Infoteca's E-Journal

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Graffiti Gains New Respect

By CLAUDIA BARBIERI

PARIS — Like a slow-burning fuse, graffiti has smoldered in the contemporary art world for decades: omnipresent in the streets yet not quite hot enough to catch fire in the market. But this year it exploded, with graffiti and "street art" shows in major museums and gallery spaces both sides of the Atlantic — and people have been lining up round the block to get in.

In March and April, a show of graffiti tags in the south-west gallery of the Grand Palais, one of the top Paris exhibition venues, was a media and public sensation.
"The lines around the building every day were even longer than those for the Warhol exhibition next door," said Alain-Dominique Gallizia, a French architect who created the show, during an interview.
On 300 identical rectangular canvases, Mr. Gallizia commissioned matched pairs of paintings from leading street artists worldwide, to create a panorama of graffiti's historical and geographical development from 1970s New York subway roots to modern urban landscapes as far-flung as Australia and Brazil.
Included in the show were works by Taki 183, the onetime New York delivery boy credited with first turning signature tags into a form of self expression; Lady Pink, an early female tagger; Bando, known in everyday life as Philippe Lehman, a scion of the Lehman banking family, who first brought New York-style graffiti to France in the 1980s; and Nunca, the Brazilian street artist from São Paulo who shot to international fame a year ago when he was chosen as one of six artists to spray paint giant murals on the river facade of the Tate Modern, in London.
"You can see the characteristics of each country through the artists," Mr. Gallizia said. "This collection is a work in progress and it's continually expanding. My dream is to bring it to the Guggenheim in New York."
Mr. Gallizia may be dreaming of New York, but late last month two Paris galleries beat him to the door. On May 28, the Helenbeck and Gismondi galleries opened "Whole in the Wall," a combined show of graffiti and antique furniture at the former Splashlight Studios in Midtown Manhattan.
The show, running through June 27, brings together many of the first generation New York graffiti writers, like Lin Felton, known as Quik, and Aaron Goodstone, known as Sharp, with top-flight European artists, like the stencil painters Blek le Rat, of France, and Banksy, from Britain, and other contributors to the global urban landscape, including the ubiquitous Nunca, from Brazil.
If the organizers were inclined to heed preopening warnings that New York might not be ready to welcome back the train taggers of yesteryear, many of whom have since found a more appreciative refuge in Europe, they need not have worried.
As at the Grand Palais, a few weeks earlier, the opening night attracted "hundreds of people, lining up around the block in the rain," said Chantal Gismondi, who with her twin sister, Brigitte Helenbeck, curated the street-art display. Her husband, Jean Gismondi, a Paris antiques dealer, provided the 17th- and 18th-century furnishings.
No sooner will the New York show close than the spotlight will swing back to Paris, where the Cartier Foundation for Contemporary Art will next month give over its Jean Nouvel exhibition space on the Boulevard Raspail to a six-month-long retrospective of urban art and culture, "Né dans la Rue," or "Born in the Street."
Established in 1984 by Alain-Dominique Perrin, chief executive of Cartier, the foundation, a leading private-sector cultural institution in France, aims to discover and promote the leading edge artistic movements of the day. In French cultural terms, to be chosen for a show at the Cartier foundation is pretty much a sacramental consecration.
The exhibition will be split into two parts on two floors, showing the birth and early development of street art in New York, from 1969 to 1989 on one level, and the global contemporary scene on the other. A separate room will display a rotating selection of French street artists.
Photographs will be on show by Jon Naar, who collaborated with Norman Mailer on an iconic 1974 study, "Faith of Graffiti." Also on display will be "black books" — notebooks in which New York taggers sketched their designs before spraying them on the trains; and clips from "Style Wars" by Henry Chalfant, also a photographer, for many the bible of New York graffiti.

The show aims to highlight the influences on street and graffiti art and the way that styles have developed. “Today the borders are blurred between street and graffiti artists,” said Leanne Sacramone, curator at the foundation. “There are lots of cross-influences. We wanted to show the context of the city. This is a history in context.”

The changes and developments of graffiti help to explain its breakthrough into the cultural mainstream, said Valériane Mondot, a curator of graffiti-art shows in Paris and founder of an online graffiti site, Taxie Gallery.

As graffiti has shifted from the street to canvas, the artists’ tools have also changed: Standard car-spray aerosols have given way to purpose-designed cans with interchangeable caps for fat and thin lines, and new paint blends offer a richer palette. Can control has become the mark of sophisticated, painterly technique.

The Internet, too, has played a vital role, bringing graffiti to the wired generation. And Ms. Mondot belongs to a new generation of gallery owners who nurture, guide and promote their graffiti artists, often using the Web.

In London, gallery owners like Steve Lazarides of the Lazarides Gallery, Paul Jones of the Elms Lesters Gallery and Richard Tokatly of the Artificial Gallery are playing a similar role. Mr. Tokatly, who shows artists including Banksy, Damien Hirst, the Chapman brothers and Grayson Perry on his Web site, seems to have a feel for the way the cultural wind is blowing. “I have more hits for Banksy than I do for Damien Hirst,” he said.

http://www.nytimes.com/2009/06/10/arts/10iht-rcartgraff.html?ref=arts&pagewanted=all

Babies understand numbers as abstract concepts

22:00 08 June 2009 by **Anil Ananthaswamy**

Our ability to think of numbers as abstract concepts is probably innate and even babies barely a few hours old seem to have the ability, researchers say.

Abstract numerical thought is the ability to perceive numbers as entities, independently of specific things. It can be demonstrated by the humans capacity to link a certain number of objects to the same number of sounds, irrespective of what the specific sounds or objects are. But whether this ability is innate or learned through culture or language wasn't known.

To investigate, Véronique Izard of Harvard University and colleagues worked with 16 newborns, whose ages ranged from 7 to 100 hours.

Each baby was first played a 2-minute tape that contained spoken syllables, such as "ra ra ra ra me me me me"). Then, with the tape playing in the background, the baby was shown a sequence of images with abstract geometrical objects (see movie, .mov format, 2.27 MB), in which each alternate image had the number of objects that tallied with the number of syllables.

The researchers found that 15 of 16 newborns looked significantly longer at the correct image. "This is telling us that babies, within a couple of hours after they are born, have a very abstract representation of numbers that applies similarly to visual and audio stimuli," says Izard.

An earlier study found that babies a few months old, who were played two voices, paid more attention to a video of two rather than three faces. But in this case the babies might just have learned to link faces with voices, Izard says.

The babies in the new study weren't always cooperative. The researchers had to discard data from 50 infants, either because they were being fussy, or fell asleep, or had to be looked after by their handlers.

Journal reference: *Proceedings of the National Academy of Sciences* (DOI: 10.1073/pnas.0812142106)

http://www.newscientist.com/article/dn17264-babies-understand-numbers-as-abstract-concepts.html?full=true&print=true

Ancient warfare: Fighting for the greater good

19:00 04 June 2009 by **Ewen Callaway**

Does a genetic predisposition to altruism flourish because of armed conflict? (Image: Michael Friedel / Rex Features)

War, what is it good for? A lot, it could turn out.

Lethal warfare drove the evolution of altruistic behaviour among ancient humans, claims a new study based on archaeological records and mathematical simulations.

If correct, the new model solves a long-standing puzzle in human evolution: how did our species transition from creatures interested in little more than passing down their own genes to societies of (generally) law-abiding (mostly) monogamists?

No one knows for sure when these changes happened, but climactic swings that occurred between approximately 10,000 to 150,000 years ago in the late Pleistocene period may have pushed once-isolated bands of hunter-gatherers into more frequent contact with one another, says Samuel Bowles, an evolutionary biologist at the Santa Fe Institute in New Mexico and the University of Siena, Italy, who led the study. "I think that's just a recipe for high-level conflict."

Tribes at war

By warfare, Bowles isn't talking about highly organised contests between nation-states and their armies. Rather, this period of warfare was probably characterised by ongoing skirmishes between neighbouring populations.

"We're talking about groups of men who got out in twos or threes or fives," he says. "They didn't have a chain of command and it's hard to see how they could force people to fight."

For this reason, altruistic intent on the part of each warrior is key. Each person would do better to stay home than to put their life on the line for their neighbours – yet they still went out and risked their lives, Bowles says.

To assess whether or not people with a random genetic predisposition to altruism could flourish via armed conflicts, Bowles culled archaeological and ethnographic data on the lethality of ancient warfare and plugged them into an evolutionary model of population change.

Cost of clashes

In ancient graves excavated previously, Bowles found that up to 46 per cent of the skeletons from 15 different locations around the world showed signs of a violent death. More recently, war inflicted 30 per cent of deaths among the Ache, a hunter-gatherer population from Eastern Paraguay, 17 per cent among the Hiwi, who live in Venezuela and Colombia, while just 4 per cent among the Anbara in northern Australia.

On average, warfare caused 14 per cent of the total deaths in ancient and more recent hunter-gatherers populations.

The cost of losing an armed conflict as a group is high enough to balance out the individual risks of warfare, especially if a population is relatively inbred, Bowles' model concludes. Since evolution acts on genes, it makes more sense to make more sacrifices for a related neighbour than an unrelated one.

Since Bowles had no way of knowing how inbred Pleistocene populations were, he compared contemporary hunter-gatherers such as African pygmies and native Siberians. Individuals in these populations were closely related enough to justify going to war, he found.

Inbreeding

"There's no doubt that his is a controversial view," says Ruth Mace, an evolutionary anthropologist at University College London. Inbreeding between the victors and any surviving losers would dilute, not concentrate, altruistic genes, she says.

Bowles modelled this possibility in a previous paper and found that even with a measure of inbreeding, altruists still win out. However, he agrees that it would slow the evolution of altruism through warfare. "A much better way to spread the genes is to kill everybody," he says.

Mark van Vugt, a psychologist at the University of Kent at Canterbury, UK, notes that warriors could act in their own self-interest, not for the good of the group.

"Studies on the Amazonian Yanomamö people show that these warriors do get a greater share of resources, they get more women, they sire more offspring," he says. "How do you explain that there are individual benefits for these warriors? There shouldn't be."

Still, van Vugt thinks Bowle's model is on the right track. Studies show that people divided into arbitrarily chosen groups – say heads and tails – behave altruistically to members of their group, but are more hostile toward non-members.

"Together we provide different pieces of the puzzle. If they fit together, they are starting to make sense," van Vugt says.

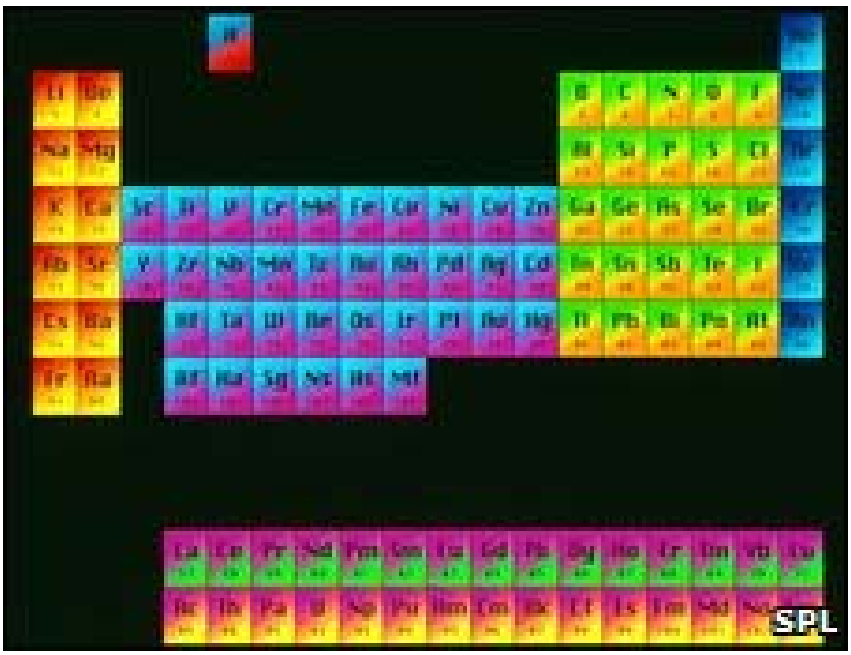
Journal reference: *Science* (DOI: 10.1126/science.1168112)

http://www.newscientist.com/article/dn17255-ancient-warfare-fighting-for-the-greater-good.html

Periodic table gets a new element

By Victoria Gill
Science reporter, BBC News

The ubiquitous periodic table will soon have a new addition - the "super-heavy" element 112.



More than a decade after experiments first produced a single atom of the element, a team of German scientists has been credited with its discovery.

The team, led by Sigurd Hofmann at the Centre for Heavy Ion Research, must propose a name for their find, before it can be formally added to the table.

Scientists continue the race to discover more super-heavy elements.

Professor Hofmann began his quest to add to the periodic table in 1976.

The fusion experiments he and his colleagues carried out at the centre have already revealed the existence of elements with atomic numbers 107-111.

These are known as "super-heavy elements" - their numbers represent the number of protons which, together with neutrons, give the atom the vast majority of its mass.

To create element 112, Professor Hofmann's team used a 120m-long particle accelerator to fire a beam of charged zinc atoms (or zinc ions) at lead atoms. Nuclei of the two elements merged, or fused, to form the nucleus of the new element.

These very large and heavy nuclei are also very unstable. They begin to fall apart or "decay" very soon after being formed - within a few milliseconds, in this case.

This releases energy, which scientists can measure to find out the size of the decaying nucleus.

But such experiments produce very few successful fusions, and scientists need increasingly powerful accelerators to run experiments for longer and find the elusive, unstable elements.

This is why it took such a long time for element 112 to be officially recognised by the International Union of Pure and Applied Chemistry (IUPAC).

Its discovery had to be independently verified, and so far only four atoms have ever been observed.

IUPAC temporarily named the element ununbium, as "ununbi" is derived from the figures "one one two" in Latin; but Professor Hofmann's team now has the task of proposing its official name.

He is currently keeping the shortlist under wraps.

Working together

Teams in Russia, the US and Japan are taking part in what Professor Hofmann described as the "friendly competition" to discover new, heavier elements.

In 2006, Professor Hofmann's competitors at the Joint Institute for Nuclear Research (JINR) in Dubna, Russia, claimed the discovery of element 118. It was made by bombarding a californium target with a beam of calcium ions.

"We have confirmed some of these results," Professor Hofmann told BBC News.

But he is now setting his sights higher. "We tried the same experiment to get to element 120. We've not seen it yet, but we believe the element exists and, with a long enough beam time, it could be produced," he said.

"It's certainly a race, and it's nice to be first."

What name would you give to the new element and why? Tell us your suggestions.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8093374.stm

Published: 2009/06/10 17:01:17 GMT

'Tiny chance' of planet collision

By Pallab Ghosh
Science correspondent, BBC News

Astronomers calculate there is a tiny chance that Mars or Venus could collide with Earth - though it would not happen for at least a billion years.

The finding comes from simulations to show how orbits of planets might evolve billions of years into the future.

But the calculated chances of such events occurring are tiny.

Writing in the journal Nature, a team led by Jacques Laskar shows there is also a chance Mercury could strike Venus and merge into a larger planet.

Professor Laskar of the Paris Observatory and his colleagues also report that Mars might experience a close encounter with Jupiter - whose massive gravity could hurl the Red Planet out of our Solar System.

Astronomers had thought that the orbits of the planets were predictable. But 20 years ago, researchers showed that there were slight fluctuations in their paths.

Now, the team has shown how in a small proportion of cases these fluctuations can grow until after several million years, the orbits of the inner planets begin to overlap.

The researchers carried out more than 2,500 simulations. They found that in some, Mars and Venus collided with the Earth.

"It will be complete devastation," said Professor Laskar.

"The planet is coming in at 10km per second - 10 times the speed of a bullet - and of course Mars is much more massive than a bullet."

Professor Laskar's calculations also show that there is a possibility of Mercury crashing into Venus. But in that scenario, the Earth would not be significantly affected.

"If there is anyone around billions of years from now, they'd see a burst of light in the sky and the two planets would be merged," he said.

"The new planet would be a little bit bigger than Venus, and the Solar System would be a little more regular after the collision, but the Earth's orbit would not be affected."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8093005.stm

Published: 2009/06/10 17:04:04 GMT

How Young Mice Phone Home: Study Gives Clue To How Mothers' Brains Screen For Baby Calls

A new study gives a clue to how mother mice' brains screen for baby calls. (Credit: The Liu lab)

ScienceDaily (June 11, 2009) — Emory University researchers have identified a surprising mechanism in the brains of mother mice that focuses their awareness on the calls of baby mice. Their study, published June 11 in Neuron, found that the high-frequency sounds of mice pups stand out in a mother's auditory cortex by inhibiting the activity of neurons more attuned to lower frequency sounds.

"Previous research has focused on how the excitation of neurons can detect or interpret sounds, but this study shows the key role that inhibition may play in real situations," said Robert Liu, assistant professor of biology and senior author of the study.

In 2007, Liu and colleagues were the first to demonstrate that the behavioral context in which communication sounds are heard affects the brain's ability to detect, discriminate and respond to them. Specifically, the researchers found that the auditory neurons of female mice that had given birth were better at detecting and discriminating vocalizations from mice pups than auditory neurons in virgin females.

Experiments on awake mice

While that experiment was done with anesthetized mice, the current study by Liu's lab is the first to record the activity of neurons in the auditory cortex of awake mice. Both female mice that had given birth and virgin female mice with no experience caring for mice pups were used in the study.

When exposed to the high-frequency whistles of mice pups, which fall into the 60 to 80 kilohertz range, a large area of neurons in the auditory cortex of the mother mice was more strongly inhibited than in the virgin mice. The pattern of excitation of neurons was similar, however, for both the mothers and virgins.

"Something different is happening in the mothers' brains when they are processing the same sound, and this difference is consistent," Liu said. "The inhibition of neurons appears to be enhancing the contrast in the sound of mice pups, so they stand out more in the acoustic environment."

Showing neural plasticity

Liu's research focuses on how the brain evolves to process sounds in the natural environment. "By understanding normal functioning of the auditory processes in the brain, then we can begin to understand what is breaking down in disease situations, such as following a stroke or brain lesion," he said.

Until recently, it had been widely assumed that the auditory cortex acted simply as a static filter, and that areas downstream in the brain did the complex task of learning to parse meaning from sounds.

"What our experiments help demonstrate is that even at this relatively early stage of cortical sound processing, responses are dynamic," Liu said. "The auditory cortex has plasticity, so that sounds that become behaviorally relevant to us can get optimized."

More research is needed, he added, to determine whether the changes in the brains of mother mice is due to hormonal shifts, the behavioral experience of caring for pups, or both.

The study authors include Edgar Galindo-Leon, a post-doctoral fellow in Liu's lab, and Frank Lin, a graduate student in the lab. Their research was funded by the National Institute for Deafness and Communication Disorders and the NSF Center for Behavioral Neuroscience.

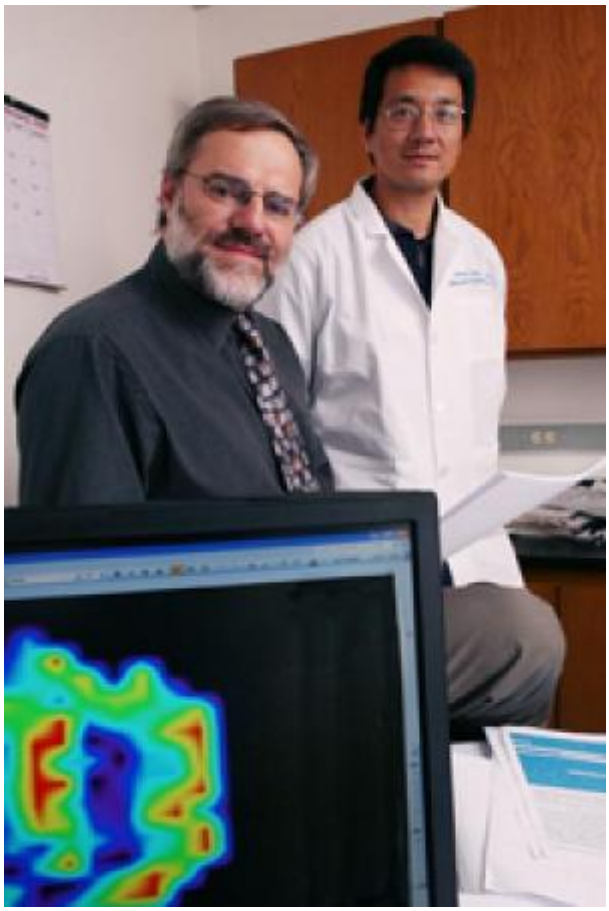
Journal reference:

1. Edgar E. Galindo-Leon, Frank G. Lin, Robert C. Liu. **Inhibitory Plasticity in a Lateral Band Improves Cortical Detection of Natural Vocalizations**. *Neuron*, 2009; DOI: 10.1016/j.neuron.2009.05.001
2.

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

http://www.sciencedaily.com/releases/2009/06/090610124422.htm

Oxygen Plus MRI Might Help Determine Cancer Therapy Success



Drs. Ralph Mason (left) and Dawen Zhao, both radiologists, have demonstrated that blood oxygen level dependent MRIs might help oncologists determine the best treatment for some cancer patients. (Credit: UT Southwestern Medical Center)

ScienceDaily (June 11, 2009) — A simple magnetic resonance imaging (MRI) test involving breathing oxygen might help oncologists determine the best treatment for some cancer patients, report researchers at UT Southwestern Medical Center.

Prior research has shown that the amount of oxygen present in a tumor can be a predictor of how well a patient will respond to treatment. Tumors with little oxygen tend to grow stronger and resist both radiotherapy and chemotherapy. Until now, however, the only way to gauge the oxygen level in a tumor, and thus determine which treatment might be more effective, was to insert a huge needle directly into the cancerous tumor.

The new technique, known as BOLD (blood oxygen level dependent) MRI, can detect oxygen levels in tumors without the need for an invasive procedure. The patient need only be able to breathe in oxygen when undergoing an MRI.

"The patient simply inhales pure oxygen, which then circulates through the bloodstream, including to the tumors," said Dr. Ralph Mason, professor of radiology, director of the UT Southwestern Cancer Imaging Center and senior author of a study appearing online and in a future edition of Magnetic Resonance in Medicine. "Using MRI, we can then go in and estimate how much oxygen a particular tumor is taking up, providing us some insight into how the tumor is behaving and what sort of treatment might be effective."

The most important finding, Dr. Mason said, is that BOLD MRI performed as well as the standard yet more invasive procedure for viewing tumors. That method, known as FREDOM (fluorocarbon relaxometry using echo planar imaging for dynamic oxygen mapping) MRI, requires the injection of a chemical called a reporter molecule directly into the tumor.

"The BOLD technique appears to indicate accurately the oxygen levels in tumors," Dr. Mason said. "Because BOLD is immediately applicable to patients, this holds promise as a new method for predicting response to therapy."

BOLD MRI has been used extensively in studying brain function, but the procedure has only recently begun to be used to assess blood oxygenation and vascular function in tumors.

Physicians at UT Southwestern are already testing BOLD MRI in patients with cervical, prostate, and head and neck cancer. They have proposed using it in lung cancer patients as well, Dr. Mason said. Previous research has shown that those specific tumor types are more likely to have little oxygen.

In the published study, researchers took multiple images of breast tumors implanted just below the skin of rats, which were given anesthesia to help them remain still during the imaging process. Humans do not require anesthesia, Dr. Mason said.

Dr. Mason said the team took the research back to the preclinical stage because they needed to better define what physicians were seeing in the clinic and whether the findings were reproducible.

Dr. Mason said that examining each form of cancer in this way presents its own technical challenges. For example, the motion of the lungs or the design of a face mask for breathing oxygen must be taken into account.

"If we can prove that the test is meaningful in animals, then it is that much more worthwhile to argue for doing it in a patient. This preclinical work provides the foundation for future clinical studies," Dr. Mason said. "It helps justify doing a larger clinical trial with the goal of ultimately becoming a diagnostic test for oncologists."

Researchers currently are trying to determine how much oxygen must be inhaled by a patient in order to be effective. The next step is to expand studies in patients and prove the relevance to more tumor types.

Other UT Southwestern researchers involved in the research were Dr. Dawen Zhao, lead author and assistant professor of radiology; Dr. Lan Jiang, a postdoctoral researcher in radiation oncology; and Dr. Eric Hahn, consultant in radiology.

The work was supported by the Department of Defense and the National Cancer Institute. The MRI experiments were performed in UT Southwestern's Advanced Imaging Research Center, an NIH-funded basic and translational research facility.

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

http://www.sciencedaily.com/releases/2009/06/090603091042.htm

Unmanned Aircraft Helping Scientists Learn About Alaskan Ice Seals

Ribbon seal and pup. (Credit: NOAA)

ScienceDaily (June 11, 2009) — NOAA's Fisheries Service scientists and their partners have launched an unmanned aircraft to mount the vehicle's first search for ice seals at the southern edge of the Bering Sea pack ice during the Arctic spring, in an effort to learn more about these remotely located species.

On May 13, the NOAA research vessel *McArthur II* departed Kodiak, Alaska, and headed for the Bering Sea to launch the ScanEagle, an unmanned aircraft that is being used to collect images and video along the ice edge.

NOAA's Fisheries Service scientists from the Alaska Science Center's National Marine Mammal Laboratory, in cooperation with the University of Alaska's Cooperative Institute for Arctic Research, will use the images, taken during the month-long expedition, to evaluate whether unmanned aircraft could be useful for estimating the abundance and distribution of ice seals. In 2008, NOAA determined that ribbon seals should not be listed under the Endangered Species Act. NOAA was also petitioned to list spotted, bearded and ringed seals, and is gathering information and preparing status reviews for those species.

"The distributions of ice seals are broad and include areas very far from shore," said Michael Cameron, NOAA's Fisheries Service's lead scientist on the expedition. "Using traditional, manned aircraft to survey all of the sea ice habitat in Alaskan waters would be challenging, expensive and potentially dangerous. We hope that the ScanEagle will provide a safe and efficient way to collect information in this remote environment."

The ScanEagle, owned and operated by the University of Alaska Fairbanks, weighs less than 27 pounds. When loaded with fuel and survey equipment it can fly for about 20 hours at a cruising speed between 48 and 75 knots.

The small aircraft is recovered through a modified "skyhook" system—a catch line, hung out over the water using a large deck crane, caught by airframe-mounted hooks on the ends of the ScanEagle wings.

"We tested the ScanEagle from two NOAA vessels, the Dyson and the McArthur II, in Puget Sound near Seattle," said Robyn Angliss, deputy director of NOAA's National Marine Mammal Laboratory. "It performed well and we expect the same in the far north."

There are many potential applications of this technology in the North Pacific. In addition to surveys for ice seals and other easily visible marine mammals such as walrus, the system could potentially be used to study near surface oceanography, sea ice conditions and movements, and to collect information on atmospheric and weather conditions.

Collecting data on seals and sea ice will improve the agency's understanding of seal habitat preferences and sensitivity to climate change.

Greg Walker and Don Hampton from the University of Alaska Fairbanks will be piloting their ScanEagle system from the McArthur II. Other key partners who have been pivotal in making this project successful are Insitu, the aircraft's manufacturer, their subcontractor Evergreen, and the U.S. Navy.

NOAA understands and predicts changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and conserves and manages our coastal and marine resources.

Adapted from materials provided by National Oceanic and Atmospheric Administration.

http://www.sciencedaily.com/releases/2009/06/090606110130.htm

Sleep Restriction Results In Weight Gain Despite Decreases In Appetite And Consumption

ScienceDaily (June 11, 2009) — According to a research abstract that will be presented on June 8 at Sleep 2009, the 23rd Annual Meeting of the Associated Professional Sleep Societies, in the presence of free access to food, sleep restricted subjects reported decrease in appetite, food cravings and food consumption; however, they gained weight over the course of the study. Thus, the finding suggests that energy intake exceeded energy expenditure during the sleep restriction.

Results indicate that people whose sleep was restricted experienced an average weight gain of 1.31 kilograms over the 11 days of the study. Of the subjects with restricted sleep who reported a change in their appetite and food consumption, more than 70 percent said that it decreased by day 5 of the study. A group of well rested control subjects did not experience the weight gain.

According to lead investigator Siobhan Banks, PhD, a research fellow at the University of South Australia and former assistant research professor at the University of Pennsylvania School of Medicine, it was surprising that participants did not crave foods rich in carbohydrates after sleep restriction, as previous research suggested they might. Results indicate that even though physiologically the desire to eat was not increased by sleep loss in participants, other factors such as the sedentary environment of the laboratory and the ability to snack for longer due to reduction in time spent asleep might have influenced the weight gain.

"During real-world periods of sleep restriction (say during shift work), people should plan their calorie intake over the time they will be awake, eating small, healthy meals," said Banks. "Additionally, healthy low fat/sugar snacks should be available so the temptation to eat comfort foods is reduced. Finally, keeping up regular exercise is just as important as what food you eat, so even though people may feel tried, exercising will help regulate energy intake balance."

The study involved 92 healthy individuals (52 male) between the ages of 22 and 45 years who participated in laboratory controlled sleep restriction. Subjects underwent two nights of baseline sleep (10 hours in bed per night), five nights of sleep restriction and varying recovery for four nights. Nine well rested participants served as controls. Food consumption was ad libitum (subjects had three regular meals per day and access to healthy snacks, and during nights of sleep restriction subjects were given a small sandwich at one a.m.).

Abstract Title: Sustained Sleep Restriction in Healthy Adults with Ad libitum Access to Food Results in Weight Gain without Increased Appetite or Food Cravings

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Adapted from materials provided by American Academy of Sleep Medicine.

http://www.sciencedaily.com/releases/2009/06/090608071935.htm

Mathematical Problem Solved After More Than 50 Years: Chern Numbers Of Algebraic Varieties

ScienceDaily (June 11, 2009) — A problem at the interface of two mathematical areas, topology and algebraic geometry, that was formulated by Friedrich Hirzebruch, had resisted all attempts at a solution for more than 50 years. The problem concerns the relationship between different mathematical structures. Professor Dieter Kotschick, a mathematician at the Ludwig-Maximilians-Universität (LMU) in Munich, has now achieved a breakthrough.

As reported in the online edition of the journal *Proceedings of the National Academy of Sciences* (PNAS), Kotschick has solved Hirzebruch's problem. Topology studies flexible properties of geometric objects that are unchanged by continuous deformations. In algebraic geometry some of these objects are endowed with additional structure derived from an explicit description by polynomial equations. Hirzebruch's problem concerns the relation between flexible and rigid properties of geometric objects. (PNAS, 9 June 2009)

Viewed topologically, the surface of a ball is always a sphere, even when the ball is very deformed: precise geometric shapes are not important in topology. This is different in algebraic geometry, where objects like the sphere are described by polynomial equations. Professor Dieter Kotschick has recently achieved a breakthrough at the interface of topology and algebraic geometry.

"I was able to solve a problem that was formulated more than 50 years ago by the influential German mathematician Friedrich Hirzebruch", says Kotschick. "Hirzebruch's problem concerns the relation between different mathematical structures. These are so-called algebraic varieties, which are the zero-sets of polynomials, and certain geometric objects called manifolds." Manifolds are smooth topological spaces that can be considered in arbitrary dimensions. The spherical surface of a ball is just a two-dimensional manifold.

