formations and eventual explosions provided the seeds for subsequent stars to come into being.

According to their simulation, gravity acted on minute density variations in matter, gases, and the mysterious "dark matter" of the universe after the Big Bang in order to form this early stage of a star -- a protostar with a mass of just one percent of our sun. The simulation reveals how pre-stellar gases would have actually evolved under the simpler physics of the early universe to form this protostar. Dr. Yoshida's simulation also shows that the protostar would likely evolve into a massive star capable of synthesizing heavy elements, not just in later generations of stars, but soon after the Big Bang.

"This general picture of star formation, and the ability to compare how stellar objects form in different time periods and regions of the universe, will eventually allow investigation into the origins of life and planets," said Lars Hernquist, a Professor of Astronomy at Harvard University and a co-author of this latest report. "The abundance of elements in the universe has increased as stars have accumulated," he says, "and the formation and destruction of stars continues to spread these elements further across the universe. So when you think about it, all of the elements in our bodies originally formed from nuclear reactions in the centers of stars, long ago."

Their simulation of the birth of a protostar in the early universe signifies a key step toward the ambitious goal of piecing together the formation of an entire primordial star and of predicting the mass and properties of these first stars of the universe. More powerful computers, more physical data, and an even larger range will be needed for further calculations and simulations, but these researchers hope to eventually extend this simulation to the point of nuclear reaction initiation -- when a stellar object becomes a true star.

"Dr. Yoshida has taken the study of primordial star formation to a new level with this simulation, but it still gets us only to the halfway point towards our final goal. It is like laying the foundation of a skyscraper," said Volker Bromm, Assistant Professor of Astronomy at the University of Texas, Austin and the author of a companion article. "We must continue our studies in this area to understand how the initially tiny protostar grows, layer by layer, to eventually form a massive star. But here, the physics become much more complicated and even more computational resources are needed."

Journal reference:

1. Yoshida et al. **Protostar Formation in the Early Universe**. *Science*, August 1, 2008

Adapted from materials provided by American Association for the Advancement of Science.

http://www.sciencedaily.com/releases/2008/07/080731143329.htm

Potential Of Graphene Films As Next-generation Transistors Demonstrated

ScienceDaily (Aug. 1, 2008) — Physicists at the University of Pennsylvania have characterized an aspect of graphene film behavior by measuring the way it conducts electricity on a substrate. This milestone advances the potential application of graphene, the ultra-thin, single-atom thick carbon sheets that conduct electricity faster and more efficiently than silicon, the current material of choice for transistor fabrication.

The research team, led by A.T. Charlie Johnson, professor in the Department of Physics and Astronomy at Penn, demonstrated that the surface potential above a graphene film varies with the thickness of the film, in quantitative agreement with the predictions of a nonlinear Thomas-Fermi theory of the interlayer screening by relativistic low energy charge carriers. The study appears online in the journal Nanoletters and will appear in print in the August edition.

Johnson's study, "Surface Potentials and Layer Charge Distributions in Few-Layer Graphene Films," clarifies experimentally the electronic interaction between an insulating substrate and few-layer graphene films, or FLGs, the standard model for next-generation transistors.

It is more practical to develop devices from FLGs, rather than single-layer materials. To make use of these films, graphene must be placed on a substrate to be functionalized as a transistor. Placing the film on a substrate causes an electronic interaction between the two materials that transfers carriers to or from, or "dopes," the FLG.

The focus of the Penn study was aimed at understanding how these doped charges distribute themselves among the different layers of graphene. The distribution of these charges determines the behavior of graphene transistors and other circuits, making it a critical component for device engineering. The team measured the surface potential of the material to determine how these doped charges were distributed along the transistor, as well as how the surface potential of the transistor varied with the number of layers of graphene employed.

Using electrostatic force microscopy measurements, the team characterized the surface potential of the graphene film and found it to be dependent on the thickness of the graphene layers. The thicker the carbon strips, the higher the electronic surface potential, with the surface potential approaching its limit for films that were five or more sheets thick. This behavior is unlike that found for conventional metals or semiconductors which would have, respectively, much shorter or longer screening lengths.

The surface potential measurements were in agreement with a theory developed by Penn professor and physicist Eugene Mele. The theory makes an important approximation, by treating electrostatic interactions in the film but neglecting quantum mechanical tunneling between neighboring layers. This allows the model to be solved analytically for the charge distribution and surface potential.

While prior theoretical work considered the effect of a substrate on the electronic structure of FLG, few experiments have directly probed the graphene-substrate interaction. Quantitative understanding of charge exchange at the interface and the spatial distribution of the resulting charge carriers is a critical input to device design.

Graphene-derived nanomaterials are a promising family of structures for application as atomically thin transistors, sensors and other nanoelectronic devices. These honeycomb sheets of sp2 -bonded carbon atoms and graphene sheets rolled into molecular cylinders share a set of electronic properties making them ideal for use in nanoelectronics: tunable carrier type and density, exceptionally high carrier mobility and structural control of their electronic band structures. A significant advantage of graphene is its two-dimensionality, making it compatible with existing planar device architectures. The challenge is realizing the potential of these materials by fabricating and insulating them on substrates.

The study was performed by Sujit S. Datta and Mele of the Department of Physics and Astronomy in the School of Arts and Sciences at Penn as well as Douglas R. Strachan of the Department of Physics and Astronomy and also the Department of Materials Science and Engineering within Penn's School of Engineering and Applied Science.

The study was funded by

Penn's Nano/Bio Interface Center

through the National Science Foundation, the Army Research Office and the Department of Energy.

Adapted from materials provided by University of Pennsylvania.

http://www.sciencedaily.com/releases/2008/07/080731140313.htm

Stem Cell Technology: First Neurons Created From ALS Patient's Skin Cells

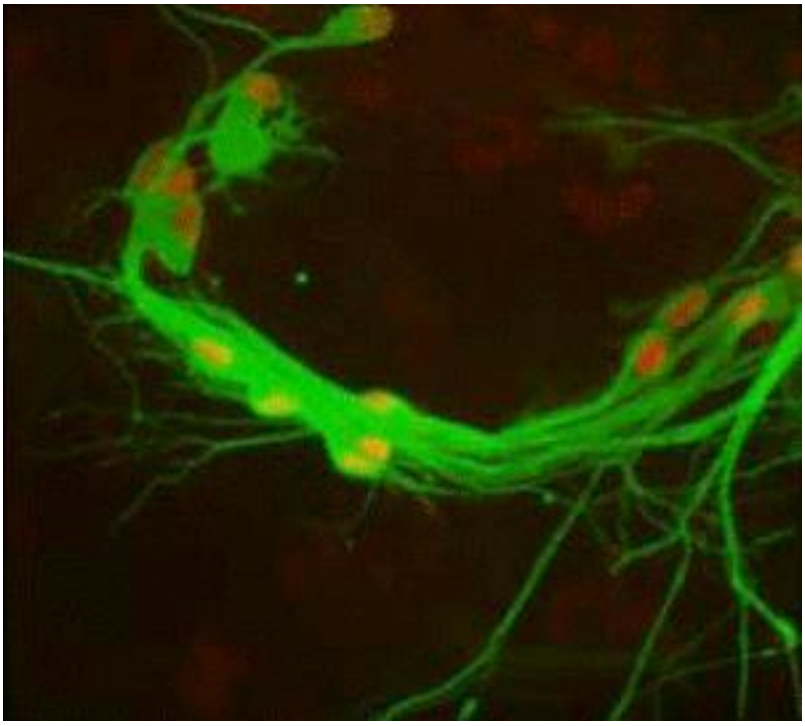


Image of motor neuron. (Credit: Courtesy Dimos, Rodolfa et al)

ScienceDaily (Aug. 1, 2008) — Harvard and Columbia scientists have for the first time used a new technique to transform an ALS (amyotrophic lateral sclerosis, or Lou Gehrig's disease) patient's skin cells into motor neurons, a process that may be used in the future to create tailor-made cells to treat the debilitating disease.

The research – led by Kevin Eggan, Ph.D. of the Harvard Stem Cell Institute – will be published July 31 in the online version of the journal Science.

This is the first time that skin cells from a chronically-ill patient have been reprogrammed into a stem cell-like state, and then coaxed into the specific cell types that would be needed to understand and treat the disease.

Though cell replacement therapies are probably still years away, the new cells will solve a problem that has hindered ALS research for years: the inability to study a patient's motor neurons in the laboratory.

ALS is caused by the degeneration and death of motor neurons, the nerve cells which convey nerve impulses from the spinal cord to each of the body's muscles. The death of motor neurons leads to paralysis of these muscles, including those involved in swallowing and breathing, and ultimately leads to death of the patient. The disease affects about 30,000 people in the United States.

"Up until now, it's been impossible to get access to the neurons affected by ALS and, although everyone was excited by the potential of the new technology, it was uncertain that we would be able to obtain them from patients' skin cells," says co-author Chris Henderson, Ph.D., professor of pathology, neurology and neuroscience, co-director of the Center for Motor Neuron Biology and Disease at Columbia, and senior scientific advisor of the Project A.L.S./ Jenifer Estess Laboratory for Stem Cell Research. "Our paper now shows that we can generate hundreds of millions of motor neurons that are genetically identical to a

patient's own neurons. This will be an immense help as we try to uncover the mechanisms behind this disease and screen for drugs that can prolong life."

The motor neurons were created using a new technique that reprograms human adult skin cells into cells that resemble embryonic stem (ES) cells. The technique used to make these cells – called induced pluripotent stem (iPS) cells – was a major advance in the field that was first reported last November by researchers in Japan and Wisconsin. Those studies used skin cells from healthy adults, but it remained unknown whether iPS cells could be created with cells from chronically-ill patients and then transformed into neurons. The Columbia-Harvard team, in this paper, showed this was possible using an ALS patient's skin cells.

Columbia clinician-researchers Wendy Chung, M.D., Ph.D., Herbert Irving Assistant Professor of Pediatrics in Medicine, and Hiroshi Mitsumoto, M.D., D.Sc., the Wesley J. Howe Professor of Neurology at Columbia, obtained skin cells from an 82-year-old ALS patient. In the Project A.L.S. laboratory, Columbia researchers Dr. Henderson and Hynek Wichterle, Ph.D., assistant professor of pathology, and colleagues cultured the cells and contributed expertise needed for identifying iPS cell-derived motor neurons. Finally, Harvard researchers, led by Kevin Eggan of the Harvard Stem Cell Institute, successfully used the new technique to reprogram the skin cells into iPS cells and differentiate them into motor neurons.

Scientists had originally hoped to create neurons and other adult cells using "therapeutic cloning," in which DNA from a patient is inserted into a donated egg to create embryonic stem cells. That technique, however, has still not been successful in humans, and is also hindered by a shortage of donated eggs.

If the iPS technique holds its promise in producing neurons and other cells for research, it will probably replace the "therapeutic cloning" approach, Dr. Henderson says, but there are still lots of questions about the iPS-derived neurons.

"We don't know yet how similar they are to the motor neurons in ALS patients," he says. "While the cells exhibit many properties that are typical of motor neurons, we don't yet know whether they will be prone to degeneration that will allow us to mimic the disease in the culture dish and therefore to screen potential drugs."

Researchers at Columbia and Harvard are already collaborating to investigate the cells with the ultimate goal of determining how they differ from a healthy person's motor neurons.

"Project A.L.S. has always maintained that collaboration between scientists is the answer to understanding and treating this disease," Valerie Estess, founder and research director, Project A.L.S. "We are thrilled to have catalyzed the Harvard-Columbia collaboration that led to this discovery."

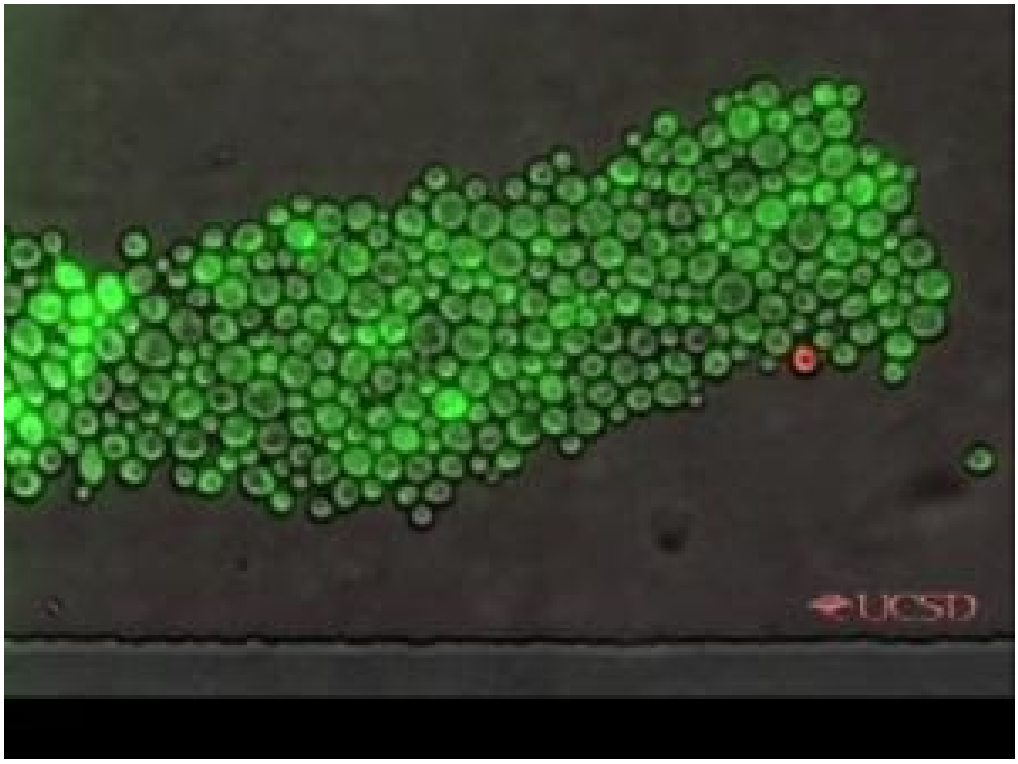
"Therapeutic use of the cells is probably a long way off," Dr. Henderson says. "Right now there are safety issues with iPS cells, including a risk of cancer. We also don't know how to reintroduce cells into a sick adult in a way that will be beneficial. All these hurdles need to be overcome first before we can think about using the cells to treat disease, but we can start immediately to evaluate them as a tool for drug discovery."

The Columbia and Harvard researchers were supported by the Harvard Stem Cell Institute, Project A.L.S., the SMA Foundation, MDA Wings Over Wall Street, the Claire and Leonard Tow Charitable Foundation, the Spina, Drago and Bowen Families, Ride for Life and the New York Stem Cell Foundation.

Adapted from materials provided by Columbia University Medical Center.

http://www.sciencedaily.com/releases/2008/07/080731143347.htm

New Yeast Trick For Eating Favorite Food



Microscope imagery of yeast growing in a microfluidic chamber specially designed to control the sugars the yeast have access to. (Credit: UC San Diego Jacobs School of Engineering)

ScienceDaily (July 31, 2008) — It is well known that yeast, the humble ingredient that goes into our breads and beers, prefer to eat some sugars more than others. Glucose, their favorite food, provides more energy than any other sugar, and yeast has evolved a complex genetic network to ensure that they consume as much glucose as possible whenever it is available. UC San Diego bioengineers have recently identified a previously unknown mechanism that allows yeast to shut down the metabolism of another sugar, galactose, when they sense glucose in the environment.

The findings will be published online by the journal Nature on 30 July 2008.

This research marks the first discovery of post-transcriptional gene regulation in a key model for gene regulation in higher organisms: the galactose genetic system in the yeast Saccharomyces cerevisiae.

Molecular biologists have long thought that the primary mechanism for regulating genes is through proteins called transcription factors, which can either increase or decrease the activity of a gene by binding directly to the DNA. However, a paradigm shift has occurred in recent years as researchers have shown that the control of genes frequently occurs at the intermediated stages between transcription and the formation of functional proteins. This "post-transcriptional" regulation provides cells with an additional level of control over phenotypic expression.

The UCSD team demonstrated that the glucose network actively shuts down the galactose network by degrading messenger RNA that would otherwise go on to form the enzymes needed to metabolize galactose.

"To find something new in the well-known galactose network after predicting it is extremely exciting," said Matthew Bennett, the first author on the Nature paper and a postdoctoral researcher in the Systems Biodynamics Lab in UC San Diego's bioengineering department.

A better understanding of the yeast galactose network could lead to new insights in human cell behavior, human physiology and metabolic diseases such as diabetes. "The more we know about gene networks, the more we learn about how they can fail," said Bennett.

Feeding Yeast the Microfluidic Way

The work also highlights the kinds of important biological insights that scientists can gain by studying how gene networks operate in dynamic, life-like environments, rather than in steady-state environments. The bioengineers built yeast growth chambers in which food is delivered by microfluidic tubes. The design allowed for the raising and lowering of glucose levels with great control, while keeping galactose levels steady.

"Much of gene regulation appears to deal with changes in the environment. Our new work demonstrates that you can modify the environment in a highly controlled way and then monitor single cells in order to see how specific gene networks respond to the environmental changes," explained bioengineering professor Jeff Hasty, the senior author on the Nature paper.

The researchers found that yeast are much better at adapting to changes in available food sources than the prevailing models predicted.

"We didn't expect that yeast would respond so quickly to changes in glucose levels until we did these experiments," said Bennett

By controlling the exact growth conditions with microfluidic technology, the engineers determined that the canonical models for the yeast metabolic network underestimated how quickly and nimbly yeast can switch from galactose to glucose.

"The experimental system was much better than the computational models predicted. The model started filtering out the glucose pulses too soon," said Hasty, who stressed the utility of their tried-and-true engineering approach. "We drove our system with a sine wave in typical engineering fashion, and sure enough, we learned something interesting."

The undulating sine wave represents pulses of glucose delivered to the yeast cells while galactose levels remained constant.

When the glucose pulses started coming faster and faster, the model underestimates the ability of the yeast to react to the glucose pulse by shutting down the galactose metabolic network.

This discrepancy between the experimental results and the model predictions got the bioengineers thinking about what could be happening that is not captured in the current model. A combination of computational modeling and experimental work led the researchers to a new post-transcriptional control mechanism in which jumps in glucose increase the degradation rate of messenger RNA that are crucial for the functioning of the galactose metabolic network.

Adapted from materials provided by University of California - San Diego, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080730140730.htm

Life In A Bubble: Mathematicians Explain How Insects Breathe Underwater

The Fisher spider Dolomedes triton uses an air layer, approximately 0.2 mm thick, as an oxygen supply. (Credit: John Bush and Morris Flynn)

ScienceDaily (July 31, 2008) — Hundreds of insect species spend much of their time underwater, where food may be more plentiful. MIT mathematicians have now figured out exactly how those insects breathe underwater.

By virtue of their rough, water-repellent coat, when submerged these insects trap a thin layer of air on their bodies. These bubbles not only serve as a finite oxygen store, but also allow the insects to absorb oxygen from the surrounding water.

"Some insects have adapted to life underwater by using this bubble as an external lung," said John Bush, associate professor of applied mathematics, a co-author of the recent study.

Thanks to those air bubbles, insects can stay below the surface indefinitely and dive as deep as about 30 meters, according to the study co-authored by Bush and Morris Flynn, former applied mathematics instructor. Some species, such as Neoplea striola, which are native to New England, hibernate underwater all winter long.