In mathematical terminology Hirzebruch's problem was to determine which Chern numbers are topological invariants of complex-algebraic varieties. "I have proved that – except for the obvious ones – no Chern numbers are topologically invariant", says Kotschick. "Thus, these numbers do indeed depend on the algebraic structure of a variety, and are not determined by coarser, so-called topological properties. Put differently: The underlying manifold of an algebraic variety does not determine these invariants."

The solution to Hirzebruch's problem is announced in the current issue of *PNAS Early Edition*, the online version of PNAS.

Journal reference:

1. Dieter Kotschick. **Characteristic numbers of algebraic varieties**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0903504106

Adapted from materials provided by Ludwig-Maximilians-Universität München.

http://www.sciencedaily.com/releases/2009/06/090610124858.htm

Fossil Bone Bed Helps Reconstruct Life Along California's Ancient Coastline

Teeth such as this from the extinct 40-foot-long shark Carcharocles megalodon are common in the Sharktooth Hill Bone Bed because, like modern sharks, these extinct sharks also shed teeth throughout their lives. (Credit: Image courtesy of University of California - Berkeley)

ScienceDaily (June 10, 2009) — In the famed Sharktooth Hill Bone Bed near Bakersfield, Calif., shark teeth as big as a hand and weighing a pound each, intermixed with copious bones from extinct seals and whales, seem to tell of a 15-million-year-old killing ground.

Yet, new research by a team of paleontologists from the University of California, Berkeley, the University of British Columbia in Vancouver, Canada, and the University of Utah paints a less catastrophic picture. Instead of a sudden die-off, the researchers say that the bone bed is a 700,000-year record of normal life and death, kept free of sediment by unusual climatic conditions between 15 million and 16 million years ago.

The team's interpretation of the fossils and the geology to establish the origins of the bone bed, the richest and most extensive marine deposit of bones in the world, are presented in the June 2009 issue of the journal *Geology*.

The mix of shark bones and teeth, turtle shells three times the size of today's leatherbacks, and ancient whale, seal, dolphin and fish skeletons, comprise a unique six-to-20-inch-thick layer of fossil bones, 10 miles of it exposed, that covers nearly 50 square miles just outside and northeast of Bakersfield.

Since the bed's discovery in the 1850s, paleontologists have battled over an obvious question: How did the bones get there? Was this a killing ground for megalodon, a 40-foot version of today's great white shark? Was it a long-term breeding area for seals and other marine mammals, like Mexico's Scammon's lagoon is for the California gray whale? Did a widespread catastrophe, like a red tide or volcanic eruption, lead to a massive die-off?

The new and extensive study of the fossils and the geology of Sharktooth Hill tells a less dramatic story, but an important one, for understanding the origin of rich fossil accumulations, said Nicholas Pyenson, a

former UC Berkeley graduate student who is now a post-doctoral fellow at the University of British Columbia.

"If you look at the geology of this fossil bed, it's not intuitive how it formed," Pyenson said. "We really put together all lines of evidence, with the fossil evidence being a big part of it, to obtain a snapshot of that period of time."

Pyenson and his colleagues, totaling five UC Berkeley Ph.D.s and UC Berkeley integrative biology professor Jere Lipps, hope that the study will draw renewed attention to the bone bed, which Lipps said needs protection even though a small portion of it was added to the National Natural Landmark registry in 1976.

"This deposit, if properly developed, would look just like Dinosaur National Monument," said Lipps, referring to a popular park in Colorado and Utah. "(Sharktooth Hill) is actually much more extensive, and the top of the bone bed has complete, articulated skeletons of seals and other marine mammals."

One 12-foot-long fossil seal skeleton that Lipps helped excavate during the 50 years he has visited the bone bed was mounted and displayed for decades at the Natural History Museum of Los Angeles County (NHM), which houses thousands of fossils excavated from the Sharktooth Hill deposits during expeditions in the 1960s and 1980s. Other collections are in the California Academy of Sciences, San Diego Natural History Museum, Buena Vista Museum of Natural History in Bakersfield, and UC Berkeley's Museum of Paleontology (UCMP), where students over the years have made studies of the bone bed's extinct sea turtles, sharks, marine mammals and seabirds. Lipps is a faculty curator in the UCMP.

The paper's other coauthors - all of whom obtained their Ph.D.s from UC Berkeley - are Randall B. Irmis, now an assistant professor of geology and geophysics at the University of Utah, and Lawrence G. Barnes, Edward D. Mitchell Jr. and Samuel A. McLeod of NHM's Department of Vertebrate Paleontology.

When the bone bed formed between 15,900,000 and 15,200,000 years ago, the climate was warming, sea level was at a peak, California's Central Valley was an inland sea dubbed the Temblor Sea and the emerging Sierra Nevada was shoreline. By closely studying the geology of the Sharktooth Hill area, the paleontologists determined that it was part of an underwater shelf in a large embayment, directly opposite a wide opening to the sea.

Pyenson and Irmis examined some 3,000 fossilized bone and teeth specimens in the collections of many museums, including the NHM and UCMP, and they and Lipps also cut out a meter-square section of the bone bed, complete with the rock layers above and below, and transported it to UC Berkeley for study.

Below the bone bed, they found several feet of mudstone interlaced with shrimp burrows, typical of ocean floor sediment several hundred to several thousand feet below the surface. The bone bed itself averaged 200 bones per square meter, most of them larger bones, with almost no sediment. Most were disarticulated, as if the animal carcasses had decayed and their bones had been scattered by currents.

"The bones look a bit rotten," Lipps said, "as if they lay on the seafloor for a long time and were abraded by water with sand in it." Many bones had manganese nodules and growths, which form on bones that sit for long periods in sea water before being covered by sediment.

Toward the top of the bone bed, some articulated skeletons of seals and whales were found, while in the layer above the bone bed, most skeletons were articulated and encased in sediment.

The team's conclusion is that the climatic conditions were such that currents carried sediment around the bone beds for 100,000 to 700,000 years, during which time bones remained exposed on the ocean floor and accumulated in a big and shifting pile.

Given the rarity of bones marked by shark bites, plus the occurrence of terrestrial animals such as tapirs and horses that must have washed out to sea, predation by sharks like Carcharocles megalodon seems unlikely to have been the major source of the bone bed, the authors wrote. Because of few young or juvenile specimens, the team also discounted the hypothesis that this was a breeding ground for early seals such as Allodesmus. The absence of volcanic ash makes a volcanic catastrophe unlikely, while the presence of land mammal fossils makes red tide an unlikely cause.

"These animals were dying over the whole area, but no sediment deposition was going on, possibly related to rising sea levels that snuffed out silt and sand deposition or restricted it to the very near-shore environment," Pyenson said. "Once sea level started going down, then more sediment began to erode from near shore."

Pyenson noted that, while bone beds around the world occur in diverse land and marine environments, the team's analysis of the Sharktooth Hill Bone Bed could have implications for other fossil-rich marine deposits.

The work was funded by UCMP and UC Berkeley's Department of Integrative Biology, as well as by grants from the Geological Society of America and the American Museum of Natural History, and graduate fellowships from the National Science Foundation.

Adapted from materials provided by University of California - Berkeley.

http://www.sciencedaily.com/releases/2009/06/090608131144.htm

Moon Magic: New Tool To Visualize Past, Future Lunar Eclipses

*The top row of images is comprised of digital photographs taken from Troy, N.Y. of the Feb. 21, 2008 lunar eclipse. The bottom row of images is comprised of computer simulations rendered by researchers at Rensselaer Polytechnic Institute. (Credit: Image courtesy of Rensselaer Polytechnic Institute*ScienceDaily (June 10, 2009) — Lunar eclipses are well-documented throughout human history. The rare and breathtaking phenomena, which occur when the moon passes into the Earth's shadow and seemingly changes shape, color, or disappears from the night sky completely, caught the attention of poets, farmers, leaders, and scientists alike. Researchers at Rensselaer Polytechnic Institute have developed a new method for using computer graphics to simulate and render an accurate visualization of a lunar eclipse. The model uses celestial geometry of the sun, Earth, and moon, along with data for the Earth's atmosphere and the moon's peculiar optical properties to create picture-perfect images of lunar eclipses.The computer-generated images, which are virtually indistinguishable from actual photos of eclipses, offer a chance to look back into history at famous eclipses, or peek at future eclipses scheduled to occur in the coming years and decades. The model can also be configured to show how the eclipse would appear from any geographical perspective on Earth — the same eclipse would look different depending if the viewer was in New York, Seattle, or Rome. "Other researchers have rendered the night sky, the moon, and sunsets, but this is the first time anyone has rendered lunar eclipses," said Barbara Cutler, assistant professor of computer science at Rensselaer, who supervised the study. "Our models may help with investigations into historical atmospheric phenomena, and they could also be of interest to artists looking to add this special effect to their toolbox."Graduate student Theodore C. Yapo presented the study, titled "Rendering Lunar Eclipses," in late May at the Graphics Interface 2009 conference. The appearance of lunar eclipses can vary considerably, ranging from nearly invisible jet black to deep red, rust, to bright copper-red or orange. The appearance depends on several different factors, including how sunlight is refracted and scattered in the Earth's atmosphere. Yapo and Cutler combined and configured models for sunlight, the solar system, as well as the different layers and different effects of the Earth's atmosphere, to develop their lunar eclipse models.For the study, Yapo and Cutler compared digital photos of the Feb. 21, 2008, total lunar eclipse with computer-rendered models of the same eclipse. The rendered images were nearly indistinguishable from the photos.Another model they created was a rendering of the expected 2010 lunar eclipse. Yapo said he looks forward to taking photographs of the event and comparing them to the renderings. One potential hiccup, he said, is the April eruption of Mt. Redoubt in Alaska – volcanic dust in the Earth's stratosphere can make a lunar eclipse noticeably darker and more brown. Yapo and Cutler's models can account for this dust, but they performed their simulation prior to the eruption, and assumed a low-dust atmosphere.

1. Theodore C. Yapo and Barbara Cutler. **Rendering Lunar Eclipses**. *Proceedings of Graphics Interface*, 2009

Adapted from materials provided by Rensselaer Polytechnic Institute.

http://www.sciencedaily.com/releases/2009/06/090608131158.htm

New Cleaning Protocol For Future 'Search For Life' Missions

Testing of next generation rovers onboard the Arctic Mars Analogue Svalbard Expedition. This "Cliffbot" rover is being designed to sample rock outcrops on Mars and the Moon where scientifically relevant samples are easier to access. (Credit: Photo courtesy of Kvell Ove Storvik, Arctic Mars Analog Svalbard Expedition (AMASE). Rover courtesy of the Jet Propulsion Laboratory, California Institute of Technology.)

ScienceDaily (June 10, 2009) — Scientists have developed a new cleaning protocol for space hardware, such as the scoops of Mars rovers, which could be used on future "Search for Life" missions on other planets.

The new protocol was developed as part of a project to investigate life that exists in extreme Arctic environments, which are the closest analogue we have on Earth to the surface of Mars. The studies are also designed to help guide future NASA and ESA planetary missions.

Published in the journal *Astrobiology*, the decontamination protocol was developed and tested by scientists at the University of Leeds and NASA. It deals with the dilemma known as 'forward contamination' - ensuring that bugs from Earth don't hitch a ride across space and jeopardise the integrity of samples collected by rovers.

The decontamination protocol involves a cocktail of chemicals that were applied and tested on various sampling devices, including a glacial ice core drill and a rover scoop.

"We are trying to avoid a case of mistaken identity," says Professor Liane Benning, a biogeochemist from the University of Leeds and co-author of the paper.

"We know that on Mars, if present, any biological signatures will be extremely scarce. Therefore it is essential that we are able to minimise 'background noise' and to document just how clean our sampling devices really are before we use them," she adds.

"We are now able to fully decontaminate sampling devices in the lab and field to null levels of detectable organic biosignatures, before any samples are collected. Importantly, this new procedure doesn't just sterilise, but it also cleans off any trace organic molecules of dead organisms," says Professor Benning.

The work was carried out as part of the Arctic Mars Analog Svalbard Expeditions (AMASE) which uses Svalbard (a set of islands in the Arctic ocean at 74-80˚N) as an international test site for NASA and ESA "Search for Life" instrumentation scheduled to fly on future Mars missions.

Svalbard is an excellent terrestrial analogue environment to Mars as life is scarce and it has a similar geology and many pristine glaciers.

"This work also enabled recent habitability and biomarker preservation studies in the extreme glacial settings of Svalbard. In addition, this work will guide future planetary missions, especially those to icy regions in the Solar System, such as Mars, or the moons of Jupiter and Saturn (Europa and Enceladus) where we are interested in understanding the potential habitats of cold-loving organisms living in ice," says Dr Jennifer Eigenbrode, NASA research scientist.

This work was carried out during the 2005 and 2006 field seasons of AMASE and was funded by a NASA ASTEP award to co-author Andrew Steele at the Carnegie Institution of Washington and grants from the Earth and Biosphere Institute at the University of Leeds to Liane G. Benning.

Journal reference:

1. Eigenbrode et al. **A Field-Based Cleaning Protocol for Sampling Devices Used in Life-Detection Studies**. *Astrobiology*, 2009; 090604064537080 DOI: 10.1089/ast.2008.0275

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

http://www.sciencedaily.com/releases/2009/06/090608071952.htm

What Causes Irritability In Menopause?

ScienceDaily (June 10, 2009) — Irritability is frequently the main presenting complaint of perimenopausal and postmenopausal women; yet, studies specifically researching on irritability in this population are lacking.

As it remains controversial whether mood symptoms related to menopause are independently associated with hormonal changes or whether they are secondary to vasomotor or other bothersome symptoms of menopause, such as insomnia. This study aims to assess irritability in either perimenopausal or postmenopausal women, to look for possible associations with vasomotor symptoms, insomnia and chronic disease, and to explore possible hormonal links with sex steroids, gonadotrophins, prolactin and thyroid hormones. A total of 163 peri- and postmenopausal women, non-hormonal therapy or tibolone users, attending a menopause clinic were included in this cross-sectional study.The subjects completed the Irritability, Depression, Anxiety Scale, which is an 18-item self-report scale that assesses irritability as a temporary psychological state. Irritability is divided into 'outwardly directed' if it is expressed toward others and 'inwardly directed' if it is directed toward oneself. Climacteric symptoms were evaluated by Greene's scale, which provides subscores for vasomotor symptoms. Insomnia was measured by the Athens Insomnia Scale. Chronic disease refers to the existence of hypertension, cardiac disease, diabetes mellitus or thyroid disease.

The study sample consisted of 163 women, with a mean age of 55.1 years (SD = 5.7). Of the total sample, 124 women were postmenopausal and 26 perimenopausal. Fifty-four women suffered from chronic disease. The mean score for inward irritability was 5.1 (SD = 2.4) and 5.9 (SD = 2.7) for outward irritability. The mean scores for inward and outward irritability, insomnia and vasomotor symptoms were not different between peri- and postmenopausal women (analysis of covariance, $p > 0.05$). A significant positive correlation was found between outward irritability and FSH ($r = 0.25$,$p = 0.005$) and LH levels ($r = 0.26$, $p = 0.006$). There was no significant association between inward irritability and hormonal levels. No significant relationships were detected between vasomotor symptoms, insomnia and menopausal status and the 2 subscales of irritability.Multiple linear regression analysis indicated that women with chronic disease had a significantly higher score on both the inward and the outward irritability scales, with effect sizes equal to 44.6 and 40.0%, respectively. Furthermore, in the multivariable model outward irritability was associated both with increased levels of FSH and LH, with effect sizes for a 20-unit increase equal to 22.2 and 37.0%, respectively. Outward and inward irritability of peri- and postmenopausal women was found to be related to chronic disease, a factor that is not specific to menopause but may be partially influenced by the older age of menopausal women. Outwardly directed irritability was found to be related to FSH and LH levels.

There are no data supporting a possible direct association between FSH and LH and the expression of outward irritability. However, as FSH and LH are markers of ovarian aging and menopause, the results of this study may give an indication of a link between outward irritability and menopause.

Journal reference:

1. Spyropoulou et al. **Irritability in Menopause: An Investigation of Its Relation to Menopausal, Hormonal and Physical Factors**. *Psychotherapy and Psychosomatics*, 2009; 78 (2): 128 DOI: 10.1159/000203120

Adapted from materials provided by Journal of Psychotherapy and Psychosomatics, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090609073026.htm

Predictive Powers: A Robot That Reads Your Intention?

Joint toy-making activity between robot and man. (Credit: Copyright JAST)

ScienceDaily (June 10, 2009) — European researchers in robotics, psychology and cognitive sciences have developed a robot that can predict the intentions of its human partner. This ability to anticipate (or question) actions could make human-robot interactions more natural.

The walking, talking, thinking robots of science fiction are far removed from the automated machines of today. Even today's most intelligent robots are little more than slaves – programmed to do our bidding.Many research groups are trying to build robots that could be less like workers and more like companions. But to play this role, they must be able to interact with people in natural ways, and play a pro-active part in joint tasks and decision-making. We need robots that can ask questions, discuss and explore possibilities, assess their companion's ideas and anticipate what their partners might do next.

The EU-funded JAST project (http://www.euprojects-jast.net/) brings a multidisciplinary team together to do just this. The project explores ways by which a robot can anticipate/predict the actions and intentions of a human partner as they work collaboratively on a task.

Who knows best?

You cannot make human-robot interaction more natural unless you understand what 'natural' actually means. But few studies have investigated the cognitive mechanisms that are the basis of joint activity (i.e. where two people are working together to achieve a common goal). A major element of the JAST project, therefore, was to conduct studies of human-human collaboration. These experiments and observations could feed into the development of more natural robotic behaviour.The researchers participating in JAST are at the forefront of their discipline and have made some significant discoveries about the cognitive processes involved in joint action and decision-making. Most importantly, they scrutinised the ways in which observation plays an important part in joint activity.

Scientists have already shown that a set of 'mirror neurons' are activated when people observe an activity. These neurons resonate as if they were mimicking the activity; the brain learns about an activity by effectively copying what is going on. In the JAST project, a similar resonance was discovered during joint tasks: people observe their partners and the brain copies their action to try and make sense of it.

In other words, the brain processes the observed actions (and errors, it turns out) as if it is doing them itself. The brain mirrors what the other person is doing either for motor-simulation purposes or to select the most adequate complementary action.

Resonant robotics

The JAST robotics partners have built a system that incorporates this capacity for observation and mirroring (resonance).

“In our experiments the robot is not observing to learn a task,” explains Wolfram Erlhagen from the University of Minho and one of the project consortium's research partners. “The JAST robots already know the task, but they observe behaviour, map it against the task, and quickly learn to anticipate [partner actions] or spot errors when the partner does not follow the correct or expected procedure.”The robot was tested in a variety of settings. In one scenario, the robot was the 'teacher' – guiding and collaborating with human partners to build a complicated model toy. In another test, the robot and the human were on equal terms. “Our tests were to see whether the human and robot could coordinate their work,” Erlhagen continues. “Would the robot know what to do next without being told?” By observing how its human partner grasped a tool or model part, for example, the robot was able to predict how its partner intended to use it. Clues like these helped the robot to anticipate what its partner might need next. “Anticipation permits fluid interaction,” says Erlhagen. “The robot does not have to see the outcome of the action before it is able to select the next item.”

The robots were also programmed to deal with suspected errors and seek clarification when their partners’ intentions were ambiguous. For example, if one piece could be used to build three different structures, the robot had to ask which object its partner had in mind.

From JAST to Jeeves

But how is the JAST system different to other experimental robots?

“Our robot has a neural architecture that mimics the resonance processing that our human studies showed take place during joint actions,” says Erlhagen. “The link between the human psychology, experimentation and the robotics is very close. Joint action has not been addressed by other robotics projects, which may have developed ways to predict motor movements, but not decisions or intentions. JAST deals with prediction at a much higher cognitive level.”

Before robots like this one can be let loose around humans, however, they will have to learn some manners. Humans know how to behave according to the context they are in. This is subtle and would be difficult for a robot to understand.Nevertheless, by refining this ability to anticipate, it should be possible to produce robots that are proactive in what they do.

Not waiting to be asked, perhaps one day a robot may use the JAST approach to take initiative and ask: “Would you care for a cup of tea?”The JAST project received funding from the ICT strand of the EU’s Sixth Framework Programme for research.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com/releases/2009/06/090605075302.htm

Size Of A Galaxy Can Be Determined By Its Dark Matter, Physicists And Mathematicians Show

Dark matter ring. (Credit: Image courtesy of Andalucía Innova)

ScienceDaily (June 10, 2009) — Dark matter is an enigmatic energy that makes up most of the mass in the Universe, whose nature has not yet been identified. Researchers have succeeded in estimating the percentage of dark matter in the Universe and describing the processes related to the very existence of this matter. But, until now, no one has established the distribution and behavior of the dark matter in a galaxy.

Now, astronomers in the Theoretical Physics and Cosmos Department of the University of Granada, led by Eduardo Battaner, in collaboration with researchers in the Applied Mathematics Department, have made great progress: establishing the distribution and behaviour of the dark matter in a galaxy.

New mathematical calculations on the dark matter describe the density profiles which define how the dark matter changes in a galaxy. This had not been specified in the astronomy field yet. Until now, the behaviour of the dark matter had been estimated through simulations, but the new mathematical description approach based on equations and functions which describe each characteristic of the dark matter make this result much more reliable.

Specifically this new discovery allows a better understanding of the actual size of a galaxy. The collaboration of astronomers and mathematicians has allowed the developing of the density function of dark matter in a galaxy, describing how the dark matter is arranged from the galactic centre to its outermost part. When watching a galaxy to study the dark matter, a much larger size of a galaxy can be seen compared to that identified when watching the visible radiation. At the same time, it has been concluded that the density of the dark matter in a galaxy is maximum in the centre and it gradually decreases as it gets to the outermost part, but increases considerably the total size of the galaxy. This finding introduces new criteria into the study of galactic dynamics and, of course, of the dark matter.

Dark matter is a main component of the Universe, which has not yet been directly observed. In fact it is the component that makes up the greatest part of the Universe mass. This concept was used for the first time by Fritz Zwicky in 1933. He deduced the existence of a considerable quantity of mass that could not be observed but had to exist as an explanation to the phenomenon of galaxy movements. Currently, the quantity of dark matter in the Universe is well known: 23% dark matter vs. just over 4% of visible matter. The rest, up to 100%, is enigmatic dark energy. Despite the fact that we know well the quantity of dark matter and its behaviour, its nature has not yet been identified. This is one of the most important challenges in cosmology.

"With these results, we cannot establish what dark matter is, but we have defined its behaviour and we have information that helps to know other characteristics like its temperature," Eduardo Battaner said with regard to the results of his research.

Starting from the wide knowledge of the group of astronomers on the dynamics of a galaxy, and applying it through the mathematical modelling knowledge, some complex descriptive functions have been developed which represent the dynamics of the dark matter. Professor Juan Soler, of the university of Granada, has been the coordinator of the research part related to the mathematical calculus.

Adapted from materials provided by Andalucía Innova, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090609073156.htm

Circadian Rhythm: How Cells Tell Time

Dr. Yi Liu is studying mold that uses a protein called FRQ as the main gear of its biological clock. His research team had found that a sequence of changes in the protein's chemical structure is used to mark time, a finding that might someday help develop treatments for human sleep disorders. (Credit: Image courtesy of UT Southwestern Medical Center)

ScienceDaily (June 10, 2009) — The fuzzy pale mold that lines the glass tubes in Dr. Yi Liu's lab doesn't look much like a clock.

But this fungus has an internal, cell-based timekeeper nearly as sophisticated as a human's, allowing UT Southwestern Medical Center physiologists to study easily the biochemistry and genetics of body clocks, or circadian rhythms.

In a new study appearing online this week in the *Proceedings of the National Academy of Sciences*, Dr. Liu and his co-workers have found that this mold, which uses a protein called FRQ as the main gear of its clock, marks time by a sequence of changes in the protein's chemical structure.

Dr. Liu said the new finding might someday help researchers develop treatments for human sleep disorders and other problems associated with a faulty biological clock.

"This timekeeping protein is really the core component of the circadian clock," said Dr. Liu, professor of physiology at UT Southwestern and senior author of the study.

Despite the evolutionary distance from mold to man, mechanisms controlling their circadian clocks are very similar. In both, circadian rhythms control many biological processes, including cell division, hormonal release, sleep/wake cycles, body temperature and brain activity.

The researchers employed a fungus called Neurospora, an organism frequently used in studies on genetics and cell processes, especially circadian rhythms. It reproduces in the dark and rests in the light.

A decade ago, Dr. Liu discovered that FRQ controlled the cellular clock in Neurospora by chemical changes of its protein structure. As the day goes on, the cell adds chemical bits called phosphates to the protein. Each new phosphate acts like a clock's ticking, letting the cell know that more time has passed.

When the number of phosphates added to FRQ reaches a certain threshold, the cell breaks it down, ready to start the cycle again.

The researchers, however, did not know where the phosphates attached to FRQ, how many got added throughout a day, or how they affected the protein's ability to "tell" time.

In the current study, the researchers used purified FRQ to analyze the specific sites where phosphate groups attach. In all, the researchers found 76 phosphate docking sites.

"This is an extremely high number," Dr. Liu said. "Most proteins are controlled by only a handful of phosphate sites."

They also studied how these phosphates are added to FRQ daily and found that two enzymes are responsible for adding most of the phosphate groups in Neurospora. They also found that the total number of phosphates oscillates robustly day by day.

In addition, the researchers created a series of mutations in many of the phosphate docking sites, creating strains of mold that had abnormally short or long daily clocks.

In upcoming studies, the researchers plan to identify which enzymes add phosphates to specific sites and exactly how changes in a particular site affect a cell's clock.

Other UT Southwestern physiology researchers contributing to the work were co-lead authors Dr. Chi-Tai Tang, postdoctoral researcher, and Dr. Shaojie Li, former postdoctoral researcher; Dr. Joonseok Cha, postdoctoral fellow; Dr. Guocun Huang, assistant instructor; and Dr. Lily Li, former postdoctoral researcher. Researchers from the National Institute of Biological Sciences in China and the Chinese Academy of Sciences also participated.

The study was supported by the National Institutes of Health and the Welch Foundation.

Adapted from materials provided by UT Southwestern Medical Center.

http://www.sciencedaily.com/releases/2009/06/090608182537.htm

'Jellyfish Joyride' A Threat To The Oceans

The numbers of jellyfish, like this 'Catostylus', appear to be on the increase due to a combination of pollution, overfishing and climate change. (Credit: Lisa Gershwin, Reef HQ)

ScienceDaily (June 10, 2009) — Early action could be crucial to addressing the problem of major increases in jellyfish numbers, which appears to be the result of human activities.New research led by CSIRO Climate Adaptation Flagship and University of Queensland scientist, Dr Anthony Richardson, presents convincing evidence that this 'jellyfish joyride' is associated with over-fishing and excess nutrients from fertilisers and sewage.

"Dense jellyfish aggregations can be a natural feature of healthy ocean ecosystems, but a clear picture is now emerging of more severe and frequent jellyfish outbreaks worldwide," Dr Richardson says.

"In recent years, jellyfish blooms have been recorded in the Mediterranean, the Gulf of Mexico, the Black and Caspian Seas, the Northeast US coast, and particularly in Far East coastal waters."The most dramatic have been the outbreaks in the Sea of Japan involving the gargantuan Nomura jellyfish which can grow up to 2 m in diameter and weigh 200 kg."The new research, by Dr Richardson and colleagues at the University of Miami, Swansea University and the University of the Western Cape, has been published in the international journal; *Trends in Ecology and Evolution*, in time for World Oceans Day on 8 June. "Fish normally keep jellyfish in check through competition and predation but overfishing can destroy that balance," Dr Richardson says. "For example, off Namibia intense fishing has decimated sardine stocks and jellyfish have replaced them as the dominant species." Climate change may favour some jellyfish species by increasing the availability of flagellates in surface waters – a key jellyfish food source. Warmer oceans could also extend the distribution of many jellyfish species.

"Mounting evidence suggests that open-ocean ecosystems can flip from being dominated by fish, to being dominated by jellyfish," Dr Richardson says "This would have lasting ecological, economic and social consequences.

"We need to start managing the marine environment in a holistic and precautionary way to prevent more examples of what could be termed a 'jellyfish joyride'."

ournal reference:

1. Richardson et al. **The jellyfish joyride: causes, consequences and management responses to a more gelatinous future**. *Trends in Ecology & Evolution*, 2009; 24 (6): 312 DOI: 10.1016/j.tree.2009.01.010

Adapted from materials provided by CSIRO Australia.

http://www.sciencedaily.com/releases/2009/06/090609092057.htm

Interactive Data Eyeglasses: New Data Eyeglasses Can Read From Engineer's Eyes Which Details Need To Be Included On Building Plans

Interactive Data Eyeglasses. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (June 10, 2009) — New data eyeglasses can read from the engineer's eyes which details he needs to see on the building plans. A CMOS chip with an eye tracker in the microdisplay makes this possible. The eyeglasses are connected to a PDA, display information and respond to commands. For car designers, secret agents in the movies and jet fighter pilots, data eyeglasses – also called head-mounted displays, or HMDs for short – are everyday objects. They transport the wearer into virtual worlds or provide the user with data from the real environment. At present these devices can only display information. "We want to make the eyeglasses bidirectional and interactive so that new areas of application can be opened up," says Dr. Michael Scholles, business unit manager at the Fraunhofer Institute for Photonic Microsystems IPMS in Dresden.A group of scientists at IPMS is working on a device which incorporates eye tracking – users can influence the content presented by moving their eyes or fixing on certain points in the image. Without having to use any other devices to enter instructions, the wearer can display new content, scroll through the menu or shift picture elements. Scholles believes that the bidirectional data eyeglasses will yield advantages wherever people need to consult additional information but do not have their hands free to operate a keyboard or mouse. The Dresden-based researchers have integrated their system's eye tracker and image reproduction on a CMOS chip. This makes the HMDs small, light, easy to manufacture and inexpensive.The chip measuring 19.3 by 17 millimeters is fitted on the prototype eyeglasses behind the hinge on the temple. From the temple the image on the microdisplay is projected onto the retina of the user so that it appears to be viewed from a distance of about one meter. The image has to outshine the ambient light to ensure that it can be seen clearly against changing and highly contrasting backgrounds. For this reason the research scientists use OLEDs, organic light-emitting diodes, to produce microdisplays of particularly high luminance.

In industry and in the medical field, the interactive data eyeglasses could enable numerous tasks to be performed more simply, efficiently and precisely. Many scenarios are possible, including patients' vital functions, MRT and x-ray images for the operating surgeon, construction drawings for erection engineers and installation instructions for service technicians. Some users have already tried out conventional HMDs, but the results were not very impressive. In most cases they were found to be too expensive, too heavy, too bulky and not very ergonomic. "We have now overcome these hurdles," says Scholles. With his team and colleagues from other Fraunhofer institutes he is already working on the next development stage of the bidirectional eyeglasses.

Adapted from materials provided by Fraunhofer-Gesellschaft, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090608143703.htm

Sleep Extension Improves Athletic Performance And Mood

ScienceDaily (June 10, 2009) — Athletes who extended their nightly sleep and reduced accumulated sleep debt reported improvements in various drills conducted after every regular practice, according to a research abstract that will be presented on June 8, at Sleep 2009, the 23rd Annual Meeting of the Associated Professional Sleep Societies.

Results of the study indicated that sleep extension in athletes was associated with a faster sprinting drill (approximately 19.12 seconds at baseline versus 17.56 seconds at end of sleep extension), increased hitting accuracy including valid serves (12.6 serves compared to 15.61 serves), and hitting depth drill (10.85 hits versus 15.45 hits).

According to the lead author of the study, Cheri Mah, M.S., researcher at the Stanford Sleep Disorders Clinic and Research Laboratory at Stanford University in CA., many of the athletes who participated in the study realized for the first time the importance of sleep and how it impacts their performance during competitions.

"Traditionally, elite athletes dedicate numerous hours to daily practice, strength training, and conditioning as well as work closely with nutritionists in hopes of optimizing their athletic performance," said Mah. "However, very little, if any, attention is focused on an athlete's sleeping patterns and habits. While most athletes and coaching staff may believe that sleep is an important contributing factor in sports, many do not realize that optimal or peak performance can only occur when an athlete's sleep and sleep habits are optimal."

The study included five healthy students between the ages of 18 and 21 who were members of the Stanford Women's tennis team. Athletes maintained their habitual sleep/wake patterns for a two to three week baseline during their regular tennis seasons. Athletic performance assessments were reported after every practice throughout the study, including sprinting and hitting drills. Athletes then extended their sleep, aiming for 10 hours a night for a period of five to six weeks. Mood and daytime sleepiness were monitored and daily sleep/wake activities were monitored through actigraphy and sleep journals. The study was conducted specifically during the regular tennis season to provide data during weekly practices as well as during tournaments and competitions.

Mah believes that findings of this study would be pertinent to other sports, in that daytime sleepiness would be reduced and mood and athletic performance would improve based on findings from initial trails of this study, which were presented at the 2007 (focusing on Basketball) and 2008 (focusing on swimming) SLEEP Conferences.

Adapted from materials provided by American Academy of Sleep Medicine.

http://www.sciencedaily.com/releases/2009/06/090608071939.htm

Physiological Response May Explain Why Some Severely Obese Patients Overeat

ScienceDaily (June 10, 2009) — Don't feel like you are getting full when eating a large meal? New research from The Miriam Hospital suggests that a physiological response may partially explain why severely obese individuals may not feel satisfied after eating and often have difficulty controlling the amount of food they consume during a meal.

Researchers led by Dale Bond, PhD, of The Miriam Hospital's Weight Control and Diabetes Research Center focused on habituation, or the idea that continual exposure to a specific food decreases one's physical response to that food. Habituation theory suggests that if one habituates, or adjusts, slowly to food cues, they are less likely to feel satisfied with that particular food and can consume more of it.In the study, published online in Obesity Surgery, the research team looked at saliva production following repeated exposure to lemon juice. They compared the responses of two groups – severely obese patients preparing for bariatric surgery and normal weight individuals – and found that the bariatric surgery candidates continued to salivate at a consistent rate throughout the tastings, indicating that very little habituation occurred. Meanwhile, the salivation rate of the normal weight controls decreased with successive exposures to the lemon juice.

"The failure of bariatric surgery candidates to habituate suggests that satiation, or the feeling of fullness while eating, is impaired in this population. This could play a role in the inability of some severely obese individuals to regulate or control the amount of food that they eat during a meal," says Bond.He adds that the findings make a case for the use of habituation as a model to study why some patients who have undergone bariatric surgery continue to engage in problematic behaviors, such as binge eating, which contributes to poorer weight loss outcomes.

The study included 34 severely obese bariatric surgery candidates and 18 individuals of normal weight. Saliva was collected from cotton balls positioned in each participant's mouth during two baseline water trials and ten lemon juice trials. Participants also completed questionnaires to assess the level of conscious control over eating as well as the frequency of binge eating episodes during the previous 28 days.Although the study's findings support previous research comparing individuals with mild obesity and normal weight individuals, the researchers say this is the first study to test this model in a severely obese patient population.

"Bariatric surgery has been referred to as 'behavioral surgery,' given the importance of eating behavior in postoperative outcomes. Habituation may be a valuable tool for enhancing our understanding of eating regulation in severely obese individuals and how it is impacted by bariatric surgery," says Bond, who is also an assistant professor (research) in psychiatry (weight control) at The Warren Alpert Medical School of Brown University.The authors add that further research is needed to determine whether habituation rates to food stimuli change after bariatric surgery and whether such changes are related to weight loss and/or mechanisms specific to different surgical procedures.

The research was funded by grants from Alpert Medical School's Center for Excellence in Women's Health and the American Diabetes Association. Study co-authors were Rena R. Wing, Harry C. Sax and Sivamainthan Vithiananthan, all from The Miriam Hospital and Alpert Medical School; G.D. Roye and Beth A. Ryder from Rhode Island Hospital and Alpert Medical School; Dieter Pohl from Roger Williams Hospital; and Hollie A. Raynor from the University of Tennessee.

Adapted from materials provided by Lifespan, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090609130806.htm

What About The Boys? Boys Face Serious Issues Which Are Being Ignored, Experts Argue

ScienceDaily (June 10, 2009) — Both boys and girls have issues, but boys seem to be the ones getting the raw deal. According to Judith Kleinfeld, professor of psychology at the University of Alaska Fairbanks in the US, issues affecting boys are more serious than those affecting girls, but they have been neglected by policy makers. Her review of issues characterizing American boyhood, how they compare to those affecting girls, and the lack of initiatives in place to address them has just been published in the June issue of Springer's journal *Gender Issues*.

Professor Kleinfeld's paper reviews the different viewpoints surrounding the debated existence of a so-called 'boy crisis'. She then looks at gender differences in measures of educational achievement including literacy levels, college entrance tests, school grades, engagement in schools, dropout rates, as well as psychological issues affecting young people including mental health, suicide, depression and conduct disorders. Lastly, she shows how boys and girls compare in terms of premature death and injuries and rates of delinquency and arrests.

According to Judith Kleinfeld, boys get the raw deal. Compared with girls, American boys have lower rates of literacy, lower grades and engagement in school, higher drop-out from school, and dramatically higher rates of suicide, premature death, injuries, and arrests. Boys are also placed more often in special education. Girls on the other hand are more likely to have different problems including depression, suicidal thoughts and eating disorders.

The researcher argues that although there have been numerous federal, state, school district, and foundation programs aimed at addressing issues faced by girls, led in part by the strong feminist movement, the same cannot be said for the problems encountered by boys. In her view, they have been largely neglected.

Professor Kleinfeld concludes: "In terms of policy discussion and educational investments, the nation is addressing gender differences which barely exist but ignoring gender gaps which are substantial. Policy attention has focused on the supposed underachievement of females in mathematics and science but these gender gaps are small. In contrast, substantial gender gaps are occurring in reading and writing which place males at a serious disadvantage in the employment market and in college…. Both boys and girls face gendered problems which need policy attention."

Journal reference:

1. Kleinfeld et al. **The State of American Boyhood**. *Gender Issues*, 2009; DOI: 10.1007/s12147-009-9074-z

Adapted from materials provided by Springer.

http://www.sciencedaily.com/releases/2009/06/090608125114.htm

Concerns over older mother trend

By Branwen Jeffreys
Health correspondent, BBC News

An urgent public debate on the trend for women to delay motherhood is needed, leading doctors say.

The Royal College of Obstetricians and Gynaecologists will publish evidence on Monday about the increased medical risks of pregnancy for older mothers.

Doctors are also concerned many women still do not understand how rapidly fertility declines after the age of 35.

But other experts said progress in the health service meant the NHS could cope with the trend.

The college set up an expert group to look into the issue after the latest figures showed the number of older mothers has risen to record levels.

" **I myself don't think there is a huge problem here, if you actually look at the statistics, pregnancy has never been safer** "
Frank Furedi, from the University of Kent

The experts will point out that for a woman over the age of 42 the success rate of a live birth for each IVF cycle falls to 5%, whereas for a woman under 35 it is 31%.

Later maternal age may also have implications for health service as it deals with a growing number of women at higher risk of complications, the college will say.

While most pregnancies in the UK result in a healthy baby, the experts say a minority of older women face the risk of serious adverse effects such as developing diabetes in pregnancy.

Mandish Dhanjal, a consultant obstetrician who has pulled together the evidence on medical risks for the college, said the trend to older motherhood was very marked.

"If you look at older mothers over the age of 35 - in the mid 1980s about 8% of those women who got pregnant were over 40 whereas now that figure has more than doubled to 19%".

The risks for a woman in her 40s of medical complications are between two and five times higher than a woman in her 20s, although the absolute risks are still quite small.

Two of the most serious risks highlighted by the college are pre-eclampsia and diabetes.

There is also a concern among specialists that women's perception of motherhood may be overly influenced by celebrity older mothers.

Mr Dhanjal said: "Many young women will be reading magazines which focus on this. Unfortunately the mass media doesn't tend to report the complications".

Risks

But some commentators believe focusing on the medical risks does not take account of some of the profound social changes shaping women's lives, such as greater opportunities in the world of work and an expectation of financial independence.

Frank Furedi, professor of sociology at the University of Kent, who writes on parenting, believes society has not caught up with the changing reality.

"I myself don't think there is a huge problem here, if you actually look at the statistics, pregnancy has never been safer.

"We have a very good health system that is able to minimise the risks for women having children at 35 or 36."

Mary Newburn, of the National Childbirth Trust, said while the parenting charity supported the efforts to make women aware of the medical risks, changes to working practices were also needed.

"We now need to look at how we can make it possible for women to have career breaks earlier on and to enable them to have children at a younger age.

"Likewise, the introduction of shared parental leave should lead to less pressure on women to reach a certain point in their career before having children. "

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8097652.stm

Published: 2009/06/12 16:00:05 GMT

Discovery could ease cancer pain

A breakthrough could lead to drugs to alleviate the pain experienced by cancer patients.

The biology of cancer pain is different to other types of pain, often rendering analgesic drugs ineffective.

Work by a German team, published in Nature Medicine, shows that blocking a specific type of hormone-like molecule produced by tumours could help.

The team showed that the molecules make nerve endings grow in nearby tissue, causing an acute sensation of pain.

" **What's particularly encouraging is that this research could one day lead to drugs that can block pain locally at the tumour site** "
Dr Joanna Owens Cancer Research UK

Pain is one of the most debilitating symptoms associated with the many forms of the disease. It can become excruciating as cancer advances, but tackling it has proved difficult for doctors.

The molecules highlighted by the latest study, by a team at Heidelberg University, were known to play a role in the development of blood cells in the bone marrow. But this is the first time they have also been shown to have a role in causing pain.

New drugs

The researchers hope their work could lead to new drugs to block this action.

Dr Mark Matfield is scientific adviser to the Association for International Cancer Research, which partly funded the work. He said: "Identifying one of the ways in which cancer causes pain - in fact, perhaps the main mechanism - is a crucial step towards drugs that could bring relief to cancer sufferers across the world." Dr Joanna Owens, of the charity Cancer Research UK, said: "It's important that we continue to improve pain relief for people with cancer, and this study reveals an intriguing new avenue to explore.

"What's particularly encouraging is that this research could one day lead to drugs that can block pain locally at the tumour site - which could ultimately lead to more effective pain relief with fewer side effects."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8089306.stm

Published: 2009/06/13 23:09:44 GMT

Feminine Mystique

By LEAH HAGER COHEN

A SHORT HISTORY OF WOMEN

By Kate Walbert

239 pp. Scribner. $24

Nearly everything about Kate Walbert's new novel is wickedly smart, starting with the title: "A Short History of Women." Does it connote modesty or grandeur? "Short" sounds modest. "History" sounds grand — grandiose, in fact, when affixed to a work of fiction. But "Women" clinches it: modest, then. After all, what more trifling subject could one elect to research? Such, at any rate, is the prevailing view in the world inhabited by Walbert's characters — all five generations of them. One of the book's accomplishments is that it persuades us that this sentiment holds no less currency in 21st--century America than it did in late Victorian England. But Walbert's primary concerns — unlike those of some of her characters — aren't political. Her writing wears both its intelligence and its ideology lightly. No manifesto, this is a gorgeously wrought and ultimately wrenching work of art.

Like her last novel, "Our Kind," which was a National Book Award finalist, "A Short History of Women" consists of linked stories: in this case, 15 lean, concentrated chapters that hopscotch through time and alternate among the lives of Dorothy Trevor Townsend, a British suffragist, and a handful of her descendants. Several of the stories have been previously published; most could stand alone. Yet together they coalesce into more than the sum of their parts. It is Walbert's conceit that while the oldest and youngest generations never meet, they share a legacy of echoes: objects and phrases that repeat mysteriously, and with increasing significance, across the decades. This spare novel manages, improbably, to live up to its title: it delivers what feels like a reasonably representative history of women — at least of white, Anglo-Saxon women, over the past hundred-odd years.

What is that history? What are its implications? And why should we care about them? Consider Virginia Woolf's dictum: "This is an important book, the critic assumes, because it deals with war. This is an insignificant book because it deals with the feelings of women in a drawing room." If you think this belief is dated, think again. Just two months ago, Joyce Carol Oates told The New York Times Magazine why violence is so often the subject of her fiction. "If you're going to spend the next year of your life writing," she explained, "you would probably rather write 'Moby-Dick' than a little household mystery."

"A Short History of Women" ingeniously suggests the fallacy of the war/drawing room dichotomy. Its various settings include neither battlefield nor whaler, yet masculine power and influence pervade these pages, from Havelock Ellis, Charles Darwin and the "good men of Lloyd's" in belle époque London to

the young soldiers patrolling Dover Air Force Base in present-day Delaware. What's remarkable is the way Walbert uses male preoccupations to illuminate the lives of her female characters — and there's nothing "little" about them.

The most arresting and oddly affecting is Evelyn Townsend, Dorothy's daughter, who opens the book by announcing, "Mum starved herself for suffrage, Grandmother claiming it was just like Mum to take a cause too far." The year is 1914, and the War to End All Wars has recently begun. Evelyn's father long ago "vanished in Ceylon." Her mother lies dead "in her simple box, a lavender Votes for Women sash across her small, unquivering bosom," while "bloated zeppelins" darken the sky overhead. Evelyn, age 13, is packed off to a girls' school far north of London, "out of harm's way," where she'll be taught elocution and Domestic Duties.

All this is reported with dispassionate, almost surgical precision. Evelyn is a stoic, apparently — or else shell-shocked, like so many of the newly returned soldiers. Or perhaps, as her grandmother puts it before sending her away, she's simply "hard as rock." But Evelyn's cool dispatches are actually flooded with feeling, and flood us with feeling. Like an actor who knows that fighting back tears can evoke 10 times the pathos of dissolving into sobs, Walbert makes skillful use of restraint.

At school, Evelyn falls for the young new priest, Father Fairfield, who smokes and takes the girls sledding and "no longer believes." To top it off, he reveals that he admired her mother: "A real hero she was. She would not compromise, he says. She did something, he says." Evelyn's tone is habitually terse, but in this instance her austerity is particularly moving, since we know Father Fairfield's words must salve a terrible wound. (Everyone else, from the press to the hospital attendants to Evelyn's own grandmother, has expressed only contempt for her mother's act.) And Evelyn's woodenness is not simply heartbreaking; at times, it sublimates into a kind of stark poetry, as when she reveals that after only a few months at the school Father Fairfield will be drafted, then "killed within his second week, but for now he stands before us beautiful and ruined and not yet dead."

Now I must throw up my hands in despair: I'm running out of space, and the only thing I've addressed in a modicum of detail is the first chapter — a mere dozen pages! The trouble is that each chapter is like a slice of exquisite cake. But the reviewer's predicament is the reader's pleasure. I found myself going back time and again to reread whole paragraphs, not because they'd been obscure, but in the way one might press a finger to the crumbs littering an otherwise cleaned plate: out of a desire to savor every morsel.

So much is packed between this book's covers that the "Short" of the title and the brevity of the chapters (two are no more than a page long) wind up feeling like a kind of trompe l'oeil. Here is Dorothy as a child in the late 1800s, witnessing the rape of her friend on a dirt road. Here is Evelyn as a professor of chemistry at Barnard, sharing a drink with a student on V-J Day. Here are Dorothy's American descendants — including her granddaughter and namesake (a shaggy-haired iconoclast who might have stepped out of a Grace Paley story) mounting a solo protest against the Iraq war. In the next generation, Walbert gives us a divorced businesswoman who, surfing the Internet after midnight, accidentally stumbles across her mother's blog, and a Manhattanite with three small children who spins "clay into pots and teacups and dessert plates" and compares anxieties with another mother during one marathon, wine-fueled playdate.

Nor is it only the main characters who come to life. If Walbert excels at miniatures, she's fantastic at micro-miniatures: the homosexual World War I medic, a witness to the Christmas truce at Ypres; the female servant to whom the task falls of telling Evelyn that her mother is dead; the black maid issued an impromptu invitation to participate in her white employer's consciousness-raising group. I'd gladly read an entire novel about any of these fleeting figures. But they're not simply further evidence of the author's skill. Each contributes something vital to what she is saying about our world. That is, about us — the ways we silence and are silenced, the ways we see and hear and grasp hold of meaning. Kate Walbert may work in miniature, but her scope is vast.

Leah Hager Cohen, the author of three novels and four nonfiction books, is a frequent contributor to the Book Review.

http://www.nytimes.com/2009/06/14/books/review/Cohen-t.html?_r=1&8bu&emc=bua1

Henry Fairlie: The Gentleman Delinquent
By CHRISTOPHER HITCHENS

In November 1956, during the height (or depth, according to taste) of the crisis over the Suez Canal, Henry Fairlie appeared on a live BBC radio show to give his support to the Tory government's invasion of Egypt. One might say this was doubly imprudent of him: the attack was already disclosing itself as a debacle, and Fairlie himself was on the run from the law, first as a bankrupt and then (having failed to attend his own bankruptcy hearing) as a man cited for contempt of court. His radio appearance made it easy for the authorities to pinpoint his whereabouts, and he was soon in Brixton prison. Asked for her reaction, his long-suffering wife plaintively but memorably said, "At least I know where he is tonight."

Nobody who knew Henry even slightly (and I must here confess that I knew him reasonably well in Washington in the mid-1980s) would fail to see in this an encapsulation of the man and the style. The word "raffish" might have been coined for him. In the introduction to BITE THE HAND THAT FEEDS YOU: Essays and Provocations (New Republic/Yale University, $30), an anthology of Fairlie's writings, the editor, Jeremy McCarter, says that "even in the louche world of Fleet Street, where every vice found a champion, he distinguished himself: he drank; his finances were a crime against responsibility; his charm and darkly handsome looks availed him of endless affairs." It was more than something of an achievement, then, that the general tenor of his essays was able to sustain such a high moral tone.
Before becoming one of those Englishmen who fall in love with America and never fall out again, he made a reputation in London as an essayist who was both thoughtful and iconoclastic. To him belongs the credit for putting that very useful term of generalization "the Establishment" into popular circulation. I remember once being told that the editorial policy of The Times of London was determined by "a committee that never meets," and Fairlie's experiences as a writer on that newspaper were certainly of help to him in charting the various intersecting magic circles that somehow managed to exert the real power behind the scenes. But the way he made his charge stick was by pointing out that the reactionary old-boy network and all "the right people" had in fact conspired to protect the network of Communist traitors in the British Foreign Office who caused such embarrassment by disappearing and then reassembling in Moscow in the 1950s and '60s. In the same net, therefore, he had caught both the hidebound and the subversive. This was radical journalism at its best, and Henry's own tendencies toward the truant and the delinquent were quite probably of some use to him in making the diagnosis.
Both pushed and pulled across the Atlantic (he was captivated by the spaciousness and generosity of America on his first visit in 1965 and also needed a refuge from libel suits, jealous husbands and

maddened creditors back home), he began to produce the reflections and polemics, many of them first published in The New Republic, that are the meat of this new volume. Written in (almost) unfailingly superb English, they retain their appeal mostly because they display a sort of romantic Toryism and traditionalism, with its guarded attitude toward commerce and capitalism, and yet contain a celebration of American individualism. Fairlie wrote many of his best pieces from the road, covering the civil rights movement, say, or working on a book called "Journey Into America" — unpublished but here excerpted — which found him downing drinks with a big-shouldered autodidact named Hooter, encountered on a swing through Minnesota.

It's a commonplace now for commentators to lament the bloodlessness and lack of authenticity that characterize official election cycles, but having witnessed the authentically dramatic contest of 1968 — a year about which he was always delighted to reminisce and hold forth — Fairlie became ever more depressed by the decline of oratory and by the standardization, or perhaps better say homogenization, of political speech. In a 1988 essay entitled "Brief Whining Moments," he naturally scourged the dullness and mediocrity of George H. W. Bush and Michael Dukakis but, not content with such soft targets, subjected the overpraised eloquence of Jesse Jackson to a withering comparison with the speeches of Dr. Martin Luther King. "We are now nearing the end of eight years," Henry wrote, "in which a president who does not really lead by his speeches has been praised for being a 'great communicator.' The euphemism is necessary because he does not make speeches. The irony points to the uncomfortable truth that the communications industry — the media — recognized a package of its own manufacture and labeled it Great Communicator."

This willingness to include his own profession among the targets of ire was one of Fairlie's trademarks, and his many quarrels with employers and editors were the source for the only half-joking title of this book (which might, had he lived, have adorned his memoirs). But it was odd that Fairlie got Reagan so wrong in other ways. Not reprinted here is the embarrassing article in 1980 in which he bet the whole farm on the re-election of Jimmy Carter and followed the liberal majority in dismissing the governor of California as a "slippered pantaloon." On the other hand, and slightly to my surprise, the editor has included a Washington Post article from the same year in which Fairlie said, of the Republican convention delegates, that "the Reaganites on the floor were exactly those who in Germany gave the Nazis their main strength and who in France collaborated with them and sustained Vichy."

His hasty show of references to H. L. Mencken and Randolph Bourne — about whom he wrote passionately and well in other contexts — cannot conceal the straining for effect and the feigning of outrage that are so sadly evident here.

Henry's closing years were not delightful ones: He ended up quasi-homeless and moved into the offices of The New Republic as an alternative to sleeping rough. He became a shameless borrower of money and unwelcome even in the less fastidious bars around Dupont Circle. I myself think that this indigence was the cause of some of his less admirable journalism: he had to cudgel phony opinions out of his weakening brain and frame in order to finance the next bender. Having partly succeeded him as the Washington correspondent of The Spectator, I caught him out making a slanderous allegation in print that was backed up, when challenged, only by an unimpressive piece of bluffing and blustering. Not long after that, in 1990, before we could even have a reconciling cocktail — and just after he had written an essay (reprinted here) that stole my idea for a satire of those who asked for Perrier water in bars only to demand a handful of Potomac water, in the form of ice cubes, to go with it — he took a bad tumble on his way back to his office/home and died, with distressing celerity, at 66. In the lives of many younger journalists, he had managed to fulfill the two great tutorial roles of enviable example and awful warning.

Christopher Hitchens is a columnist for Vanity Fair and the Roger S. Mertz media fellow at the Hoover Institution.

http://www.nytimes.com/2009/06/14/books/review/Hitchens-t.html?8bu&emc=bub1

Oh, Lord

By KATHRYN HARRISON

BYRON IN LOVE

A Short Daring Life

By Edna O'Brien

228 pp. W. W. Norton & Company. $24.95

Thank the gods of literature that George Gordon, Lord Byron, was born in 1788, well out of the reach of psychopharmacology. "Byron in Love," the Irish novelist Edna O'Brien's compact and mischievously complicit biography of the great Romantic poet and enfant terrible, skates over its subject's literary career to showcase the dissolute behavior Byron's critics decried as that of a "second Caligula." Arguably, Caligula was the more moderate soul. Even the Byronic hero falls short of his inspiration. Emily Brontë's Heathcliff and her sister Charlotte's Mr. Rochester are both pale pretenders to a character no writer could invent.

The rapacious trajectory of the poet's appetite for sex and celebrity makes him a poster boy for what his contemporary and countryman Dr. J. C. Prichard termed "moral insanity" — a disease of the passions that left the intellect intact while "the individual is . . . incapable . . . of conducting himself with decency and propriety in the business of life." Today, we'd dismiss Byron as a bipolar sex addict whose unresolved Oedipal conflict held him in thrall to the father he never knew. If lithium wouldn't have poisoned the mania — and the poetry — out of him, how about Abilify with a chaser of Luvox?

"His beginning," O'Brien narrates drily, "was not propitious" — a mother who was destitute, "quick-tempered and capricious"; a father in exile to escape debt; and the stigma of a club foot. A ready-made "symbol of castration," Byron's deformed right limb would provoke such overcompensation that his verses were eclipsed by his sexual exploits. By the time he embarked, at age 27, on what O'Brien calls "the most public marriage of any poet," he had fathered a child with his half-sister, Augusta Leigh. In what reads like a helpless, hapless, even slapstick collapse in the face of reason, he orchestrated one after another imbroglio in which his bride, Annabella Milbanke, was forced to endure the company of his incestuous lover and their infant daughter (who, he was relieved to report, did not betray her unnatural conception by being "born an ape").

Annabella, who resisted Byron's epistolary courtship for two years, declaring she would not "enter into a family where there is a strong tendency to Insanity," seems to have succumbed to a tragic if unoriginal conceit, imagining she might with effort change her husband's profligate nature. As for Byron, he was in it for the money. Exacerbated by her morally superior stance, his disappointment at discovering that her dowry, as O'Brien nicely puts it, was "more theoretical than actual" fueled a savage spree of persecution.
O'Brien sets the stage for her readers' amusement rather than censure. "Their wedding night had," she notes, "its literary correlation in the works of Edgar Allan Poe, a crimson curtain catching fire, a hallucinating bridegroom believing he was in hell, then pacing the long ghostly gallery with his loaded pistols." The ensuing scenes might be more purely and deliciously farcical (or one would feel less guilty for enjoying their ghastliness) had Byron not been so unrepentantly cruel to his wife. As it was, he forced the increasingly hysterical Annabella to listen as Augusta read aloud from letters proving he had never loved the woman he deigned to marry. After that prelude, Annabella was sent off to the abandoned connubial bower while he remained with Augusta.
Cruelty seems to have been a cornerstone of Byron's personality, a wretched and gleeful sadism born of self-loathing. "Childe Harold's Pilgrimage" — the first two cantos, published in 1812, constituted a general invitation to his polysexual coming-out party — was clearly autobiographical, and Byron called its hero a "repulsive personage."
Perhaps ennui was unavoidable for the youth who became the sixth Lord Byron at the age of 10. The only male among his cousins, he was spoiled by his aunts and great-aunts, indulged in selfishness rather than taught to temper his passions. Installed at Newstead Abbey, his crumbling ancestral home, the boy carried loaded pistols in his waistcoat pocket and discharged them whenever he pleased, indoors or out, satisfying a taste for gothic excess that would later inspire him to use human skulls as drinking vessels and travel with a menagerie that included peacocks, monkeys and birds of prey. The bullying his lame foot occasioned at Harrow inspired a lifelong cultivation of his physique and strengthened his disdain for convention.
Enrolled at Trinity College, Cambridge, in 1805 (where he kept a bear as a pet), Byron demonstrated a flamboyance and disregard for authority that won him boundless attention. His ability to attach people to him, his friend John Hobhouse observed, was magical, engendering a popularity that allowed him to plunge, O'Brien remarks, into an "abyss of sensuality." At 17, he embarked on the kind of affair with a choirboy that was "punishable by hanging" and later considered marrying a young prostitute whose charms held him hostage for a "week or so." By 1809 he'd set sail under Captain Kidd on the young nobleman's obligatory grand tour, during which he acquired the background for his poetry, as well as syphilis — and, having "outlived" all his appetites, as he wrote in his journal, the conviction that "at 23 the best of life is over."
What followed would be redux, but having committed herself to "follow him in his Rake's Progress," O'Brien does just that. Until his death at 36, Byron continued a course of sybaritic abandon, traveling with an entourage bewitched by his escapades and terrified by his mood swings and violent temper. "You know that all my loves go crazy — and make scenes," he wrote to Augusta in 1821, unable to draw a distinction between himself and the type of paramour he attracted. His autopsy, performed where he died, in Greece, bore witness to the toll his passions had exacted from his flesh — heart grossly enlarged, liver cirrhotic. In London, where his body was returned for burial, a barrier had to be erected around his casket to protect it from the throngs of mourners. It was the greatest display of what came to be called Byromania, but hardly the last.
Kathryn Harrison writes fiction and nonfiction. Among her books is a biography, "Saint Thérèse of Lisieux."

http://www.nytimes.com/2009/06/14/books/review/Harrison-t.html?8bu&emc=bua2

Rewriting the Rules

By PAUL M. BARRETT

FOOL'S GOLD

How the Bold Dream of a Small Tribe at J. P. Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe

By Gillian Tett

293 pp. Free Press. $26

To understand the calamity on Wall Street, we need erudite financial analysis and good old-fashioned stories about human fallibility. Gillian Tett, who oversees global market coverage for The Financial Times, offers some of each. In "Fool's Gold," she describes how a small group of bankers at storied J. P. Morgan built a monster that got out of control and helped destroy much of their industry. Tett's tale doesn't explain all of the recent mayhem, but it is one place to start.

She shows us the financial world through the eyes of her talented but short-sighted subjects: geniuses at math and marketing, they thought they had discovered how to defy the laws of nature. The old rules didn't apply.

Beginning in the mid-1990s, the wizards at Morgan decided they could defeat the banker's oldest foe — the danger that borrowers will not repay their loans. If that sounds as audacious as bringing the dead to life, it's not far off. The Morgan team thought they could combine esoteric financial instruments so cleverly that repayment risk would simply disappear, or at least become so diluted as no longer to matter. Relieved of risk, banks would lend more money, corporations would grow more quickly and capitalism would blossom.

Accomplishing this "bold dream," as Tett puts it, required arduous toil in the financial laboratory — accompanied, at times, by after-hours antics of "Animal House" proportions. The author excels at recreating this fevered environment. She also deciphers Wall Street mumbo-jumbo in terms that a lay reader, or at least a determined lay reader, can understand.

The Morgan bankers assembled innovative amalgams of what are known as credit derivatives. In its simplest form, a credit derivative is a contract between two parties in which the seller agrees to compensate the buyer if a loan goes into default. Used conservatively, a derivative can provide a hedge against risk. Bank A, worried about a loan it has made, strikes a derivative deal to pay a fee to Bank B in exchange for Bank B's promise to compensate Bank A if the loan sours. Bank A sheds some of the uncertainty related to its loan and feels emboldened to make fresh loans. Bank B assumes some of the risk but immediately enjoys the fee income. It's "win-win," as the Morgan bankers told themselves and anyone else who would listen.

They went on to combine the derivatives with a process called securitization, which traditionally involved lenders selling their loans to an investment bank. The investment bank "bundled" the loans together and sold pieces of the bundle to pension funds and other investors. The original lenders, having offloaded their loans, could make new ones. The investors acquired a slice of the loan bundle and its interest income without having to go to the trouble of meeting and assessing the borrowers. Win-win, again.

The Morgan group broke new ground by securitizing not just loans but credit derivatives. They industrialized the procedure, selling securitized debt and derivatives on an extraordinary scale. It got very, very complicated.