This phenomenon was first observed many years ago, but the MIT researchers are the first to calculate the maximum dive depths and describe how the bubbles stay intact as insects dive deeper underwater, where pressure threatens to burst them.

The new study, which appears in the Aug. 10 issue of the Journal of Fluid Mechanics, shows that there is a delicate balance between the stability of the bubble and the respiratory needs of the insect.

The air bubble's stability is maintained by hairs on the insects' abdomen, which help repel water from the surface. The hairs, along with a waxy surface coating, prevent water from flooding the spiracles—tiny breathing holes on the abdomen.

The spacing of these hairs is critically important: The closer together the hairs, the greater the mechanical stability and the more pressure the bubble can withstand before collapsing.

However, mechanical stability comes at a cost. If the hairs are too close together, there is not enough surface area through which to breathe.

"Because the bubble acts as an external lung, its surface area must be sufficiently large to facilitate the exchange of gases," said Flynn, who is now an assistant professor of mechanical engineering at the University of Alberta.

The researchers developed a mathematical model that takes these factors into account and allows them to predict the range of possible dive depths. They found that there is not only a maximum depth beyond which the bubble collapses, but a minimum depth above which the bubble cannot meet the insect's respiratory needs.

Though the researchers found that the insects can go as deep as 30 meters below the surface, they rarely venture deeper than several meters, due to environmental factors such as amount of sunlight, availability of prey and the presence of predators.

The researchers first took an interest in the external lung phenomenon when they accidentally captured one of the underwater breathers while looking for water striders. A few years ago, Bush and colleagues figured out how the striders use surface tension to glide across the water's surface.

Other researchers have explored systems that could replicate the external lung on a larger scale, for possible use by diving humans. A team at Nottingham Trent University showed that a porous cavity surrounded by water-repellent material is supplied with oxygen by the thin air layer on its surface. The surface area required to support human respiration is impractically large, in excess of 100 square meters; however, other avenues for technological application exist. For example, such a device could supply the oxygen needed by fuel cells to power small autonomous underwater vehicles.

Adapted from materials provided by Massachusetts Institute of Technology.
http://www.sciencedaily.com/releases/2008/07/080730155354.htm

Improved Estrogen Reception May Sharpen Fuzzy Memory

ScienceDaily (July 31, 2008) — Estrogen treatments may sharpen mental performance in women with certain medical conditions, but University of Florida researchers suggest that recharging a naturally occurring estrogen receptor in the brain may also clear cognitive cobwebs.

The discovery suggests that drugs can be developed to offset "senior moments" related to low estrogen levels, as well as to protect against neurological diseases, all while avoiding the problems associated with adding estrogen to the body.

Writing online in Molecular Therapy in July, scientists with UF's McKnight Brain Institute describe how they improved thought processes in female mice bred with the inability to produce estrogen receptor-alpha, a protein apparently necessary for healthy learning and memory.

"We were able to restore function in these animals, not by dosing them with estrogen, but by enabling them to use the estrogen that was naturally present in their bodies," said Tom Foster, Ph.D., the Evelyn F. McKnight chair for brain research in memory loss at the UF College of Medicine. "We discovered that you can affect the estrogen receptor directly in the hippocampus, right where it's needed to address memory and spatial learning."

Changes in the estrogen receptor have been associated with age-related memory deficits and an increased incidence of Alzheimer's disease among women. In addition, previous studies have shown estrogen replacement may improve cognition in postmenopausal women and younger women with low estrogen levels. Estrogen also appears to protect against Alzheimer's disease and dementia.

The downside is that estrogen is a powerful hormone that has far-reaching effects throughout the body. It has been associated with a slight increase in women's risk for breast cancer, heart disease in patients with existing cardiovascular problems, and stroke.

"Estrogen may act as a growth agent for cancer, but in the brain, it appears to maintain health and counteract stress," Foster said. "We wanted to come back and enhance the signaling pathway that makes estrogen functional. We used a gene therapy technique that enables us to target the brain, but ultimately there could be a pharmaceutical that enhances the signaling pathway solely in the brain."

The mice had unusually low levels of estrogen because their ovaries were removed at an early age. However, scientists were still able to rescue learning ability by delivering the correct gene to produce estrogen receptor-alpha directly to the hippocampus.

Mice that lacked the estrogen receptor showed poor ability to locate a platform hidden in a small swimming tank over a training period of several days. After receiving the gene, the mice learned to locate the platform in two days of training.

"This research shows that when the estrogen receptor-alpha is restored to adult mice that have been missing it their entire lives, it is still possible to enhance memory and learning," said John H. Morrison, Ph.D., dean of basic sciences and the Graduate School of Biological Sciences at Mount Sinai School of Medicine, who did not participate in the research. "This is good news for moving forward to develop clinical interventions and therapeutics because it appears critical damage was not done to brain circuitry during early development. There has also been debate about which of at least two estrogen receptors is key to synaptic health. Clearly estrogen receptor-alpha plays a critically important role in hippocampal organization and function."

Recordings made from the brain tissue of treated mice showed signals were strongly communicated across the gaps, or synapses, between hippocampal cells, similar to what would happen with estrogen replacement.

"Investigating the impact of genetically replacing the estrogen receptor at the cellular, synaptic and behavioral levels is a scientific tour de force which provides a strong foundation for the role of estrogen receptor alpha in mediating estrogen action in the hippocampus to restore select types of memory function," said Roberta Diaz Brinton, Ph.D., a professor of pharmacology and pharmaceutical sciences and biomedical engineering at the University of Southern California, who was not involved in the study. "From a technology perspective, their technique to transfect the estrogen receptor is an exciting advance for researching steroid receptors in the brain."

Studying the effects of increasing the estrogen receptor in other brain regions may shed additional light on memory processes.

"The research brings up the idea that local activation of non-nuclear estrogen receptor-alpha is important for regulating memory processes in the hippocampus," said Teresa A. Milner, Ph.D., a professor of neuroscience at Weill Cornell Medical College, who also was also not involved in the research.

UF neuroscience associate Asha Rani and UF scientists Ashok Kumar, Ph.D.; Li Cui, Ph.D.; and Susan L. Semple-Rowland, Ph.D., participated in the study, which was supported by the National Institutes of Health and the Evelyn F. McKnight Brain Research Foundation.

Adapted from materials provided by University of Florida.

http://www.sciencedaily.com/releases/2008/07/080729160823.htm

Mud Pots Signal Possible Extension Of San Andreas Fault

Researchers have conducted a comprehensive survey of mud pots (like the one shown above) in the area immediately east of the southeastern-most portion of the Salton Sea in Imperial County, Calif. (Credit: Image courtesy of Seismological Society of America)

ScienceDaily (July 31, 2008) — A linear string of mud pots and mud volcanoes suggest surface evidence for a southern extension of the San Andreas Fault that runs through the Salton Sea, according to a paper published in the August issue of the Bulletin of the Seismological Society of America (BSSA).

Researchers David K. Lynch and Kenneth W. Hudnut of USGS report the results of a comprehensive survey of mud pots in the area immediately east of the southeastern-most portion of the Salton Sea in Imperial County, Calif. Using satellite imagery, followed by a physical examination of the land, they identified a cluster of 33 mud pots, mud volcanoes and sink holes which, when plotted, form a clear linear pattern.

Mud pots and mud volcanoes are geothermal features produced when water or gas is forced upward through soil and sediments. Mud pots can assume a variety of forms, typically being depressions or enclosed basins containing gas seeps, bubbling water or viscous mud. Mud pots can also be water-laden and appear as bubbling muddy water. Mud volcanoes, on the other hand, are elevated conical structures composed of accumulations of viscous mud extruded from a central vent. They range from finger-sized to several kilometers across, though the largest in the Salton Sea area are about 2 meters high. Small mud volcanoes on land, ranging from one to 10 feet in height, are usually called mud cones or gryphons and are usually associated with volcanic and seismic activity.

"The presence of a linear field of geothermal features is evidence of a planar rift extending to considerable depth in the crust," Lynch and Hudnut write.

While geologists have suspected that the San Andreas Fault extended beyond its confirmed terminal point near Bombay Beach, erosion, seismic inactivity and agricultural reshaping of the land have erased any previously identifiable surface evidence to support the theory.

The San Andreas Fault is a plate boundary separating Pacific and North American plates. "This new evidence indicates that the region is more complicated than we previously thought," Lynch said. "The extension of the San Andreas does not appear to be active. It is probably a very old part of the fault, and helps to explain the larger, more complex transition area between the Imperial fault and San Andreas fault, called the Brawley Seismic Zone."

The southern portion of the San Andreas Fault is the focus of the Great Southern California ShakeOut, which will be an earthquake drill on 13 Nov. 2008 designed to help prepare local citizens for the next very large earthquake. The scenario will call for a quake with a magnitude of 7.8 that begins in the same area that is the subject of this paper.

The public can visit many of the 33 mud pots and mud volcanoes, some of which are located in the Wister Unit of the Imperial Wildlife Area that is administered by the California Department of Fish and Game.

Adapted from materials provided by Seismological Society of America, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080729133417.htm

New Technique To Compress Light Could Open Doors For Optical Communications

ScienceDaily (July 31, 2008) — Scientists at the University of California, Berkeley, have devised a way to squeeze light into tighter spaces than ever thought possible, potentially opening doors to new technology in the fields of optical communications, miniature lasers and optical computers.

Optics researchers succeeded previously in passing light through gaps 200 nanometers wide, about 400 times smaller than the width of a human hair. A group of UC Berkeley researchers led by mechanical engineering professor Xiang Zhang devised a way to confine light in incredibly small spaces on the order of 10 nanometers, only five times the width of a single piece of DNA and more than 100 times thinner than current optical fibers.

"This technique could give us remarkable control over light," said Rupert Oulton, research associate in Zhang's group and lead author of the study, "and that would spell out amazing things for the future in terms of what we could do with that light."

Just as computer engineers cram more and more transistors into computer chips in the pursuit of faster and smaller machines, researchers in the field of optics have been looking for ways to compress light into smaller wires for better optical communications, said Zhang, senior author of the study, which will be published in the August issue of Nature Photonics and is currently available online.

"There has been a lot of interest in scaling down optical devices," Zhang said. "It's the holy grail for the future of communications."

Not only would compressed light make possible smaller optical fibers, but it could lead to huge advances in the field of optical computing. Many researchers want to link electronics and optics, but light and matter make strange bedfellows, Oulton said, because their characteristic sizes are on vastly different scales. However, confining light can actually alter the fundamental interaction between light and matter. Ideally, optics researchers would like to cram light down to the size of electron wavelengths to force light and matter to cooperate.

The researchers run into a brick wall, however, when it comes to compressing light farther than its wavelength. Light doesn't want to stay inside a space that small, Oulton said.

They have squished light beyond these limits using surface plasmonics, where light binds to electrons allowing it to propagate along the surface of metal. But the waves can only travel short distances along the metal before petering out.

Oulton had been working on combining plasmonics and semiconductors, where these losses are even more pronounced, when he came up with an idea to achieve simultaneously strong confinement of the light and mitigate the losses. His theoretical "hybrid" optical fiber consists of a very thin semiconductor wire placed close to a smooth sheet of silver.

"It's really a very simple geometry, and I was surprised that no one had come up with it before," Oulton said.

Oulton ran computer simulations to test this idea. He found that not only could the light compress into spaces only tens of nanometers wide, but it could travel distances nearly 100 times greater in the simulation than by conventional surface plasmonics alone. Instead of the light moving down the center of the thin wire, as the wire approaches the metal sheet, light waves are trapped in the gap between them, the researchers found.

The research team's technique works because the hybrid system acts like a capacitor, Oulton said, storing energy between the wire and the metal sheet. As the light travels along the gap, it stimulates the build-up of charges on both the wire and the metal, and these charges allow the energy to be sustained for longer distances. This finding flies in the face of the previous dogma that light compression comes with the drawback of short propagation distances, Zhang said.

"Previously, if you wanted to transmit light at a smaller scale, you would lose a lot of energy along the path. To retain more energy, you'd have to make the scale bigger. These two things always went against each other," Zhang said. "Now, this work shows there is the possibility to gain both of them."

Even though the current study is theoretical, the construction of such a device should be straightforward, Oulton said. The problem lies in trying to directly detect the light in such a small space - no current tools are sensitive enough to see such a small point of light. But Zhang's group is looking for other ways to experimentally detect the tiny bits of light in these devices.

Oulton believes the hybrid technique of confining light could have huge ramifications. It brings light closer to the scale of electrons' wavelengths, meaning that new links between optical and electronic communications might be possible.

"We are pulling optics down to the length scales of electrons," Oulton said. "And that means we can potentially do some things we have never done before."

This idea could be an important step on the road to an optical computer, a machine where all electronics are replaced with optical parts, Oulton said. The construction of a compact optical transistor is currently a major stumbling block in the progress toward fully optical computing, and this technique for compacting light and linking plasmonics with semiconductors might help clear this hurdle, the researchers said.

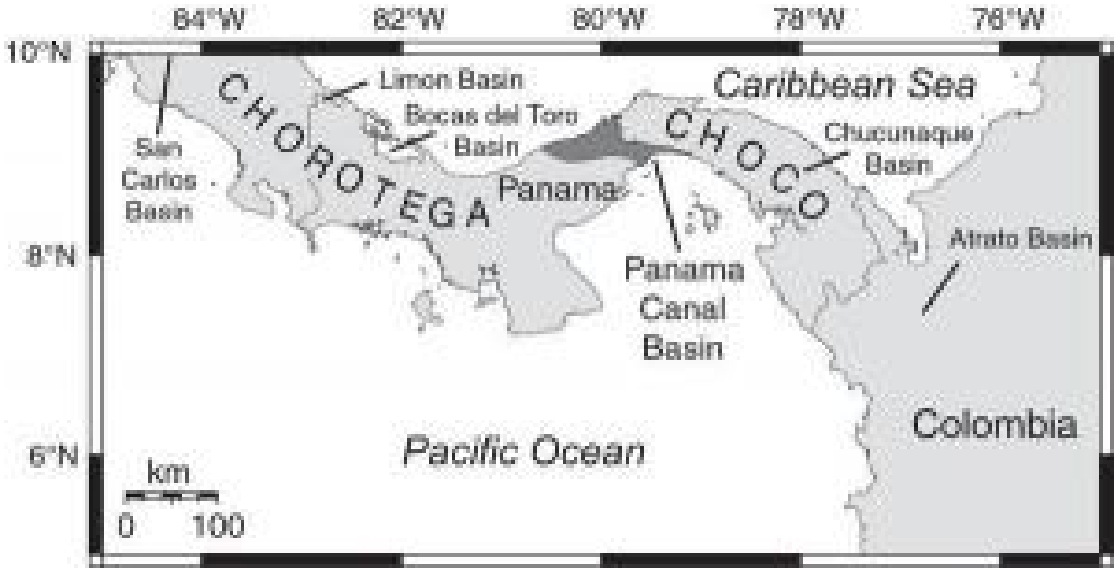
Other authors of the study are Volker Sorger, Dentcho Genov and David Pile, all of Zhang's research group at UC Berkeley.

The U.S. Air Force Office of Scientific Research, the National Science Foundation and the Department of Defense helped support this study.

Adapted from materials provided by University of California - Berkeley.

http://www.sciencedaily.com/releases/2008/07/080730140936.htm

Isthmus Of Panama Formed As Result Of Plate Tectonics, Study Finds



Location of the Panama Canal Basin and other depositional basins in southern Central America. (Credit: PLoS ONE)

ScienceDaily (July 31, 2008) — Contrary to previous evidence, a new University of Florida study shows the Isthmus of Panama was most likely formed by a Central American Peninsula colliding slowly with the South American continent through tectonic plate movement over millions of years.

The study, co-authored by Florida Museum of Natural History researchers Michael Kirby, Douglas Jones and Bruce MacFadden, is published in the July 30 issue of PLoS ONE, the online journal of the Public Library of Science. The study uses geologic, chemical and biologic methods to date rocks and fossils found in sides of the Gaillard Cut of the Panama Canal. The results show that instead of being formed by rising and subsiding ocean levels or existing as a string of islands as scientists previously believed, the Isthmus of Panama was first a peninsula of southern Central America before the underlying tectonic plates merged it with South America 4 million years ago.

"Scientists knew Panama was a North American peninsula, possibly as early as 19 million years ago because fossils that are closely related to North American land mammals, such as rhinos, horses, peccaries and dogs have been found in the Panama Canal during ongoing maintenance," said Kirby, lead author of the study. "But we were not certain when this peninsula first formed and how long it may have existed."

The canal's maintenance also exposes sediment layers and marine animal fossils, as well as strata of rocks and clay specific to numerous environments, including lagoon, delta, swamp, woodland and dry tropical forest.

Previous studies placed marine sediment as the youngest layers, suggesting the peninsula was submerged before finally joining with South America. The current study revises the time order of strata, however, and concludes that the Panamanian peninsula joined with South America roughly 4 million years ago.

Deep-sea deposits in one sediment layer suggest a short-lived strait may have existed across the Panama Canal Basin between 21 and 20 million years ago," said Jones, director of the Florida Museum of Natural History. "However, these short-lived straits probably had little impact on the long-term evolution of Central America's flora and fauna."

Kirby explained that because of numerous geologic faults resulting from tectonic plate movement that continues today, there is no area in Panama that allows a full view of the strata making up the land.

"We realized there was a problem with our previous understanding of the stratigraphy, or layering of sediments, in Panama," Kirby said.

The authors used alternative methods such as strontium isotope dating of fossils and re-analysis of vertebrate fossils to better determine the geologic sequence of the Canal.

"There's always missing information, like pages out of a book, when it comes to figuring out which layers came first and which were formed later," Kirby added.

Anthony Coates, a staff scientist emeritus at the Smithsonian Tropical Research Institute in Panama who has extensively studied the geological history of the rise of the Central American isthmus, said the study brings together a diverse array of geologic evidence that convincingly suggests Central America was a peninsula and not a group of islands.

"They have made an important contribution to the land-based geologic evidence of the plate tectonic history of the formation of the Isthmus," said Coates, who did not participate in the study. "Their results have important consequences for the nature of the global change engendered by the rise and closure of the isthmus."

One of the major effects of the formation of the Isthmus of Panama was the intensification of the Gulf Stream in the Atlantic Ocean. While the area that is now Panama was still a peninsula, ocean currents moving north along the north coast of South America spilled over to the Pacific Ocean through the wide Central American Seaway, also called the Atrato Seaway. As tectonic plate movement joined the peninsula with South America to form the present-day Isthmus of Panama, equatorial ocean currents between the Atlantic and Pacific were cut off, forcing water northward into the Gulf Stream current.

"The strengthened Gulf Stream, in turn, delivered enough moisture to allow the formation of glaciers across North America," Kirby said.

Journal reference:

1. Kirby MX, Jones DS, MacFadden BJ. **Lower Miocene Stratigraphy along the Panama Canal and Its Bearing on the Central American Peninsula**. *PLoS ONE*, 2008; 3(7): e2791 DOI: 10.1371/journal.pone.0002791

Adapted from materials provided by University of Florida, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080729234142.htm

Cholesterol-lowering Drug Boosts Bone Repair

ScienceDaily (July 31, 2008) — Lovastatin, a drug used to lower cholesterol and help prevent cardiovascular disease, has been shown to improve bone healing in an animal model of neurofibromatosis type 1 (NF1). The research, reported today in the open access journal BMC Medicine, will be of great interest to NF1 patients and their physicians.

Many NF1 patients suffer from bowing, spontaneous fractures and pseudarthrosis (incomplete healing) of the tibias (shinbones). Mateusz Kolanczyk from Stefan Mundlos' laboratory in the Max Planck Institute for Molecular Genetics, Berlin, led a team that investigated lovastatin's ability to prevent pseudarthrosis in a new animal model of human NF1 disease.

Current therapies are often futile when applied to pseudarthrosis of the tibia; in some cases, amputation is the only option. To better understand this problem, Kolanczyk and his colleagues developed this mouse model. He said, "In our model, the mice showed tibial bowing similar to that observed in NF1 patients, however since mouse legs are not subjected to the same excessive mechanical forces as humans, we also applied a bone injury model". The authors drilled a 0.5mm hole in the tibia of anaesthetised mice. As they describe, "This enables analysis of the complex process of bone repair while at the same time causing the least possible distress to the animals".

The process of bone repair was examined 7, 14 and 28 days post-injury. The authors found that the mice given the statin treatment had marked improvements in bone healing compared to the control animals. As they report, "Lovastatin appears to accelerate cortical bone repair primarily by enhancing new bone formation within the bone marrow cavity and by replacing fibro-cartilaginous tissue in the injury site with mineralised bone matrix".

Kolanczyk concludes, "Our results suggest the usefulness of lovastatin, a drug approved in 1987 for the treatment of high cholesterol, in the treatment of neurofibromatosis-related fracture healing abnormalities". The experimental model presented here constitutes a valuable tool for the preclinical testing of other candidate drugs that target similar bone problems.

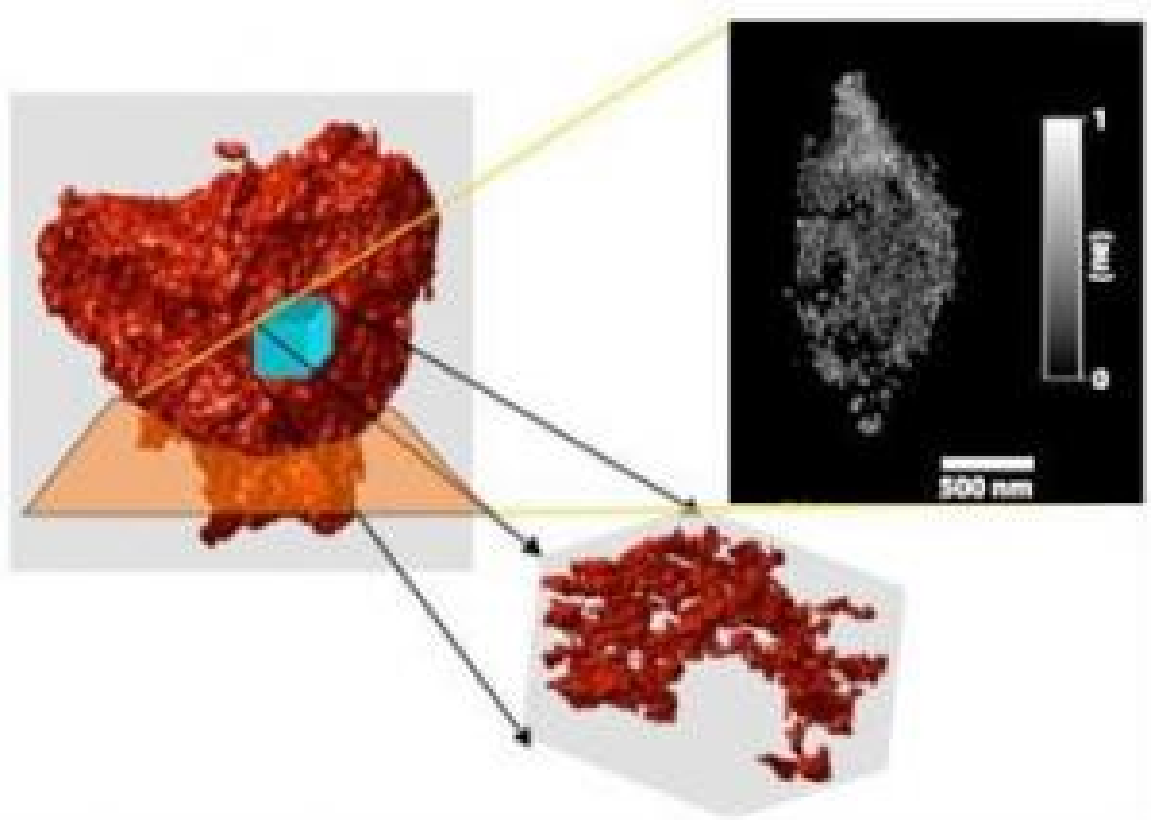
Journal reference:

1. Mateusz Kolanczyk, Jirko Kuehnisch, Nadine Kossler, Monika Osswald, Sabine Stumpp, Boris Thurisch, Uwe Kornak and Stefan Mundlos. **Modelling NF1 tibial dysplasia and its treatment with lovastatin**. *BMC Medicine*, (in press) [link]

Adapted from materials provided by BioMed Central, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080730222209.htm

Scientists Determine Strength Of 'Liquid Smoke'



Section and isosurface rendering of a 500-nanometer cube from the interior of the 3D volume. The foam structure shows globular nodes that are interconnected by thin beam-like struts. Approximately 85 percent of the total mass is associated with the nodes, and there is no evidence of a significant fraction of dangling fragments. (Credit: Image courtesy of DOE/Lawrence Livermore National Laboratory)

ScienceDaily (July 31, 2008) — Researchers have created a 3D image of a material referred to as "liquid smoke."

Aerogel, also known as liquid smoke or "San Francisco fog," is an open-cell polymer with pores smaller than 50 nanometers in diameter.

For the first time, Lawrence Livermore and Lawrence Berkeley scientists have peered into this material and created three-dimensional images to determine its strength and potential new applications.

Aerogel is a form of nanofoam, an engineered material designed for high strengh-to-weight ratio. Such nanofoam structires are also present in the fields of geology, phospholipids, cells, bone structure, polymers and structural materials, wherever lightness and strength are needed.

These mesoporous (2-50 nanometer-sized pores) crystalline materials can be used as catalysts for cleaner fuels and for the diffusion of water and oil in porous rocks. The structure and diffusion properties of nanofoams are determined by their structure.

Aerogels have the highest internal surface area per gram of material of any known materials because of its complicated, cross-linked internal structure. They also exhibit the best electrical, thermal and sound insulation properties of any known solid. It's not easy to see inside aerogel to determine the topology and

structure at nanoscale-length scales because the smallest pore is normally too small to be observed internally by any conventional microscope.

But Livermore scientist Anton Barty and Lawrence Berkeley researcher and former LLNL scientist Stefano Marchesini were determined. They inverted coherent X-ray diffraction patterns to capture the three-dimensional bulk lattice arrangement of a micron-sized piece of aerogel.

"By imaging an isolated object at high resolution in three dimensions, we've opened the door to a range of applications in material science, nanotechnology and cellular biology," Barty said.

For about 20 years, Livermore has developed and improved aerogels for national security applications, synthesized electrically conductive inorganic aerogels for use as supercapacitors, and as a water purifier for extracting harmful contaminants from industrial waste or for desalinizing seawater, and even used aerogel to capture stardust particles during NASA's Stardust mission.

The new research shows that the lattice structure within aerogel is weaker than expected. The researchers saw a structure made up of nodes connected by thin beams.

"This blob and beam structure explains why these low-density materials are weaker than predicted and explains the high mass scaling exponent seen in the materials," Barty said.

In the future, the 3D analysis could be applied to other porous materials and could help modeling filtration problems such as oil and water in minerals, Barty said.

Other Livermore researchers include Aleksandr Noy, Stefan Hau-Riege, Alexander Artyukhin, Ted Baumann, James Stolken, Tony van Buuren, John Kinney and former LLNL researcher Henry Chapman, who is now at the Centre for Free Electron Laser Science, DESY, in Hamburg, Germany.

The team used the Advanced Photon Source at Argonne National Laboratory for the experiments.

The research appears in the July 29 issue of the journal Physical Review Letters.

Adapted from materials provided by DOE/Lawrence Livermore National Laboratory.

http://www.sciencedaily.com/releases/2008/07/080729234306.htm

The Power Of Peter Piper: How Alliteration Enhances Poetry, Prose, And Memory

ScienceDaily (July 31, 2008) — From nursery rhymes to Shakespearian sonnets, alliterations have always been an important aspect of poetry whether as an interesting aesthetic touch or just as something fun to read. But a recent study suggests that this literary technique is useful not only for poetry but also for memory.

In several experiments, researchers R. Brooke Lea of Macalester College, David N. Rapp of Northwestern University, Andrew Elfenbein and Russell Swinburne Romine of University of Minnesota and Aaron D. Mitchel of the Pennsylvania State University had participants read works of poetry and prose with alliterative sentences to show the importance of repetitive consonants on memory.

Previous studies have shown that alliteration can act as a better tool for memory than both imagery and meaning, however the reason for this has never been established. In their experiments the researchers hoped to demonstrate that alliterations retrieve similar sounding words and phrases from a person's memory, making it a useful tool for poetry comprehension and memorization.

In one experiment, a group of participants read aloud poems with similar alliterative sounds throughout it while other participants had to read aloud poems with either different alliterative sounds or no alliterations at all. A second experiment had the same conditions, except that participants read a series of poems silently. The final experiment had participants read a work of narrative prose, also with the same conditions in regards to alliterative sounds in the literature. In each experiment, participants had to recall both content and thematic aspects from the works that they read.

The results of all three experiments underscore the interaction between alliteration and memory. In each of the experiments, participants in the same-alliteration condition were able to recall the most from the literature they read.

"In our experiments, concepts presented early in a poem (or prose passage) were more available when alliterative sounds overlapped between lines than when there was no overlap," the researchers reported.

Additionally, the results of the other experiments, published in the July issue of Psychological Science, a journal of the Association for Psychological Science, show that alliteration's affect on memory is not lessened by either the type of work it is used in or whether or not the literature is read silently or aloud. Most importantly, the results demonstrate alliteration only works as a tool for memory when the alliterative sounds are similar; while the participants in the same-alliteration condition did well in each experiment, those in the other two conditions had similar, less impressive results.

Adapted from materials provided by Association for Psychological Science.

http://www.sciencedaily.com/releases/2008/07/080730140837.htm

Digestive Specialists Freeze Out Esophagus Cancer With New Therapy

Dr. Jayaprakash Sreenarasimhaiah, and other gastroenterologists at UT Southwestern are using a novel procedure to freeze damaged cells in the esophagus, preventing them from turning cancerous. (Credit: UT Southwestern Medical Center)

ScienceDaily (July 31, 2008) — UT Southwestern Medical Center gastroenterologists are using a new method to freeze damaged cells in the esophagus, preventing them from turning cancerous.

The Food and Drug Administration-approved cryoablation therapy helps Barrett's esophagus patients with dysplasia, a condition in which normal cells are transformed into potentially cancerous ones.

"Due to damage from chronic stomach acid, they are people who have a higher risk of developing esophagus cancer," said Dr. Jayaprakash Sreenarasimhaiah, assistant professor of internal medicine in the division of digestive and liver disease at UT Southwestern. "The goal of this therapy is to literally freeze the damage in its tracks and stop it before it turns to cancer."

Gastroenterologists, using a special catheter, spray liquid nitrogen on the damaged tissue to freeze the superficial lining of the esophagus, the long tube that carries food from the throat to the stomach. The treated tissue eventually falls off, allowing normal cells to grow and replace the damaged cells in about six to eight weeks.

"Repeated treatments can actually help get rid of Barrett's esophagus with dysplasia and prevent the progression to cancer," said Dr. Sreenarasimhaiah, a gastroenterologist who specializes in endoscopic technology.

The minimally invasive cryoablation therapy has recently been approved by the FDA for treating Barrett's, but it requires special training and equipment available in only a handful of centers in Texas and a few dozen nationally.

Barrett's esophagus can result from ongoing heartburn, which allows a constant splashing of acid from the stomach into the esophagus. Untreated, it can become Barrett's with dysplasia, in which cells start to transform.

Typical treatment includes endoscopic mucosal resection (EMR), in which the damaged lining is scraped away, a procedure that takes hours and can have side effects such as bleeding or narrowing of the esophagus. The most aggressive approach includes surgery to remove damaged portions of the tube.

Some patients, however, are too sick or elderly to be candidates for surgery. Others simply want another option.

"This is a disease we see in a lot of older patients with other illnesses, so the decision to send them to surgery requires careful consideration," Dr. Sreenarasimhaiah said. "Cryoablation therapy is particularly attractive for older patients who may have complications or other medical issues – such as accompanying heart or lung diseases – that make traditional surgeries for Barrett's with dysplasia too risky."

Cryoablation therapy takes about 30 to 40 minutes and requires sedation. As with an endoscopy, a tube down the patient's throat is used to insert a tiny camera and instruments. No incisions are required.

Early results from studies show the therapy – similar to that used by dermatologists to freeze off warts – works well inside the esophagus, though further study is needed, Dr. Sreenarasimhaiah said.

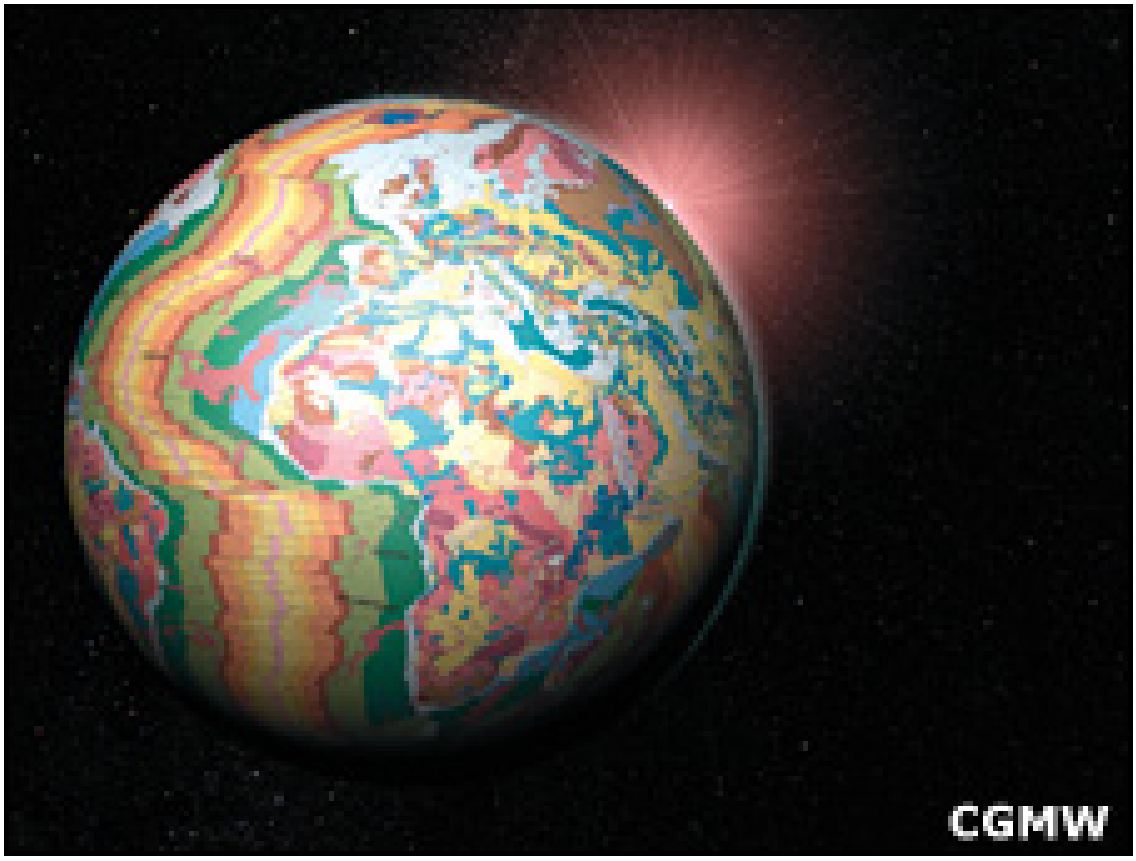
"Patients may feel a little pain in the first couple of days, like a heartburn-type pain, but that starts to improve after a few days and after that they usually don't feel anything," he said. "They can eat immediately after they wake. They are not on a special diet, but they do continue their anti-reflux medications."

Adapted from materials provided by UT Southwestern Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080729074928.htm

Geological mapping gets joined up

By Jennifer Carpenter
Science reporter, BBC News



First global geological map on the web

The world's geologists have dug out their maps and are sticking them together to produce the first truly global resource of the world's rocks.

The OneGeology project pools existing data about what lies under our feet and has made it available on the web.

Led by the British Geological Survey (BGS), the project involved geologists from 80 nations.

Between 60% and 70% of the Earth's surface is now available down to the scale of 1:1,000,000.

"That's 1cm for every 10km of the Earth's surface," explained Ian Jackson from the BGS and leader of the OneGeology Project.

"With that resolution, people can focus in on a small part of their city.

"Eventually, people will be able to get up close and see the rocks beneath their house."

Mr Jackson said this was because the geological maps were being constantly updated.

"Every time someone bores a hole in the ground, and hauls out some rock, we can refine our maps a little bit more."

Project organisers explained that what is novel about this project is that it takes local geological information and makes it global.

Useful rocks

The resource displays geological information with the use of a "virtual globe", in much the same way as Google Earth now presents satellite images.

Eventually, it is hoped that the geological maps will be detailed enough to help companies find the Earth's exploitable resources, such as minerals and oil.

Mr Jackson suggested that the project should encourage the mining of minerals in developing countries, by making maps available that were previously unavailable to outside investors.

The developers of the system added that it would also help scientists and engineers learn more about the Earth and its environmental changes.

"Rocks are not inert, they influence the supply of water and the formation of soil, and so impact flooding and agriculture."

How low can you go?

Researchers at the BGS hope that by making geological surveys global, they can encourage "big science" - research that no one country or geological survey could do on its own.

By crossing national borders, the "joined-up geology" should foster international initiatives that will target global problems, such as climate change.

"Geological surveys across the world are involved in trying to work out how you put CO2 underground and keep it there, and these sorts of databases are going to be required."

At present, most of the globe is available at the scale of 1:1,000,000.

"However, some nations take the view that 1:1,000,000 is too commercially sensitive to release," conceded Mr Jackson.

"Other parts of the world have not been mapped thoroughly enough to give us the resolution we would like."

The project is the first global geological map that is constantly updated, so the resolution will only get better. In France and Britain, users of the OneGeology resource can already look at the rocks that lie directly beneath their feet in 3D.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7535379.stm

Published: 2008/07/31 18:14:39 GMT

Ivory Poaching At Critical Levels: Elephants On Path To Extinction By 2020?

Elephant tusks seized by authorities lie next to weapons used by poachers, including rocket-propelled grenades used against rangers who protect the elephants. (Credit: William Clark)

ScienceDaily (Aug. 1, 2008) — African elephants are being slaughtered for their ivory at a pace unseen since an international ban on the ivory trade took effect in 1989. But the public outcry that resulted in that ban is absent today, and a University of Washington conservation biologist contends it is because the public seems to be unaware of the giant mammals' plight.