The intricacy itself appealed to the Morgan bankers, as did the magical idea of dispersing risk to investors far and wide so that lenders could lend without hesitation. The author introduces characters like the evocatively named Blythe Masters, a pretty blond British woman with a "BBC accent," an economics degree from Cambridge and fervor for credit derivatives. "I think these products appealed to me because I had a quantitative background," Masters told Tett, "but they are also so creative."

Masters became the alluring public face for Morgan's derivative "products," marketing them to clients impressed by the concept that risk could vanish. Channeling Masters, Tett writes: "For the first time in history, banks would be able to make loans without carrying all, or perhaps even any, of the risk involved themselves. That would, in turn, free up banks to make more loans, as they wouldn't need to take losses if those loans defaulted." By now, you must be seeing the too-good-to-be-true aspect to all this.

Morgan exercised some restraint in imbibing the derivatives potion it peddled to others. That's one reason that, years later, it is one of the survivors on Wall Street, although as part of J. P. Morgan Chase. Less prudent were Bear Stearns, Lehman Brothers, Merrill Lynch and American International Group.

Tett explains that Morgan's rivals took the reckless, and in some cases fatal, step of adding subprime mortgage loans to the derivatives-and-securitization mix. That's an important distinction. When the real estate bubble burst in 2006 and 2007, derivatives and securities tied to subprime mortgages suddenly lost value. It turned out that Wall Street's computer models simply hadn't anticipated a national housing crash. The supposedly benign dispersal of risk was revealed for what it really was: a global plague that spread dangerous risk to nearly all major financial institutions. Lenders that had spewed loans with abandon abruptly froze up, refusing to do business even with trusted corporate customers. Investors panicked; stock markets crashed.

Tett's close focus on Morgan illustrates how the hubris of a relative handful of little-known financiers contributed to the worldwide crisis. But the author's contention that the "bold dream" conjured up at Morgan was "corrupted" by others may absolve Masters and her comrades too neatly. First, Tett strangely plays down how lavishly Morgan paid its derivatives clique to pursue their bold dream. Surely fat bonuses helped obscure the dangers.

The Morganites sold the notion that financial gravity had been overcome—that risk had been vanquished and that lending could proliferate endlessly. That some would take this to absurd extremes seems entirely foreseeable. The retrospective shock that Tett's subjects express in interviews rings hollow, especially when we learn that some of them, although not Blythe Masters, left Morgan and personally imported derivatives know-how to institutions that behaved more rashly.

Morgan's culpability doesn't end there, either. Tett notes that Morgan provided key manpower and initiative in a ferocious Wall Street lobbying campaign that persuaded Congress, the Securities and Exchange Commission, and the Clinton and Bush administrations to back off from regulating derivatives trading in any meaningful way. Industry advocates received vital backing from the high priest of free market ideology, Alan Greenspan, then the chairman of the Federal Reserve.

The argument that persuaded Washington to allow manic derivatives trading to go unchecked boiled down to the myth that financiers had a powerful self-interest in keeping one another honest. Wrong. As Tett reports, Greenspan went before Congress last October to admit that "he had made a 'mistake' in believing that banks would do what was necessary to protect their shareholders and institutions. '[That was] a flaw in the model . . . that defines how the world works,' " Greenspan confessed belatedly. Based on Tett's account, most former members of the Morgan derivatives squad haven't acknowledged similar regret. That's ominous, because while many on Wall Street have lost their jobs, a lot of the Morgan alumni are still out there, as are many of their competitors who displayed even greater irresponsibility during the derivatives madness. This book leaves one wondering whether we'll be smart enough to rein them in with tougher regulations before they open their next bag of tricks.
Paul M. Barrett is an assistant managing editor of BusinessWeek.

http://www.nytimes.com/2009/06/14/books/review/Barrett-t.html?8bu&emc=bua2

American Macho

By BEVERLY GAGE

REBIRTH OF A NATION

The Making of Modern America, 1877-1920

By Jackson Lears

Illustrated. 418 pp. Harper/HarperCollins Publishers. $27.99

On March 11, 2003, about a week - before President George W. Bush began bombing Iraq, the cultural historian Jackson Lears published an Op-Ed article in The New York Times pleading for sanity. He sensed that it was already too late, and suggested that war opponents might be "fingering a rabbit's foot from time to time." As a historian, however, Lears couldn't help asking when the "regenerative" impulse to seek national glory through war first took root. The result is "Rebirth of a Nation," a fascinating cultural history that locates the origins of Bush-era belligerence in the anxieties and modernizing impulses of the late 19th century.

Lears describes his bookas a "synthetic reinterpretation" of the Gilded Age and Progressive Era, an effort to dislodge classics like Richard Hofstadter's "Age of Reform"(1955) and Robert Wiebe's "Search for Order, 1877-1920"(1967). It's an ambitious project; both books, despite legions of critics, have shown remarkable staying power. Fortunately, Lears is well qualified for the task. One of the deans of American cultural history (as well as a professor at Rutgers University), Lears has spent decades writing about turn-of-the-20th-century debates over consumerism, modernity, religion and market capitalism. With "Rebirth of a Nation," he expands his vision to include politics, war and the presidency as well.

The book's title — a play on D. W. Griffith's 1915 film "The Birth of a Nation" — suggests two of Lears's greatest revisionist concerns: the lasting influence of Civil War violence and "the rising significance of race." Beginning in the 1870s, he argues, Americans attempted to stitch their country back together around a "militarist fantasy" of Anglo-Saxon supremacy. Yet rather than bringing the hoped-for personal and national redemption, their efforts produced tragedy. According to Lears, the same cultural logic that justified lynching in the American South and the conquest of American Indians in the West eventually led to war in Cuba, the Philippines and Europe — and, a century later, to our own mess in Iraq.

Lears is hardly the first scholar to address these themes. But he is among the most far-reaching, seeking to redefine an era known for its reformist energies as a time when militarism and racismall too often triumphed over more pacific, democratic ideals. Like any good synthesis, "Rebirth of a Nation"dutifully covers the major trends of the age: the rise of industrial capitalism, the expansion of American empire, the tightening chokehold of Jim Crow. What brings new life to this material is the book's emphasis on how Americans' "inner lives" came to shape their outer worlds. Events that appear to be struggles for conquest and plunder turn out, in Lears's view, to be animated by a personal search for meaning. "The rise of total

war between the Civil War and World War I was rooted in longings for release from bourgeois normality into a realm of heroic struggle," he writes. "This was the desperate anxiety, the yearning for rebirth, that lay behind official ideologies of romantic nationalism, imperial progress and civilizing mission — and that led to the trenches of the Western Front."

This approach can exaggerate the impact of culture (great-power diplomacy, too, led to the trenches). But "Rebirth of a Nation" captures something undeniably powerful about the nation's psychic crisis as it recovered from the wounds of civil war. The late 19th century brought vast change at nearly every level of culture and society, from the growth of white-collar employment to the dislocations of mass immigration and urbanization. This crisis was particularly acute for white men, who found their traditional sources of power and identity challenged at every turn. In response, Lears writes, they turned to solutions ranging from the muscular Christianity of the Y.M.C.A. to the Populist struggle for self-determination to bloody conflicts on the battlefield.

Lears's "poster boy" for this aggressive new masculinity is Teddy Roosevelt, whose blend of boosterism, progressivism and unabashed imperialism captured both its high ideals and serious dangers. Like so many reformers, Roosevelt sought to remake American society along more equitable and democratic lines. At the same time, he believed that Anglo-Saxon men possessed a God-given right to dominate the world. In both cases, Lears suggests, Roosevelt's politics were the product of a profound internal struggle. "There must be control," Roosevelt wrote in the 1890s. "There must be mastery, somewhere, and if there is no self-control and self-mastery, the control and the mastery will ultimately be imposed from without." He was writing to Rudyard Kipling about the problem of governing "dark-hued" peoples, but he might as well have been writing about his own psyche.

While Roosevelt serves as the book's protagonist, its pages are filled with lively portraits of other period figures, from the escape artist Harry Houdini to the settlement house worker and peace activist Jane Addams. Lears uses these men and women as exemplars of broad cultural trends: Houdini transformed magic "from spiritualism to strenuousness"; Addams represented "an alternative to militarism for romantic young professionals." "Rebirth of a Nation" also includes glimpses of humbler Americans eking out lives at the margins of the era's great conflicts. In one moving section, Lears recounts the story of Emily French, a "hard-worked woman," in her words, whose abandonment by her husband left her nearly destitute (and who happened to keep a detailed diary of her struggles).

At times, it's not quite clear how these disparate figures all fit into the theme of "rebirth," a concept at once highly specific and conveniently broad. In addition, Lears never satisfyingly explains why the brutality of the Civil War spawned dreams of heroics, while World War I produced a consensus that American soldiers were "dying in vain." But these are minor quibbles. "Rebirth of a Nation"is a major work by a leading historian at the top of his game — at once engaging and tightly argued. Like the best histories, it is also a book that speaks to our own time.

In his conclusion, Lears explicitly identifies Roosevelt as George W. Bush's true "ideological ancestor," a rebuttal to those who would place the universalist Woodrow Wilson first in the Iraq war's genealogy. Still, it's on the subject of economic culture — long a staple of Lears's work — that "Rebirth of a Nation"delivers its most pointed critique. Lears completed his manuscript before the current financial crisis, and before the Obama administration came to power advertising its own message of "rebirth." His descriptions of budding American consumerism nonetheless resonate strongly with present-day concerns. In his chapter on "The Mysterious Power of Money," Lears quotes Mark Twain satirizing the excesses of the first Gilded Age: "Beautiful credit! The foundation of modern society. Who shall say that this is not the golden age of mutual trust, of unlimited reliance upon human promises?" The reality, Lears reminds us, was far less glamorous. "A great deal of waste, fraud and corruption went into the making of the modern American economy," he writes in a description that might be transferred wholesale to our own Gilded Age, "and much of it was concentrated on Wall Street."

Beverly Gage, a history professor at Yale, is the author of "The Day Wall Street Exploded: A Story of America in Its First Age of Terror."

http://www.nytimes.com/2009/06/14/books/review/Gage-t.html?8bu&emc=bua2

Empires in Collision

By ERIC ORMSBY

THE ENEMY AT THE GATE

Habsburgs, Ottomans and the Battle for Europe

By Andrew Wheatcroft

Illustrated. 339 pp. Basic Books. $27.50

By 1683, Kara Mustafa, grand vizier of the Ottomans, was still a pasha with something to prove. He had been raised in the household of the illustrious Koprulu family, which would supply an unbroken succession of brilliant — if often ill-fated — grand viziers to the Ottoman court. Described by a contemporary as “corrupt, cruel and unjust,” Kara Mustafa had risen to become admiral of the Aegean galley fleet but had also succeeded in navigating the treacherous crosscurrents of palace intrigue; by 1675, the sultan had offered him his daughter’s hand.

His steady rise did nothing to satisfy his fierce ambition. For Kara Mustafa, the ultimate prize lay to the West. More than a century before, in 1529, Suleiman the Magnificent had besieged Vienna, but the onset of winter forced him to abandon the assault. To succeed where Suleiman had failed represented the pinnacle of imperial glory.

As Andrew Wheatcroft brilliantly shows in “The Enemy at the Gate,” the skirmishes and the pitched battles that raged for centuries between Habsburgs and Ottomans, and their numerous vassals on both sides, represented not so much a “clash of civilizations” as a collision of empires. For all the pious sloganeering that accompanied it, the struggle was only incidentally one between Islam and Christendom. Territory was the aim, along with something less tangible but equally compelling: the right to claim the legacy of the Roman Empire. Leopold I, Holy Roman Emperor, took it as given that the legacy belonged rightfully to the Habsburgs, but the Ottoman Sultan Mehmed IV believed just as fervently that the title of Roman Caesar was his. Had not his ancestor, Mehmed the Conqueror, toppled the Byzantines and seized

Constantinople two centuries before? Far from wishing to obliterate the Byzantine past, the Ottomans meant to assume it as their own, and Vienna, the seat of the Habsburg empire, was the final prize.
Kara Mustafa is only one of many bold and complex characters Wheatcroft brings swaggering to the stage in his scholarly but fast-paced narrative. He is especially attuned to the hidden contradictions of his personages. Leopold I is seen as simultaneously rigid and dithering, a disastrous combination, while Mehmed IV, though bookish and retiring, reveled in martial exploits; he would lead his vast army as far as Belgrade before transferring command to Kara Mustafa. Wheatcroft relies on such adroit contrasts to depict these distant figures. Thus, Prince Eugene of Savoy, the "noble knight" of Habsburg legend, was not only the greatest general of the age but an impassioned bibliophile, a discerning connoisseur who managed his private life so discreetly that it remains a mystery to this day. Beside him, Charles V, Duke of Lorraine, another Habsburg hero, emerges as all raw courage and bristling audacity, a man most alive in the saddle amid the thick of battle.
Charles once remarked, "He that feareth not an enemy knows not what war is." That observation is central to Wheatcroft's account. His theme isn't merely "Europe's fear of the Turks" but "fear itself." (As he notes in his coda, that fear is still rampant, camouflaged beneath recent — especially Austrian — dismay over Turkey's continuing campaign to join the European Union.) Despite his best intentions, Wheatcroft's narrative isn't likely to allay such fears. Describing an attack by Ottoman cavalry and infantry — the dreaded sipahis and janissaries — he writes, "To face a howling tide of janissaries racing towards you, to watch the heads and limbs of your companions spin off the sharp edge of a sipahi sabre required exceptional courage." He conveys the spooky sense of stifled panic the besieged Viennese experienced as Turkish attackers began tunneling beneath the city's defenses and the populace had to prick up its ears day and night for the telltale "noises of picks and shovels below the streets."
Wheatcroft, the author of several earlier books on both Habsburgs and Ottomans, states that he set out here to portray the Ottoman "face of battle," borrowing a phrase from the classic work by John Keegan, and in this he succeeds; his narrative is thrilling as well as thoughtful, a rare combination. Even so, a subtle imbalance prevails. The Ottomans inspired dread in their enemies; fear was part of their arsenal. But, as Wheatcroft repeatedly demonstrates, the Habsburgs were fearsome too, and perhaps even crueler than their opponents, engaging not only in full-scale massacres but in flayings, beheadings and impalements.
Perhaps because Wheatcroft hasn't drawn on Ottoman Turkish sources, his Ottomans, for all his skill at depicting them, appear oddly imperturbable. After Kara Mustafa's debacle before the walls of Vienna, he retreated to Belgrade; there, on Christmas Day 1683, he greeted the sultan's executioners, kneeling with "stoic Ottoman calm," and even courteously lifting his beard to expose his throat to the silk garrote. The story is legendary, and Wheatcroft recounts it well. Still, here as elsewhere, we'd like to hear the fierce heart beating beneath the legend.
Eric Ormsby's latest book is "Ghazali: The Revival of Islam."

http://www.nytimes.com/2009/06/14/books/review/Ormsby-t.html?8bu&emc=bua2

A Kid's Best Friends: Puppies

By ELIZABETH BIRD

WHICH PUPPY?

By Kate Feiffer. Illustrated by Jules Feiffer

Unpaged. Paula Wiseman/Simon & Schuster. $16.99.(Ages 4 to 8)

On the cover a row of puppies (and puppy pretenders) line up in various stages of adorableness before the White House. Is this picture book about what I think it's about? Yes!
Wasting no time, the father-daughter team of Jules and Kate Feiffer latched on to a moment in history that all kids could understand: Barack Obama telling his children from a national stage on Election Day that they could have a puppy. (In April, they got one: a 6-month-old Portuguese water dog they named Bo.)
In the Feiffers' vision, puppies from all over the globe are told of the search, and each and every one is eager to have its place in the sun. But how to choose? After the oldest basset hound in Mississippi announces, "We'll hold a contest to find the most presidential puppy in the country," thousands arrive, ready to prove that they're the best. Unfortunately, the results are repeatedly disappointing, until at long last three puppies (or rather two puppies and a guinea pig with ambition) are selected. In the story, the winning dog is revealed off-screen, and though our heroes are not really the winners, they are still privy to a lovely surprise at the end of the book. Jules Feiffer makes fine use of his trademark curls and swirls of the pen, filling the pages to overflowing with a cornucopia of prospective pups. Against a white - backdrop the pictures and words tumble over one another like dogs at play.
Elizabeth Bird is a children's librarian at the New York Public Library.

http://www.nytimes.com/2009/06/14/books/review/Bird-t.html?8bu&emc=bua3

A Kid's Best Friends: Kittens
By TEMPLE GRANDIN

SUGAR WOULD NOT EAT IT

By Emily Jenkins. Illustrated by Giselle Potter

Unpaged. Schwartz & Wade Books. $16.99.(Ages 4 to 8)

When I was in the third grade, I found learning to read with Dick and Jane books just boring. "Sugar Would Not Eat It" would have worked much better for me because it is interesting and funny, and the illustrations are rich and wonderful with lots of detail.
The story is about a "small and fluffy" stray kitten that is adopted by a little boy named Leo. "Leo didn't know anything about kittens, and he didn't know anything about cats," but he likes this kitten, and she seems to like him too. He names her "Sugar" and tries to feed her chocolate cake, "but Sugar would not eat it." He tries and tries again, to no avail. In the end, Sugar is happy with more appropriate food like milk and chicken.
I really liked this book, but of course, adults must tell children never to feed chocolate to cats or dogs — small amounts of dark chocolate can make pets ill, or if they eat enough of it, even kill them. Maybe in the second edition Sugar could be refusing to eat broccoli or brussels sprouts.
But for children who are just beginning to read, not to mention cat lovers of any age, "Sugar Would Not Eat It" is a charmer.
Temple Grandin is the author of "Animals Make Us Human" and "Animals in Translation."

http://www.nytimes.com/2009/06/14/books/review/Grandin-t.html?8bu&emc=bua3

Experts close to roots of greying

The grey hairs that develop with age really are signs of stress, at least of the cellular kind, say scientists.

Genotoxic stress, namely anything that damages the genetic code of life DNA, causes a malfunction of the cells ultimately responsible for hair colour.

The stress sets off a chain of reactions involving specialised cells called melanocyte stem cells, their work on mice in Cell journal reveals.

Similar mechanisms appear to be at work in humans too, they say. The findings could help explain why people with Ataxia telangiectasia, a rare, neurodegenerative syndrome caused by a mutation in a gene called ATM, go grey prematurely.

In their study, Dr Emi Nishimura and colleagues found the ATM "caretaker" gene serves as a checks and measures system to stop melanocyte stem cells going awry.

It is the job of these cells within the hair follicles to make the mature pigment-producing melanocytes that give hair its youthful colour.

Damaged DNA

Researchers have already traced greying to the gradual dying off of the stem cells.

But this is not the only way the stem cells are depleted. They also progressively make errors, turning or differentiating into fully committed pigment cells in the wrong place within the hair follicle, where they are useless for colouring hair. And the latest work on mice shows irreparable DNA damage, as caused by ultraviolet light and ionising radiation, is responsible. Dr Nishimura of Kanazawa University said: "Once stem cells are damaged irreversibly, the damaged stem cells need to be eliminated to maintain the quality of the stem cell pool.

"We found that excessive genotoxic stress triggers differentiation of melanocyte stem cells." But others believe going grey is caused by a massive build up of hydrogen peroxide due to wear and tear of our hair follicles.

The hydrogen peroxide ends up blocking the normal production of melanin, an team of European scientists recently reported in the FASEB scientific journal, published by the Federation of the American Societies for Experimental Biology.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8091490.stm

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What Really Prompts The Dog's 'Guilty Look'

Boxer mix. People see 'guilt' in a dog's body language when they believe the dog has done something it shouldn't have -- even if the dog is in fact completely innocent of any offense. (Credit: iStockphoto/Mark Coffey)

ScienceDaily (June 14, 2009) — What dog owner has not come home to a broken vase or other valuable items and a guilty-looking dog slouching around the house? By ingeniously setting up conditions where the owner was misinformed as to whether their dog had really committed an offense, Alexandra Horowitz, Assistant Professor from Barnard College in New York, uncovered the origins of the “guilty look” in dogs in the recently published “Canine Behaviour and Cognition” Special Issue of Elsevier’s Behavioural Processes.

Horowitz was able to show that the human tendency to attribute a “guilty look” to a dog was not due to whether the dog was indeed guilty. Instead, people see ‘guilt’ in a dog’s body language when they believe the dog has done something it shouldn’t have – even if the dog is in fact completely innocent of any offense.

During the study, owners were asked to leave the room after ordering their dogs not to eat a tasty treat. While the owner was away, Horowitz gave some of the dogs this forbidden treat before asking the owners back into the room. In some trials the owners were told that their dog had eaten the forbidden treat; in others, they were told their dog had behaved properly and left the treat alone. What the owners were told, however, often did not correlate with reality.

Whether the dogs' demeanor included elements of the "guilty look" had little to do with whether the dogs had actually eaten the forbidden treat or not. Dogs looked most “guilty” if they were admonished by their

owners for eating the treat. In fact, dogs that had been obedient and had not eaten the treat, but were scolded by their (misinformed) owners, looked more "guilty" than those that had, in fact, eaten the treat. Thus the dog's guilty look is a response to the owner's behavior, and not necessarily indicative of any appreciation of its own misdeeds.

This study sheds new light on the natural human tendency to interpret animal behavior in human terms. Anthropomorphisms compare animal behavior to human behavior, and if there is some superficial similarity, then the animal behavior will be interpreted in the same terms as superficially similar human actions. This can include the attribution of higher-order emotions such as guilt or remorse to the animal.

The editor of the special issue, Clive D.L. Wynne of the Department of Psychology, University of Florida, explained, "this is a remarkably powerful demonstration of the need for careful experimental designs if we are to understand the human-dog relationship and not just reify our natural prejudices about animal behavior." He pointed out that dogs are the oldest domesticated species and have a uniquely intimate role in the lives of millions of people. Recent research on dogs has indicated more human-like forms of reasoning about what people know than has been demonstrated even in chimpanzees.

Journal reference:

1. Horowitz et al. **Disambiguating the 'guilty look';: Salient prompts to a familiar dog behaviour**. *Behavioural Processes*, 2009; 81 (3): 447 DOI: 10.1016/j.beproc.2009.03.014

Adapted from materials provided by Elsevier, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090611065839.htm

From Oxygen Transport To Melanin Formation: Activation Mechanism Of Key Enzymes Explained

Emperor Scorpion (Pandinus imperator). (Credit: iStockphoto)

ScienceDaily (June 14, 2009) — *Pandinus imperator*, the emperor scorpion, is not only popular as a pet, but is also of interest for research purposes. The reason for this is its blue blood, which transports oxygen and distributes it throughout the body. Like tyrosinase, the key enzyme in melanin synthesis, the blue blood pigment hemocyanin found in the emperor scorpion and other arthropods belongs to a group of special molecules that occur in all organisms and that have many different functions: coloring the skin, hair and eyes, immune response, wound healing or the brown discoloration of fruit.

"When these enzymes mutate, this may result in albinism, or in birth marks when production of the pigment melanin increases, as often seen in melanoma," explains Professor Heinz Decker of Johannes Gutenberg University Mainz. The biophysicist has been studying hemocyanins and the associated tyrosinases for the past 20 years. In cooperation with researchers, Dr. Cong and Dr. Chiu, from the Baylor College of Medicine in Houston he has now been able to show for the first time exactly how the enzymes become active, thereby fulfilling their various functions. This work was published in the journal Structure on 13 May.

The researchers investigated the hemocyanin molecules of the emperor scorpion with the aid of cryo-electron microscopy. This is done by dissolving the molecules in an extremely thin film of water and then freezing it. The use of this technology means that the water does not form crystals, but an amorphous film of ice, which can then be examined by means of electron microscopy. "The benefit of this method lies in the fact that we can use it to penetrate the inside of the molecules and therefore see exactly what takes place there," says Decker. The molecules house the "active center", the part of the enzyme that carries out its function. Access to the active center is at first blocked.

Once the researchers have triggered an appropriate stimulus the structure changes. "We have seen that a specific domain of the molecules must move before the door to the active center is opened, thus triggering enzyme activity. This allows bulky phenols to reach the active center as a substrate and be converted into active quinones by bonding with oxygen; these quinones can then independently synthesize to melanin". For many years, Decker had been proposing this activation mechanism as a hypothesis in his work, but now it has been directly observed for the first time.

The observations made regarding the oxygen transport molecule hemocyanin can also be applied to tyrosinases. Hemocynanin is so closely related to tyrosinases that it can even be converted into tyrosinases by means of the activation mechanism described. This, too, has been demonstrated in several experiments. New opportunities have thus been created for an improved understanding of disorders or diseases such as albinism and malignant melanoma. The cosmetics industry is interested in this interrelationship, as the color of the skin and hair is determined by the formation of melanin. The food industry could make use of the information to prevent the discoloration of fruit, such as banana peels for example, by inhibiting this mechanism.

This study was funded by the National Center for Research Resources, the Roadmap Initiative for Medical Research (in Houston) and the German Research Foundation (DFG, SFB490) as well as the newly established Research Focus of Computational Sciences in Mainz (CMS) and Research Center for Immunology in Mainz.

Journal reference:

1. Cong et al. **Structural Mechanism of SDS-Induced Enzyme Activity of Scorpion Hemocyanin Revealed by Electron Cryomicroscopy**. *Structure*, 2009; 17 (5): 749 DOI: 10.1016/j.str.2009.03.005

Adapted from materials provided by Mainz University, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090604104852.htm

Multivitamins In Pregnancy Reduce Risk Of Low Birth Weights

ScienceDaily (June 14, 2009) — Prenatal multivitamin supplements are associated with a significantly reduced risk of babies with a low birth weight compared with prenatal iron-folic acid supplementation, found a new study in the *Canadian Medical Association Journal (CMAJ).*

The World Health Organization currently recommends iron-folic acid supplements for all pregnant women. Previous studies have not shown an advantage from prenatal multimicronutrient supplementation over iron-folic acid supplementation.

"Low birth weight and related complications are considered the most common cause of global infant mortality under the age of 5 years," write Dr. Prakash Shah and study coauthors from Mount Sinai Hospital in Toronto. "With the possibility of reducing low birth weight rates by 17%, micronutrients supplementation to pregnant women, we believe, offers the highest possible return for the investment. These results are synthesized findings from 15 studies published worldwide."

It is estimated that of the total 133 million births worldwide per year, 15.5% are low birth weight babies. The authors suggest that approximately 1.5 million babies born with a low birth weight could be avoided each year globally, if all mothers receive prenatal multimicronutrient supplementation.

The research is limited by variability among the included studies, including timing, duration, composition of micronutrients, and characteristics of the study populations.

In a related commentary, Dr. Zulfiqar Bhutta and Dr. Batool Azra Haider of the Aga Khan University in Karachi, Pakistan recommend that multimicronutrient supplementation during pregnancy replace iron and folate supplements in susceptible populations if it is proven safe and effective. They note that multiple interventions in developing countries may be necessary to improve maternal nutrition and fetal status such as fortified food supplements, interventions that address specific nutrient deficiencies, and measures to reduce the burden of HIV, malaria and other diseases.

Journal reference:

1. Prakesh S. Shah, MD MSc, Arne Ohlsson, MD MSc on behalf of the Knowledge Synthesis Group on Determinants of Low Birth Weight and Preterm Births. **Effects of prenatal multimicronutrient supplementation on pregnancy outcomes: a meta-analysis**. *Canadian Medical Association Journal*, [link]

Adapted from materials provided by Canadian Medical Association Journal, via EurekAlert!, a service of AAAS

http://www.sciencedaily.com/releases/2009/06/090608182549.htm

Pre-pregnancy Depressed Mood May Heighten Risk For Premature Birth

ScienceDaily (June 14, 2009) — Researchers trying to uncover why premature birth is a growing problem in the United States and one that disproportionately affects black women have found that pre-pregnancy depressive mood appears to be a risk factor in preterm birth among both blacks and whites.Black women, however, have nearly two times the odds of having a preterm birth compared to white women, according to Amelia Gavin, a University of Washington assistant professor of social work and lead author of a new study that appears online in the June issue of the *Journal of Women's Health*."Preterm births are one of the most significant health disparities in the United States and the overall number of these births increased from 10.6 percent in 2000 to 12.8 percent in 2005," she said.While there appears to be some sort of link between giving birth prematurely and depressed mood, the study found no cause and effect, said Gavin, who studies health disparities. She believes the higher preterm birth rate among blacks may be the result of declining health over time among black women.For this study, premature birth referred to any child born after less than 37 weeks of gestation. Normal gestation ranges from 38 to 42 weeks. Data for the study was drawn from a larger longitudinal investigation looking at the risks for cardiovascular disease among more than 5,000 young adults in four metropolitan areas. The Coronary Artery Risk Development in Young Adults Study also collected information about mental health and pregnancy outcomes. Between 1990 and 1996, 555 women in the larger study gave birth. These women were the subjects in the depression-premature birth study.

"At this point we can't say that pre-pregnancy depressive mood is a cause of preterm birth or how race effects this association," said Gavin. "But it seems to be a risk factor in giving birth prematurely and higher pre-pregnancy depressive mood among black women compared to white women may indirectly contribute to the greater odds of preterm birth found among black women."In the study 18.1 percent of the black women had a preterm birth compared to 8.5 percent of the white women.This difference may be the result of what she calls "weathering," or accelerated declines in health due to repeated socioeconomic and political factors."What some people experience by being black takes a toll on the physiological system, and over time wear and tear that occurs across neural, neuroendocrine and immune systems as a result of chronic exposure to stressors lead to health disparities for blacks. Some of this may manifest itself in premature birth and low-birth weight," Gavin said.The study did not look at depressive mood or depression during pregnancy because the larger research project did not collect that data. She hopes to replicate and expand her findings by analyzing data from another study to look at depressive mood prior to pregnancy and childhood poverty to see if those two factors in part explain the black and white difference in preterm delivery. That study also will look at the role antidepressive medication plays in preterm birth."My ultimate goal is to incorporate a life course health development framework to examine disparities in birth outcomes," she said. "You have to look at the context of health across the life course of a woman, not just during pregnancy."The consequences of higher preterm delivery are a growing burden on the health care system and parents. Studies have shown that preterm babies have higher morbidity rates and U.S. preterm birth rates are creeping up with no good explanation. In the U.S. the population at greatest risk for major depression is women of childbearing age and the onset and course of depression are often intertwined with reproductive events. A recent national study reported that 8.4 percent of pregnant women in the past year experienced major depression and only slightly more than 14 percent of those women sought treatment for any mood disorder.Co-authors of the study are David Chae of Emory University, Sarah Mustillo of Purdue University, and Dr. Catarina Kiefe of the University of Alabama at Birmingham and the Birmingham Veterans Affairs Medical Center. The National Center for Research Resources and the Roadmap for Medical Research, both components of the National Institutes of Health, funded the research.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2009/06/090610133555.htm

Laptops Linked To Male Infertility

ScienceDaily (June 13, 2009) — While fatherhood might be far from the minds of most young men, behavior patterns they establish early on may impact their ability to become a dad later in life. Excessive laptop use tops this list of liabilities, according to one reproductive specialist at Loyola University Health System (LUHS)."Laptops are becoming increasingly common among young men wired into to the latest technology," said Suzanne Kavic, MD, director of the division of reproductive endocrinology at LUHS and associate professor in the department of obstetrics and gynecology and department of medicine at Loyola University Chicago Stritch School of Medicine. "However, the heat generated from laptops can impact sperm production and development making it difficult to conceive down the road."