The elephant death rate from poaching throughout Africa is about 8 percent a year based on recent studies, which is actually higher than the 7.4 percent annual death rate that led to the international ivory trade ban nearly 20 years ago, said Samuel Wasser, a UW biology professor.

But the poaching death rate in the late 1980s was based on a population that numbered more than 1 million. Today the total African elephant population is less than 470,000.

"If the trend continues, there won't be any elephants except in fenced areas with a lot of enforcement to protect them," said Wasser.

He is lead author of a paper in the August issue of Conservation Biology that contends elephants are on a course that could mean most remaining large groups will be extinct by 2020 unless renewed public pressure brings about heightened enforcement.

Co-authors are William Clark of the Interpol Working Group on Wildlife Crime and the Israel Nature and Parks Authority, Ofir Drori of the Last Great Ape Organization in Cameroon, Emily Kisamo of the

Lusaka Agreement Task Force in Kenya, Celia Mailand of the UW, Benezeth Mutayoba of Sokoine University in Tanzania and Matthew Stephens of the University of Chicago.

Wasser's laboratory has developed DNA tools that can determine which elephant population ivory came from. That is important because often poachers attack elephants in one country but ship the contraband ivory from an adjacent nation to throw off law enforcement.

For instance, 6.5 tons of ivory seized in Singapore in 2002 were shipped from Malawi, but DNA tracking showed the ivory came originally from an area centered on Zambia. Similarly, a 2006 shipment of 3.9 tons seized in Hong Kong had been sent from Cameroon, but DNA forensics showed it came from an area centered on Gabon.

Evidence gathered from recent major ivory seizures shows conclusively that the ivory is not coming from a broad geographic area but rather that hunters are targeting specific herds. With such information, Wasser said, authorities can beef up enforcement efforts and focus them in specific areas where poaching is known to occur as a means of preventing elephants from being killed. But that will only happen if there is sufficient public pressure to marshal funding for a much larger international effort to halt the poaching.

In 1989, most international ivory trade was banned by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which regulates trade in threatened and endangered species. The restrictions banned ivory trade except for ivory from elephants that nations legally culled from their herds or those that died naturally.

At the time the treaty was enacted, poachers were killing an average of 70,000 elephants a year. The ban instigated much stronger enforcement efforts, nearly halting poaching almost immediately. However, that sense of success resulted in waning enforcement. Western aid was withdrawn four years after the ban was enacted and poaching gradually increased to the current alarming rates, Wasser said.

"The situation is worse than ever before and the public is unaware," he said, "It's very serious because elephants are an incredibly important species. They keep habitats open so other species that depend on such ecosystems can use them. Without elephants, there will be major habitat changes, with negative effects on the many species that depend on the lost habitat.

"Elephants also are a major part of ecotourism, which is an important source of hard currency for many African countries."

The illegal ivory trade is being carried out mostly by large crime syndicates, Wasser believes, and is being driven by growing markets in China and Japan, where ivory is in demand for carvings and signature stamps called hankos.

In addition, in the last few years demand has risen sharply in the United States, where much of the ivory is used to make knife handles and gun grips. In fact, a May report from the Care for the Wild International, a not-for-profit British natural protection organization, ranks the U.S. second behind China as a marketplace for illegal ivory.

But the illegal ivory trade has gotten relatively low priority from prosecutors, and new laws promoting global trade have created "a policing nightmare," Wasser says, which makes ivory poaching a high-profit, low-risk endeavor.

The only way to curb the trade, he believes, is to focus enforcement in areas where the ivory comes from in the first place, before it enters the complex, global crime trade network. Public support is crucial to helping reduce demand and to spur the needed enforcement help from the West.

However, Wasser believes that news reports about the need to cull excess elephants from managed populations in three or four countries have led many people to believe incorrectly that there are too many elephants in Africa. Those managed populations are confined by fences that limit the elephants' natural movements.

"Public support stopped the illegal ivory trade back in 1989 and can do so again," Wasser said. "The work with DNA sampling allows us to focus law enforcement on poaching hot spots.

"It forces countries to take more responsibility for what goes on within their borders, and it also gives us more insight on where to look so that, hopefully, we can stop the poachers before the elephants are actually killed."

The work was funded by the U.S. Fish and Wildlife Service African Elephant Conservation Fund, the University of Washington Center for Conservation Biology and the International Fund for Animal Welfare.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com:80/releases/2008/07/080731140219.htm

Aging Impairs The 'Replay' Of Memories During Sleep

Aging impairs the consolidation of memories during sleep, a process important in converting new memories into long-term ones, according to new research. (Credit: iStockphoto)

ScienceDaily (Aug. 1, 2008) — Aging impairs the consolidation of memories during sleep, a process important in converting new memories into long-term ones, according to new animal research in the July 30 issue of The Journal of Neuroscience. The findings shed light on normal memory mechanisms and how they are disrupted by aging.

During sleep, the hippocampus, a brain region important in learning and memory, repeatedly "replays" brain activity from recent awake experiences. This replay process is believed to be important for memory consolidation. In the new study, Carol Barnes, PhD, and colleagues at the University of Arizona found reduced replay activity during sleep in old compared to young rats, and rats with the least replay activity performed the worst in tests of spatial memory.

Barnes and colleagues recorded hippocampal activity in 11 young and 11 old rats as they navigated several mazes for food rewards. Later, when the animals were asleep, the researchers recorded their hippocampal activity again. In the young animals, the sequence of neural activity recorded while the animals navigated the mazes was repeated when they slept. However, in most of the old animals, the sequence of neural activity recorded during sleep did not reflect the sequence of brain activity recorded in the maze.

"These findings suggest that some of the memory impairment experienced during aging could involve a reduction in the automatic process of experience replay," said Michael Hasselmo, DPhil, at Boston University, an expert unaffiliated with the study.

Animals with more faithful sleep replay also performed better on memory tests. The researchers tested the same 22 rats on a spatial learning and memory task. Consistent with previous research, the young rats recalled the solution to the spatial task faster and more accurately than the old rats. In the old group, the researchers found that the top performers in the spatial memory task were also the ones that showed the

best sleep replay. Irrespective of the animal's age, the researchers found that animals who more faithfully replayed the sequence of neural activity recorded in the maze while asleep also performed better on the spatial memory task.

"This is the first study to suggest that an animal's ability to perform a spatial memory task may be related to the brain's ability to perform memory consolidation during sleep," said study author Barnes.

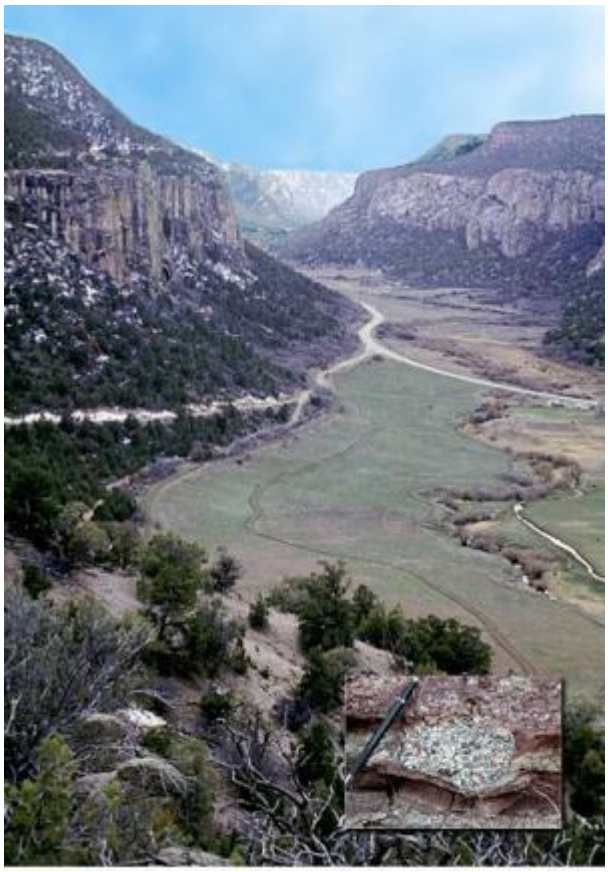
Identification of the specific memory deficit present in the aging brain may be a first step to preventing age-related memory loss. "This study's findings could inspire the development and testing of pharmacological agents designed to enhance memory replay phenomena," Hasselmo said.

The research was supported by the Arizona Chapter of the Achievement Rewards for College Scientists Foundation and The McKnight Brain Research Foundation.

Adapted from materials provided by Society for Neuroscience, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080729234144.htm

Cold And Ice, Not Heat, Episodically Gripped Tropical Regions 300 Million Years Ago



Unaweep Canyon in the Rocky Mountains is the site of a deep gorge that reveals ancient landscapes and sediments. The inset image is of a "dropstone" from an eons-old glacier. (Credit: Gerilyn Soreghan, courtesy NSF)

ScienceDaily (Aug. 1, 2008) — Geoscientists have long presumed that, like today, the tropics remained warm throughout Earth's last major glaciation 300 million years ago. New evidence, however, indicates that cold temperatures in fact episodically gripped these equatorial latitudes at that time.

Geologist Gerilyn Soreghan of Oklahoma University found evidence for this conclusion in the preservation of an ancient glacial landscape in the Rocky Mountains of western Colorado. Three hundred million years ago, the region was part of the tropics. The continents then were assembled into the supercontinent Pangaea.

Soreghan and colleagues published their results in the August 2008, issue of the journal Geology.

Climate model simulations are unable to replicate such cold tropical conditions for this time period, said Soreghan. "We are left with the prospect that what has been termed our 'best-known' analogue to Earth's modern glaciation is in fact poorly known."

"This study is an example of the wealth of untapped climate information stored in Earth's 'deep time' geologic record millions of years ago," said H. Richard Lane, program director in NSF's Division of Earth Sciences, which funded the research. "These kinds of discoveries may greatly improve our understanding and prediction of modern climate change."

As a result of the close proximity of the ancient tropical glaciers to the sea, the toes of the glaciers were likely less than 500 meters above sea level--much lower than the tropical glaciers of Earth's recent glacial times.

"The Late Paleozoic tropical climate was not buffered against cold from the high latitudes, as everyone had thought," said Soreghan. "The evidence we found indicates that glaciers were common at this time, even in tropical latitudes. This calls into question traditional assumptions of long-lasting equatorial warmth in the Late Paleozoic, and raises the possibility of large-scale and unexpected climate change in the tropics during that time."

Adapted from materials provided by National Science Foundation.

http://www.sciencedaily.com/releases/2008/07/080731140227.htm

Engine test for Falcon 9 rocket

A key milestone has been reached in the development of the rocket that may soon be flying cargo and astronauts to the International Space Station (ISS).

The SpaceX company has conducted a test-firing of its Falcon 9 vehicle.

The demonstration in Texas meets a target laid down by the US space agency (Nasa) which has given SpaceX some "seed" funding.

Nasa hopes the Falcon 9 can help fill the mission gap that will exist while it develops a successor to the shuttle.

That successor - known as Ares/Orion - is not expected to be flying before 2015, leaving a five-year break from shuttle retirement in 2010 during which the Americans would be reliant on international partners for all their ISS transportation needs.

It is anticipated that the Falcon 9 will make its maiden flight in the coming months - certainly by the first quarter of 2009. Initially, it will just loft satellites, including the British-built-and-operated Hylas broadband and TV spacecraft.

But SpaceX wants to be using the vehicle to launch its Dragon capsule very soon afterwards. The capsule is being designed to carry both supplies and people to the space station.

The latest testing saw the first nine-engined firing of the Falcon 9's first stage (it will have two stages, both of which will be reusable). Firings were completed on Thursday and Friday, at the Texas Test Facility outside McGregor.

SpaceX said the engines, at full power, consumed 1,500kg (3,200lbs) of fuel and liquid oxygen per second, and generated a thrust of 3,700 kiloNewtons (832,000lbf) - four times the maximum thrust of a 747 aircraft.

California-based SpaceX and Virginia-based Orbital Sciences Corporation have both received development money from Nasa under its Commercial Orbital Transportation Services (COTS) competition.

The agency wants to see the "market" take over many of the low-Earth orbit transportation roles traditionally done "in house" at Nasa; and the hope is that the commercial sector can service the space station at a lower cost than has been the case to date.

This would leave the US space agency free to concentrate its technology - and more of its resources - on activities further afield, going to the Moon and to Mars.

In its "heavy" configuration, Falcon 9 will have the capacity to take about 30 tonnes of payload into low-Earth orbit - comparable to what the shuttle is able to achieve now.

SpaceX is about to launch its smaller Falcon 1 rocket in the coming days.

The company is led by the internet billionaire Elon Musk.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7538700.stm

Published: 2008/08/02 14:32:49 GMT

China's 'rapid renewables surge'

By Mark Kinver
Science and nature reporter, BBC News

China's rapid investment in low carbon technologies has catapulted the nation up the global renewable energy rankings, a report shows.

The Climate Group study said China invested $12bn (£6bn) in renewables during 2007, second only to Germany.

However, it was expected to top the table by the end of 2009, it added.

The findings have been published as China faces criticism over its air quality ahead of the Beijing Olympic Games, which begin on 8 August.

The report, China's Clean Revolution, brings together the latest data on the country's burgeoning renewables sector in one publication.

Co-author Changhua Wu, The Climate Group's China director, said the rapid rise in investment was, in part, the result of the government realising that the western model of industrialisation was unsustainable.

"China has been experiencing similar problems during its industrial revolution that western nations saw during their period of rapid growth - pollution, environmental damage and resource depletion," she told BBC News.

"Domestically, we are being constrained in many ways; we do not have that many natural resources anymore.

"We have to rely on the international markets, so there is a big security concern there."

Uncertainty over future energy supplies has seen global fuel prices reach record levels, which has resulted in renewable technologies becoming a more attractive option.

The report said China's $12bn investment in renewables during 2007 was only just behind top-of-the-table Germany, which spent $14bn.

In order to meet its target of increasing the percentage of energy from low carbon technologies from 8% in 2006 to 15% by 2020, China is expected to invest an average of $33bn annually for the next 12 years.

This was going to result in China becoming the leading investor by the end of 2009, Ms Wu forecast.

Figures within the report showed that China was already the leading producer in terms of installed renewable generation capacity.

It has the world's largest hydroelectricity capacity since the controversial Three Gorges project began producing electricity, and the fifth largest fleet of wind turbines on the planet.

Although its installed capacity of photovoltaic (PV) panels is still relatively low, it is already a leading manufacturer of solar panels.

Ms Wu explained that the rapid growth of the sector was being driven by both government and business.

"In order to really drive towards a low carbon economy, policy incentives are crucial; but it is not always the case," she said.

"The wind sector's fast growth was mainly a result of domestic policies, because the government offered incentives to developments so that private and public sector entrepreneurs would jump on it.

"But the solar PV sector benefitted mainly from the international market, such as demand from the US and EU.

"Even today, the policy incentives are still not there, yet it still has grown to the level it is now."

Lingering legacy

However, despite the advances in low carbon technology, the legacy of rapid economic growth, which was primarily fuelled by burning coal, has been soaring greenhouse gas emissions.

In the final days before the opening ceremony of the Olympic Games in Beijing, there has been growing international concern over the air quality in the Chinese capital as the world's top athletes begin to arrive.

Organisers of the Games had promised that the city's notorious pollution would be cleaned up, so failure to deliver would be seen as an embarrassing environmental shortcoming.

City officials said that they would introduce emergency measures, such as banning the use of private cars and closing some factories, if conditions did not improve.

Although Beijing's troubles are currently under the media spotlight, air quality is a nationwide problem. According to figures from the World Bank, 20 of the planet's 30 most polluted cities are in China.

"In terms of total emissions, China is already the world's biggest emitter," Ms Wu said. "That's publicly available information, even the government is not denying it anymore.

"But if you look at emissions on a per capita basis, we are not the biggest emitters because we have 1.3bn people."

The report suggests that if China's population emitted as much as US citizens, its total emissions would be roughly equivalent to those of the entire planet's human activity.

"But just looking at numbers does not help tackle global climate change," Ms Wu added.

"In China, we are concerned about the speed of growth in emissions; it is really scary."

The report showed that China was only responsible for about 7% of greenhouse gases emitted in the period before 2002, when more than 90% of emissions from human activity were released.

But since the turn of the century, it added, China's portion has been growing steadily and now accounts for 24% of the global total.

The government is looking to stabilise its emissions by 2020, primarily through greater energy efficiency and the expansion of the nation's renewable energy infrastructure, including electric cars.

Ms Wu added that within the international climate negotiations, the Chinese were looking to developed nations to prove that they were serious about tackling climate change, such as delivering the mandatory cuts in emissions outlined in the Kyoto Protocol.

"If they are not able to do it with the technology available to them, then is it reasonable to expect China and India to do it?

"China does not commit itself to a number and then not deliver," she said, referring to whether China would sign up to legally binding targets in the ongoing UN climate negotiations about what system should replace the current Kyoto Protocol when it expires in 2012.

"If they commit, then they are very, very serious about; so they have to figure out what is possible."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7535839.stm

Published: 2008/08/01 09:33:30 GMT

http://news.bbc.co.uk/2/hi/science/nature/7535839.stm

Study revives six degrees theory

A US study of instant messaging suggests the theory that it takes only six steps to link everyone may be right - though seven seems more accurate.

Microsoft researchers studied the addresses of 30bn instant messages sent during a single month in 2006.

Any two people on average are linked by seven or fewer acquaintances, they say.

The theory of six degrees of separation has long captured people's imagination - notably inspiring a popular 1993 film - but had recently seemed discredited.

One of the researchers on the Microsoft Messenger project, Eric Horvitz, said he had been shocked by the results. "What we're seeing suggests there may be a social connectivity constant for humanity," he was quoted as saying by the Washington Post newspaper.

"People have had this suspicion that we are really close. But we are showing on a very large scale that this idea goes beyond folklore."

Urban myth?

The database used by Mr Horvitz and his colleague Jure Leskovec covered all of the Microsoft Messenger instant-messaging network, or roughly half of the world's instant-messaging traffic, in June 2006.

For the purposes of the study, two people were considered to be acquaintances if they had sent one another an instant message.

Examining the minimum chain lengths it would take to connect all the users in the database, they found the average length was 6.6 steps and that 78% of the pairs could be connected in seven links or fewer.

The idea of six degrees of separation was conceived by US academic Stanley Milgram, after experiments in which he asked people to pass a letter only to others they knew by name.

The aim was to get it, eventually, to a named person they did not know living in another city.

The average number of times it was passed on, he said, was six - hence, the six degrees of separation.

However, in July 2006, Judith Kleinfeld, professor of psychology at Alaska Fairbanks University, went back to Milgram's original research notes and discovered that 95% of the letters sent out had failed to reach their target.

She suggested that the six degrees theory might be the academic equivalent of an urban myth.

The Microsoft researchers said that, to their knowledge, their study had for the first time validated Milgram's theory on a planetary scale.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7539329.stm

Published: 2008/08/03 08:53:45 GMT

Low-gravity Training Machine Reduces Joint, Muscle Impacts, Says Study

A new CU-Boulder study of a space-age, low-gravity training machine led by Associate Professor Rodger Kram, (pictured here) shows the machine significantly reduced impacts on muscles and joints of study subjects. (Credit: Image courtesy of University of Colorado at Boulder)

ScienceDaily (Aug. 4, 2008) — A new CU-Boulder study of a space-age, low-gravity training machine led by Associate Professor Rodger Kram, shows the machine significantly reduced impacts on muscles and joints of study subjects.

A University of Colorado at Boulder study of a space-age, low-gravity training machine used by several 2008 Olympic runners showed it reduced impacts on muscles and joints by nearly half when subjects ran at the equivalent of 50 percent of their body weight.

The new study has implications for both competitive runners rehabilitating from injuries and for ordinary people returning from knee and hip surgeries, according to Associate Professor Rodger Kram of CU-Boulder's integrative physiology department.

Known as the "G-Trainer," the machine consists of a treadmill surrounded by an inflatable plastic chamber that encases the lower body of the runner, said Kram. Air pumped into the chamber increases the pressure and effectively reduces the weight of runners, who are sealed in the machine at the waist in a donut-shaped device with a special zipper and "literally lifted up by their padded neoprene shorts," he said.

Published in the August issue of the Journal of Applied Biomechanics, the study is the first to quantify the effects of running in the G-Trainer, built by Alter-G Inc. of Menlo Park, Calif., using technology developed at NASA's Ames Research Center in California. The paper was authored by Kram and former CU-Boulder doctoral student Alena Grabowski, now a postdoctoral researcher at the Massachusetts Institute of Technology.

Although G-Trainers have been used in some sports clinics and college and professional sports training rooms since 2006, the new study is the first scientific analysis of the device as a training tool for running, said Grabowski.

"The idea was to measure which levels of weight support and speeds give us the best combination of aerobic workout while reducing the impact on joints," said Kram. "We showed that a person can run faster in the G-Trainer at a lower weight and still get substantial aerobic benefits while maintaining good neuromuscular coordination."The results indicated a subject running at the equivalent of half their weight in the G-Trainer at about 10 feet per second, for example -- the equivalent of a seven-minute mile -- decreased the "peak" force resulting from heel impact by 44 percent, said Grabowski. That is important, she said, because each foot impact at high speed can jar the body with a force equal to twice a runner's weight.

Several former CU track athletes participating in the 2008 Olympics in Beijing have used the machine, said Kram. Alumna Kara Goucher, who will be running the 5,000- and 10,000-meter races in Beijing, has used the one in Kram's CU-Boulder lab and one in Eugene, Ore., for rehabilitation, and former CU All-American and Olympic marathoner Dathan Ritzenhein also uses a G-Trainer in his home in Oregon. Other current CU track athletes who have been injured have tried the machine in Kram's lab and found it helpful to maintain their fitness as they recovered, Kram said.

For the study, the researchers retrofitted the G-Trainer with a force-measuring treadmill invented by Kram's team that charts vertical and horizontal stress load on each foot during locomotion, measuring the variation of biomechanical forces on the legs during running. Ten subjects each ran at three different speeds at various reduced weights, with each run lasting seven minutes. The researchers also measured oxygen consumption during each test, Kram said.Grabowski likened the effect of the G-Trainer on a runner to pressurized air pushing on the cork of a bottle. "If you can decrease the intensity of these peak forces during running, then you probably will decrease the risk of injury to the runner."

The G-Trainer is a spinoff of technology originally developed by Rob Whalen, who conceived the idea while working at NASA Ames as a National Research Council fellow to help astronauts maintain fitness during prolonged space flight. While the NASA technology was designed to effectively increase the weight of the astronauts to stem muscle atrophy and bone loss in low-gravity conditions, the G-Trainer reverses the process, said Grabowski.

In the past, sports trainers and researchers have used climbing harnesses over treadmills or flotation devices in deep-water swimming pools to help support the weight of subjects, said Kram. Harnesses are cumbersome, while pool exercises don't provide sufficient aerobic stimulation and biomechanical loading on the legs, he said.

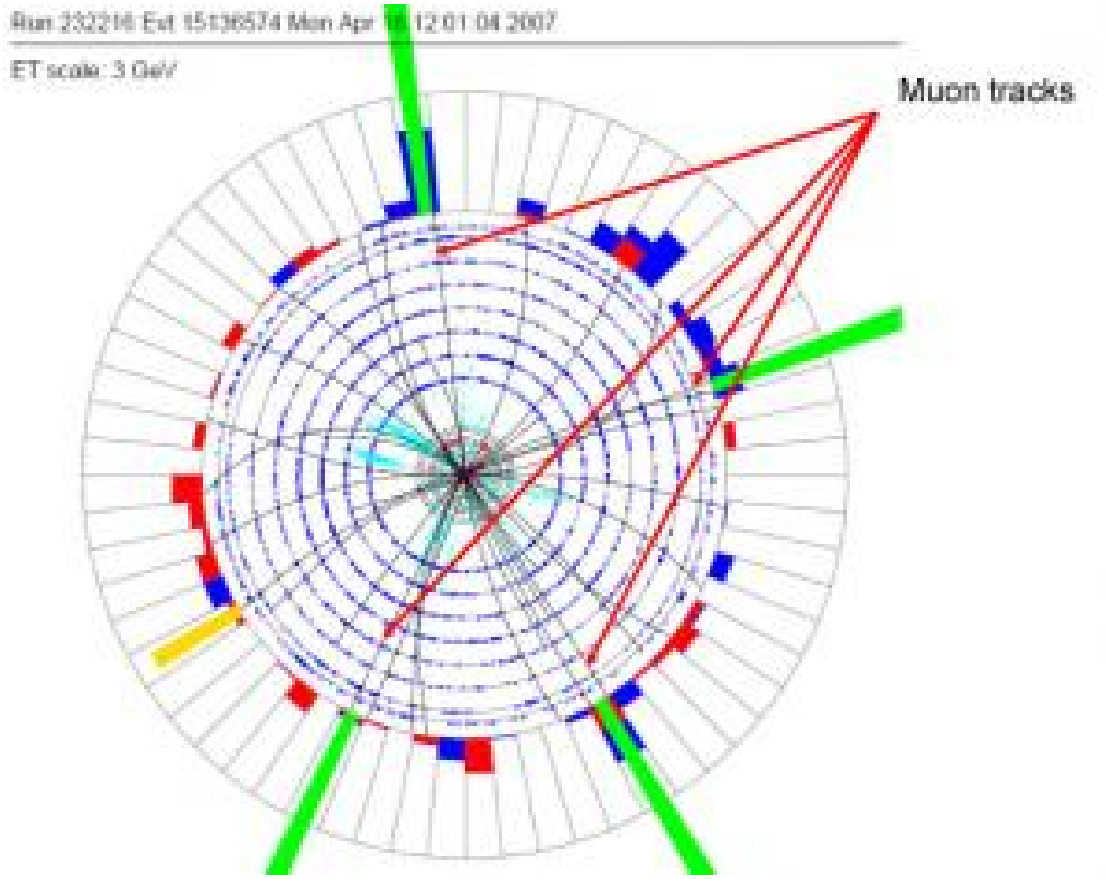
Marathon world-record holder Paula Radcliffe of Great Britain is currently using a G-Trainer in her high-altitude training base in Font-Remeu, France. Radcliffe is trying to stay in top running shape while recovering from a stress fracture in her femur in time for the 2008 Olympic women's marathon on Aug. 17, according to the London Telegraph.

Kram and Grabowski have begun a follow-up study of walking using the G-Trainer. By studying subjects walking at various weights and speeds in the machine, the researchers should be able to quantify its effectiveness as a rehabilitation device for people recovering from surgeries, stress fractures and other lower body injuries, Kram said.

Adapted from materials provided by University of Colorado at Boulder.

http://www.sciencedaily.com:80/releases/2008/07/080730140934.htm

Prelude To The Higgs: A Work For 2 Bosons In The Key Of Z



One of the three ZZ events recorded by the DZero experiment at Fermilab: Each Z boson decayed into a pair of high-energy muons, yielding four muon tracks in the DZero detector. The green bars indicate the direction associated with each muon. (Credit: Image courtesy of DOE/Fermi National Accelerator Laboratory)

ScienceDaily (Aug. 4, 2008) — Scientists of the DZero collaboration at the US Department of Energy's Fermilab have announced the observation of pairs of Z bosons, force-carrying particles produced in proton-antiproton collisions at the Tevatron, the world's highest-energy particle accelerator.

The properties of the ZZ diboson make its discovery an essential prelude to finding or excluding the Higgs boson at the Tevatron.

The observation of the ZZ, announced at a Fermilab seminar on July 25, connects to the search for the Higgs boson in several ways. The process of producing the ZZ is very rare and hence difficult to detect. The rarest diboson processes after ZZ are those involving the Higgs boson, so seeing ZZ is an essential step in demonstrating the ability of the experimenters to see the Higgs.

The signature for pairs of Z bosons can also mimic the Higgs signature for large values of the Higgs mass. For lower Higgs masses, the production of a Z boson and a Higgs boson together, a ZH, makes a major contribution to Higgs search sensitivity, and the ZZ shares important characteristics and signatures with ZH.

The ZZ is the latest in a series of observations of pairs of the so-called gauge bosons, or force-carrying particles, by DZero and its sister Tevatron experiment, CDF. The series began with the study of the

already rare production of W bosons plus photons; then Z bosons plus photons; then observation of W pairs; then WZ. The ZZ is the most massive combination and has the lowest predicted likelihood of production in the Standard Model. Earlier this year, CDF found evidence for ZZ production; the DZero results presented on Friday for the first time showed sufficient significance, well above five standard deviations, to rank as a discovery of ZZ production.

"Final analysis of the data for this discovery was done by a thoroughly international team of researchers including scientists of American, Belgian, British, Georgian, Italian and Russian nationalities," said DZero cospokesperson Darien Wood. "They worked closely and productively together to achieve this challenging and exciting experimental result."

DZero searched for ZZ production in nearly 200 trillion proton-antiproton collisions delivered by the Tevatron. Scientists used two analyses that look for Z decays into different combinations of secondary particles. One analysis looked for one Z decaying into electrons or muons, the other decaying into "invisible" neutrinos. The neutrino signature is challenging experimentally, but worthwhile because it is more plentiful. In the even rarer mode, both Z bosons decay to either electrons or muons. Just three events were observed in this mode, but the signature is remarkably distinctive, with an expected background of only two tenths of one event.

Adapted from materials provided by DOE/Fermi National Accelerator Laboratory.

http://www.sciencedaily.com/releases/2008/07/080730140841.htm

Giant Grass Miscanthus Can Meet US Biofuels Goal Using Less Land Than Corn Or Switchgrass

Using the grass Miscanthus x giganteus as a feedstock for ethanol production would significantly reduce the amount of farmland needed for biofuels, said U. of I. crop sciences professor Stephen P. Long. (Credit: Photo by Don Hamerman)

ScienceDaily (Aug. 4, 2008) — In the largest field trial of its kind in the United States, researchers have determined that the giant perennial grass Miscanthus x giganteus outperforms current biofuels sources – by a lot.Using Miscanthus as a feedstock for ethanol production in the U.S. could significantly reduce the acreage dedicated to biofuels while meeting government biofuels production goals, the researchers report.

Using corn or switchgrass to produce enough ethanol to offset 20 percent of gasoline use – a current White House goal – would take 25 percent of current U.S. cropland out of food production, the researchers report. Getting the same amount of ethanol from Miscanthus would require only 9.3 percent of current agricultural acreage. (View a narrated slideshow about Miscanthus research.)

The new findings, from researchers at the University of Illinois, appear this month in the journal Global Change Biology.“What we’ve found with Miscanthus is that the amount of biomass generated each year would allow us to produce about 2 1/2 times the amount of ethanol we can produce per acre of corn,” said crop sciences professor Stephen P. Long, who led the study. Long is the deputy director of the BP-sponsored Energy Biosciences Institute, a multi-year, multi-institutional initiative aimed at finding low-carbon or carbon-neutral alternatives to petroleum-based fuels. Long is an affiliate of the U. of I.’s Institute for Genomic Biology. He also is the editor of Global Change Biology.

In trials across Illinois, switchgrass, a perennial grass which, like Miscanthus, requires fewer chemical and mechanical inputs than corn, produced only about as much ethanol feedstock per acre as corn, Long said.

"It wasn't that we didn't know how to grow switchgrass because the yields we obtained were actually equal to the best yields that had been obtained elsewhere with switchgrass," he said. Corn yields in Illinois are also among the best in the nation.

"One reason why Miscanthus yields more biomass than corn is that it produces green leaves about six weeks earlier in the growing season," Long said. Miscanthus also stays green until late October in Illinois, while corn leaves wither at the end of August, he said.The growing season for switchgrass is comparable to that of Miscanthus, but it is not nearly as efficient at converting sunlight to biomass as Miscanthus, Frank Dohleman, a graduate student and co-author on the study, found.

"One of the criticisms of using any biomass as a biofuel source is it has been claimed that plants are not very efficient – about 0.1 percent efficiency of conversion of sunlight into biomass," Long said. "What we show here is on average Miscanthus is in fact about 1 percent efficient, so about 1 percent of sunlight ends up as biomass.""Keep in mind that when we consider our energy use, a few hours of solar energy falling on the earth are equal to all the energy that people use over a whole year, so you don't really need that high an efficiency to be able to capture that in plant material and make use of it as a biofuel source," he said.

Field trials also showed that Miscanthus is tolerant of poor soil quality, Long said."Our highest productivity is actually occurring in the south, on the poorest soils in the state," he said. "So that also shows us that this type of crop may be very good for marginal land or land that is not even being used for crop production."Because Miscanthus is a perennial grass, it also accumulates much more carbon in the soil than an annual crop such as corn or soybeans, Long said.

"In the context of global change, that's important because it means that by producing a biofuel on that land you're taking carbon out of the atmosphere and putting it into the soil."Researchers at Illinois are exploring all aspects of biofuels production, from the development of feedstocks such as Miscanthus, to planting, harvest, storage, transport, conversion to biofuels and carbon sequestration.

Using Miscanthus in an agricultural setting has not been without its challenges, Long said. Because it is a sterile hybrid, it must be propagated by planting underground stems, called rhizomes. This was initially a laborious process, Long said, but mechanization allows the team to plant about 15 acres a day. In Europe, where Miscanthus has been grown for more than a decade, patented farm equipment can plant about 50 acres of Miscanthus rhizomes a day, he said.Once established, Miscanthus returns annually without need for replanting. If harvested in December or January, after nutrients have returned to the soil, it requires little fertilizer.

This sterile form of Miscanthus has not been found to be invasive in Europe or the U.S., Long said.

There are at least a dozen companies building or operating plants in the U.S. to produce ethanol from lignocellulosic feedstocks, the non-edible parts of plants, and companies are propagating Miscanthus rhizomes for commercial sale, Long said.

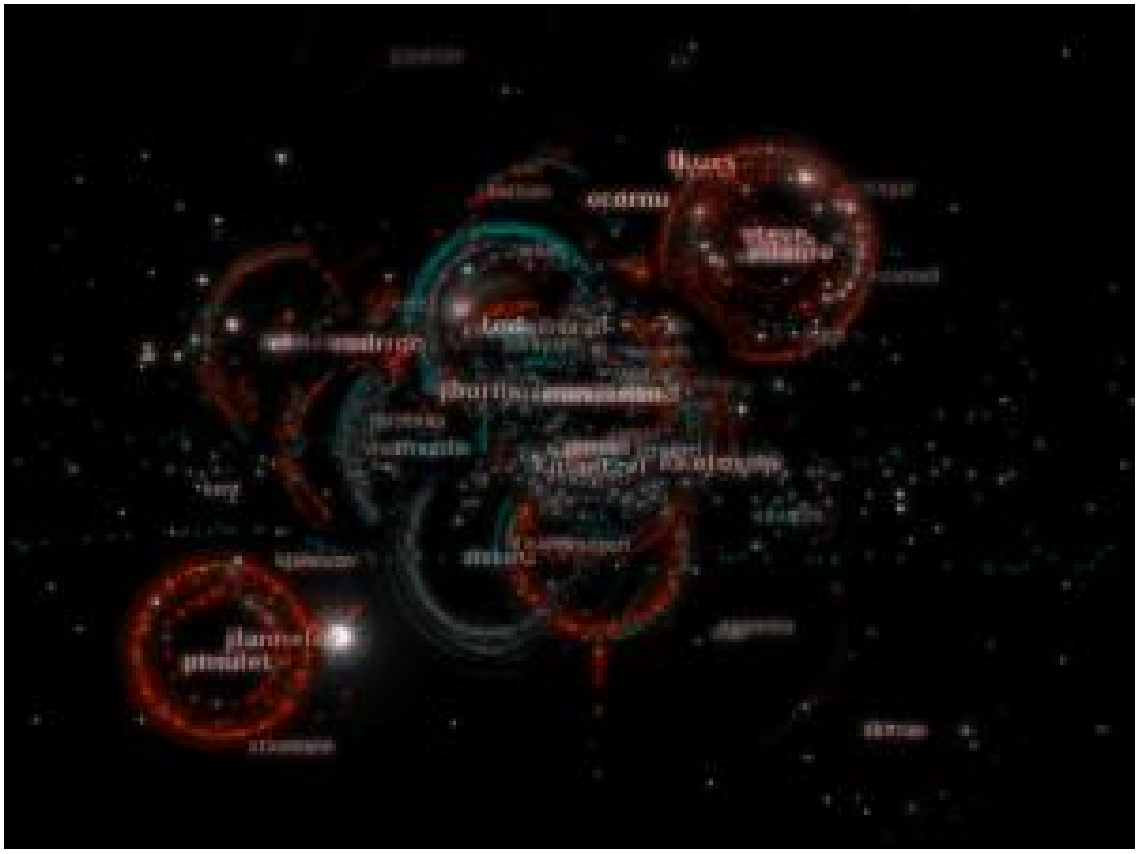
Although research has led to improvements in productivity and growers are poised to begin using it as a biofuels crop on a large scale, Miscanthus is in its infancy as an agricultural product, Long said.

"Keep in mind that this Miscanthus is completely unimproved, so if we were to do the sorts of things that we've managed to do with corn, where we've increased its yield threefold over the last 50 years, then it's not unreal to think that we could use even less than 10 percent of the available agricultural land," Long said. "And if you can actually grow it on non-cropland that would be even better."

Adapted from materials provided by University of Illinois at Urbana-Champaign.

http://www.sciencedaily.com/releases/2008/07/080730155344.htm

Visualizing Open Source Software Development



A moment from the Eclipse project. (Credit: Image courtesy of VIDI group / University of California - Davis)

ScienceDaily (Aug. 4, 2008) — A UC Davis graduate student has created short, colorful movies that show the development of open source software. With dancing points of light, rings of color and a soundtrack, the Code_swarm animations show how software such as the Python scripting language and the Apache Web server have developed from the contributions of different programmers.

Inspired by music videos, the objective of Code_swarm is to create an engaging visual representation of computer software accessible to anyone, said Michael Ogawa, who created the movies in the laboratory of Professor Kwan-Liu Ma at the UC Davis Department of Computer Science.

Computer software projects are among the most complex artifacts ever created by humans. Some of the most complex are "open source" programs that are created by a floating group of volunteers developing and making changes to different parts of the code.