Kavic recommends placing laptops on desktops to prevent damaging sperm and decreasing counts and motility. Other tips to protect male fertility include:

- Avoiding hot tubs
- Wearing boxers instead of briefs
- Refraining from ejaculating too frequently (the recommendation is to only engage in sexual intercourse every other day around ovulation)
- Exercising moderately (one hour, three to five times per week)
- Avoiding exercise that can generate heat or trauma to the genital area
- Eating well
- Taking a daily multivitamin
- Getting eight hours of sleep per night
- Staying hydrated and limiting caffeine to no more than two cups per day
- Refraining from smoking
- Avoiding drugs and excessive alcohol use
- Minimizing exposure to toxins
- Avoiding excessive weight gain or weight loss
- Practicing stress reduction techniques

Forty percent of fertility issues are attributed to males. Other leading causes of male infertility include varicocoeles or enlarged varicose veins in the scrotum. This condition can raise the temperature in the testicles and damage or kill sperm. Other reasons include genital injuries or defects, certain sexually transmitted infections, prostatitis (an infection or inflammation of the prostate), immune and hormonal disorders and erectile dysfunction. Kavic also notes that underlying health issues and medications may be to blame for fertility issues. "Medications for depression, blood pressure and certain heart conditions may lower libido or cause impotence," said Kavic. "Men should talk with their physicians to see if medication is necessary or if they can switch to another with fewer side effects."

Reproductive endocrinology services available for males at LUHS include consultations, medical history and physical examinations, semen analysis, intrauterine inseminations by husband donor, assessments for the need for assisted reproductive technology and referrals to support services and alternative medicine.

"With Father's Day around the corner, males should be reminded to take care of their health," said Kavic. "An annual physical exam combined with a healthy lifestyle may make it easier to become a dad when the time is right."

Adapted from materials provided by Loyola University Health System.
http://www.sciencedaily.com/releases/2009/06/090612202347.htm

Low-fat Diet Helps Genetically Predisposed Animals Avoid Liver Cancer

ScienceDaily (June 13, 2009) — In a study comparing two strains of mice, one susceptible to developing cancer and the other not, researchers found that a high-fat diet predisposed the cancer-susceptible strain to liver cancer, and that by switching to a low-fat diet early in the experiment, the same high-risk mice avoided the malignancy. The switched mice were lean rather than obese and had healthy livers at the end of the study.The findings, from a joint University of Pennsylvania School of Medicine and Case Western Reserve University study, appear online this month in *Human Molecular Genetics.*The investigators studied hepatocellular carcinoma (HCC), a type of liver cancer that is one of the leading causes of cancer death worldwide. Thirty percent of cases of this type of liver cancer are associated with obesity, type 2 diabetes, and related metabolic diseases, although a direct link between these and liver cell cancer has not been completely established. "The connection between obesity and cancer is not well understood at this point," says senior co-author John Lambris, PhD, the Dr. Ralph and Sallie Weaver Professor of Research Medicine at Penn. The researchers hope the results will lead to the development of blood tests that can detect precancerous conditions related to diet.

The remaining seventy percent of HCC cases result from hepatitis B and C viral infections, exposure to the fungal toxin aflatoxin, chronic alcohol use, or genetic liver diseases.The usual outcome of hepatocellular carcinoma is poor, because only 10 to 20 percent of these tumors can be surgically removed. If the cancer cannot be completely removed, the disease is usually deadly within 3 to 6 months. Hepatocellular carcinoma causes close to 700,000 deaths worldwide per year, mostly outside the US.The researchers tested the long-term effects of high-fat and low-fat diets on males of two inbred strains of mice and discovered that one strain, named C57BL/6J, was susceptible to non-alcoholic steatohepatitis (NASH) and hepatocellular carcinoma on a high-fat, but not a low-fat diet. The other strain, called A/J, was not susceptible to disease on a high-fat diet. The mice were fed their respective diets for close to 500 days, weighed periodically, and then analyzed for the presence of disease.RNA profiles of hepatocellular carcinoma versus tumor-free liver tissue at the end of the experiment showed that two signaling networks – one centered on Myc and the other on NF-kappa B – were involved. This result is similar to findings obtained from studies on the two major classes of hepatocellular carcinoma in humans.At the end of the experiment, mice susceptible to cancer showed characteristics of NASH such as inflammation and fibrosis, and, in some cases, cirrhosis as well as hepatocellular carcinoma, in their livers. A switch from a high-fat to a low-fat diet reversed these outcomes in groups of C57BL/6J mice that were fed a high-fat diet early in the experiment. The switched C57BL/6J mice were lean rather than obese and had healthy livers at the end of the study. All mice kept on a high-fat diet for the duration of the experiment had liver tumors at the end of 500 days.A similar change in diet may have important implications for preventing liver cancers in humans, suggest the researchers. "The reason these findings are so provocative is that it relates to diet and we now have a unique model we know will develop cancer," says Lambris."By waiting for evidence of disease before terminating the study, instead of using an arbitrary endpoint as is done in most experimental studies, we were able to discover an important new experimental model for a common cancer in humans," says senior co-author Joseph Nadeau, Professor and Chair of the Department of Genetics at Case Western Reserve University School of Medicine.The work was funded by the National Center for Research Resources and the Charles B. Wang Foundation.Co-authors, in addition to Lambris and Nadeau are Maciej M. Markiewski from Penn, Annie E. Hill-Baskin, David A. Buchner, Haifeng Shao, David DeSantis, Nathan A. Berger, and Colleen Croniger from Case Western, and Gene Hsiao, and Shankar Subramaniam from University of California, San Diego.

Adapted from materials provided by University of Pennsylvania School of Medicine, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090611160702.htm

Science, the Extravaganza

By DENNIS OVERBYE

THE cosmic circus is back in town.

The second annual World Science Festival, a five-day extravaganza of performances, debates, celebrations and demonstrations, including an all-day street fair on Sunday in Washington Square Park, began with a star-studded gala tribute to the Harvard biologist Edward O. Wilson at Lincoln Center Wednesday night. Over the next three days the curious will have to make painful choices: attend an investigation of the effects of music on the brain with a performance by Bobby McFerrin, or join a quest for a long-lost mural by Leonardo Da Vinci at the Metropolitan Museum of Art? Learn about the science behind "Battlestar Galactica" with actors from the show, or head to one of various panels of scientists and philosophers arguing about free will, alternate universes, science and religion, time and what it means to be human?

On Saturday there's a chance to play naturalist, scouring a pair of New York parks under professional guidance in what Dr. Wilson calls a "BioBlitz" for flora, fauna and "all things crawly." On Sunday you can get your hands in a variety of experiments at the street fair, including a "CSI"-style crime scene.

The festival is the brainchild of Brian Greene, a Columbia University physicist and mathematician and best-selling author, and his wife, Tracy Day, a former producer for ABC. They say they thought of the project after attending a science festival in Genoa, Italy, and being impressed by seeing science bubbling through the streets and cafes.

The idea is to mix up art, theater and music with the inevitable talking heads and professional interlocutors like Charlie Rose or Alan Alda, who can keep the discussion moving and down to earth, in order to entice an audience that didn't know it was interested in science. Ms. Day likes to describe the strategy this way: "Bring them in for the art and have them leave with science."

Last year more than 100,000 people stood in block-long lines to watch dancers reinterpret string theory, Oliver Sacks interpret his own failing eyesight, scientists debate quantum mechanics and what it means to be human. There were about 46 events, including a daylong street fair in Washington Square Park. In the end everything sold out, the organizers said.

"We learned that there is an untapped hunger in the public for a way into science." said Dr. Greene, who recently sat down with Mr. Alda (who was accompanied by a ghost Twitterer), to discuss the festival.

Mr. Alda, perhaps best known as Hawkeye Pierce in "M*A*S*H," is also longtime science buff and admits to wanting to be an inventor as a boy. Asked about the famous cultural divide between art and science he said that they are mutually reinforcing: "Art needs rigor, and science needs creativity."

In a sort of smackdown between the two, art, represented by Mr. Alda, got the better of science, represented by Dr. Greene. Challenged to explain string theory, Mr. Alda produced a serviceable explanation: the smallest entities in nature are wriggling strings that take on different identities depending on how they vibrate. But Dr. Greene was stumped when asked to hum the theme song from "M*A*S*H."
This year, because of the leaner economic climate, the festival offerings have been scaled back a bit to 40 events, including the street fair on Sunday in Washington Square Park. Ticket prices have also been reduced, Dr. Greene said. (Information on family activities: Spare Times, Page 24.)
The festival is sponsored by 18 organizations, including the Simons Foundation, the Alfred P. Sloan Foundation and the John Templeton Foundation.
One of the biggest differences this year, Dr. Greene said, was symbolized by Wednesday night's gala in honor of Dr. Wilson. In addition to celebrating science, Dr. Greene explained, "we also need to celebrate great scientists — people who've profoundly changed our lives but are often barely known."
He said that future editions of the festival would feature other scientists: "When kids look up to great scientists the way they do to great musicians and actors, civilization will jump to the next level."
Dr. Wilson, an expert and lover of ants, certainly qualifies. He has spent his career taking seriously the notion that the behavior of creatures is just as much a part of nature as hair color or cholesterol counts and so founded the field known as sociobiology. For his troubles he has won two Pulitzer prizes and had a pitcher of water dumped on his head by political activists worried about the implications of his work for human societies.
Dr. Wilson's imprint on this year's festival extends beyond the opening gala and a dramatization of his life on Thursday by the actress Anna Deavere Smith. He will also be featured Friday night on a panel discussing what it means to be human. The topic this year will focus on altruism, a problem that has engaged many evolutionary biologists and philosophers over the years. On Sunday night Dr. Wilson will give a talk on his adventures "BioBlitzing" the world in search of new species.
On Wednesday, speaking at a rapturous reception after his birthday gala, Dr. Wilson called attention to what he called a lopsided emphasis in the current movement toward all things green on preserving the physical environment. More emphasis, he said, needs to be put on preserving the diverse forms of life on this planet, which are dying out at a shocking rate. If we devote ourselves to saving them, we will automatically fix the environment, he said.
"Species are dying," he said, "while we stand here nattering."
More information about the festival and a schedule of events can be seen at worldsciencefestival.com.

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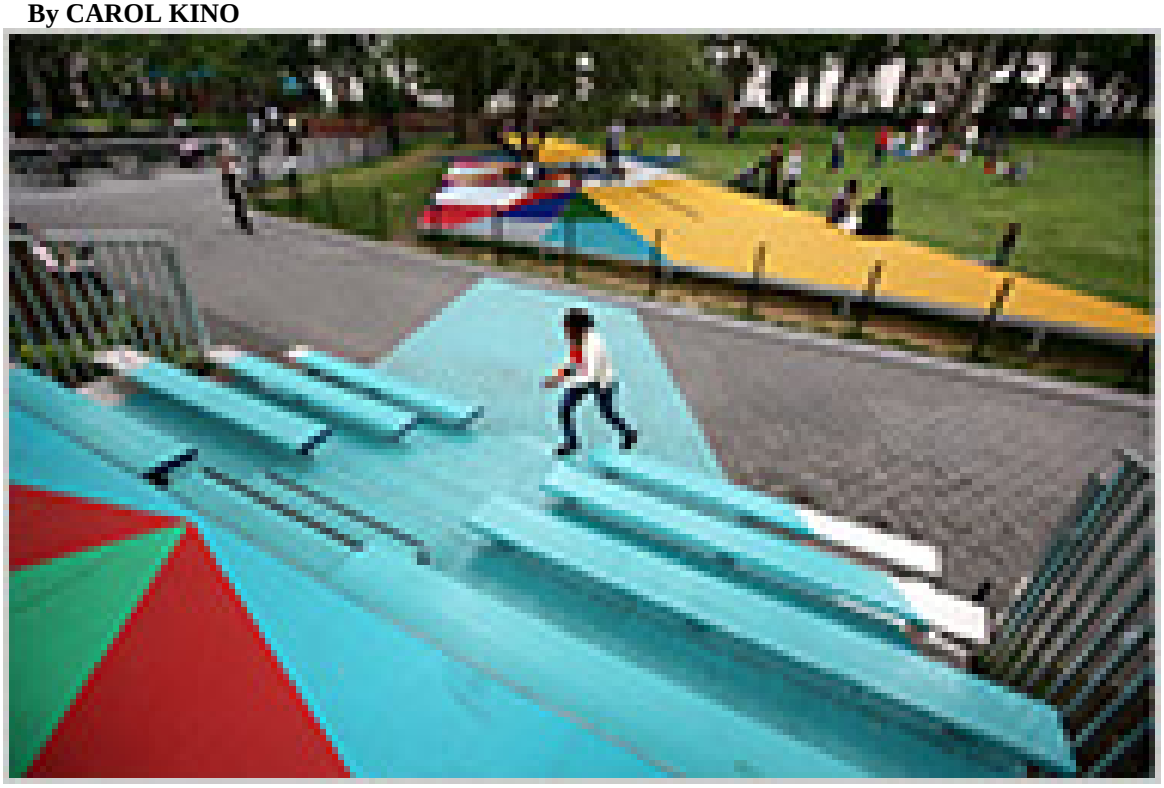
Go Ahead, Play With (and on) the Art

By CAROL KINO



IT was a brilliant spring morning in Madison Square Park, and the uptown end of the central lawn was already crowded with children playing on a multicolored triangular platform that looked as though it had been made from giant Lego blocks. The children clambered up and down, tossing balls, yelling gleefully and digging in a square of blue rubber mulch that lay on the ground beneath this structure. Their mothers and baby sitters lounged alongside them, sitting on the platform or watching from a set of adjoining turquoise bleachers.

At first glance this assemblage might have been mistaken for a particularly inventive playground. But it was actually a piece by the artist Jessica Stockholder, who was watching from the sidelines with Debbie Landau, the president of the Madison Square Park Conservancy, which commissioned the work. Both of them laughed in amazement at the unfolding spectacle.

For more than 25 years Ms. Stockholder has been celebrated for site-specific sculptures and installations that challenge boundaries, blurring the distinction among painting, sculpture and environment, and even breaching gallery walls by extending beyond windows and doors. But with this piece, in the park through Aug. 15, she seems to have crossed another sort of border.

“I’ve never worked in a place like this, with all these people and kids,” Ms. Stockholder said happily, over the din of children’s voices. “I didn’t realize it would be such a magnet, that it would be the thing people really wanted to sit on, and that kids would like it so much.”

Ms. Landau said she too had been struck by the installation’s instant allure. “People discovered it immediately,” she said, noting that its mood changes throughout the day, with the morning rush of children giving way to a more adult lunchtime and early evening crowd. Even before the piece opened to the public, she added, she realized that it would pose an operational challenge. “The minute the blue mulch went down,” she said, “we e-mailed Jessica and said: ‘This is a sandbox. What kid wouldn’t want to play?’ And in fact by the next day a kid had made mounds and had a truck in there.” (The solution: Park employees rake and reshape the mulch twice a day.)

The piece, called “Flooded Chambers Maid” — a play on the concept of women’s work and service work, as well as art making — has much in common with Ms. Stockholder’s gallery installations. It incorporates industrial materials and ready-made manufactured objects, and its brightly colored parts combine to create something of a three-dimensional abstract painting in space.

Although elements like the bleachers and the steel-and-fiberglass gridded segments that make up the platform were fabricated months in advance, the piece feels as though it were invented on the spot. And part of it was: beyond the bleachers lays a garden that Ms. Stockholder planted in a somewhat free-form fashion in April, with the help of Christy Dailey, the conservancy’s chief gardener. The result suggests a D.I.Y. take of a Constructivist painting, built from plants, flowers and upturned buckets and bins from Wal-Mart.

With its focus on geometry this work also suggests a nod to the surrounding architecture and streets, especially the triangular Flatiron Building, which lies just south of the park. But that wasn’t what Ms. Stockholder consciously intended. “I don’t sit down and think about things in that way,” she said. “I walked around the park and spent time thinking about it. I made this piece in response to the patterning that was already here.”

In a sense this is a golden moment for Ms. Stockholder, who recently turned 50. Although she has been showing here since 1985, soon after receiving her master of fine arts degree from Yale, she has three simultaneous exhibitions of her work on view this month. As well as the park piece there is a sculpture show, “Sailcloth Tears,” through June 20 at Mitchell-Innes & Nash in Chelsea. And “Swiss Cheese Field,” a suite of monoprint constructions based on Ms. Stockholder’s drawings for the park project, can be seen through July 2 at Senior & Shopmaker, a gallery overlooking the site. As Ms. Stockholder said, “We took advantage of the moment.”

She produced the prints during a handful of frenzied sessions at Two Palms, a SoHo print shop, working on several at once, with technologically sophisticated machinery and a several crew members. “It’s one of the more exhausting things I’ve done,” she said.

But the sculptures were made the way she usually works: alone in her studio near Yale, where she is director of the graduate sculpture department. (She lives in an adjoining house with her husband, Patrick Chamberlain, a psychologist, and Charles, their 13-year-old son.)

“I don’t have assistants and things in the studio,” she said. Although she works with “anything I can buy and carry,” she frequently allows herself to be limited by the material she already has on hand, like buckets, bolts of cloth, paint and light bulbs, and lets her intuition guide her. “What I like about it is I don’t know what I’m doing,” she said. “I make things complicated for myself and chaotic, so I feel unsettled, and then the challenge is to make something structured and complete emerge from that.”

The park project offered yet another challenge, she said: “It involved much more planning.”

That planning began about three years ago when Ms. Landau, a longtime fan of Ms. Stockholder’s work, mentioned her name to the committee that advises the conservancy’s art program, Mad. Sq. Art. (Since 2004 it has commissioned work by living artists including Sol LeWitt, Roxy Paine and Ursula von Rydingsvard.) Ms. Landau suggested Ms. Stockholder because “I loved her use of color, the vividness, the bold collages, the geometry,” she said. “What was also great was that we’d never had anything that you could quite call an installation before.”

The nomination was ardently supported by another committee member, Adam D. Weinberg, the director of the Whitney Museum of American Art. He first met Ms. Stockholder in 1990 when he included five sculptures in a display of new appropriation art at the museum’s Equitable Center gallery. One piece, he recalled, incorporated burlap, painted Sheetrock, an old car door and a tiny orange light bulb.

“What I immediately loved about them is that I couldn’t figure them out,” he said. “They were somewhere between painting and sculpture and environment. The work also draws on the whole history of art from Matisse to Rauschenberg, Smithson and Gordon Matta-Clark.”

Mr. Weinberg was also uniquely familiar with Ms. Stockholder’s rare alfresco projects. In 2002, as director of the Addison Gallery of American Art in Andover, Mass., he commissioned her first outdoor work made in this country. (The conservancy project is her second.) Made for a show called “SiteLines: Art on Main,” it was installed on a vista landscaped by Frederick Law Olmstead and involved armchairs, a park bench and bleachers, and encouraged visitors to become part of the piece by luring them to sit and enjoy the view. “Her work makes you very aware of your own physical presence in the environment,” he said.

As for Ms. Stockholder, the current project came as a welcome antidote to traveling around the world making museum and gallery projects. “It wasn’t just like arriving and making something in two weeks

and leaving," she said. "It seemed to have roots in a community and a dialogue that are a little bit more substantive."

So in summer 2007 she embarked on a creative process that for her was quite atypical. It involved making drawings, building a model and working with a cast of dozens: as well as the 23-member conservancy staff, the team included a production manager, a fabrication manager, two engineers and maintenance, installation and gardening crews.

There were city building codes to worry about. "Debbie and I talked a lot about the size of the holes in these gratings," Ms. Stockholder said. "They couldn't be too large, because little kids would be likely to be running around, and you didn't want their feet to get stuck, and we had to think a lot about the edges of things and making sure they weren't sharp." Because the platform could be only so high without a railing, she made a virtue of that restriction by positioning it at seating level.

There was also a budget of $300,000, which clocks in as the priciest in the conservancy's history (although it's a far cry from the cost of some other recent public artworks, like Olafur Eliasson's $15.5 million "New York City Waterfalls" in 2008).

After the initial quotes came in, Ms. Stockholder let her imagination run away with her, coming up with ideas for more elaborate elements, like a more lushly planted garden. But last fall, after the economy tanked, her ambitions had to be reined in. Although she stuck to a couple of wish-list items, she impressed the team with her willingness to compromise on many more, from the vinyl coating for the bleachers (largely replaced by commercial oil paint) to the number of plants (scaled down). "She's a very easy artist to work with," said Ms. Landau.

But Ms. Stockholder said she took these constraints as inspiration. "In some way that's what the work is about," she said. "I work in response to the limitations of any situation and in relationship to what's possible." Besides, she added, the project had given her new opportunities. "In a park," she said, you are not working with studio materials or a flat piece of paper. You have grass, and the people and the city and the daylight."

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'LIGHT OF THE SUFIS'
The Many Voices of Enlightenment

By HOLLAND COTTER

"What's in your head — throw it away! What's in your hand — give it up! Whatever happens — don't turn away from it." That's how a 10th-century Persian spiritual master — Abu Said ibn Abil-Khair was his name — defined the Islamic devotional practice known as Sufism. Countless other definitions have been proposed since, almost as many as for Islam itself.

Religions and spiritual movements are complicated things, and accurate descriptions of them are bound to be contradictory. Sufism, like Islam, is both mystical and practical, embracing and exclusionary, pacific and assertive, ascetic and sensual, free form and discipline bound. Such oppositions aren't a problem. They generate the unifying friction that makes culture tick.

But complexity also makes us nervous. We have an itch to neaten it up, flatten it out. So we do. The West tends to see all Islam as fundamentalist, bellicose and puritanical, and Sufism as a sexy, proto-New Agey, un-Islamic departure. At the same time a fundamentalist Muslim minority rejects Sufism, with its world-touring dervishes, tippler poets and pop stars, as a Western-pandering perversion of Islamic tradition.

Clearly neither side is prepared to take the let-go-and-change option that Abu Said suggests is the Sufi way. But art, by default, does take it. Taken piece by piece, art can be ideologically arm-twisting. But collectively it is disordered enough to give equal time to many voices. And many voices is what you find in a tiny, exquisite show called "Light of the Sufis: The Mystical Arts of Islam" in the newly reinstalled Islamic galleries at the Brooklyn Museum.

While global politics has made Islam part of our consciousness, we hear little about Sufism and its long history. The term "sufi" probably derives from an Arabic word for wool, referring to the rough garments once worn by Middle Eastern ascetics. Certain followers of Sufism were called "dervishes," a term related to a Persian word for poor. It seems likely that Sufism initially developed a few centuries after the prophet Mohammad's death in 632 A.D. as a back-to-basics alternative to the extravagance of the early Islamic imperial courts. In response to it a group of like-minded Muslims set materialist moderation, if not outright renunciation, as a goal. They advocated turning away from the world and toward spiritual illumination. Muhammad, enraptured by God, was their role model, and a passage from the Koran known as "Light Verse" was a primary text: "Allah is the light of the heavens and earth. His light may be compared to a niche that enshrines a lamp, the lamp within a crystal of starlike brilliance. Light upon light; Allah guides to his light whom He will."

A Koran page handwritten in light — that is, in gold and silver inks on a sheet of parchment dyed deep blue — is the exhibition's oldest work, dating from the 10th or 11th century. Seen by candlelight, the words, which describe the rewards of Paradise, would have glinted against the dark ground like constellations in a night sky.

Luxury versions of glass lamps found in homes were created for mosques. A 14th-century Egyptian example, enameled, gilded and inscribed with quotations from the "Light Verse," is in the show, on loan from the Metropolitan Museum. So is a 16th-century brass candlestick inscribed with lines in Persian about the attraction of moths to a flame, a metaphor for a soul's ego-extinguishing passion for God.

And as often as not, spiritual yearning is expressed in terms of erotic attraction. One of the grand romances of popular Arabic literature was the Romeo-and-Juliet tale of Majnun and Layla, who fell in love. When Layla's father married her off to some else, Majnun lost his mind. Delirious with ardor and despair, he refused to eat or sleep, and wandered the countryside for years like a wild man.

In some versions of the story Layla dies in a distant country, and he pines away in grief. In other accounts, like the one illustrated in a 17th-century Indian painting in the show, the two are reunited, at which point, exhausted with privations, Majnun dies in his beloved's arms. In both cases he is a prototype of the Sufi who has gone the whole, extreme way to become, in the words of the poet Farid al-Din Attar, "a dead body, a nonexistent heart and a soul scorched away," an ego reduced by love to an ash on the arm of God.

Not everything about Sufism was so unworldly. For some adherents poverty was more a spiritual than a physical condition, and tokens of it could be sumptuous: a beggar's bowl cast in silver and inlaid with jewels; Korans in gilded bindings; light-reflecting lusterware tiles to decorate tombs.

The air of ordinary life permeates Sufi writing. The verses of the great 13th-century poet Mawlana Jalal-al-Din Rumi are sprinkled with kitchen references, off-color jokes, gossipy banter and market talk: "With God, you get the best deal; he buys your dirty fortune and gives you in exchange light of the soul."

Institutional Sufism today has corporate dimensions. What began as a reformist spiritual impulse had become an economic and political force. One of the outstanding pieces in Brooklyn's Islamic gallery reinstallation — organized, like the Sufi show, by Ladan Akbarnia, the museum's associate curator of Islamic art — is a large 19th- or early-20th-century painting depicting the Battle of Karbala, a violent episode in the dispute between the Sunni and Shia branches of Islam, and one in which Husayn ibn Ali, a pious grandson of the prophet, died a martyr's death.

The relationship of Shiism and Sufism, two powerful minorities, has been troubled, even hostile, particularly under orthodox Shiite-dominated governments in Iran, where Sufi mysticism was officially disdained. At the same time certain Sufi orders have closely associated themselves with Shiism. In doing so, Sufism puts into practice a principle of universal spiritual embrace and also shows itself adept in navigating the ways of the world.

But that worldliness, while real, is also circumscribed. Sufi literature tells us that 70,000 veils of light and darkness separate people from God. The Sufi's task is to find a way through those veils. That's a full-time job and a confounding and fearful one when light and darkness become the same.

Some Sufis have spoken of Black Light, the light of bewilderment, a light so bright that it has the effect of a blackout: everything familiar disappears, "like the flame of the candle in the presence of the sun," as Rumi puts it. The idea is that God is now so blindingly near that all else becomes invisible. He is a vision of everything and nothing, and the devotee is immersed in it. The moth becomes one with the flame.

Few practitioners attain so radical a state of absorption. But the desire to find lightness of heart — to have old spirit-killing depressions and anxiety-causing attachments melted away — continues. Sufism is very much part of any full definition of Islam today. And today is where "Light of the Sufis" leaves us, with two contemporary works.

One, called "Prayer Stone 5," is by Pouran Jinchi, an artist who was born in Iran and now lives in New York City. It consists of overlaid rubbings that Ms. Jinchi took of two carved stones in a Shia shrine in the holy city of Mashhad in Iran. One stone was inscribed with the name of Allah, the other with prayers for peace directed to a revered leader in the Shia line of spiritual succession.

In and around the lacelike patterns left by the rubbings, Ms. Jinchi has added something of her own: words from Muslim daily prayers written over and over in a minute calligraphic hand, their repetition being the physical equivalent of the Sufi practice of constantly reciting the names of God.

The second work, called "Fragments of Light 2," is by Kelly Driscoll, who lives in Brooklyn. It is made up of verses by Rumi etched onto sheets of clear glass that have been bound into a book. The volume, transparent from first page to last, forms a natural link to the Koran page that opens the show. And it gives the final word to a great Sufi singer of spiritual passion, who also happens to be a best-selling poet in the United States and who once summed up his entire life in three short, ardent laser-beam phrases: "I burned, and burned, and burned."

"Light of the Sufis: The Mystical Arts of Islam" remains on view through Sept. 6 in the newly reinstalled Islamic galleries at the Brooklyn Museum, 200 Eastern Parkway, at Prospect Park, (718) 638-5000, brooklynmuseum.org.

http://www.nytimes.com/2009/06/12/arts/design/12sufi.html?ref=design

Greenland Ice Sheet Melting Faster Than Expected; Larger Contributor To Sea-level Rise Than Thought

Melting water from a glacier in Greenland runs into the ocean. (Credit: Photo by Sebastian Mernild)

ScienceDaily (June 13, 2009) — The Greenland ice sheet is melting faster than expected, according to a new study led by a University of Alaska Fairbanks researcher and published in the journal *Hydrological Processes*.

Study results indicate that the ice sheet may be responsible for nearly 25 percent of global sea rise in the past 13 years. The study also shows that seas now are rising by more than 3 millimeters a year--more than 50 percent faster than the average for the 20th century.

UAF researcher Sebastian H. Mernild and colleagues from the United States, United Kingdom and Denmark discovered that from 1995 to 2007, overall precipitation on the ice sheet decreased while surface ablation--the combination of evaporation, melting and calving of the ice sheet--increased. According to Mernild's new data, since 1995 the ice sheet lost an average of 265 cubic kilometers per year, which has contributed to about 0.7 millimeters per year in global sea level rise. These figures do not include thermal expansion--the expansion of the ice volume in response to heat--so the contribution could be up to twice that.

The Greenland ice sheet has been of considerable interest to researchers over the last few years as one of the major indicators of climate change. In late 2000/early 2001 and in 2007, major glacier calving events sent up to 44 square miles of ice into the sea at a time. Researchers are studying these major events as well as the less dramatic ongoing melting of the ice sheet through runoff and surface processes.

Ice melt from a warming Arctic has two major effects on the ocean. First, increased water contributes to global sea-level rise, which in turn affects coastlines across the globe. Second, fresh water from melting ice changes the salinity of the world's oceans, which can affect ocean ecosystems and deep water mixing.

"Increasing sea level rise will be a problem in the future for people living in coastal regions around the globe," said Mernild. "Even a small sea level rise can be a problem for these communities. It is our hope that this research can provide people with accurate information needed to plan for protecting people and communities."

Journal reference:

1. Sebastian H. Mernild, Glen E. Liston, Christopher A. Hiemstra, Konrad Steffen, Edward Hanna, Jens H. Christensen. **Greenland Ice Sheet surface mass-balance modelling and freshwater flux for 2007, and in a 1995-2007 perspective**. *Hydrological Processes*, 2009; n/a DOI: 10.1002/hyp.7354

Adapted from materials provided by University of Alaska Fairbanks.

http://www.sciencedaily.com/releases/2009/06/090612092741.htm

Hatchery Fish May Hurt Efforts To Sustain Wild Salmon Runs

Steelhead trout return to spawn. (Credit: John McMillan)

ScienceDaily (June 13, 2009) — Steelhead trout that are originally bred in hatcheries are so genetically impaired that, even if they survive and reproduce in the wild, their offspring will also be significantly less successful at reproducing, according to a new study published today by researchers from Oregon State University.

The poor reproductive fitness – the ability to survive and reproduce – of the wild-born offspring of hatchery fish means that adding hatchery fish to wild populations may ultimately be hurting efforts to sustain those wild runs, scientists said.

The study found that a fish born in the wild as the offspring of two hatchery-reared steelhead averaged only 37 percent the reproductive fitness of a fish with two wild parents, and 87 percent the fitness if one parent was wild and one was from a hatchery. Most importantly, these differences were still detectable after a full generation of natural selection in the wild.

The effect of hatcheries on reproductive fitness in succeeding generations had been predicted in theory, experts say, but until now had never been demonstrated in actual field experiments.

"If anyone ever had any doubts about the genetic differences between hatchery and wild fish, the data are now pretty clear," said Michael Blouin, an OSU professor of zoology. "The effect is so strong that it carries over into the first wild-born generation. Even if fish are born in the wild and survive to reproduce, those adults that had hatchery parents still produce substantially fewer surviving offspring than those with wild parents. That's pretty remarkable."

An earlier report, published in 2007 in the journal Science, had already shown that hatchery fish that migrate to the ocean and return to spawn leave far fewer offspring than their wild relatives. The newest findings suggest the problem does not end there, but carries over into their wild-born descendants.

The implication, Blouin said, is that hatchery salmonids – many of which do survive to reproduce in the wild– could be gradually reducing the fitness of the wild populations with which they interbreed. Those hatchery fish provide one more hurdle to overcome in the goal of sustaining wild runs, along with problems caused by dams, loss or degradation of habitat, pollution, overfishing and other causes.

Aside from weakening the wild gene pool, the release of captive-bred fish also raises the risk of introducing diseases and increasing competition for limited resources, the report noted.

This research, which was just published in Biology Letters, was supported by grants from the Bonneville Power Administration and the Oregon Department of Fish and Wildlife. It was based on years of genetic analysis of thousands of steelhead trout in Oregon's Hood River, in field work dating back to 1991. Scientists have been able to genetically "fingerprint" three generations of returning fish to determine who their parents were, and whether or not they were wild or hatchery fish.

The underlying problem, experts say, is Darwinian natural selection.

Fish that do well in the safe, quiet world of the hatcheries are selected to be different than those that do well in a much more hostile and predatory real-world environment. Using wild fish as brood stock each year should lessen the problem, but it was just that type of hatchery fish that were used in the Hood River study. This demonstrates that even a single generation of hatchery culture can still have strong effects.

Although this study was done with steelhead trout, it would be reasonable to extrapolate its results to other salmonids, researchers said. It's less clear what the findings mean to the many other species that are now being bred in captivity in efforts to help wild populations recover, Blouin said, but it's possible that similar effects could be found.

Captive breeding is now a cornerstone of recovery efforts by conservation programs for many threatened or endangered species, the researchers noted in their report. Thousands of species may require captive breeding to prevent their extinction in the next 200 years – which makes it particularly important to find out if such programs will ultimately work. This study raises doubts.

"The message should be clear," the researchers wrote in their report's conclusion. "Captive breeding for reintroduction or supplementation can have a serious, long-term downside in some taxa, and so should not be considered as a panacea for the recovery of all endangered populations."

Adapted from materials provided by Oregon State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090610091224.htm

Red Wine Compound Resveratrol Demonstrates Significant Health Benefits

Low to moderate drinking -- especially of red wine -- appears to reduce all causes of mortality. (Credit: iStockphoto)

ScienceDaily (June 12, 2009) — The benefits of alcohol are all about moderation. Low to moderate drinking – especially of red wine – appears to reduce all causes of mortality, while too much drinking causes multiple organ damage. A mini-review of recent findings on red wine's polyphenols, particularly one called resveratrol, will be published in the September issue of *Alcoholism: Clinical & Experimental Research*; the review is also available at Early View."Reports on the benefits of red wine are almost two centuries old," said Lindsay Brown, associate professor in the School of Biomedical Sciences at The University of Queensland and corresponding author for the study. "The media developed the more recent story of the French paradox in the early 1990s. However, studies on the actions of resveratrol, one of the active non-alcoholic ingredients, were uncommon until research around 1997 showed prevention of cancers. This led to a dramatic interest in this compound."

Red wine contains a complex mixture of bioactive compounds, including flavonols, monomeric and polymeric flavan-3-ols, highly colored anthocyanins, as well as phenolic acids and the stilbene polyphenol, resveratrol. Brown said that some of these compounds, particularly resveratrol, appear to have health benefits."The breadth of benefits is remarkable – cancer prevention, protection of the heart and brain from damage, reducing age-related diseases such as inflammation, reversing diabetes and obesity, and many more," said Brown. "It has long been a question as to how such a simple compound could have these effects but now the puzzle is becoming clearer with the discovery of the pathways, especially the sirtuins, a family of enzymes that regulate the production of cellular components by the nucleus. 'Is resveratrol the only compound with these properties?' This would seem unlikely, with similar effects reported for other components of wine and for other natural products such as curcumin. However, we know much more about resveratrol relative to these other compounds."

Stephen Taylor, professor of pharmacology at the University of Queensland, agreed that resveratrol is the "compound du jour."

"I think that red wine has both some mystique and some historical symbolism in the west," said Taylor, "and of course, some various pleasures attached to its ingestion, all of which give it a psychological advantage edge, food-wise. Not many of us can or will eat a couple of cups of blueberries a day for years on end, but if we could do a population study for a decade or so on such a group, you might actually see similar results."

Key points of the review include:

- Resveratrol exhibits therapeutic potential for cancer chemoprevention as well as cardioprotection.

"It sounds contradictory that a single compound can benefit the heart by preventing damage to cells, yet prevent cancer by causing cell death, said Brown. "The most likely explanation for this, still to be rigorously proved in many organs, is that low concentrations activate survival mechanisms of cells while high concentrations turn on the in-built death signals in these cells."

- Resveratrol may aid in the prevention of age-related disorders, such as neurodegenerative diseases, inflammation, diabetes, and cardiovascular disease.

"The simplest explanation is that resveratrol turns on the cell's own survival pathways, preventing damage to individual cells," said Brown. "Further mechanisms help, including removing very reactive oxidants in the body and improving blood supply to cells."

- Low doses of resveratrol improve cell survival as a mechanism of cardio- and neuro-protection, while high doses increase cell death.

"The key difference is probably the result of activation of the sirtuins in the nucleus," said Brown. "Low activation reverses age-associated changes, while high activation increases the process of apoptosis or programmed cell death to remove cellular debris. Similar changes are seen with low-dose versus high-dose resveratrol: low-dose resveratrol produces cellular protection and reduces damage, while high-dose resveratrol prevents cancers."In summary, noted Brown, current scientific research is starting to explain reports from the last 200 years that drinking red wine improves health. "It is a cliché that 'nature is a treasure trove of compounds,' but studies with resveratrol show that this is correct! We need to understand better the vast array of compounds that exist in nature, and determine their potential benefits to health."

"There is one particular point that deserves fleshing out," added Taylor. "Resveratrol is largely inactivated by the gut or liver before it reaches the blood stream, where it exerts its effects – whatever they may be – good, bad, or indifferent. Thus, most of the reseveratrol in imbibed red wine does not reach the circulation. Interestingly, absorption via the mucous membanes in the mouth can result in up to around 100 times the blood levels, if done slowly rather than simply gulping it down. Of course, we don't know if these things matter yet, but issues like this are real and generally ignored by all."

Journal reference:

1. Brown et al. **The Biological Responses to Resveratrol and Other Polyphenols From Alcoholic Beverages**. *Alcoholism Clinical and Experimental Research*, 2009; DOI: 10.1111/j.1530-0277.2009.00989.x

Adapted from materials provided by Alcoholism: Clinical & Experimental Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090611174052.htm

'Junk' DNA Proves To Be Highly Valuable

When ARS plant pathologist Bret Cooper and his collaborators investigated "junk" DNA in the model plant Arabidopsis thaliana, they may have found what could be the key to improving control of gene expression in transgenic crops. (Credit: Photo by Peggy Greb)

ScienceDaily (June 12, 2009) — What was once thought of as DNA with zero value in plants--dubbed "junk" DNA--may turn out to be key in helping scientists improve the control of gene expression in transgenic crops.

That's according to Agricultural Research Service (ARS) plant pathologist Bret Cooper at the agency's Soybean Genomics and Improvement Laboratory in Beltsville, Md., and collaborators at Johns Hopkins University in Baltimore, Md.

For more than 30 years, scientists have been perplexed by the workings of intergenic DNA, which is located between genes. Scientists have since found that, among other functions, some intergenic DNA plays a physical role in protecting and linking chromosomes. But after subtracting intergenic DNA, there was still leftover or "junk" DNA which seemed to have no purpose.

Cooper and collaborators investigated "junk" DNA in the model plant *Arabidopsis thaliana*, using a computer program to find short segments of DNA that appeared as molecular patterns. When comparing these patterns to genes, Cooper's team found that 50 percent of the genes had the exact same sequences as the molecular patterns. This discovery showed a sequence pattern link between "junk" and coding DNA. These linked patterns are called pyknons, which Cooper and his team believe might be evidence of something important that drives genome expansion in plants.

The researchers found that pyknons are also the same in sequence and size as small segments of RNA that regulate gene expression through a method known as gene silencing. This evidence suggests that these RNA segments are converted back into DNA and are integrated into the intergenic space. Over time, these sequences repeatedly accumulate. Prior to this discovery, pyknons were only known to exist in the human genome. Thus, this discovery in plants illustrates that the link between coding DNA and junk DNA crosses higher orders of biology and suggests a universal genetic mechanism at play that is not yet fully understood.

The data suggest that scientists might be able to use this information to determine which genes are regulated by gene silencing, and that there may be some application for the improvement of transgenic plants by using the pyknon information.

This research was published online as an advance article on the Molecular BioSystems website, and will be published later this year in a special issue of *Computational Systems Biology*.

Journal reference:

1. Feng et al. **Coding DNA repeated throughout intergenic regions of the Arabidopsis thaliana genome: evolutionary footprints of RNA silencing**. *Molecular BioSystems*, 2009; DOI: 10.1039/b903031j

Adapted from materials provided by USDA/Agricultural Research Service.
http://www.sciencedaily.com/releases/2009/06/090606105203.htm

Staying Sharp: New Study Uncovers How People Maintain Cognitive Function In Old Age

ScienceDaily (June 12, 2009) — Not everyone declines in cognitive function with age. Elderly people who exercise at least once a week, have at least a high school education and a ninth grade literacy level, are not smokers and are more socially active are more likely to maintain their cognitive skills through their 70s and 80s, according to research published in the June 9, 2009, print issue of *Neurology*®, the medical journal of the American Academy of Neurology.

The study followed 2,500 people age 70 to 79 for eight years, testing their cognitive skills several times over the years. Many of the participants showed decline in cognitive function. Fifty-three percent of the participants showed normal age-related decline and 16 percent showed major cognitive decline. However, 30 percent of the participants had no change or improved on the tests over the years.

The researchers then examined what factors made the people whose cognition stayed sharp different from those who lost some of their abilities over eight years.

"To this day, the majority of past research has focused on factors that put people at greater risk to lose their cognitive skills over time, but much less is known about what factors help people maintain their skills," said study author Alexandra Fiocco, PhD, of the University of California, San Francisco.

The study reported a unique profile that differentiates people who maintain cognitive function from people who show age-related decline: people who exercise moderately to vigorously at least once a week are 30 percent more likely to maintain their cognitive function than those who do not exercise that often. Those who have at least a high school education are nearly three times as likely to stay sharp as those who have less education. Elderly with a ninth grade literacy level or higher are nearly five times as likely to stay sharp than those with lower literacy levels. Non-smokers are nearly twice as likely to stay sharp as those who smoke. Finally, people working or volunteering and people who report living with someone are 24 percent more likely to maintain cognitive function in late life.

"Some of these factors such as exercise and smoking are behaviors that people can change. Discovering factors associated with cognitive maintenance may be very useful in prevention strategies that guard against or slow the onset of dementia," Fiocco said. "These results will also help us understand the mechanisms that are involved in successful aging."

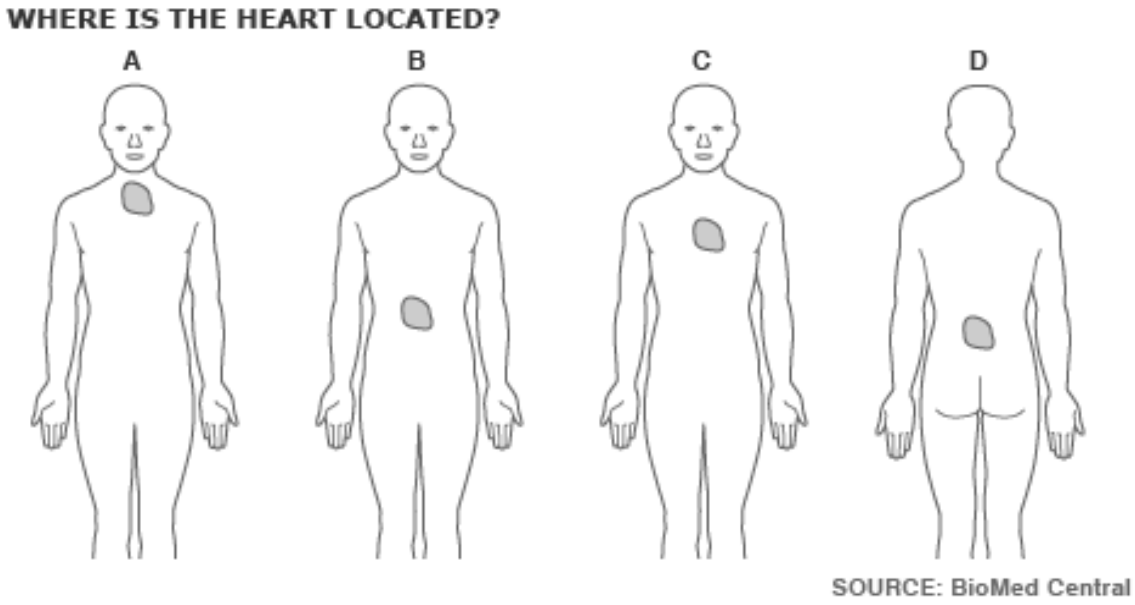
The study was supported by the National Institutes of Health.

Adapted from materials provided by American Academy of Neurology.

http://www.sciencedaily.com/releases/2009/06/090608162424.htm

Basic anatomy 'baffles Britons'

Many people in the UK are unable to identify the location of their major organs, a study suggests.



A team at King's College London found public understanding of basic anatomy has not improved since a similar survey was conducted 40 years ago.

Less than 50% of the more than 700 people surveyed could correctly place the heart, BMC Family Practice says.

Under one-third could place the lungs in their correct location, but more than 85% got the intestines right.

There are concerns that a poor grasp of anatomy could potentially compromise patient care.

The researchers asked more than 700 people to look at outlines of both a male and female body and identify which of several shaded areas was a particular organ.

Those asked included apparently healthy members of the public and then people undergoing treatment for a problem that affected specific organs.

Even those for whom the organ was particularly relevant often performed poorly - more than half of those with renal problems did not correctly identify the kidneys.

Fewer than 30% of the general population were able to do so.

But liver patients did better, with 75.3% identifying the organ compared with 46% of the general population.

The researchers said they had aimed to update a similar piece of research carried out in 1970, in which just over half of all the questions were correctly answered.

But with an average of 52.5% correctly answered, the results have barely changed.

"We thought that the improvements in education seen since then, coupled with an increased media focus on medical and health-related topics and growing access to the internet as a source of medical information, might have led to an increase in patients' anatomical knowledge," said lead researcher John Weinman.

"As it turns out, there has been no significant improvement in the intervening years."

There was little difference between men and women, although women did perform better when a female body image was used.

Unsurprisingly, the better educated identified more organs correctly.

Communication concerns

The researchers said their findings did raise concerns about doctor-patient communication and possibly therefore the quality of care.

Don Redding, head of policy at the Picker Institute Europe, a patient research group, agreed.

"There is a real problem with health literacy - people's ability to understand and process health information - which this study is indicative of.

"It really does matter, particularly as we look ahead to an NHS where resources are ever tighter.

"If people are going to use the NHS in an effective way they need to be able to communicate and understand what is said to them - this way we avoid repeat referrals, unnecessary hospitalisations.

"Everyone involved has to think harder about how to engage people in their own health - it's the only way."

Ellen Mason, from the British Heart Foundation, said: "Ideally the public would have a better knowledge of the location of their major body organs than this study suggests.

"This would hopefully produce a more meaningful dialogue with their doctor when something goes wrong with one of these organs.

"However, it is ultimately more important to know how to look after your heart than where it is in your body."

Answers: Heart - C, Kidneys - D, Pancreas - B.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8092930.stm

Published: 2009/06/12 00:01:03 GMT

Typhoons trigger slow earthquakes

By Victoria Gill
Science reporter, BBC News

Typhoons can trigger imperceptible, slow earthquakes, researchers say.

Scientists report in the journal Nature that, in a seismically active zone in Taiwan, pressure changes caused by typhoons "unclamp" the fault.

This gentle release causes an earthquake that dissipates its energy over several hours rather than a few potentially devastating seconds.

The researchers believe this could explain why there are relatively few large earthquakes in this region.

Alan Linde from the Carnegie Institution for Science in the US and colleagues monitored movement of two colliding tectonic plates in eastern Taiwan.

They used three borehole "strainmeters" - highly sensitive instruments deep below the ground.

"These detect otherwise imperceptible movements and distortions of rock," explained co-author Selwyn Sacks, also from the Carnegie Institution.

Gentle relief

The instruments picked up 20 "slow earthquakes", each lasting from several hours to more than a day. Of these, 11 co-incided exactly with typhoons.

The authors described the possibility that this coincident timing was by chance as "vanishingly small".

“ **For the typhoon to be a trigger, the fault must be precariously close to failure** ”
Alan Linde Carnegie Institution for Science

"It's rare that you see something so definitive, especially when it's something new," Dr Linde told BBC News.

Their findings could provide clues about why there are relatively few large earthquakes in this region.

Here, the colliding plates move so rapidly that they build mountains at a rate of almost 4mm per year. Dr Linde said that in geological terms that was almost like "growing mushrooms".

"It's surprising that this area of the globe has had no great earthquakes and relatively few large earthquakes," Dr Linde commented.

"By comparison, the Nankai Trough in southwestern Japan has a plate convergence rate of about 4cm per year, and this causes a magnitude 8 earthquake every 100 to 150 years.

"The activity in southern Taiwan comes from the convergence of the same two plates, and there the Philippine Sea Plate pushes against the Eurasian Plate at twice that rate.

"This fault experiences more or less constant strain and stress build-up."

He described how the fault "dipped steeply" westward from near the east coast so that it is under the land area. So the landward side is under constant strain to move upward.

When a typhoon passes over the land, the air pressure on the land is lowered. That slight change in force "unclamps" the fault and allows it to move.

"But this change is quite small," said Dr Linde. "So for the typhoon to be a trigger, the fault must be precariously close to failure."

The frequent, slow earthquakes this causes are "totally imperceptible" from the ground. And Dr Linde thinks it is sensible to assume that they may reduce the frequency of larger, more damaging earthquakes.

But this is extremely hard to show because, as he puts it, "how do you prove something that doesn't happen?"

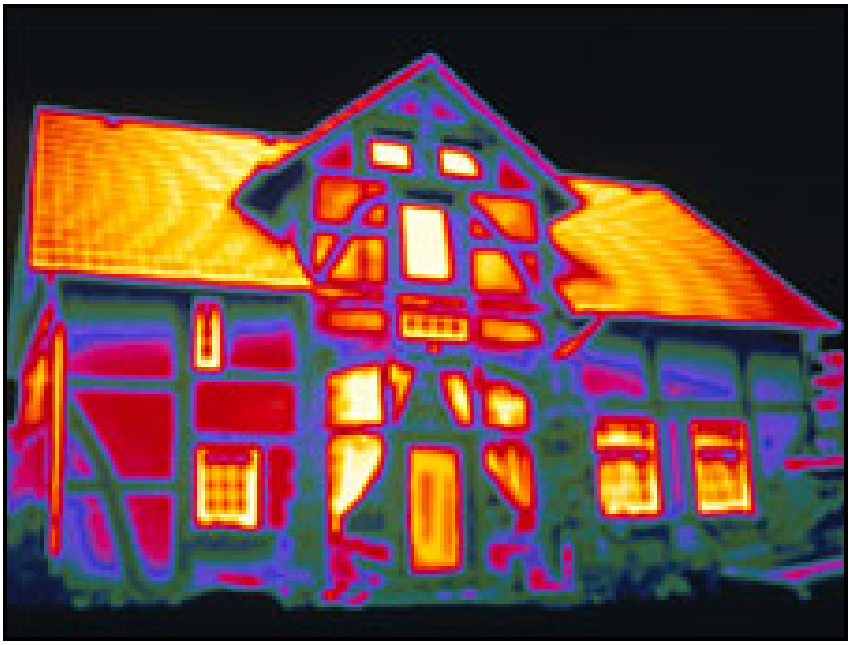
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8094083.stm

Published: 2009/06/11 07:44:02 GMT

Government 'must back insulation'

By Roger Harrabin
Environment analyst, BBC News

The winner of a clean energy prize says government must show much greater urgency in insulating people's homes.



West Yorkshire's Kirklees Council has won the prestigious Ashden award for its major home refurbishment programme.

The council says the UK government could save families £200 a year and cut greenhouse gases if it guaranteed the cash for a nationwide "refurb".

The government says it plans a nationwide scheme based on Kirklees - and says the criticisms are misguided.

Homes are the unnoticed polluters: they produce about a third of our greenhouse gases - and home energy bills are a burden for many.

Kirklees Council tackled both issues at once by sending hit squads of workers street to street, offering everyone free loft and cavity wall insulation with no conditions.

It says it is the most effective way of getting homes refurbished, and that it saves a third of the cost if work is done on a street-by-street basis. It also says it removes the social stigma of having to apply for a means-tested government grant and the problem of having to find a trustworthy contractor.

Energy savings

So far, 25,000 homes have been made over. Kirklees says the average saving in energy bills is £200 a year. One key factor is that the council guarantees the work as a protection against cowboy builders.

Nearly 100 full-time jobs and 60 part-time roles have been created as a result of the scheme. Installations are proceeding at a rate of 600 a week, making this easily the UK's largest refurbishment scheme.

The government, which will soon breach its own Warm Homes Act mandating insulation standards for poor households, says it plans a great British "refurb" modelled on Kirklees.

" **Every home capable of having it should get free loft or cavity wall insulation** "
Dr Phil Webber

It agrees a major initiative is vital because only 1% of housing stock is renewed every year. If existing homes are not radically improved, it will be impossible for the UK to meet climate change targets.

A government spokesman said: "We'd agree that up-scaling to a door-to-door approach is going to be needed. Under our existing schemes, we're aiming for loft and cavity wall insulation in all appropriate homes by 2015."

Questions remain, though, about funding and delivery.

The Treasury has resolved that energy companies will have to take responsibility for delivering refurbishment schemes. This leaves government money untouched but it will act as an indirect levy on electricity bills. Government argues that it will save everyone money in the long run.

Dr Phil Webber, who runs the Kirklees scheme, says the government hasn't committed enough cash to get it started. "Every home capable of having it should get free loft or cavity wall insulation," he says.

"But funding levels (with energy company schemes known as CERT and CESP) are not sufficient to enable the current schemes to scale up.

"Also between 30 and 70% of homes - depending on the area - have solid walls. We've got to do something about them, too."

'Upfront financing'

Kirklees has trialled an external render-based product that is approved by English Heritage and mimics the look of brick, stone render or even Yorkshire stone. It water-proofs - and insulates better than cavity wall filling. But costs are significantly greater at £6-10k per house.

A government spokesman said: "The need for more expensive adaptations like solid wall insulation is what our Great British Refurb proposals are all about. We want to make financing available upfront with repayments made over a long period.

"Repayments would pass from one property owner to the next. The intention is to enable a full property re-fit in seven million homes by 2020, every home by 2030."

But Dr Webber said the government's ambitions would fail through a lack of capital.

"The government should find the capital," he said. "It is the major shareholder in banks and it should insist that the banks put up the money for this - it's a safe bet that actually saves money.

"And the government could underwrite it. The Treasury needs to be bolder - why they don't do it, I don't know. We have got the car-scrapping scheme in very quick time - I don't understand why it hasn't happened in the energy field."

The government spokesman said the whole refurb programme was under consultation to run from 2012 and was beyond current spending programmes.

But campaigners are also baffled that this sort of labour-intensive home insulation has not been more of a priority in the recent fiscal stimulus as it creates so many "shovel-ready" jobs. It is the sort of stimulus recommended by the former chief Treasury economist Lord Nicholas Stern.

They are also dubious that the power suppliers - who have been tasked with delivering the refurbishment - are up to the task.

Andrew Warren from the industry lobby group the Association for Conservation of Energy says many power suppliers have decided to give away low-energy light bulbs rather than attempt to get people to insulate their homes better.

"This is a cop-out," he told BBC News. "The firms aren't even forced to monitor whether the bulbs are even used or whether they are left in the box. The government is letting the power firms determine the pace of improvement to our housing stock - and the power firms have an incentive for us to keep using electricity."

And Dr Webber said that to be successful, schemes had to be locally guaranteed and facilitated: "You've got to make it easy for people. If there's no loft hatch we'll put one in for you.

"If you need scaffolding we'll do it - at no extra cost… we don't send you off to get a builder. We have a consultant on renewables, so you know what the best options are. These are complicated matters and I think the government hasn't understood how much help people need."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8095470.stm

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'Boom and bust' of deforestation

By Richard Black
Environment correspondent, BBC News

Cutting down Amazon forest for cattle and soy does not bring long-term economic progress, researchers say.

A study of 286 Amazon municipalities found that deforestation brought quick benefits that were soon reversed.

Writing in the journal Science, the researchers say the deforestation cycle helps neither people nor nature. They suggest that mechanisms to reward people in poorer countries for conserving rainforest could change this "lose-lose-lose" situation.

Jumbled paths

" **Reversing this pattern will hinge on capturing the values of intact forests** "
Andrew Balmford, Cambridge University

The Brazilian government has long had a twin-track approach to the Amazon, which contains about 40% of the world's remaining rainforest.

While the land development agency Incra settles people in the region as a way of giving them land and livelihoods - a policy that dates from the 1970s - the environment ministry is trying to reduce the rate of deforestation. Last year the environment ministry named Incra as the country's worst illegal logger.

The Science study suggests that the settlement and expansion policy is not producing real benefits for people.

Ana Rodrigues and colleagues assessed the development status of people in 286 municipalities using the UN's Human Development Index (HDI), which combines measures of standard of living, literacy and life expectancy.

Some of the municipalities were in areas of virgin forest. Others had already lost all their trees, and some were in the process of being deforested.

Areas in the initial stage of deforestation yielded HDI scores above the average for the region.

But once the period of deforestation had passed, scores returned to the values seen in areas that had not yet been logged. "It is generally assumed that replacing the forest with crops and pastureland is the best approach for fulfilling the region's legitimate aspirations to development," said Dr Rodrigues

"We found although the deforestation frontier does bring initial improvements in income, life expectancy, and literacy, such gains are not sustained." The "boom and bust" pattern was the same for each of the three aspects of the HDI, showing that even a straight economic benefit was not maintained.

REDD dawn

As the study emerged, UN climate negotiators are meeting in Bonn to discuss aspects of a follow-on treaty to the Kyoto Protocol, which is suppposed to be finalised by the end of the year.

One of the aspects of the new treaty will be a mechanism that rewards local communities for keeping carbon-absorbing forests intact - a mechanism known as REDD (Reducing Emissions through Deforestation and forest Degradation). Andrew Balmford, a co-author of the new study, said REDD and other proposals could change the current situation, which he described as disastrous for local people, wildlife and the global climate.

"Reversing this pattern will hinge on capturing the values of intact forests... so that local people's livelihoods are better when the forest is left standing than when it is cleared," said the Cambridge professor of conservation science.

"Discussions being held in the run-up to this December's crucial climate change meeting in Copenhagen... offer some promise that this lose-lose-lose situation could be tackled, to the benefit of everyone - local Brazilians included." The research was possible only because Brazil has good data on human development and on deforestation, which these days is measured by satellites.

But Ana Rodrigues believes the conclusions probably hold true for other countries stocked with tropical forests in southeast Asia or west Africa. "I would be very surprised if we didn't see this boom and bust pattern emerging in these areas as well," she told BBC News.

President Lula is currently debating whether to ratify a bill that would grant legal status to illegal settlers and loggers in the Amazon region.

Environmentalists say the bill would increase the rate of land-grabs, with a knock-on rise in illegal logging likely.

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Story from BBC NEWS:
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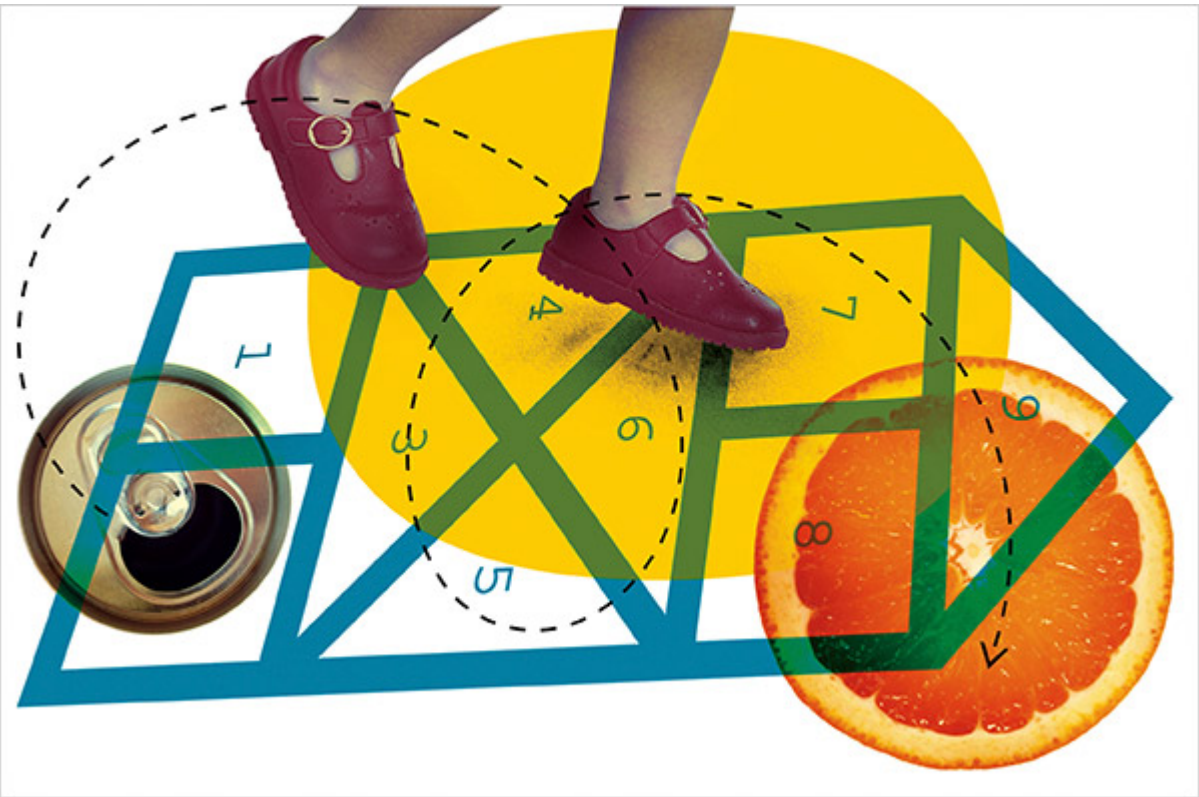
Kid Goes Into McDonald's and Orders ... Yogurt?