In Ogawa's videos, the names of those developers float across the screen and fade away if they stop contributing. Colored dots, representing new files, appear in random locations and fly toward the developer working on them, forming rings around the names. Developers working on the same or related files hover together; the names of those working on different parts of the software are farther apart.

"The viewer gets an impression of the dynamics of the project: Who the big players are, whether they work on the same or separate files and the scale of the project in time and space," Ogawa said.

The animations show that there is no single, signature way to create open source software, Ogawa said. Some projects are the work of a single person for long stretches of time, some are guided by a small group and others are regularly worked on by a large group.

Ogawa calls Code_swarm an example of "organic information visualization," which turns data into a living, breathing system. He chose music videos as a model for the final product because they are short, dynamic and interesting, in contrast with most academic videos, he said.

The Code_swarm software itself is now open source, hosted by Google Code. Examples of the videos can be found at http://vis.cs.ucdavis.edu/~ogawa/codeswarm/.

Adapted from materials provided by University of California - Davis.

http://www.sciencedaily.com/releases/2008/07/080731140235.htm

Emerging Scientific Discipline Of Aeroecology

ScienceDaily (Aug. 3, 2008) — Aeroecology is the emerging discipline for studying how airborne organisms -- birds, bats, arthropods and microbes -- depend on the support of the lower atmosphere that is closest to the Earth's surface. Called the aerosphere, it influences the daily and seasonal movements, development traits, such as size and shape, and evolution of behavioral, sensory, metabolic and respiratory functions of airborne organisms. Understanding how they respond to altered landscapes and atmospheric conditions can also help mitigate adverse effects.

In the history of science and technology, there is an infrequent combination of empirical discoveries, theories and technology developments converge that make it possible to recognize a new discipline. Past examples include marine biology, biomechanics and astrobiology with more recent developments of nanotechnology and bioinformatics – all disciplines that are now well established in the lexicon of modern science and technology.Kunz, who is best known for his extensive research on bats, explained that aeroecology embraces and integrates the domains of atmospheric science, earth science, geography, ecology, computer science, computational biology, and engineering.

The unifying concept that underlies aeroecology is its focus on the planetary boundary layer of the Earth's atmosphere, or aerosphere, which supports the myriad of airborne organisms that, in large part, depend upon this natural environment for their existence. Organisms that use the aerosphere, specifically arthropods, birds and bats, are also influenced by an increasing number of anthropogenic or man-made conditions and structures, notably lighted towns and cities, air pollution, skyscrapers, aircraft, radio and television towers, plus a recent proliferation of communication towers and wind turbines that dot the Earth's landscape.In addition, human-altered landscapes increasing are characterized by deforestation, intensive agriculture, urbanization, and assorted industrial activities that are rapidly and irreversibly transforming the quantity and quality of available terrestrial and aquatic habitats which airborne organisms rely upon. These conditions are known to influence navigational cues, sources of food, water, nesting and roosting habitats--factors that can, in turn, alter the structure and function of terrestrial and aquatic ecosystems and the assemblages of organisms.Similarly, "climate change and its expected increase in global temperatures, altered circulation of air masses, and effects on local and regional weather patterns are expected to have profound impacts on the foraging and migratory behavior of insects, birds and bats," noted Kunz."In contrast to organisms that depend strictly on terrestrial or aquatic existence, those that routinely use the aerosphere are almost immediately influenced by changing atmospheric conditions (e.g. winds, air density, precipitation, air temperature) sunlight, polarized light, moonlight and geomagnetic and gravitational forces," the report states.Ecologists who study animals that use the aerosphere face three important challenges:to discover best methods for detecting the presence, taxonomic identity, diversity, and activity of organisms that use this aerial environment,to identify ways to integrate relevant environmental variables at different temporal and spatial scales, andto determine how best to understand and interpret behavioral, ecological, and evolutionary responses of organisms in the context of complex meteorological conditions and patterns within both natural and anthropogenically-altered environments."Appropriate integration of diverse tools and concepts for probing into the lives of organisms aloft can help inform important ecological and evolutionary concepts and management decisions associated with the spread of invasive species, emergence of infectious diseases, altered biodiversity, and sustainability of terrestrial, aquatic, and aerospheric environments," said Kunz.

Journal reference:

1. Kunz et al. **Aeroecology: probing and modeling the aerosphere**. *Integrative and Comparative Biology*, 2007; 48 (1): 1 DOI: 10.1093/icb/icn037

Adapted from materials provided by Boston University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/08/080801094258.htm

Mother Earth Naked: A Modern Masterpiece

Geology of South America on the globe. (Credit: Image courtesy of OneGeology)

ScienceDaily (Aug. 3, 2008) — Have you ever wondered what our world would look like stripped bare of all plants, soils, water and man-made structures? Well wonder no longer; images of the Earth as never seen before have been unveiled in what is the world's biggest geological mapping project ever.

Earth and computer scientists from 79 nations are working together on a global project called OneGeology to produce the first digital geological map of the world. This project is doing the same for the rocks beneath our feet that Google does for maps of the Earth's surface. These scientists have achieved their goal in just over one year after initiating this global project. For a science that usually counts time in millions of years, this is no mean feat!

OneGeology is supported by UNESCO and six other international umbrella bodies and is the flagship project for UN International Year of Planet Earth 2008. The key results of this project are:

1. Geological maps from around the globe are accessible on the World Wide Web;
2. A new web language has been written for geology which allows nations to share data with each other and the public;
3. The know-how to do this is being exchanged so that all nations across the world, regardless of their development status, can take part and benefit.

Explaining the significance of this project, Ian Jackson, Chief of Operations at the British Geological Survey, who is coordinating OneGeology explained: "Geological maps are essential tools in finding natural resources e.g. water, hydrocarbons and minerals, and when planning to mitigate geohazards e.g. earthquakes, volcanoes and radon. Natural resources are a crucial source of wealth for all nations,

especially those that need to develop and build their economies. Identifying geohazards is often a matter of life or death. Other challenges facing all nations in the 21st century include rising sea levels, management of waste (nuclear or domestic) and storage of carbon. Knowledge of the rocks that we all live on has become increasingly important and sharing that knowledge at a time of global environmental change is crucial".

François Robida, Deputy Head of Division, Information Systems and Technologies at the Bureau de Recherches Géologiques et Minières, France, explained; "Today you can go to the OneGeology website and get geological maps from across the globe — from an overview of our entire planet, to larger scale maps of the rocks of individual nations. You also have the ability to hop from this web site to higher resolution applied maps and data on linked national web sites. Participating nations are contributing to a legacy for humankind; by acting locally they are thinking globally".

Unfortunately information about the Earth's rocks isn't always up-to-date, joined-up, and in some parts of the world is not available at all! This was the challenge that OneGeology project set out to tackle and these scientists will be unveiling the the result of their work at the 33rd International Geological Congress in Oslo, Norway on 6 August 2008.

On the web: http://www.onegeology.org/

Adapted from materials provided by British Geological Survey, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/07/080731073557.htm

Superfluid-superconductor Relationship Is Detailed

ScienceDaily (Aug. 3, 2008) — Scientists have studied superconductors and superfluids for decades. Now, researchers at Washington University in St. Louis have drawn the first detailed picture of the way a superfluid influences the behavior of a superconductor. In addition to describing previously unknown superconductor behavior, these calculations could change scientists' understanding of the motion of neutron stars.

A neutron star, the high-density remnant of a former massive star, is thought to contain both a neutron superfluid and a proton superconductor at its core. Despite widespread agreement that neutron stars contain both materials, superfluid-superconductors have not been widely studied.

"Not many people have thought seriously about the interactions between a superfluid and a superconductor that are co-existing like this," said Mark Alford, associate professor of physics and lead author of the paper published in the July issue of Physical Review B, "They tended to treat the two components separately."

Super Phenomena

Separately, the two phenomena are well understood. A superconductor allows a flow of current without resistance. Similarly, a superfluid flows without friction. Unlike superconductors and superfluids, a superfluid-superconductor does not exist on earth. But, understanding its hybrid behavior may be a first step toward creating one in the lab and understanding what goes on inside neutron stars.

In addition to conducting current without resistance, superconductors also exclude magnetic fields. Neutron stars have massive magnetic fields, but scientists do not know how a superconductor behaves in the presence of this field, specifically whether it will be a type I or type II superconductor. A type I superconductor forces a magnetic field around its exterior. A type II superconductor, however, strikes a compromise, letting the magnetic field pass through tiny non-superconducting holes called flux tubes. Type II superconductors permit one unit of magnetic field per flux tube.

Whether a superconductor is type I or type II depends on a value called kappa. If kappa is greater than a set critical value, the superconductor is type II. Likewise, if kappa is less than the critical value, the superconductor is type I. Add a superfluid, however, and these calculations show that the superconductor's boundary shifts, changing the critical value of kappa and causing exotic behavior at the boundary.

Living on the Edge

Ariel Zhitnitsky at the University of British Columbia was the first to report this boundary shift. Curiosity piqued by the shift, Alford and his collaborator, graduate student Gerald Good, decided to take a closer look at the boundary.

"We found that the boundary wasn't just shifted, but new behavior appeared when the superconductor is on the edge, between type I and type II," said Alford. Since superconductors and superfluids are older physics, Alford added, "We were surprised that there was anything new to mine here."

To understand the boundary shift, Alford and Good examined two interactions between the superfluid and superconductor. The first had a superconductor either attracting or repelling a superfluid. The second had a flowing superconductor causing a superfluid to flow either with it or against it.

Exotic Behavior at the Shifted Boundary

Alford and Good found that the two superconductor-superfluid interactions (attractive/repulsive and flow) had opposite effects on the boundary shift and produced different, but equally exotic, boundary behavior.

The attractive/repulsive interaction increased kappa, favoring a type I superconductor and creating intermediate type II states near the boundary. These intermediate states resemble type II because they have flux tubes; but strangely, more than one unit of magnetic field appears to exist in each. Depending on the parameters, an infinite number of intermediate type II states exist, with any number of magnetic field units in each flux tube.

Unlike the attractive/repulsive interaction, the flow interaction decreased kappa, favoring a type II superconductor. Instead of intermediate type II states, the flow interaction creates meta-stable regions on either side of the boundary. Specifically, in these regions a superconductor that should be type II can get stuck as type I and vice versa. A familiar example of similar behavior is when, under the right conditions, water remains a liquid despite freezing temperatures.

Passing the Baton

Just as Zhitnitsky's work inspired Alford and Good to look closer at the type I/type II boundary, this work has already spurred others in new directions. A group at Dartmouth College is confirming some behavior seen by Alford and Good, but the Dartmouth results favor a different scenario for the intermediate type II phases (unpublished).

The Dartmouth group is not seeing multiple units of magnetic field in one flux tube, but flux tubes that are a fixed distance apart (with one unit of magnetic field each). These flux tubes tend to "stick together" rather than spread out as far as possible, as in normal type II superconductors. Alford and Good said they could not rule out this possibility due to limitations in the simplified model and in computing capacity.

"The Dartmouth group is seeing similar intermediate phases," said Good, "but slightly different behavior. That's the next step in our research and it's already being done, which is pretty neat."

Adapted from materials provided by Washington University in St. Louis, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/08/080801153127.htm

Free Academic Articles Get Read But Don't Generate More Citations

ScienceDaily (Aug. 3, 2008) — When academic articles are "open access" or free online, they get read more often, but they don't -- going against conventional wisdom -- get cited more often in academic literature, finds a new Cornell study.

The reason, suggest Cornell graduate student Philip Davis and colleagues, including three Cornell professors, is that most researchers probably already have all the access they need to relevant articles.

"It appears that higher quality articles -- in other words, more citable articles -- are simply made freely available," said Davis. "Previous studies using different methods simply got cause and effect reversed." The study is published online in the British Medical Journal and will be published in the print edition Aug. 9.

The findings are particularly relevant to academic researchers, because the frequency with which a researcher's work is cited can be a factor in tenure and promotion decisions.

The researchers conducted the first controlled study of open-access publishing, randomly making some journal articles freely available while keeping others available by subscription only, to determine whether increased access to journal articles results in more article downloads and citations.

They found that in the year after the articles were published, open-access articles were downloaded more but were no more likely to be cited than subscription-based articles.

"The established dogma is that freely available scientific articles are cited more because they are read more," said Davis, a former science librarian who designed the study. "We found that open-access publishing may reach more readers than subscription-access publishing, but there is no evidence that freely accessible articles are cited any more than subscription-access articles."

The researchers randomly assigned 247 articles in 11 scientific journals, to free access. They measured how many times these articles were downloaded, the number of unique visitors to each article and how many times each article was cited.

"There were definitely more article downloads for freely accessible articles," said Davis. "Yet nearly half of these downloads were by Internet indexing robots like Google, crawling the Web for free content."

"There are many reasons to provide free access to the literature," said Davis. "A citation advantage, however, is not one of them."

Other co-authors are Bruce V. Lewenstein, professor of communication; Daniel H. Simon, assistant professor of economics; James G. Booth, professor of statistics; and Matthew J.L. Connolly, programmer and analyst, all at Cornell. The research was funded by the Andrew W. Mellon Foundation.

Adapted from materials provided by Cornell University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080731173203.htm

How Some Bacteria May Steal Iron From Their Human Hosts

ScienceDaily (Aug. 2, 2008) — Like their human hosts, bacteria need iron to survive and they must obtain that iron from the environment. While humans obtain iron primarily through the food they eat, bacteria have evolved complex and diverse mechanisms to allow them access to iron.A Syracuse University research team led by Robert Doyle, assistant professor of chemistry in The College of Arts and Sciences, discovered that some bacteria are equipped with a gene that enables them to harvest iron from their environment or human host in a unique and energy efficient manner. Doyle's discovery could provide researchers with new ways to target such diseases as tuberculosis.

The research will be published in the August issue (volume 190, issue 16) of the Journal of Bacteriology, published by the American Society for Microbiology."Iron is the single most important micronutrient bacteria need to survive," Doyle says. "Understanding how these bacteria thrive within us is a critical element of learning how to defeat them."

Doyle's research group studied Streptomyces coelicolor, a Gram-positive bacteria that is closely related to the bacteria that causes tuberculosis. Streptomyces is abundant in soil and in decaying vegetation, but does not affect humans. The TB bacteria and Streptomyces are both part of a family of bacteria called Actinomycetes. These bacteria have a unique defense mechanism that enables them to produce chemicals to destroy their enemies. Some of these chemicals are used to make antibiotics and other drugs.Actinomycetes need lots of iron to wage chemical warfare on its enemies; however, iron is not easily accessible in the environments in which the bacteria live— e.g. human or soil. Some iron available in the soil is bonded to citrate, making a compound called iron-citrate. Citrate is a substance that cells can use as a source of energy. Doyle and his research team wondered if the compound iron-citrate could be a source of iron for the bacteria. In a series of experiments that took place over more than two years, the researchers observed that Streptomyces could ingest iron-citrate, metabolize the iron, and use the citrate as a free source of energy. Other experiments demonstrated that the bacteria ignored citrate when it was not bonded to iron; likewise, the bacteria ignored citrate when it was bonded to other metals, such as magnesium, nickel, and cobalt.The next task was to uncover the mechanism that triggered the bacteria to ingest iron-citrate. Computer modeling predicted that a single Streptomyces gene enabled the bacteria to identify and ingest iron-citrate. The researchers isolated the gene and added it to E. coli bacteria (which is not an Actinomycete bacteria). They found that the mutant E. coli bacteria could also ingest iron-citrate. Without the gene, E. coli could not gain access to the iron.

"It's amazing that the bacteria could learn to extract iron from their environment in this way," Doyle says. "We went into these experiments with no idea that this mechanism existed. But then, bacteria have to be creative to survive in some very hostile environments; and they've had maybe 3.5 billion years to figure it out."The Streptomyces gene enables the bacteria to passively diffuse iron-citrate across the cell membrane, which means that the bacteria do not expend additional energy to ingest the iron. Once in the cell, the bacteria metabolize the iron and, as an added bonus, use the citrate as an energy source. Doyle's team is the first to identify this mechanism in a bacteria belonging to the Actinomycete family. The team plans further experiments to confirm that the gene performs the same signaling function in tuberculosis bacteria. If so, the mechanism could potentially be exploited in the fight against tuberculosis.

"TB bacteria have access to an abundant supply of iron-citrate flowing through the lungs in the blood," Doyle says. "Finding a way to sneak iron from humans at no energy cost to the bacteria is as good as it gets. Our discovery may enable others to figure out a way to limit TB's access to iron-citrate, making the bacteria more vulnerable to drug treatment."

Adapted from materials provided by Syracuse University.

http://www.sciencedaily.com/releases/2008/07/080731140223.htm

Traumatic Response To Bad Memories Can Be Minimized

Researchers have identified the brain mechanism that switches off traumatic feelings associated with bad memories, a finding that could lead to the development of drugs to treat panic disorders. (Credit: iStockphoto/Mauro Scarone Vezzoso)

ScienceDaily (Aug. 2, 2008) — UC Irvine researchers have identified the brain mechanism that switches off traumatic feelings associated with bad memories, a finding that could lead to the development of drugs to treat panic disorders.

Scientists from UCI and the University of Muenster in Germany found that a small brain protein called neuropeptide S is involved in erasing traumatic responses to adverse memories by working on a tiny group of neurons inside the amygdala where those memories are stored.

"The exciting part of this study is that we have discovered a completely new process that regulates the adverse responses to bad memories," said Rainer Reinscheid, pharmacology and pharmaceutical sciences associate professor at UCI. "These findings can help the development of new drugs to treat conditions in which people are haunted by persistent fears, such as posttraumatic stress disorder or other panic disorders." The study appears in the July 31 issue of Neuron.

In tests, scientists exposed mice to situations that caused adverse memories. The scientists saw that when NPS receptors in amygdala neurons are blocked, the traumatic responses to bad memories persisted longer. In turn, when scientists treated the mice with compounds activating these receptors, traumatic responses disappeared faster.

After a traumatic experience, environmental cues often become associated with the bad experience and re-exposure to the same environment can trigger fearful emotions or even panic attacks, according to Reinscheid.

Other research has shown that forgetting such negative experiences may require "new learning," such as re-exposure to the place where the original experience occurred but this time without any harmful consequences. Reinscheid said this process, called the extinction of memories, occurs in both humans and laboratory animals such as mice. Until this study, scientists did not know about the specific neurons and molecules involved with extinction learning of fear memories in the brain.

Previous work by Reinscheid's group has shown that NPS is involved in regulating wakefulness and anxiety. Last year, they found evidence that a particular genetic variant of the NPS receptor may increase vulnerability to panic disorder.

Stewart D. Clark, Naoe Okamura, Dee M. Duangdao, Yan-Ling Xu of UC Irvine, and Kay Juengling, Thomas Seidenbecher, Ludmila Sosulina, Joerg Lesting, Susan Sangha and Hans-Christian Pape of the University of Muenster also worked on this study, which was funded in part by the National Institute of Mental Health.