By TARA PARKER-POPE



The eating habits of American children appear to be shifting. And for a change, the news is good.

Chicken nuggets, burgers, fries and colas remain popular with the under-13 set, of course. But new market research shows that consumption of these foods at restaurants is declining, while soup, yogurt, fruit, grilled chicken and chocolate milk are on the rise.

The findings, based on survey data by the Chicago market research firm NPD Group, follow a report last year that childhood obesity appears to have hit a plateau after rising for more than two decades. That finding, reported by The Journal of the American Medical Association, has been greeted with guarded optimism, and it remains unclear whether efforts to limit junk food and increase physical activity in schools have had a meaningful effect on the way children eat.

But the new data suggest that a number of factors, from the economic downturn to new offerings from fast-food giants, may be influencing a general shift in eating preferences among children.

The data, from NPD's Consumer Reports on Eating Share Trends, are collected from a representative sample of 3,500 households and 500 teenagers who give detailed information on their restaurant habits. The figures are considered highly reliable because the researchers collect answers daily, asking participants what they and their family ate and ordered at restaurants the day before. While this recall method is never 100 percent reliable, the data, collected since 1976, provide a consistent look at long-term trends.

Clearly, the economy is playing a big part in these trends. Orders for kids' meals that included a toy were down 11 percent last year, for example, while "value menu" orders were up 9 percent. More recently, children's orders for cold-cut sandwiches are up 11 percent, a surge that appears to be driven largely by the fast-food chain Subway's "$5 foot-long" campaign. And after more than three years of growth, restaurant birthday parties for children dropped 5 percent in the quarter ending in February, compared with the same quarter last year.

But economics cannot explain the entire shift, said Bonnie Riggs, a restaurant analyst for NPD. Cheeseburgers, fries and colas are all on value menus, but their consumption among children under 13 has fallen while healthier foods are on the rise.

Among the losers in the year ending March 31 were colas (down 10 percent), chicken nuggets and strips (8 percent), French fries (7 percent) and hot dogs (6 percent). Winners included soup (29 percent), grilled chicken sandwiches (26 percent), yogurt (21 percent), carrots (9 percent) and fruit (6 percent).

Even pizza is losing favor. While it is still the most popular food for children in quick-service restaurants, its year-to-year growth is flat, according to NPD. And in full-service restaurants, it has been replaced by pasta as the most popular food among children.

"Kids' tastes and preferences are changing," Ms. Riggs said, adding that they want "more choices and sophisticated fare."

To be sure, pizza, burgers, fries and kids' meals are still the most popular items ordered by children; the percentage gains for items like soup and yogurt are from a smaller base. But the trends bolster an argument that children's health researchers have made for years: if you offer more healthful food, kids will eat it.

And many restaurants are taking the hint. Last month, Burger King announced three new kids' meals that include small burgers, sliced apples that look like French fries, reduced-sodium chicken tenders, calcium-fortified apple juice and fat-free chocolate milk. McDonald's offers apples and yogurt, and Wendy's kids' meals include mandarin oranges.

"The food industry is always saying, 'We're giving people want they want; that's why we're giving you chicken nuggets, burgers and fries for your kids,' " said Leann L. Birch, director of the Center for Childhood Obesity Research at Penn State. "That's not really true. If kids are given different options and if parents make them available and let them choose some of those things, I think quite often we see you do get shifts in eating."

Not every choice is resulting in a more healthful meal. For instance, the NPD data show that breaded chicken sandwiches are on the rise while burgers are declining. On the Wendy's kids' menu, the breaded chicken has 340 calories, and a junior cheeseburger has 270.Among beverage orders, milk consumption is on the rise and colas are down. But orange and grapefruit sodas and root beer are rising."The perception might be that orange and grapefruit soda are better for you," Ms. Riggs said.

Still, it is noteworthy that the NPD data are based on orders in restaurants, where children are often allowed to make their own choices."We don't know how many choices kids really make," Dr. Birch said. "But my sense is that parents are much more likely to be hands-off in a restaurant situation and allow kids the freedom to make more choices.

"You go to these places where they offer healthy options for adults. But until recently, kids haven't had the opportunity to choose the right thing."

http://www.nytimes.com/2009/06/16/health/16well.html?_r=1&nl=health&emc=a1

Alcohol's Good for You? Some Scientists Doubt It

By RONI CARYN RABIN

By now, it is a familiar litany. Study after study suggests that alcohol in moderation may promote heart health and even ward off diabetes and dementia. The evidence is so plentiful that some experts consider moderate drinking — about one drink a day for women, about two for men — a central component of a healthy lifestyle.

But what if it's all a big mistake?

For some scientists, the question will not go away. No study, these critics say, has ever proved a causal relationship between moderate drinking and lower risk of death — only that the two often go together. It may be that moderate drinking is just something healthy people tend to do, not something that makes people healthy.

"The moderate drinkers tend to do everything right — they exercise, they don't smoke, they eat right and they drink moderately," said Kaye Middleton Fillmore, a retired sociologist from the University of California, San Francisco, who has criticized the research. "It's very hard to disentangle all of that, and that's a real problem."

Some researchers say they are haunted by the mistakes made in studies about hormone replacement therapy, which was widely prescribed for years on the basis of observational studies similar to the kind done on alcohol. Questions have also been raised about the financial relationships that have sprung up between the alcoholic beverage industry and many academic centers, which have accepted industry money to pay for research, train students and promote their findings.

"The bottom line is there has not been a single study done on moderate alcohol consumption and mortality outcomes that is a 'gold standard' kind of study — the kind of randomized controlled clinical trial that we would be required to have in order to approve a new pharmaceutical agent in this country," said Dr. Tim Naimi, an epidemiologist with the Centers for Disease Control and Prevention.

Even avid supporters of moderate drinking temper their recommendations with warnings about the dangers of alcohol, which has been tied to breast cancer and can lead to accidents even when consumed in small amounts, and is linked with liver disease, cancers, heart damage and strokes when consumed in larger amounts.

"It's very difficult to form a single-bullet message because one size doesn't fit all here, and the public health message has to be very conservative," said Dr. Arthur L. Klatsky, a cardiologist in Oakland, Calif., who wrote a landmark study in the early 1970s finding that members of the Kaiser Permanente health care plan who drank in moderation were less likely to be hospitalized for heart attacks than abstainers. (He has since received research grants financed by an alcohol industry foundation, though he notes that at least one of his studies found that alcohol increased the risk of hypertension.)

"People who would not be able to stop at one to two drinks a day shouldn't drink, and people with liver disease shouldn't drink," Dr. Klatsky said. On the other hand, "the man in his 50s or 60s who has a heart attack and decides to go clean and gives up his glass of wine at night — that person is better off being a moderate drinker."

Health organizations have phrased their recommendations gingerly. The American Heart Association says people should not start drinking to protect themselves from heart disease. The 2005 United States dietary guidelines say that "alcohol may have beneficial effects when consumed in moderation."

The association was first made in the early 20th century. In 1924, a Johns Hopkins biologist, Raymond Pearl, published a graph with a U-shaped curve, its tall strands on either side representing the higher death rates of heavy drinkers and nondrinkers; in the middle were moderate drinkers, with the lowest rates. Dozens of other observational studies have replicated the findings, particularly with respect to heart disease.

"With the exception of smoking and lung cancer, this is probably the most established association in the field of nutrition," said Eric Rimm, an associate professor of epidemiology and nutrition at the Harvard School of Public Health. "There are probably at least 100 studies by now, and the number grows on a monthly basis. That's what makes it so unique."

Alcohol is believed to reduce coronary disease because it has been found to increase the "good" HDL cholesterol and have anticlotting effects. Other benefits have been suggested, too. A small study in China found that cognitively impaired elderly patients who drank in moderation did not deteriorate as quickly as abstainers. A report from the Framingham Offspring Study found that moderate drinkers had greater mineral density in their hipbones than nondrinkers. Researchers have reported that light drinkers are less likely than abstainers to develop diabetes, and that those with Type 2 diabetes who drink lightly are less likely to develop coronary heart disease.

But the studies comparing moderate drinkers with abstainers have come under fire in recent years. Critics ask: Who are these abstainers? Why do they avoid alcohol? Is there something that makes them more susceptible to heart disease?

Some researchers suspect the abstainer group may include "sick quitters," people who stopped drinking because they already had heart disease. People also tend to cut down on drinking as they age, which would make the average abstainer older — and presumably more susceptible to disease — than the average light drinker.

In 2006, shortly after Dr. Fillmore and her colleagues published a critical analysis saying a vast majority of the alcohol studies they reviewed were flawed, Dr. R. Curtis Ellison, a Boston University physician who has championed the benefits of alcohol, hosted a conference on the subject. A summary of the conference, published a year later, said scientists had reached a "consensus" that moderate drinking "has been shown to have predominantly beneficial effects on health."

The meeting, like much of Dr. Ellison's work, was partly financed by industry grants. And the summary was written by him and Marjana Martinic, a senior vice president for the International Center for Alcohol Policies, a nonprofit group supported by the industry. The center paid for tens of thousands of copies of the summary, which were included as free inserts in two medical journals, The American Journal of Medicine and The American Journal of Cardiology.

In an interview, Dr. Ellison said his relationship with the industry did not influence his work, adding, "No one would look at our critiques if we didn't present a balanced view."Dr. Fillmore and the co-authors of her analysis posted an online commentary saying the summary had glossed over some of the deep divisions that polarized the debate at the conference. "We also dispute Ellison and Martinic's conclusions that more frequent drinking is the strongest predictor of health benefits," they wrote.

(Dr. Fillmore has received support from the Alcohol Education and Rehabilitation Foundation of Australia, a nonprofit group that works to prevent alcohol and substance abuse. Dr. Ellison said Dr. Fillmore's analysis ignored newer studies that corrected the methodological errors of earlier work. "She threw out the baby with the bathwater," he said.Meanwhile, two central questions remain unresolved: whether abstainers and moderate drinkers are fundamentally different and, if so, whether it is those differences that make them live longer, rather than their alcohol consumption.

Dr. Naimi of the C.D.C., who did a study looking at the characteristics of moderate drinkers and abstainers, says the two groups are so different that they simply cannot be compared. Moderate drinkers are healthier, wealthier and more educated, and they get better health care, even though they are more likely to smoke. They are even more likely to have all of their teeth, a marker of well-being.

"Moderate drinkers tend to be socially advantaged in ways that have nothing to do with their drinking," Dr. Naimi said. "These two groups are apples and oranges." And simply advising the nondrinkers to drink won't change that, he said.Some scientists say the time has come to do a large, long-term randomized controlled clinical trial, like the ones for new drugs. One approach might be to recruit a large group of abstainers who would be randomly assigned either to get a daily dose of alcohol or not, and then closely followed for several years; another might be to recruit people who are at risk for coronary disease.

But even the experts who believe in the health benefits of alcohol say this is an implausible idea. Large randomized trials are expensive, and they might lack credibility unless they were financed by the government, which is unlikely to take on the controversy. And there are practical and ethical problems in giving alcohol to abstainers without making them aware of it and without contributing to accidents.

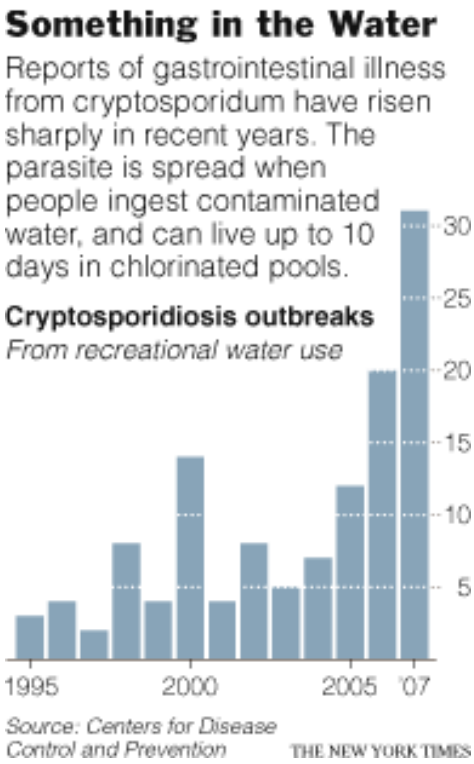
Still, some small clinical trials are already under way to see whether diabetics can reduce their risk of heart disease by consuming alcohol. In Boston, researchers at Beth Israel Deaconess Medical Center are recruiting volunteers 55 and over who are at risk for heart disease and randomly assigning them to either drink plain lemonade or lemonade spiked with tasteless grain alcohol, while scientists track their cholesterol levels and scan their arteries. In Israel, researchers gave people with Type 2 diabetes either wine or nonalcoholic beer, finding that the wine drinkers had significant drops in blood sugar, though only after fasting; the Israeli scientists are now working with an international team to begin a larger two-year trial."The last thing we want to do as researchers and physicians is expose people to something that might harm them, and it's that fear that has prevented us from doing a trial," said Dr. Sei Lee of the University of California, San Francisco, who recently proposed a large trial on alcohol and health.

"But this is a really important question," he continued. "Because here we have a readily available and widely used substance that may actually have a significant health benefit — but we just don't know enough to make recommendations."

http://www.nytimes.com/2009/06/16/health/16alco.html?nl=health&emc=a1

In Some Swimming Pools, a Nasty Intestinal Parasite

By SARAH ARNQUIST



A swimming pool can offer relief from summer heat, but swimmers should know what they are jumping into. It could be a soup of nasty parasites.

Reports of gastrointestinal illness from use of public pools and water parks have risen sharply in recent years, according to the Centers for Disease Control and Prevention. The leading culprit is a microscopic organism that lives in human feces.

Called cryptosporidium, it is a parasite transmitted in an egglike shell that can survive as long as 10 days even in chlorinated water. In 2007, the last year for which statistics are available, it was responsible for 31 recreational water outbreaks involving 3,726 people, according to the disease centers — up from 7 outbreaks and 567 people in 2004.

Health officials say the reasons are unclear. “We’re not sure whether it’s a true increase in incidence or an increase in reporting,” said Michele C. Hlavsa, an epidemiologist with the healthy swimming program at the C.D.C.

Ms. Hlavsa noted that detection and reporting had probably improved since a treatment for the diarrheal illness — called cryptosporidiosis, or crypto for short — became available in 2002. And the recent large outbreaks, she said, have raised awareness and led to better reporting.

Officials are not recommending that people avoid public pools. “We want people to swim, but be healthy about it,” said Dr. Sharon Balter, an epidemiologist with the Department of Health and Mental Hygiene in New York City, which has not had any outbreaks.

Crypto and other pool-associated illnesses are mostly caused by parasites and bacteria found in feces. The illnesses spread when people ingest contaminated water.

People should not swim or allow their children to swim when they have diarrhea, Ms. Hlavsa said. “The water you swim in is shared with everyone,” she said. “So what one swimmer does has consequences for all the swimmers.”

The symptoms of crypto resemble those of food poisoning. Though most cases clear up on their own, the illness can require hospitalization, particularly in small children and people with weakened immune systems.

One of the largest recent crypto outbreaks occurred in Utah in 2007. There were 2,000 confirmed cases, but that number vastly underestimates the illness’s total impact, said Dr. Robert T. Rolfs, the Utah state epidemiologist.

The cases started in early summer. But slow detection and reporting delayed intervention by public health officials, who struggled to contain the illness. Multiple waves of control strategies, including temporarily barring all children 5 and younger from pools, eventually helped slow the outbreak, which subsided after the swimming season, Dr. Rolfs said.

He and other officials say swimmers can take measures to protect themselves. Water in pools should not be cloudy, tiles should not be slick and filtration machines should hum in the background. When in doubt about water quality, people should notify the pool operator and, if necessary, call the local health department, which is typically responsible for pool inspection and health code enforcement, said Ms. Hlavsa of the C.D.C.

In addition to not swimming while ill with diarrhea, health experts say people should shower before swimming and never use the pool as a toilet. Parents should wash young children before they enter the pool and take them on frequent bathroom breaks. Children in diapers require vigilant attention.

“Healthy swimming,” Ms. Hlavsa said, “is no accident.”

http://www.nytimes.com/2009/06/16/health/16water.html?nl=health&emc=a1

Fitness: Making Stairs a Lure for Exercise

By ERIC NAGOURNEY

Climbing stairs is a well-established way to help keep fit. But many staircases don't lend themselves to climbing. They are tucked away in hard-to-reach places and unappealingly designed and lighted.

Now, researchers are urging building designers to rethink their approach to stairs — even including using music — to encourage people to use them more.

Writing in The Southern Medical Journal, the researchers said that even a moderate increase in the use of stairs could play a role in helping to solve the nation's weight problem. The lead author of the article is Dr. Ishak A. Mansi of Louisiana State University. His wife, Nardine Mansi, an architect, is a co-author.

The authors pointed to several characteristics of stair design that discourage regular use.

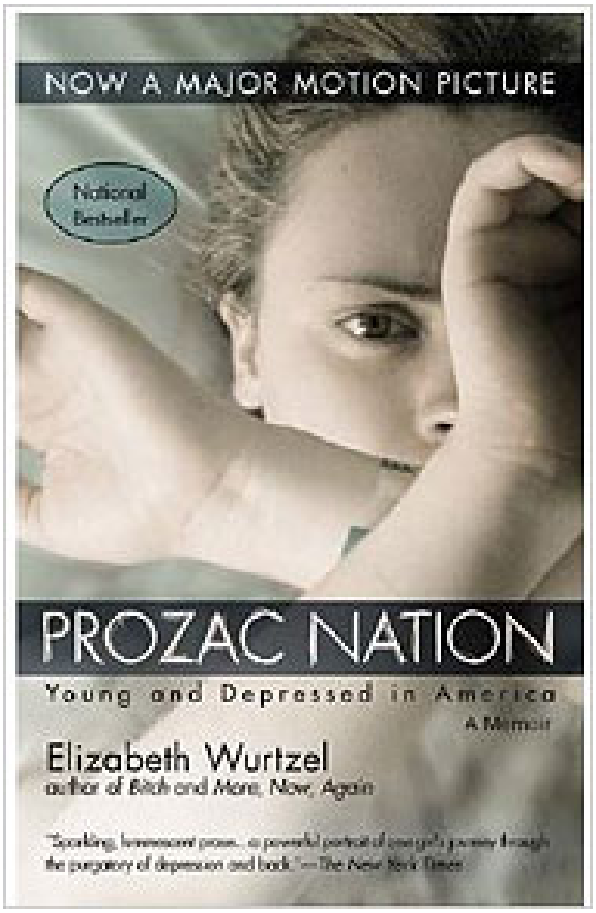
To begin with, they said, stairs are generally viewed mostly as a way to leave a building in case of fire. Because of fire codes, the article said, they tend to have heavy spring doors and no carpeting. They are also not air-conditioned.

Instead, the authors said, stairs should be made a central feature of new buildings and be designed to draw people to them. Even in existing buildings, they said, improvements can be made.

In one study, the article said, researchers looked at increasing stair use at a workplace by adding carpeting. They also painted the walls, put up artwork and played music in the stairwell. And they put up motivational signs encouraging people to take the stairs.

http://www.nytimes.com/2009/06/16/health/research/16fitn.html?nl=health&emc=a5

Titlenomics, or Creating Best Sellers
By PATRICIA COHEN



The release of "womenomics" (by Claire Shipman and Katty Kay) this month is just the latest example of publishers trying to knock off the title of "Freakonomics," the best-selling 2005 book by Steven D. Levitt, an economist, and Stephen J. Dubner, a journalist.

Although some critics initially complained about that book's "annoying title," "Freakonomics" was an instant success, generating, among other things, a column in The New York Times Magazine, a blog on the Times Web site (freakonomics.blogs.nytimes.com), and a planned documentary.
So it's no surprise that other authors hope to benefit from the reflected glory. Last summer "Obamanomics" and "Slackonomics" appeared. This year "Invent-onomics 101" made its debut. And in the fall "Scroogenomics: Why You Shouldn't Buy Presents for the Holidays" will hit bookstores.
Capitalizing on popular titles has a long pedigree in the publishing industry. A well-turned phrase can give birth to dozens of offspring. Edward Gibbon's monumental "History of the Decline and Fall of the Roman Empire," first published in 1776, has inspired variants for more than two centuries. Similarly titled books have chronicled the slide of other empires (the British, Ottoman, Japanese, American, Freudian); institutions (the C.I.A., the Roman Catholic Church, the American automobile industry, Hollywood, The Saturday Evening Post, the British aristocracy, the American programmer) and eternal ideals (truth and love goddesses).
Awkward appendages have been added, as in "Camden After the Fall: Decline and Renewal in a Post-Industrial City (Politics and Culture in Modern America)." Publishers have demoted the phrase to a subtitle ("Chasing Aphrodite: The Decline and Fall of the World's Richest Museum"). Punctuation has been added — "The Decline (And Fall?) of the Income Tax" — while humorists have intuitively understood its outsize appeal ("The Decline and Fall of Practically Everybody").

Eamon Dolan, vice president and editor in chief of the Penguin Press, explained that the title had to communicate the theme of a book almost instantly, which is why publishers so often use something familiar. A title like "Prozac Nation" or "Fast Food Nation" (which Penguin published) "conveys a pretty nuanced constellation of ideas fairly quickly," he said, and gets across the idea that "our entire society can reasonably be seen through that lens."

At the same time, he added, "the title is trying to do something on an emotional level," to make the reader pause.

Perhaps that is why titles that make extravagant, impossible declarations are so pervasive. Francis Fukuyama, an international political economist, hit the sweet spot with his influential 1992 post-cold-war treatise, "The End of History and the Last Man," which combined hyperbole with a seeming paradox. (Absent a supernova here, how could history end?).

Soon publishers were handing us the end of prosperity and the end of poverty; the end of food, which perhaps was the inspiration for the end of overeating; the end of America, followed by the end of American exceptionalism; the end of religion, the end of the Jews (a novel), the end of faith as well as the end of materialism; the end of the present world, the end of your world and the end of the world as we know it; the end of empire, memory, education, free speech, oil, fashion and money; the end of lawyers? (given the question mark, apparently more uncertain than the end of the present world).

At least six books in the past decade have used "the end of the beginning," including three novels, two histories and a children's book called "The End of the Beginning: Being the Adventures of a Small Snail (and an Even Smaller Ant)," although in fairness, Winston Churchill, who used the phrase in a famous 1943 speech, should really get the credit.

Finally, Robert Kagan, the conservative foreign-policy strategist, turned Mr. Fukuyama's title on its head with his 2008 book, "The Return of History and the End of Dreams."

Exorbitant claims are inherent in another title genre: things that have changed the world. That list includes books, ideas, beliefs, decisions, inventions, plants, bridges, gigs, battles, speeches, photographs and molecules. Some authors prefer a single item: the ocean (Atlantic), voyage (the Mayflower's), car (Model T), corporation (East India Company), business strategy (franchising), telescope (Galileo's), painting (Picasso's "Guernica") and Olympics (Rome, 1960). Others favor a set: the 5 equations, the 10 geographical ideas, the 12 books, the 50 battles, the 100 maps, the 1,001 inventions.

Multiple examples, however, raise a perplexing question: which achievement is more impressive, the discovery of, say, the five equations that changed the world or the one ($E = mc^2$) that managed to do the job on its own?

The longer the list, the less likely the chance of wretched exaggeration. Yet somehow the feat does not seem quite as impressive once the numbers increase. Some writers claim to have found the single year that changed the world — A.D. 33 (Jesus' crucifixion), 1968 (the worldwide youth revolt) or 1989 (the fall of the Berlin Wall) — yet the historian Margaret MacMillan managed to narrow it down to six months (the half year in 1919 when the four powers hammered out the Treaty of Versailles) before realizing she could do one better and identify the single week (in February 1972, when President Richard M. Nixon traveled to China).

Ultimately, the best locutions are those that credit quotidian, trivial objects with earthshaking influence, like "Cod: A Biography of the Fish That Changed the World," by Mark Kurlansky. The more obvious the significance of the subject, the less successful the title. After all, where's the element of surprise or wit in "A Man Without Equal: Jesus, the Man Who Changed the World"?

Some of the more unlikely candidates endowed with superhuman powers by authors include "Tea: The Drink That Changed the World," "Mauve: How One Man Invented a Color That Changed the World," "Banana: The Fate of the Fruit That Changed the World" and "Sugar: The Grass That Changed the World."

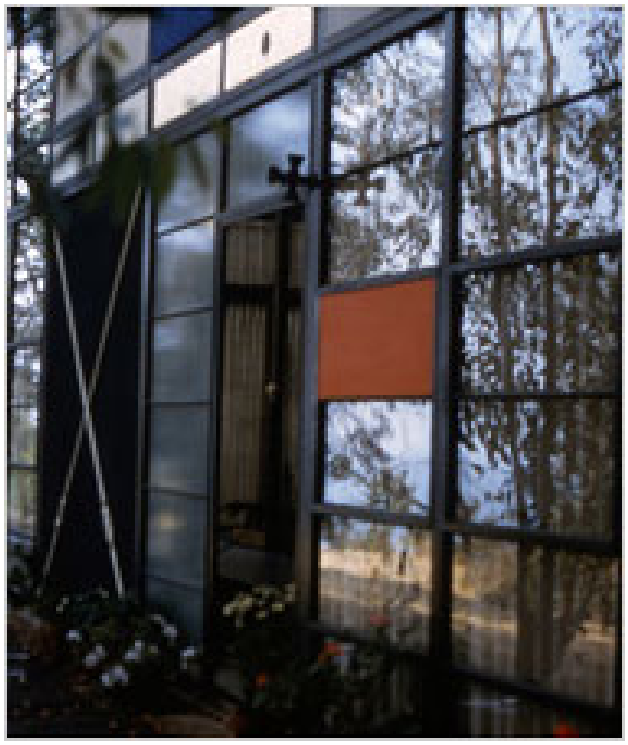
As for "Freakonomics," Mr. Dolan of the Penguin Press said that part of its success was its novelty. The first few knockoffs may be able to capitalize on that, but after a while the title and message contradict each other, he added. "You can't have a sense of revelation with something that's been repeated four or five times," he said.

The tricky part is gauging just when the magic wears off. "Essentially it works until it doesn't work," Mr. Dolan said, "and you hope you're on the right side of that line."

http://www.nytimes.com/2009/06/16/books/16titles.html?th&emc=th

A Prefab House That Dazzles Still

By ALICE RAWSTHORN



It took just one-and-a-half days for eight workers to build the frame from 11› tons of steel. The walls were made from prefabricated panels, and the windows were of a type usually used in factories. The staircase was ordered from a marine supplies catalog. The cost? Just $1 per square foot.

That was back in 1949, and the bill didn't include the labor of the owners, who'd designed the house, or their employees. Even so, $1 was remarkably cheap, especially when compared with the $11.50 it then cost to build a square foot — that's roughly a tenth of a square meter — of a typical American home. It seems even cheaper if you consider that the end result was occupied by its owner-designers, Charles and Ray Eames, for nearly 40 years. The Eameses went on to become America's most famous industrial designers, and their new home was to be one of the most influential — and beloved — houses of the 20th century.

The Eames House in Pacific Palisades, California, is to celebrate its 60th birthday next weekend with a picnic on the grounds, once a meadow owned by the Western movie star Will Rogers. The ingenuity of the prefabricated structure dazzled architects and designers at the time, and still does today. The Eameses also created an exceptionally beautiful place to live and work, where the tumbleweed they found on their honeymoon drive from Chicago to Los Angeles hangs beside a Robert Motherwell painting, and the shadows of the surrounding eucalyptus trees dance across the factory windows.

Preserved by the Eames Foundation as a National Historic Landmark, the Eames House is still beguiling. I have yet to meet anyone who has been there and hasn't fallen in love with it.

The simplest explanation is that the house was the Eameses' most personal project, and the purest expression of their design sensibility. "Nowhere is their enthusiasm, curiosity and love for design better represented," said Paola Antonelli, senior curator of design and architecture at the Museum of Modern Art in New York. The couple met in 1940 at the Cranbrook Academy of Art in Michigan, where Charles was a teacher, and Ray a student. They married the following year, and settled in Los Angeles. From a makeshift studio in their apartment, they produced their first commercial success, a plywood leg splint for the U.S. Army, using materials that Charles had smuggled home from his day job building movie sets for MGM. They went on to design furniture that, as The Washington Post once put it, changed the way "the 20th century sat down."

That's no mean feat, but there was more to the Eameses. So far they have been best known for their furniture, but other aspects of their work are compelling, too. If you asked a scientist to cite a favorite example of the Eameses' work, the answer might well be one of the short films in which they sought to demystify science and math, not a chair. Films like "Powers of Ten" — which takes the viewer on a journey from a human hand through the universe and back to earth again, ending with a carbon atom — were once praised for popularizing science and are now hailed as inspirations for the newly developed visual language known as Visualization.

Their zest for science complemented the Eameses' passion for technology, which is reflected in the house's innovative structure. Yet they also imbued their work with sensuality. The gentle curves and vibrant colors give their designs a warmth that feels very contemporary.

The same applies to their interests. Some, like their fascination with folklore, appeared eccentric at the time but seem less so now, as does the eclecticism of a couple as intrigued by physics and prefabrication as by Mexican craftsmanship. All of this is visible in the house, which is filled with thoughtful arrangements of the pebbles, buttons, pencils, toys, masks, kites and other knickknacks they collected over the years, as well as furniture and artworks made by them and their friends.

Equally prescient was the Eameses' love of nature. When they started work on the house in the mid-1940s as part of the Case Study House Program to build model modern homes in California, they envisaged it as two separate buildings: a house with ocean views across the meadow and a studio set into the hillside. The longer they spent at the site, the more they loved it. Abandoning the original design, the couple devised a plan to preserve the area's natural beauty by excavating a lot for both buildings between the trees and hill.

They were even early recyclers, and rarely threw anything away. One of their cars, a Ford, lasted them 18 years, and in the four decades they lived in their house, they replaced only one appliance, a refrigerator.

The Eameses' way of working was influential, too. "Their practice of operating in multiple arenas — architecture, design, film and exhibitions — has become the template for today's avant-garde designers, who are intentionally blurring the boundaries between the disciplines," observed Joseph Rosa, chair of architecture and design at the Art Institute of Chicago.

Similarly Ray blazed a trail as one of the few prominent women designers of the day, although her contribution was often underestimated. A British design organization once presented a medal to Charles and a rose to her, but he always insisted on crediting her equally. When they appeared on NBC's "Today" show in 1956, Ray was welcomed on set with: "This is Mrs. Eames and she is going to tell us how she helps Charles design his chairs." He cringed, while she smiled gamely. (See it for yourself on YouTube.)

"Their house has become a beacon for the American way of poetic pragmatism," said Ms. Antonelli. "Chez Eames, art is not intimidating, great design really is for everybody, and high taste means being able to enjoy the occasional tchotchke in a modernist masterpiece." That's why we love it.

http://www.nytimes.com/2009/06/15/fashion/15iht-design15.html?ref=design

Use Their Work Free? Some Artists Say No to Google

By ANDREW ADAM NEWMAN

When Google representatives recently invited dozens of prominent artists to contribute work to be featured on its new Web browser, the company enthusiastically sold the idea as an opportunity to have artwork shown to millions.