Adapted from materials provided by University of California - Irvine, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/07/080730140625.htm

Telescope Embedded In Glasses Lens Promises To Make Driving Easier For Visually Impaired

A monocular Keplerian bioptic telescope. (A) Most of the time the wearer views through the carrier lens without any effect of the telescope. (B) With a slight downward tilt of the head, the telescope is brought into the line of sight, enabling a magnified view of the object of interest. The telescope shown is the 3 mini focusable Keplerian bioptic manufactured by Ocutech, Incorporated Chapel Hill, North Carolina. (Credit: Journal of Biomedical Optics 13(3), 034027 (May/June 2008))

ScienceDaily (Aug. 2, 2008) — Glasses embedded with a telescope promise to make it easier for people with impaired vision to drive and do other activities requiring sharper distance vision. Schepens Eye Research Institute scientists describe the advantages of these innovative glasses over earlier devices in an article published in the May/June issue of Journal of Biomedical Optics.

"This new design has several advantages," says the inventor of the glasses, Dr. Eli Peli, who is a senior scientist at Schepens Eye Research Institute, a professor at Harvard Medical School, a low vision expert, and the senior author of the paper. "One major advantage is the appearance of the glasses. Because they look almost like normal everyday spectacles, it is more likely that visually impaired people will use them," says Peli, who adds that the glasses are easier to use than existing telescope models because of a wider magnified view and easier access to that view. Most importantly, shifting the magnified view up leaves the unmagnified view of the road unobstructed, which is important for safety and facilitates navigation.

Tiny telescopes (known as Biotics) mounted on glasses to help people with visual impairments have been in existence for about 60 years. They are permitted for use in driving by 39 states. These telescopes enable a visually impaired driver to read road signs and see other objects essential for safe driving, while also viewing the larger scene in front of the vehicle.

In previous designs, the telescope is mounted through the top of the regular lens or above the frame. In both cases, the telescopic eyepiece is above the wearer's pupil, requiring the driver to tilt his/her head up and down rapidly to view alternatively the magnified and unmagnified scenes. Drivers use the telescope only for a very small fraction of the driving time, looking through the regular spectacle lens most of the time.

While these bioptic telescopes are useful and helpful, many potential users have resisted them because of their strange appearance, and because the magnified view through the telescope is narrow.

In the newer glasses, Peli and his co-inventor Dr. Vargas-Martin from the University of Murcia, Spain, designed a wide-field telescope made of straight and curved mirrors built completely within the spectacle lens,

The Journal of Biomedical Optics article describes the process that Peli and his team went through as they created and tested various prototypes of telescopes leading to the design that would be most effective and comfortable for patients with low vision. They started with a telescope made with mirrors and lenses to prove the image shifting principle. To embed the whole telescope inside the spectacle lens they had to obtain the magnifying power from curved mirrors instead of lenses, as mirrors maintain their power when embedded inside the spectacle lens, while the lenses lose their power when not in the air.

Regular spherical mirrors can not be tilted without loss of focus, so they constructed a version made with tilted parabolic mirrors. The latter worked well and was in focus, but the images were distorted enough due to the parabolic shape to cause a disturbing effect during head movements. The latest design they constructed is based on spherical and flat mirrors with the flat mirrors implemented as tilted beam splitters that use polarization to reduce light loss.

Says Peli, "The short height of the actual magnifier, its position, and inclusion of a small tilt of the last flat mirror (the one closest to the user's eye), enables the wearer to simultaneously view the magnified field above the unmagnified view of the uninterrupted horizontal field.

Not only will the new glasses improve the cosmetics and usefulness of this type of device, the in-the-lens design will make it possible to mass-produce the telescopic magnifier as a standard spectacle lens blank and allow an individual's prescription to be added using the standard procedure for grinding regular spectacle lenses. This process should also reduce the price of bioptic telescopes

The next step for the team is to find a corporate partner to manufacture the lens blanks and distribute them to the public.

As the population ages and millions of American face limited vision because of eye disorders, such as age-related macular degeneration, the need for this type of vision aid will increase dramatically. The telescopic glasses may also find use in other markets. It may be used as hands-free opera glasses and may be of interest to hunters, police or military personnel who would like the ability to quickly and easily achieve a hands-free magnified view.

Schepens Eye Research Institute is an affiliate of Harvard Medical School and the largest independent eye research institute in the country.

Adapted from materials provided by Schepens Eye Research Institute, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/07/080724123141.htm

Drug Has Potential To Prevent Alcoholics From Relapsing

ScienceDaily (Aug. 2, 2008) — An experimental drug that blocks the euphoric feelings associated with drinking may prevent alcoholics from relapsing. The finding, the result of a mouse study at Oregon Health & Science University, could lead to human clinical trials within the next year.

"We showed we could block behavior in mice that resembles this increased euphoria even after the animals had been given a lot of alcohol," said Tamara Phillips, Ph.D., professor and vice chair of the behavioral neuroscience department at OHSU and a research scientist at the Portland Veterans Affairs Medical Center. "That's what you want in a treatment, because we don't get to people until after they become addicted to alcohol."

Earlier research has shown that some people's brains become sensitized as a result of chronic exposure to alcohol. This change in the brain does not subside after people quit drinking. So when they begin consuming alcohol again, "they get a bigger jolt," Phillips said.

Alcohol consumption causes the body to release a substance known as "corticotrophin-releasing factor" or CRF. It activates receptors in the brain. Phillips and her team determined that a brain receptor called CRF1 appears to be involved in this heightened pleasure sensation. They compared the responses of normal mice and mice bred without the CRF1 receptor to chronic doses of alcohol. Mice without the CRF1 receptor did not experience the euphoric jolt the normal mice demonstrated.

The research team also took normal mice with the CRF1 receptor and exposed them to chronic doses of alcohol. Before testing for the euphoric response, the researchers gave the mice an experimental drug called CP 154,526 – developed by Pfizer – which prevents CRF from reaching the brain receptor. This group of mice also did not experience the heightened reaction.

Phillips' study recently was published in the Proceedings of the National Academy of the Sciences. The results may be particularly applicable to stress-induced relapse. That's because the CRF1 receptor also triggers the body's response to stress.

This could have implications for PTSD patients. "I think if you block this receptor, you might be able to decrease drinking in response to PTSD," Phillips said.

The next step is testing CP 154,526 to see if it is safe for use in humans. If it clears that hurdle, researchers will start human trials to determine if the drug can prevent alcoholic relapse.

Adapted from materials provided by Oregon Health & Science University.

http://www.sciencedaily.com/releases/2008/07/080730175518.htm

World's smallest snake discovered

By Jennifer Carpenter
Science reporter, BBC News

The world's smallest snake, averaging just 10cm (4 inches) and as thin as a spaghetti noodle, has been discovered on the Caribbean island of Barbados.

The snake, found beneath a rock in a tiny fragment of threatened forest, is thought to be at the very limit of how small a snake can evolve to be.

Females produce only a single, massive egg - and the young hatch at half of their adult body weight.

This new discovery is described in the journal Zootaxa.

The snake - named *Leptotyphlops carlae* - is the smallest of the 3,100 known snake species and was uncovered by Dr Blair Hedges, a biologist from Penn State University, US.

"I was thrilled when I turned over that rock and found it," Dr Hedges told BBC News.

"After finding the first one, we turned hundreds of other stones to find another one."

In total, Dr Hedges and his herpetologist wife found only two females.

Defining species

Dr Hedges thinks that the snake eats termites and is endemic to this one Caribbean island. He said that, in fact, three very old specimens of this species were already in collections - one in London's Natural History Museum and two in a museum in Martinique.

However, these specimens had been misidentified.

Dr Hedges explained the difficulty in defining a new species when the organism is so small.

"Differences in small animals are much more subtle and so are frequently over-looked," he said.

Modern genetic fingerprinting is often the only way to tell species apart.

"The great thing is that DNA is as different between two small snakes as it is between two large snakes, allowing us to see the differences that we can't see by eye," explained Dr Hedges.

Researchers believe that the snake - a type of thread snake - is so rare that it has survived un-noticed until now.

But with 95% of the island of Barbados now treeless, and the few fragments of forest seriously threatened, this new species of snake might become extinct only months after it was discovered.

Smallest of the small

In contrast to other species of snake - some of which can lay up to 100 eggs in a single clutch - the world's smallest snake only produces a single egg.

"This is unusual for snakes but seems to be a feature of small animals," Dr Hedges told BBC News.

By having a single egg at a time, the snake's young are one-half the length of the adult.

Dr Hedges added that the snake's size might limit the size of its clutch.

"If a tiny snake were to have more than one offspring, each egg would have to share the same space occupied by the one egg and so the two hatchlings would be half the normal size."

The hatchlings might then be too small to find anything small enough to eat.

This has led the researchers to believe that the Barbadian snake is as small as a snake can evolve to be.

The smallest animals have young that are proportionately enormous relative to the size of the adults producing the offspring
As in the case of *Leptotyphlops carlae* , the hatchlings of the smallest snakes are one-half the length of an adult
The hatchlings of the biggest snakes on the other hand are only one-tenth the length of the adult producing the offspring
Tiny snakes produce only one massive egg - relative to the size of the mother. This is evolution at work, says Dr Hedges
The pressure of natural selection means the size of hatchlings cannot be smaller than a critical limit if they are to survive

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7537932.stm

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Getting Down With All That Skitters, Buzzes or Crawls

By EDWARD ROTHSTEIN

NEW ORLEANS — What is it about these creatures? In the new $25 million Audubon Insectarium, which opened here in June, you can watch Formosan termites eat through a wooden skyline of New Orleans (as if this city didn't have enough problems), stick your head into a transparent dome in a kitchen closet swarming with giant cockroaches and watch dung beetles plow their way through a mound of waste. And then you can engage in the museum's most brilliant interactivity by joining in the line of eager visitors prepared to munch on a handful of crunchy Cajun-fried crickets or scoop up some wax-worm stir fry.

"Gross!" your inner adolescent is likely to shout with a smiling shudder. But visitors of all ages to the Bug Appétit buffet, situated just behind the museum's Tiny Termite Café, keep lining up for seconds. And for every sight that inspires shocked amazement, there is another where sheer wonder wins out. O.K., it's fascinating to learn that a cockroach can survive for weeks without its head, or that millipedes secrete a foul-smelling liquid that you can touch, or that one of every four species on this planet is a form of beetle. But you can also watch a colony of leaf-cutter ants at work. They carry their jaw-torn green bounty into their maze of tunnels where, in one chamber open for inspection, the workers cultivate a gray fungus found nowhere else in nature; that fungus feeds the entire colony.

All this is to say that a visit to the 23,000-square-foot Insectarium forces a confrontation with a segment of the animal kingdom before which Homo sapiens might nearly be humbled. This museum, billed as the first major new institution to open in post-Katrina New Orleans, has been created in a section of the United States Custom House by the Audubon Nature Institute, a nonprofit group that also runs a local aquarium, park and zoo (and has no relationship to the National Audubon Society). By rights, though, this shouldn't be called an Insectarium at all, since it incorporates arthropods (900,000 known species that encompass insects, spiders, centipedes, millipedes and crustaceans) and annelids (segmented worms).

But the name Arthropoditarium has less commercial lure, and at any rate, if scientists, as the museum points out, have their own system of classification, in popular culture we have ours. In this case, every animal seen — from a mounted 19-inch-long stick insect from the Malay Peninsula to a live black atlas beetle that crawls inside a transparent table in the museum café, from spectacular iridescent butterflies that freely flutter in an indoor Japanese garden to the remarkable Southeast Asian mantis that looks like a dead leaf in the forest — seems to share a peculiar region of our consciousness and makes a visit here at

once bracing, unsettling and amusing. On one recent weekday there appeared to be little difference between the attentiveness of parents and the children accompanying them. (Some 2,000 visitors have come each weekend day since the institution's opening.)

In fact, the museum's comic animated film about insects — a mock television awards show, screened in a theater complete with vibrating seats and puffs of air — might have inspired a good number of screams and laughs with its special effects, but it was almost superfluous, given the sensations offered by the live bugs on display. It even seemed surprising that though there are insect museums in Philadelphia and New Jersey — and a major insectarium in Montreal — smartly done spectacles like this one have not caught on in other metropolitan areas.

Maybe these creatures are just too strange. Though they dominate the planet's biomass (and make up, we are told, 90 percent of the world's species), they seem to violate all common presuppositions about life forms. This makes them at once frightening and enticing. The most extreme opposites are on display. The filament legs of mantises or the wings of butterflies are slight wisps of organic matter; the exoskeletons of beetles are like brutish sheets of armor. Bugs seem extraordinary vulnerable — a footstep can kill hundreds of ants — and astoundingly resilient: try eliminating termites or roaches. Some survive for only days, though larvae of one wood-boring beetle have lived for 51 years, while fossils display insects that existed a hundred million years ago. Moreover, many of these animals, lacking even the most rudimentary signs of reason, coalesce into stupefyingly intelligent hives and colonies.

We look at these creatures the way children must view all animal life. What weirdness is this? How bizarre are these habits and specimens! The museum's Hall of Fame Gallery features beetles pinned in fanciful arrays, but the artifice works: you gape at their elaborate coloration and the delicacy that undercuts their apparent savageness. Even some dung beetles (which have been known to clear away 80 percent of the cow manure on Texas farms) have sheen that makes them far more appealing than their habitat.

One area here, the Underground Gallery, is meant to shrink the visitor to bug size: you step onto dark, spongy loam in an underground passage, and see lunging spiders, glaring worms, strange beetles mounted on granules of soil. But there is no need for this simulation to get a sense of these creatures. Just imagine an entomological ecoterrorist freeing these captives from their glass cases, so swarms of termites, spiders, millipedes, flying insects and biting ants slither, creep and soar freely through these rooms, like the roaches roaming through the kitchen cabinet display.

Is it any wonder that science fiction has turned such creatures into monsters with humans at their mercy? What hope does our proud individuality have when confronted with the mysterious strengths and collusive powers of these organisms?

Maybe that's why an attitude of domination accompanies the Insectarium's appreciation. Can you imagine eating roasted lion at a zoo or filleted dolphin at an aquarium? But here the admired creatures are served in elaborate dips and sautéed dishes. Photographs on the cafeteria wall display delicacies more familiar in non-Western countries: deep-fried giant waterbugs from northern Thailand, water beetles marinated in ginger and soy sauce from the Guangzhou Province in China. But chocolate chirp cookies (with crickets) and dragonflies sautéed with mushrooms can be sampled a few yards away. Even in the regular section of the café, tabletops are transparent display cases: if you shun arthropods for lunch, you can eat more typical animal-based dishes while watching a giant beetle crawl underneath your meal.

The threat — the fear, the danger, the dread — is part of the point here too. An exhibit about the insects of New Orleans discusses the splattered bugs that coat cars in the mating months of May and September, and explains how the city's history was scarred by diseases carried by uncontrolled mosquitoes. Some bugs strain all affections: in the United States, one roach is called German; in Germany it is called Russian; in Russia it is called Polish. (And in Poland, one wonders?)

The Termite Gallery is meant to frighten: the Formosan subterranean termite causes $1 billion in damage a year and has been the object of a federally financed war since 1998. It is no wonder, too, that the pest-control company Terminix donated $2 million to the Insectarium; other pest-control sponsors include BASF/Termidor and Dow AgroSciences. They want to encourage a love of bugs, a Terminix spokesman has suggested, but one that accompanies a healthy respect for their dangers and an interest in eliminating them where they shouldn't be.

This makes the Insectarium an unusual tribute, because the double visions of respect and fear, amazement and shock, fascination and disgust, are woven throughout the exhibits; indeed, throughout human encounters with these creatures. And whatever the museum's weaknesses — the Louisiana swamp gallery was a bit miasmic, the butterfly room a bit underpopulated, and the informative wall texts a bit too brief — on leaving, the world seemed larger and more astonishing than it had before. I was almost ready to return to try the sauté of the day.

The Audubon Insectarium is open 10 a.m. to 6 p.m., Tuesdays through Sundays, at 423 Canal Street, New Orleans; (800) 774-7394, auduboninstitute.org.

http://www.nytimes.com/2008/08/02/arts/design/02inse.html?_r=1&ref=arts&oref=slogin

The Spirit of His Inner American

By CLAUDIA LA ROCCO

"IN Europe in August it's like they've dropped some kind of bomb," the Italian choreographer Luca Veggetti said. All of Italy "is empty," he added. "Even on a practical level there's nothing you can do."

But Mr. Veggetti has plenty to do. He was speaking at the offices of Cedar Lake Contemporary Ballet in Chelsea, where for the last three weeks he has been creating a 15-minute quartet for a premiere in January. Then, after a 10-day break, he will begin intensive rehearsals for a daunting project at the Miller Theater: a fully staged production of Iannis Xenakis's "Oresteia," which will have its American premiere on Sept. 13.

Mr. Veggetti has been an increasingly frequent visitor to the United States, where he created works for the Miller Theater and the Guggenheim Museum's Works & Process series last year. He has long identified with what he calls the distinctly American sense of freedom, and he hopes soon to move here permanently.

"American dancers have a quality that dancers elsewhere, and especially in Europe, don't have," he said. "They have a certain kind of edge and risk-taking attitude that is due ultimately to their condition as dancers. You cannot become worse or you're out of the company." State-financed European companies, in which dancers have lengthy contracts, he said, make artists play the game to get ahead.

"My entire life I defended my independence very strongly," he said, referring to his hardscrabble, freelance career. "I paid a price for that."

The American choreographer Karole Armitage, who returned to New York in 2005 after more than two decades in Europe, agreed. "In Europe there are absolute political alliances between theaters and artists, or funding sources and artists," said Ms. Armitage, whose company, Armitage Gone! Dance, will perform Friday at the Lincoln Center Out of Doors Festival. In Italy "it is literally almost gang warfare within the opera houses."

But if American artists don't have to face heavily involved state politics, neither do they receive meaningful state financing. The European system is sometimes sneered at in the United States as leading to slickly lavish and empty work, critiques undoubtedly fueled, at times, by envy.

But Cedar Lake, founded in 2003, need envy no one. Financed by the Wal-Mart heiress Nancy Laurie, it has handsome offices, studios and theaters, and its dancers receive a 52-week contract, health insurance and paid vacation. It can afford to bring in international choreographers, and — paradoxically, given its all-American backing — it has become known for its contemporary European dance.

"I always had the feeling there was a gap between Europe and America," said Cedar Lake's artistic director, Benoit-Swan Pouffer, a French-born former member of the Alvin Ailey American Dance Theater. "My sensibility is close to Europe, but I do love American choreography."

"Memory/Measure" is Mr. Veggetti's first piece for Cedar Lake. Mr. Pouffer said he felt it was important for his virtuosic dancers to work with a choreographer who values control and restraint as much as Mr. Veggetti does."It's about feeling 10 and letting only 8 out," said Alexandra Damiani, Cedar Lake's rehearsal director and assistant to the artistic director. "There's a readiness in that stillness."

Set to a new score for voice and electronics by Paolo Aralla, "Memory/Measure" features text inspired by Ingmar Bergman, just the sort of theatricality to make some American dancegoers roll their eyes. But its moody, atmospheric tendencies are tempered by a stark astringency; though performed by two couples, the work has an isolated feel. You see the space around the performers almost as much as the shapes they make. In two rehearsals Mr. Veggetti repeatedly asked them to do less, to strip away preparatory movements.

"It's really, really hard to be really simple, especially if you've been fed a lot of different vocabularies," said Ana-Maria Lucaciu, one of the dancers. Mr. Veggetti will say: "Stop thinking you have to do a wiggle-wiggle to get to Point A. Just get to Point A, and stop messing around."Ms. Damiani will be responsible for maintaining that simplicity until Mr. Veggetti returns just before the premiere. The luxury of working so far in advance, he said, was that the dance can gestate.

"I think it is good hands, between her hands and their hands — and feets," Mr. Veggetti said.

Next he tackles Xenakis's "Oresteia," based on the Aeschylus trilogy. With a cast of more than 75 and a classical Greek text sung in quarter tones, it will be the largest, most ambitious production in the history of the adventuresome Miller Theater."It's devilishly difficult," he said of the music, which Xenakis worked on, periodically, for 30 years. "Xenakis wanted somehow for it to be incomprehensible."

Mr. Veggetti is directing "Oresteia" as its composer envisioned it: an integrated dance and choral work using principles of Greek and Japanese Noh theater. "The challenging work is to find an onstage action and a dance action with some purity that somehow relates to the events," he said. "That margin is very fine."

Mr. Veggetti found a fellow Xenakis lover in the Miller's executive director, George Steel, who has made ballet a small but vibrant part of his programming. "I'm trying to stay focused so that we can add to a pretty rich conversation about dance in New York," Mr. Steel said.

Mr. Veggetti has been a key part of that focus, and with "Oresteia" Mr. Steel is giving him his biggest platform yet in the country he hopes to make his own. "Maybe I haven't had the chance so far of putting all these elements together in such a way and in such a major production," he said. "I'm somehow comfortable in a performance like this."

He paused and chuckled. "Of course being comfortable doesn't necessarily mean that you do great things."

http://www.nytimes.com/2008/08/03/arts/dance/03laro.html?ref=arts

New York as Skyscraper
The city's spirit is captured by the Chrysler Building
By BRET STEPHENS
August 2, 2008; Page W14

Last month, Abu Dhabi's sovereign wealth fund forked over a reported $800 million for a 90% stake in New York's Chrysler Building. As with the Japanese acquisition of the equally iconic Rockefeller Center in the late 1980s, the Chrysler purchase may not wind up being a success, financially speaking. But if it was an architectural masterpiece -- or just a chunk of New York's heart -- that the oil sheiks were after, they got it.

That New Yorkers have long been in love with the Chrysler Building is not in doubt. "You can't leave New York!" the fictional Carrie Bradshaw of "Sex and the City" implores her beau when he announces his plan to move to Napa Valley. "You're the Chrysler Building! The Chrysler would be all wrong in a vineyard." Her metaphor is well chosen: Among New York's skyscrapers, the Chrysler *is* New York in the way that the Twin Towers never were while they stood, notwithstanding their solemn bearing and size. Even the venerable Empire State, storied and iconic, has more mass than grace. And it's a tourist trap.

Not so the Chrysler, where the casual visitor cannot get beyond the lobby (though that alone is worth a trip). Instead, the building tends to be admired from afar, above all for its instantly recognizable top: the eagle-headed gargoyles, which seem ready to take wing from their perches on the 61st floor; the huge triangular windows arranged along the curves of seven concentric setbacks pushing centerward and pointing skyward; the ribbed, stainless-steel crown that sparkles by day and is lit from within at night; and, as befits any skyscraper worthy of the name, the needle-like spire.

Today, we tend to think of this design as "extravagant," "exuberant," "swaggering" or "brash" -- words that could just as well describe the city in which the building stands. Early appraisals were less generous: An "upended swordfish" is how one critic saw it. A "stunt design," said another.

Indeed, it was a stunt. Architect William Van Alen's original plan called for a fairly ordinary 56-story tower topped by a glass dome. Owner Walter P. Chrysler had the more ambitious idea of putting

up the tallest building in the world. Plans changed first to a 67-story, 808-foot design; then to a 77-story, 925-foot one. The building reached its ultimate height of 1,046 feet in October 1929 only with the addition of the spire, constructed in secret and hoisted into place almost immediately after its nearest skyscraper rival, Wall Street's Bank of Manhattan, had topped out at 927 feet.

The Bank of Manhattan was designed by architect H. Craig Severance, a former partner of Van Alen who later became a personal rival. That ego, ambition and vanity (Van Alen's as well as Chrysler's) had so much to do with the Chrysler's ultimate design is not incidental to its attraction: These qualities, too, are pure New York.

Yet it is not simply on account of height that the Chrysler Building earns its status as a masterpiece. Nor is it, quite, for the legends the building evokes: of photographer Margaret Bourke-White, who so loved the building that she applied for a janitorial position there in the hopes of being allowed to live in it (she was turned down); or of the members of the old Cloud Club -- boxer Gene Tunney, financier E.F. Hutton, aviation mogul Juan Trippe and publisher Condé Nast among them -- stashing their Prohibition-era booze in hieroglygh-encoded cabinets; or of the mysterious goings on in the building's top floors, rumored to be a U.S. government listening post. (The Chrysler has a direct line of sight to the nearby United Nations.)

Rather, what distinguishes the Chrysler is its ability to inspire, as few modern buildings do, a sense of fantasy. For one thing, it achieves a skyscraper's fundamental task: It *soars*. From its first recess, just above the Lexington Avenue entrance, it follows an uninterrupted vertical path directly to the 68th floor, and only then begins to taper toward the spire.

Then there is the way the building remains perennially modern, perhaps because it is forever the past's imagining of the future. The entrances -- framed in black granite, zig-zagging patterns of metal and opaque yellow glass -- seem drawn from Fritz Lang's "Metropolis" or a Batman comic.

Inside the lobby, one finds "a dark, bizarre cavern of crystalline angles and indirect lighting behind onyx stone, more the kind of place to encounter a Valkyrie than make a business appointment," as architecture critic Eric Nash has written. A superb mural by Edward Turnbull, about two-thirds the size of the Sistine Chapel's, decorates the ceiling. It is called "Energy, Result, Workmanship and Transportation," and its centerpiece is an image of the Chrysler Building itself. It is an optimistic scene, very different from Marxist-inspired murals that Mexico's Diego Rivera would paint in New York for his Rockefeller and New School patrons just a few years later.

Nor is the mural the only way in which the Chrysler is like no other building. Consider the elevators, 32 in all, each paneled in exotic woods, each masterfully decorated with Art Deco motifs and -- what's extraordinary -- no two of them alike.

And finally -- again -- there is that fabled Chrysler top. Today's tall buildings (few of which really deserve to be called skyscrapers) are often nothing more than stacks of all but identical floors, none really different from the other except, perhaps, for the view. Not so in the Chrysler Building, where the highest nine stories become progressively smaller as they rise toward the vanishing point. Seen from within, it conveys the sensation of an aerie, or a crow's nest, or a mountaintop -- not merely a higher place, but another world.

Is there some other skyscraper that succeeds this way -- that sets the hearts of nearly all those who see it aflutter? One can only hope its new owners feel the same way about this joyful building, surely the most brilliant jewel in their crown.

Mr. Stephens writes "Global View," the Journal's foreign-affairs column.

http://online.wsj.com/public/article/SB121762156747405585.html?mod=2_1578_middlebox

From A to Zyxt

By NICHOLSON BAKER

READING THE OED

One Man, One Year, 21,730 Pages.

By Ammon Shea.

223 pp. Perigee. $21.95.

Ammon Shea, a sometime furniture mover, gondolier and word collector, has written an oddly inspiring book about reading the whole of the Oxford English Dictionary in one go. Shea's book resurrects many lost, misshapen, beautifully unlucky words — words that spiraled out, like fast-decaying muons, after their tiny moment in the cloud chamber of English usage. There's hypergelast (a person who won't stop laughing), lant (to add urine to ale to give it more kick), obmutescence (willful speechlessness) and ploiter (to work to little purpose) — all good words to have on the tip of your tongue when, for example, you're stopped for speeding.

Shea's book offers more than exotic word lists, though. It also has a plot. "I feel as though I am eating the alphabet," he writes halfway through, and you want him to make it to the end. This is the "Super Size Me" of lexicography.

Shea is well equipped for the task he has set himself. He owns about a thousand dictionaries, which he keeps on shelves in the apartment he shares with his girlfriend, Alix, who teaches psychology courses at Barnard. Some of the dictionaries he bought from a book dealer named Madeline, who lives in a loft in Lower Manhattan. Madeline owns 20,000 dictionaries. She taught Shea, he says, "the ineffable joy that can be had in pursuing the absurd."

Back in the '90s, Shea read Webster's Second from beginning to end — no easy feat. Did doing so help him in any way? No. It didn't make him a better or smarter person, or improve his test scores. In fact, it seems to have hindered his capacity for self-expression. "My head was so full of words that I often had trouble forming simple sentences out loud," he writes, "and my speech became a curious jumble of obscure words and improper syntax." But Shea seems to have loved this experience of verbal overspill — he underwent the prolonged brain-shiver that comes when thousands of unfamiliar meanings pour in without stopping. "It felt wonderful," he says.

The logical next step was to read the O.E.D., but here Shea hesitated. The O.E.D. is huge, as everyone knows. It's monstrously deep and serious and maddeningly detailed, each entry a miniature etymological seminar. It's the one that, in one incarnation, came with a rectangular magnifying glass; the one that the polymathic Simon Winchester wrote about in "The Professor and the Madman." Could Shea really make his witting way through 20 heavy volumes of tri-columnated type, all of it twinkling and squirming with abbreviations, small caps, foreign derivations and archaic spellings? Could one man read, in one year's time, 59 million consecutive words — the equivalent of one John Grisham novel per day — of definitional "prose"? Or would Shea fail and be forever known as the guy who read through to the letter N and couldn't go on?

Shea decided to make the attempt and to record his progress in this book. Each letter gets its own chapter. In Chapter A the volumes arrive, wrapped in the "regal and chitinous gloss" of their dust jackets. Shea sits near the window, his feet up on an ottoman, and begins to read. Difficulties ensue. He gets pulsing headaches and sees gray patches on the edges of his vision. His back bothers him. His neighbors make

salt cod, and the odor is distracting. He's tempted to look things up in his other dictionaries, comparing definitions, which slows his progress.

So he ventures out into the city, reading on park benches and in public libraries. No place is right. Finally he settles on a location in the basement of the Hunter College library, among books in French that don't tempt him away from the task at hand. He drinks many thermosfuls of coffee. He gets eyeglasses and finds, much to his surprise, that they help him see better. His headaches continue.

And the lovely-ugly words, words that Shea didn't know existed, leap up to his hand. Acnestis — the part of an animal's back that the animal can't reach to scratch. And bespawl — to splatter with saliva. In Chapter D, Shea encounters deipnophobia, the fear of dinner parties; Chapter K brings kankedort, an awkward situation. Months in, Shea arrives — back-aching, crabby, page-blind — at Chapter N. "Some days I feel as if I do not actually speak the English language," he writes, his verbal cortex overflowing. "It is," he observes, "like trying to remember all the trees one sees through the window of a train." Once he stares for a while, amazed, at the word glove. "I find myself wondering why I've never seen this odd term that describes such a common article of clothing."

By Chapter O there is evidence of further disintegration. Is he turning into, he wonders, one of the "Library People"? The bag-toters and mutterers who spend all their time there? "Sometimes I get angry at the dictionary and let loose with a muffled yell." At night he hears a deep, disembodied voice slowly intoning definitions.

But then, thank goodness, he breaks through into sunlight. In Chapter P he finds a rich harvest of words, including one, petrichor, that refers to the loamy smell that rises from the dry ground after a rain, and a nicely dense indivisible word, prend, that refers to a mended crack. He notes these down in his big ledger book. He attends a lexicographical congress in Chicago, where he is misunderstood by his colleagues, and returns to the Hunter library basement with renewed vigor. He tells his tolerant girlfriend about a rare P-word and then wonders aloud if he is boring her. "The point at which I became bored has long since passed," Alix replies.

Shea arrives at another bad patch partway through Chapter U, with the "un-" section — more than 400 pages of words of self-evident meaning. "I am near catatonic," he writes, "bored out of my mind." But he doesn't skip; he is lashed to the tiller, unthimbled and unthrashed.

Théophile Gautier read the dictionary to enrich and exoticize his poetry. Walter Pater read the dictionary to keep his prose pure and marmoreal — to learn what words to avoid. Shea has no interest in purity or poetry. His style is simple. He just wants to identify and savor, for their own sweet sakes, malocclusive Greek and Latin hybrids that are difficult to figure out how to pronounce. He is fond of polysyllabic near-homonyms — words like incompetible (outside the range of competency) and repertitious (found accidentally), which are quickly swallowed up in the sonic gravitation of familiar words. And a number of Shea's finds deserve prompt resurrection: vicambulist, for instance — a person who wanders city streets.

The effect of this book on me was to make me like Ammon Shea and, briefly, to hate English. What a choking, God-awful mash it is! Surely French is better. Then I recovered and saw its greatness afresh. The O.E.D., Shea notes, is "a catalog of the foibles of the human condition." Shea has walked the wildwood of our gnarled, ancient speech and returned singing incomprehensible sounds in a language that turns out to be our own.

Nicholson Baker's most recent book is "Human Smoke: The Beginnings of World War II, the End of Civilization."

http://www.nytimes.com/2008/08/03/books/review/Baker-t.html?8bu&emc=bua2

The Half-Naked and the Undead

By MARK COSTELLO

ALIVE IN NECROPOLIS

By Doug Dorst.

437 pp. Riverhead Books. $25.95.

Colma, Calif., the setting for this daring and bighearted first novel, is a city dominated by the dead. Founded as a "necropolis," a designated place of burial serving greater San Francisco, Colma is home to 17 handsome landscaped cemeteries, the names suggesting suburbs of hereafter: Woodlawn, Greenlawn, Cypress Lawn, Golden Hills, Eternal Home, Home of Peace. Twelve hundred residents live among some two million graves.

Michael Mercer is a rookie cop in this curious Deathchester, patrolling the line between the living and the dead. "Night-shift police officers reporting to the station zip their Tuffy jackets against the cold and pin their badges to the outside. Through the night, they patrol the quiet streets, wait for intoxicated drivers leaving Molloy's to cross the center line on Old Mission Road. They intervene in a domestic dispute on Spindrift Lane, thwart lumber thieves loading a pickup behind the home-improvement warehouse, break up a fight at the movie theater. They run passing checks through the cemeteries and sweep their spotlights over the fields of granite and marble, chasing away copulating kids, who dart like sprites into the shadows behind mausoleums and obelisks and weeping angels."

Mercer is a searching person when we meet him, spoiling for action yet plagued by second guessing as he closes in on 30. "Mercer hadn't planned on a career in law enforcement," Dorst writes. "He'd simply been lost. He was years removed from college, sick of bartending and office temp work. ... Spooked by a creeping sense of his own irrelevance, he was drinking too much, sleeping too much and getting dark-minded and hopeless in a way he feared might be permanent."

"Spooked" is the operative term. As Mercer will discover, some of Colma's buried aren't quite dead. This seems only fair. For in the country of George W. Bush, as depicted by Doug Dorst, many of the living aren't quite living either.

But they think they are alive, Mercer and his friends; that's the moving part. A longtime Californian, Dorst knowingly evokes the Gatsbyite lambency of local yuppie culture. At a cookout thrown by Mercer's friends, "conversations buzz, peter out, recirculate. The crowd is divided roughly in half: those who've become their parents and those who are living the same lives they did in college, only now without the college. From the former, Mercer hears about mortgages and birth coaches, about ecotourism and oil prices, about hedge funds and dog-walkers. ... From the latter, conversations about bands coming to Slim's, about the surf at Ocean Beach, about hookups and hangovers, about Vegas strippers and Vancouver bud."

Few can see or hear the ghosts around them (those who can are known as "crossers"). But almost everyone alive in this necropolis is haunted by a figurative ghost — a loss, a secret fear, some regretted act or the sense of fleeing a key responsibility.

A sergeant's widow turns up in the squad room, day after pitiful day, bearing awful homemade cookies and trying to look brave. Nick Toronto, Mercer's closest friend in the department, begins the novel as a ribald cynic and horndog. In time — surprise — Nick Toronto falls in love. His loss will lead to a broken heart. Having abandoned his ribald cynic pose, Toronto can't go back to it. He winds up finding thin solace in Zen meditation.

Mercer tries to help Toronto, the widow, the druggies and the street ravers he encounters on his beat. He's also busy lurching through a dead-end romance with Fiona, a tough but lonely E.R. nurse who drinks too much and calls at odd hours. Fiona's losses are a dying cat and creeping middle age. Dorst plays her panic wryly, coolly. Yet he accepts the flawed Fiona on her own terms — as a woman of great warmth and great potential, most of it going to waste. Most of what these people offer to one another will finally go to waste. Some offer love or friendship. What Michael Mercer offers, at times pathetically, is an eagerness for duty, a desire to be used, to be of use. One night, while overdoing duty with a complaining Nick Toronto, he finds a teenage boy left for dead inside a tomb. The boy, drunk and half-naked, his feet bound with duct tape, is eventually identified as Jude DiMaio, scion of a famous San Francisco family.

The left brain of this novel, the plotty, structured part, is a fine, familiar branch of California noir. Like Dashiell Hammett, Dorst conveys a hard-bitten love of the physical San Francisco, the fog-swallowed town, the sun after rain, the mineshaft drops in temperature. Scenes are rooted in surroundings and the weather. The fiction seems to possess, and be possessed by, its beloved Bay.

In a broader sense, the theme of troubled heirs and corrosive family secrets can almost be considered the creation myth of modern California. Mercer, probing the DiMaios, is like Marlowe in Raymond Chandler's "Big Sleep" (1939), called in to shield a wayward oil heiress from a blackmail racket, or like Jake Gittes of "Chinatown" (1974), uncovering the evil, both personal and regional, of the water barons of Los Angeles. Like Gittes before him, Mercer cannot penetrate the most important mysteries of money, power and possession. Forget it, Mike — it's Colmatown.

Above this panorama of duty blocked and love rejected sit the ghosts of Colma. The ghosts are a prime pleasure here. The prose picks up a quickness in their presence. They are figures out of newsreels, colorful, iconic. There is Lefty O'Doul, the baseball great, and Lillie Coit, the eccentric heiress and the adoptive mother of her fellow souls. Lincoln Beachey, the dashing early aviator, re-enacts his fatal crash, while Ishi, the last Yahi Indian, sings a tribal song of mourning. Doc Barker the bank robber sits on a ridge with the rest of his dead gang, menacing the quiet of the place.

Dorst writes about eternal life as if it were a variant of obsessive-compulsive disorder. The dead are doomed not to relive their deaths forever, as in some traditions, but rather to rethink the same tight group of thoughts until time itself loses meaning. Phineas Gage, an 1840s railway worker maimed when a tamping iron was blown through his brain, spends eternity desperately looking for the iron. "He feels the emptiness in his hands as something tangible, sharp and cold, and he is overwhelmed with this sense of lack. ... He concentrates harder, keeps his head down, slaps aside weeds, scans the ground closely. My iron, my iron, my goddamn iron."

Early in the novel, Mercer adopts a policeman's affectation. Instead of saying "yes" or "I agree," he says, "I'm aware."

Awareness is the high prize of the novel. Characters who save themselves from deathliness and dissolution do so through compassion and open eyes. As Mercer begins to hear and see Lillie Coit and the other souls around him, he is drawn into a struggle in the graveyard. He is needed there and this is what he needs.

The gulf between the perished and the living is another fault line in the state of California, just beneath the surface, and unstable.

Mark Costello is the author of the novel "Big If."