But some, like Gary Taxali, were not impressed. Mr. Taxali, an illustrator based in Toronto whose work has appeared in publications like Time, Newsweek and Fortune, received a call in April from a member of Google's marketing department. According to Mr. Taxali, the Google representative explained that the project will let users customize Google Chrome pages with artist-designed "skins" in their borders.
"The first question I asked," Mr. Taxali said in a recent interview, "is 'What's the fee?'"
Mr. Taxali said that when he was told Google would pay nothing, he declined.
In the ensuing weeks, a tide of indignation toward Google swelled among illustrators, who stay connected through Drawger, a Web site.
In a posting to Drawger on April 28, Mr. Taxali bemoaned the Google request — and that some struggling publications were reducing fees to illustrators by nearly half.
"So for you, I give you a special salute that I hope will keep you away because I don't need your work," Mr. Taxali wrote, followed by his own drawing of a hand gesture popular with impatient motorists.
The posting drew more than 200 responses, many from other illustrators who also had rejected Google's offer, including Joe Ciardiello, of New Jersey, whose pen drawings of authors appear frequently on the cover of The New York Times Book Review.
"You'd think that if anyone can afford to pay artists and designers it would be a company that is making millions of dollars," Mr. Ciardiello said in an interview.
In the first quarter of this year alone, Google reported profits of $1.42 billion, an increase of 8 percent over the same period last year.
In a statement responding to questions, Google said that the project was modeled after a similar one last year for iGoogle, a personalized home page, where artists and companies (including Jeff Koons, Bob Dylan and Gucci) contributed images to be used as skins.
"While we don't typically offer monetary compensation for these projects," the statement said, "through the positive feedback that we have heard thus far we believe these projects provide a unique and exciting opportunity for artists to display their work in front of millions of people."

But exposure often is a given for illustrators, who are rankled that Google is asking them to work for exposure alone.

"I have done gift cards for Target that are in stores nationwide and animations for Nickelodeon that run 24 hours a day worldwide on cable TV," Melinda Beck, an illustrator who is based in Brooklyn, wrote in an e-mail message to Google rejecting its offer. "Both of these jobs were high-profile and gave my work great exposure but both clients still paid me."

In an interview, Ms. Beck estimated it would take her a week to create original artwork to Google's specifications. (A Google spokesman countered that the company was amenable to reusing work from artists' portfolios.)

While some online publications, like Salon and Slate, hire illustrators, many rely on free or cheap stock illustrations, so illustrators are on tenterhooks about making a living online.

The fact that print publications are shrinking or folding also troubles illustrators.

"There's a lot of concern that newspapers and all of print is becoming a bit of an endangered species," said Brian Stauffer, an illustrator based in Miami whose work has appeared in publications including Rolling Stone, Esquire and Entertainment Weekly, and who also rejected Google's offer. "When a company like Google comes out very publicly and expects that the market would just give them free artwork, it sets a very dangerous precedent."

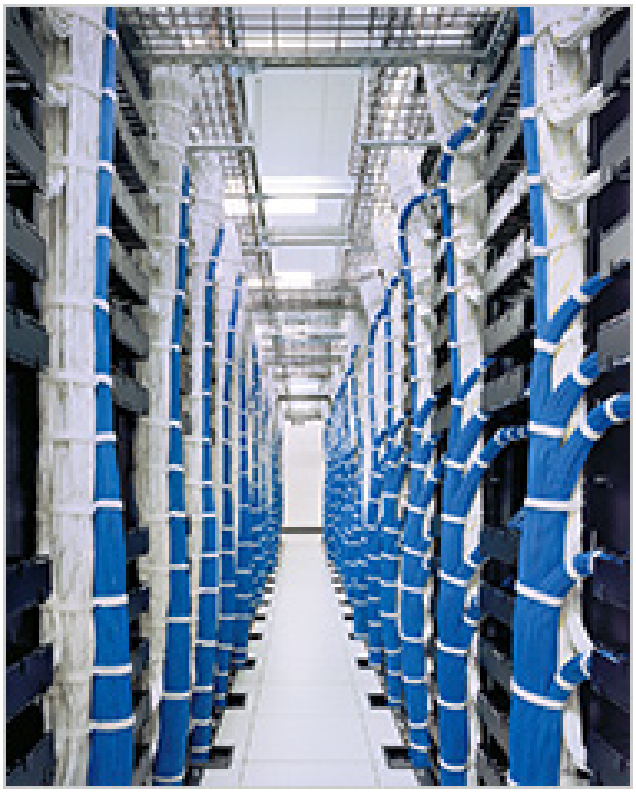
Google, though rebuffed by more than a dozen illustrators, said in its statement that it had plenty of takers.

"We don't feel comfortable releasing the names of artists who are participating in the project before it launches," stated the company, which also declined to give a date when artwork from the program would appear on Google Chrome. "However, we are currently working with dozens of artists who are excited about the opportunity to be involved in this project."

http://www.nytimes.com/2009/06/15/business/media/15illo.html?ref=design

Data Center Overload

By TOM VANDERBILT



It began with an Xbox game.

On a recent rainy evening in Brooklyn, I was at a friend's house playing (a bit sheepishly, given my incipient middle age) Call of Duty: World at War. Scrolling through the game's menus, I noticed a screen for Xbox Live, which allows you to play against remote users via broadband. The number of Call of Duty players online at that moment? More than 66,000.

Walking home, I ruminated on the number. Sixty-six thousand is the population of a small city — Muncie, Ind., for one. Who and where was this invisible metropolis? What infrastructure was needed to create this city of ether?

We have an almost inimical incuriosity when it comes to infrastructure. It tends to feature in our thoughts only when it's not working. The Google search results that are returned in 0.15 seconds were once a stirring novelty but soon became just another assumption in our lives, like the air we breathe. Yet whose day would proceed smoothly without the computing infrastructure that increasingly makes it possible to navigate the world and our relationships within it?

Much of the daily material of our lives is now dematerialized and outsourced to a far-flung, unseen network. The stack of letters becomes the e-mail database on the computer, which gives way to Hotmail or Gmail. The clipping sent to a friend becomes the attached PDF file, which becomes a set of shared bookmarks, hosted offsite. The photos in a box are replaced by JPEGs on a hard drive, then a hosted sharing service like Snapfish. The tilting CD tower gives way to the MP3-laden hard drive which itself yields to a service like Pandora, music that is always "there," waiting to be heard.
But where is "there," and what does it look like?

"There" is nowadays likely to be increasingly large, powerful, energy-intensive, always-on and essentially out-of-sight data centers. These centers run enormously scaled software applications with millions of users. To appreciate the scope of this phenomenon, and its crushing demands on storage capacity, let me sketch just the iceberg's tip of one average individual digital presence: my own. I have photos on Flickr (which is owned by Yahoo, so they reside in a Yahoo data center, probably the one in Wenatchee, Wash.); the Wikipedia entry about me dwells on a database in Tampa, Fla.; the video on YouTube of a talk I delivered at Google's headquarters might dwell in any one of Google's data centers, from The Dalles in Oregon to Lenoir, N.C.; my LinkedIn profile most likely sits in an Equinix-run data center in Elk Grove Village, Ill.; and my blog lives at Modwest's headquarters in Missoula, Mont. If one of these sites happened to be down, I might have Twittered a complaint, my tweet paying a virtual visit to (most likely) NTT America's data center in Sterling, Va. And in each of these cases, there would be at least one mirror data center somewhere else — the built-environment equivalent of an external hard drive, backing things up.

Small wonder that this vast, dispersed network of interdependent data systems has lately come to be referred to by an appropriately atmospheric — and vaporous — metaphor: the cloud. Trying to chart the cloud's geography can be daunting, a task that is further complicated by security concerns. "It's like 'Fight Club,' " says Rich Miller, whose Web site, Data Center Knowledge, tracks the industry. "The first rule of data centers is: Don't talk about data centers."

Yet as data centers increasingly become the nerve centers of business and society — even the storehouses of our fleeting cultural memory (that dancing cockatoo on YouTube!) — the demand for bigger and better ones increases: there is a growing need to produce the most computing power per square foot at the lowest possible cost in energy and resources. All of which is bringing a new level of attention, and challenges, to a once rather hidden phenomenon. Call it the architecture of search: the tens of thousands of square feet of machinery, humming away 24/7, 365 days a year — often built on, say, a former bean field — that lie behind your Internet queries.

INSIDE THE CLOUD

Microsoft's data center in Tukwila, Wash., sits amid a nondescript sprawl of beige boxlike buildings. As I pulled up to it in a Prius with Michael Manos, who was then Microsoft's general manager of data-center services, he observed that while "most people wouldn't be able to tell this wasn't just a giant warehouse," an experienced eye could discern revelatory details. "You would notice the plethora of cameras," he said. "You could follow the power lines." He gestured to a series of fluted silver pipes along one wall. "Those are chimney stacks, which probably tells you there's generators behind each of those stacks." The generators, like the huge banks of U.P.S. (uninterruptible power supply) batteries, ward against surges and power failures to ensure that the data center always runs smoothly.

After submitting to biometric hand scans in the lobby and passing through a sensor-laden multidoor man trap, Manos and I entered a bright, white room filled with librarylike rows of hulking, black racks of servers — the dedicated hardware that drives the Internet. The Tukwila data center happens to be one of the global homes of Microsoft's Xbox Live: within those humming machines exists my imagined city of ether. Like most data centers, Tukwila comprises a sprawling array of servers, load balancers, routers, fire walls, tape-backup libraries and database machines, all resting on a raised floor of removable white tiles, beneath which run neatly arrayed bundles of power cabling. To help keep servers cool, Tukwila, like most data centers, has a system of what are known as hot and cold aisles: cold air that seeps from perforated tiles in front is sucked through the servers by fans, expelled into the space between the backs of the racks and then ventilated from above. The collective din suggests what it must be like to stick your head in a Dyson Airblade hand dryer.

Tukwila is less a building than a machine for computing. "You look at a typical building," Manos explained, "and the mechanical and electrical infrastructure is probably below 10 percent of the upfront costs. Whereas here it's 82 percent of the costs." Little thought is given to exterior appearances; even the word "architecture" in the context of a data center can be confusing: it could refer to the building, the network or the software running on the servers. Chris Crosby, a senior vice president with Digital Realty Trust, the country's largest provider of data-center space, compares his company's product to a car, an assembly-line creation complete with model numbers: "The model number tells you how much power is available inside the facility." He also talks about the "industrialization of the data center," in contrast to the so-called whiteboard model of server design, by which each new building might be drawn up from scratch. The data center, he says, is "our railroad; it doesn't matter what kind of train you put on it."
At Tukwila — as at any big data center — the computing machinery is supported by what Manos calls the "back-of-the-house stuff": the chiller towers, the miles of battery springs, the intricate networks of piping. There's also what Manos calls "the big iron," the 2.5-megawatt, diesel-powered Caterpillar generators clustered at one end of a cavernous space known as the wind tunnel, through which air rushes to cool the generators. "In reality, the cloud is giant buildings full of computers and diesel generators," Manos says. "There's not really anything white or fluffy about it."

Tukwila is one of Microsoft's smaller data centers (they number "more than 10 and fewer than 100," Manos told me with deliberate vagueness). In 2006, the company, lured by cheap hydropower, tax incentives and a good fiber-optic network, built a 500,000-plus-square-foot data center in Quincy, Wash.,

a small town three hours from Tukwila known for its bean and spearmint fields. This summer, Microsoft will open a 700,000-plus-square-foot data center — one of the world's largest — in Chicago. "We are about three to four times larger than when I joined the company" — in 2004 — "just in terms of data-center footprint," Debra Chrapaty, corporate vice president of Global Foundation Services at Microsoft, told me when I met with her at Microsoft's offices in Redmond, Wash.

Yet when it comes to a large company like Microsoft, it can be difficult to find out what any given data center is used for. The company, for reasons ranging from security to competitive advantage, won't provide too much in the way of details, apart from noting that Quincy could hold 6.75 trillion photos. "We support over 200 online properties with very large scale," Chrapaty offered. "And so when you think about Hotmail supporting 375 million users, or search supporting three billion queries a month, or Messenger supporting hundreds of millions of users, you can easily assume that those properties are very large properties for our company."

Thanks to the efforts of amateur Internet Kremlinologists, there are occasional glimpses behind the silicon curtain. One blogger managed to copy a frame from a 2008 video of a Microsoft executive's PowerPoint presentation showing that the company had nearly 150,000 servers (a number that presumably would now be much higher, given an estimated monthly server growth of 10,000) and that nearly 80,000 of those were used by its search application, now called Bing. When I discussed the figures with her, Chrapaty would only aver, crisply, that "in an average data center, it's not uncommon for search to take up a big portion of a facility."

THE RISE OF THE MEGA-DATA CENTER

Data centers were not always unmarked, unassuming and highly restricted places. In the 1960s, in fact, huge I.B.M. mainframe computers commanded pride of place in corporate headquarters. "It was called the glasshouse," says Kenneth Brill, founder of the Uptime Institute, a data-center research and consulting group. "It was located near the executive suite. Here you'd spent $15 to 30 million on this thing — the executives wanted to show it off."

Over the past few decades, Brill notes, there has been an oscillation between using centralized I.T. resources and using more dispersed computing power — a battle between mainframes and desktop computers. The latest iteration is what's called the thin client: the use of centralized servers rather than the software and operating systems of desktops to perform the bulk of computing needs. But thinness in the office has come with increased thickness elsewhere: more servers in ever-larger data centers.

In his book "The Big Switch," Nicholas Carr draws an analogy between the rise of mega-data centers and the Industrial Revolution. Just as nascent industries, once powered by water wheels, were by the 20th century able to "run their machines with electric current generated in distant power plants," advances in technology and transmission speeds are permitting computing to function like a utility, a distant but ever-accessible cloud of services.

This has sweeping implications for business and society. Instead of buying software and hiring I.T. employees, companies can outsource things like customer relationship management, or C.R.M., the database software that companies use to track client interactions, to an Internet company like salesforce.com, which sells subscriptions, or seats, to its services. "Customers who have two seats on salesforce.com, like a mom-and-pop flower shop, have access to the same application as a customer that has 65,000 seats, like Starbucks or Dell," Adam Gross, vice president of platform marketing with salesforce.com, told me at the company's offices in San Francisco. By contrast, just a few years ago, he went on, "if you were to attack a really large problem, like delivering a C.R.M. application to 50,000 companies, or serving every single song ever, it really sort of felt outside your domain unless you were one of the largest companies in the world. There are these architectures now available for anybody to really attack these massive-scale kinds of problems."

And while most companies still maintain their own data centers, the promise is that instead of making costly investments in redundant I.T. hardware, more and more companies will tap into the utility-computing grid, piggybacking on the infrastructures of others. Already, Amazon Web Services makes available, for a fee, the company's enormous computing power to outside customers. The division already

uses more bandwidth than Amazon's extensive retailing operations, while its Simple Storage Service holds some 52 billion virtual objects. "We used to think that owning factories was an important piece of a business's value," says Bryan Doerr, the chief technology officer of Savvis, which provides I.T. infrastructure and what the company calls "virtualized utility services" for companies like Hallmark. "Then we realized that owning what the factory produces is more important."

THE ANNIHILATION OF SPACE BY TIME

For companies like Google, Yahoo and, increasingly, Microsoft, the data center is the factory. What these companies produce are services. It was the increasing "viability of a service-based model," as Ray Ozzie, now the chief software architect at Microsoft, put it in 2005 — portended primarily by Google and its own large-scale network of data centers — that set Microsoft on its huge data-center rollout: if people no longer needed desktop software, they would no longer need Microsoft. This realization brought new prominence to the humble infrastructure layer of the data center, an aspect of the business that at Microsoft, as at most tech companies, typically escaped notice — unless it wasn't working. Data centers have now become, as Debra Chrapaty of Microsoft puts it, a "true differentiator."

Indeed, the number of servers in the United States nearly quintupled from 1997 to 2007. (Kenneth Brill of the Uptime Institute notes that the mega-data centers of Google and its ilk account for only an estimated 5 percent of the total market.) The expansion of Internet-driven business models, along with the data retention and compliance requirements of a variety of tighter accounting standards and other financial regulations, has fueled a tremendous appetite for data-center space. For a striking example of how our everyday clicks and uploads help drive and shape this real world real estate, consider Facebook. Facebook's numbers are staggering. More than 200 million users have uploaded more than 15 billion photos, making Facebook the world's largest photo-sharing service. This expansion has required a corresponding infrastructure push, with an energetic search for financing. "We literally spend all our time figuring how to keep up with the growth," Jonathan Heiliger, Facebook's vice president of technical operations, told me in a company conference room in Palo Alto, Calif. "We basically buy space and power." Facebook, he says, is too large to rent space in a managed "co-location facility," yet not large enough to build its own data centers. "Five years ago, Facebook was a couple of servers under Mark's desk in his dorm room," Heiliger explained, referring to Mark Zuckerberg, Facebook's founder. "Then it moved to two sorts of hosting facilities; then it graduated to this next category, taking a data center from an R.E.I.T." — real estate investment trust — "in the Bay Area and then basically continued to expand that. We now have a fleet of data centers."

A big challenge for Facebook, or any Internet site with millions of users, is "scalability" — ensuring that the infrastructure will keep working as new applications or users are added (often in incredibly spiky fashion, as when Oprah Winfrey joined and immediately garnered some 170,000 friends). Another issue is determining where Facebook's data centers are located, where its users are located and the distance between them — what is called latency. Though the average user might not appreciate it, a visit to Facebook may involve dozens of round trips between a browser and any number of the site's servers. In 2007, Facebook opened a third data center in Virginia to expand its capacity and serve its increasing number of users in Europe and elsewhere. "If you're in the middle of the country, the differences are pretty minor whether you go to California or Virginia," Heiliger said. But extend your communications to, say, India, and delay begins to compound. Bits, limited by the laws of physics, can travel no faster than the speed of light. To hurry things up, Facebook can try to reduce the number of round trips, or to "push the data as close to a user as possible" (by creating new data centers), or to rely on content-data networks that store commonly retrieved data in Internet points of presence (POPs) around the world. While an anxious Facebook user serially refreshing to see if a friend has replied to an invitation might seem the very picture of the digital age's hunger for instantaneity, to witness a true imperative for speed, you must visit NJ2, a data center located in Weehawken, N.J., just through the Lincoln Tunnel from Manhattan. There, in an unmarked beige complex with smoked windows, hum the trading engines of several large financial exchanges including, until recently, the Philadelphia Stock Exchange (it was absorbed last year by Nasdaq).

NJ2, owned by Digital Realty Trust, is managed by Savvis, which provides "proximity hosting" — enabling financial companies to be close to the market. At first I took this to mean proximity to Wall

Street, but I soon learned that it meant proximity of the financial firms' machines to the machines of the trading exchanges in NJ2. This is desirable because of the rise of electronic exchanges, in which machine-powered models are, essentially, competing against other machine-powered models. And the temporal window for such trading, which is projected this year by Celent to account for some 46 percent of all U.S. trading volume, is growing increasingly small.

"It used to be that things were done in seconds, then milliseconds," Varghese Thomas, Savvis's vice president of financial markets, told me. Intervening steps — going through a consolidated ticker vendor like Thomson Reuters — added 150 to 500 milliseconds to the time it takes for information to be exchanged. "These firms said, 'I can eliminate that latency much further by connecting to the exchanges directly,' " Thomas explained. Firms initially linked from their own centers, but that added precious fractions of milliseconds. So they moved into the data center itself. "If you're in the facility, you're eliminating that wire." The specter of infinitesimal delay is why, when the Philadelphia Stock Exchange, the nation's oldest, upgraded its trading platform in 2006, it decided to locate the bulk of its trading engines 80 miles — and three milliseconds — from Philadelphia, and into NJ2, where, as Thomas notes, the time to communicate between servers is down to a millionth of a second. (Latency concerns are not limited to Wall Street; it is estimated that a 100-millisecond delay reduces Amazon's sales by 1 percent.) At NJ2, a room hosting one of the exchanges (I agreed not to say which, for security reasons), housed, in typical data-center fashion, rows of loudly humming black boxes, whose activity was literally inscrutable. This seemed strangely appropriate; after all, as Thomas pointed out, the data center hosts a number of "dark pools," or trading regimens that allow the anonymous buying and selling of small amounts of securities at a time, so as not, as Thomas puts it, "to create ripples in the market."

It seemed heretical to think of Karl Marx. But looking at the roomful of computers running automated trading models that themselves scan custom-formatted machine-readable financial news stories to help make decisions, you didn't have to be a Marxist to appreciate his observation that industry will strive to "produce machines by means of machines" — as well as his prediction that the "more developed the capital," the more it would seek the "annihilation of space by time."

THE COST OF THE CLOUD

Data centers worldwide now consume more energy annually than Sweden. And the amount of energy required is growing, says Jonathan Koomey, a scientist at Lawrence Berkeley National Laboratory. From 2000 to 2005, the aggregate electricity use by data centers doubled. The cloud, he calculates, consumes 1 to 2 percent of the world's electricity.

Much of this is due simply to growth in the number of servers and the Internet itself. A Google search is not without environmental consequence — 0.2 grams of CO2 per search, the company claims — but based on E.P.A. assumptions, an average car trip to the library consumes some 4,500 times the energy of a Google search while a page of newsprint uses some 350 times more energy. Data centers, however, are loaded with inefficiencies, including loss of power as it is distributed through the system. It has historically taken nearly as much wattage to cool the servers as it does to run them. Many servers are simply "comatose." "Ten to 30 percent of servers are just sitting there doing nothing," Koomey says. "Somebody in some department had a server doing this unique thing for a while and then stopped using it." Because of the complexity of the network architecture — in which the role of any one server might not be clear or may have simply been forgotten — turning off a server can create more problems (e.g., service outages) than simply leaving it on.

As servers become more powerful, more kilowatts are needed to run and cool them; square footage in data centers is eaten up not by servers but by power. As data centers grow to unprecedented scales — Google recently reported that one of its data centers holds more than 45,000 servers (only a handful of companies have that many total servers) — attention has shifted to making servers less energy intensive. One approach is to improve the flow of air in the data center, through computational fluid-dynamics modeling. "Each of these servers could take input air at about 80 degrees," John Sontag, director of the technology transfer office at Hewlett-Packard, told me as we walked through the company's research lab in Palo Alto. "The reason why you run it at 57 is you're not actually sure you can deliver cold air" everywhere it is needed. Chandrakant Patel, director of the Sustainable I.T. Ecosystem Lab at H.P.,

argues there has been “gross overprovisioning” of cooling in data centers. “Why should all the air-conditioners run full time in the data center?” he asks. “They should be turned down based on the need.” Power looms larger than space in the data center’s future — the data-center group Afcom predicts that in the next five years, more than 90 percent of companies’ data centers will be interrupted at least once because of power constrictions. As James Hamilton of Amazon Web Services observed recently at a Google-hosted data-center-efficiency summit, there is no Moore’s Law for power — while servers become progressively more powerful (and cheaper to deploy) and software boosts server productivity, the cost of energy (as well as water, needed for cooling) stays constant or rises. Uptime’s Brill notes that while it once took 30 to 50 years for electricity costs to match the cost of the server itself, the electricity on a low-end server will now exceed the server cost itself in less than four years — which is why the geography of the cloud has migrated to lower-rate areas.

The huge power draws have spurred innovation in the form factor of the data center itself. For its Chicago center, Microsoft is outfitting half the building with shipping containers packed with servers. “Imagine a data center that’s about 30 megawatts, with standard industry average density numbers you can probably fit 25,000 to 30,000 servers in a facility like that,” says Microsoft’s Chrapaty. “You can do 10 times that in a container-based facility, because the containers offer power density numbers that are very hard to realize in a standard rack-mount environment.”

The containers — which are pre-equipped with racks of servers and thus are essentially what is known in the trade as plug-and-play — are shipped by truck direct from the original equipment manufacturer and attached to a central spine. “You can literally walk into that building on the first floor and you’d be hard pressed to tell that building apart from a truck-logistics depot,” says Manos, who has since left Microsoft to join Digital Realty Trust. “Once the containers get on site, we plug in power, water, network connectivity, and the boxes inside wake up, figure out which property group they belong to and start imaging themselves. There’s very little need for people.”

“Our perspective long term is: It’s not a building, it’s a piece of equipment,” says Daniel Costello, Microsoft’s director of data-center research, “and the enclosure is not there to protect human occupancy; it’s there to protect the equipment.”

From here, it is easy to imagine gradually doing away with the building itself, and its cooling requirements, which is, in part, what Microsoft is doing next, with its Gen 4 data center in Dublin. One section of the facility consists of a series of containers, essentially parked and stacked amid other modular equipment — with no roof or walls. It will use outside air for cooling. On our drive to Tukwila, Manos gestured to an electrical substation, a collection of transformers grouped behind a chain-link fence. “We’re at the beginning of the information utility,” he said. “The past is big monolithic buildings. The future looks more like a substation — the data center represents the information substation of tomorrow.”
Tom Vanderbilt is the author of “Traffic: Why We Drive the Way We Do (and What It Says About Us).”

http://www.nytimes.com/2009/06/14/magazine/14search-t.html?ref=magazine

Getting Up to Speed
By JON GERTNER

This is a story not about Amtrak but about trains, and the problem with any story about trains in America is that you often find yourself thinking about Amtrak, and you often find yourself thinking about how nice it would be if you weren't thinking about Amtrak. This is especially true when you're actually riding on Amtrak, which happened to be the case one morning in March when I boarded the Pacific Surfliner in downtown Los Angeles for a 500-mile trip, mostly up the coast, to Sacramento. Anyone who lives in California can tell you that this is folly: other ways of traveling from Los Angeles to Sacramento are quicker and less frustrating and not much more expensive. You can fly in 90 minutes for around $100. Or you can drive in six hours for less than $50 in gas. For $55, my Amtrak journey was scheduled to take at least 12 hours 25 minutes. With any luck, I would arrive there by 9 p.m. And it was fairly obvious to me that I would need some luck, because my ticket to Sacramento had not bought me a train ride, exactly, but a train-bus-train ride. In San Luis Obispo, I would get off the Surfliner and board an Amtrak bus; in San Jose, I would get off the bus and board a different train to Sacramento. There was little room for error: a slow train and I would miss the bus; a slow bus and I would miss the second train. It's true I could have taken other trains to Sacramento instead, but these had their own drawbacks. The Coast Starlight, for instance, which runs north along the Pacific Coast from L.A., doesn't involve any buses, but travel time is an estimated 13 hours 44 minutes. What's worse, the Starlight, a k a the Starlate, is a train of such legendary unreliability that it is not so much a train as an anti-train. In the past it has been known to run 11 or 12 hours behind schedule and post an on-time percentage in the single digits. A third travel option promised to take about eight hours over a more direct inland route. To leave at a reasonable hour, though, I would need to take a bus from L.A. to Bakersfield, catch a train called the San Joaquin and travel to Stockton, then ride another bus from Stockton to Sacramento. So I opted for the train-bus-train combo over the bus-train-bus alternative.

The Surfliner was scheduled to leave at 7:30 a.m., and as it happened we pulled out of the station only a minute late. I had two reasons for going to Sacramento. The first was to get a clearer sense of why a lot of people in California think it's necessary to build an entirely new passenger-rail system. The second was to see how they might do so. Since it was established in 1996, the California High Speed Rail Authority, an assemblage of train advocates and engineers, had been working out of offices in the capital to explore how the state could build a rail line from Los Angeles to San Francisco for $33 billion, with two additional branches — costing billions more — eventually extending to Sacramento in the north and San Diego in the south. It would not be an Amtrak operation but one owned by the state of California. Last November, state voters approved a $10 billion bond measure to get the project moving. Earlier this year, President Obama, who on a trip to France in April conceded he was "jealous" of European high-speed trains, submitted budget and stimulus plans that together allocated approximately $13 billion for high-speed rail over the next five years. It seems almost certain that at least some of that money, and perhaps a significant percentage of it, will go this fall to California's project, which is the most developed of any U.S. high-speed-rail plan. Ray LaHood, the U.S. secretary of transportation, told me recently that

Californians “are obviously way, way ahead of everyone else.” In late May, LaHood rode on the French and Spanish high-speed-rail lines and met with European train companies that hope to sell their products to the United States.

If it can get started, the California high-speed train would almost certainly be the most expensive single infrastructure project in United States history. And if it is completed, the train will go from L.A. to San Francisco in just under 2 hours 40 minutes and from L.A. to Sacramento in about 2 hours 17 minutes. Judging by the experiences of Japan and France, both of which have mature high-speed rail systems, it would end the expansion of regional airline traffic as in-state travelers increasingly ride the fast trains. And it would surely slow the growth of highway traffic. Other potential benefits are also intriguing: a probable economic windfall for several cities along the route, with rejuvenated neighborhoods and center cities; several hundred thousand jobs in construction, manufacturing, operations and maintenance; and the environmental benefits that come from vehicles far more efficient and far less polluting than jets, buses and cars. Apart from the breathtaking price tag, commentators often focus on the projected velocity of the California trains, on how they will reach an astounding 220 m.p.h. in some stretches near Bakersfield and will cover the distance from L.A. to the Bay Area at an average speed approaching 175 m.p.h. As someone who never understood the zealotry of hard-core train enthusiasts, I found the project’s other selling points more compelling: center city to center city in a few hours without airport lines or onerous security checks. No bus connections. No traffic. And no counting on luck. Which is to say that high-speed trains are obviously about going fast, but when you think about it, they’re just as much about time as speed.

Once our Surfliner left the Los Angeles metro area, the stations slipped past slowly: Glendale, Van Nuys, Simi Valley, Moorpark, Camarillo, Oxnard. Two hours into the ride, near Ventura, we picked up the pace, and soon the train was zipping along the shoreline, first passing lemon groves and freshly plowed fields, then grasslands of wildflowers and scrub brush — punctuated in places by a lone cypress — that all sloped a hundred yards or so downhill toward the Pacific. On a plane at 30,000 feet or in a car on a highway whose inclines have been tamed and curves eased, you can forget the great sweep of California’s topography. Rediscovering it on the Surfliner is something to say in its favor. On the other hand, you can also rediscover why you might rather fly.

Somewhere in the midst of this desolate and gusty landscape we came to a dead stop. Ten minutes passed, then 20. There was a faint hum from the engines; a rocking motion from the wind. The train was about half full, and most of us looked at each other for clues. Eventually, two conductors walked up the aisle toward the engine car. Both were strapping on heavy work gloves. Something needed fixing outside, obviously, since we heard them descend to the tracks, followed by laughter and some alarming clanging noises. Across the aisle, a woman glanced at me nervously.

When the conductors stepped back on board, they had satisfied looks. “We threw some switches to get onto the sidings,” one of them told me, catching her breath as she removed her work gloves. I hadn’t realized that Amtrak employees who take tickets and wear crisp formal uniforms also tend to the tracks. But on the Surfliner, at least, they do.

Several hours later, when we finally pulled into San Luis Obispo, it was early afternoon and we were running about 30 minutes late. Out on the station platform, a conductor informed us that a connection was around the corner: a shiny blue bus, emblazoned with an Amtrak California seal. A large crowd surrounded the bus driver, a big man who was loading luggage into the stowaway compartment. One by one he pointed to each of us and asked us to step forward, state our destination and hand over our suitcases. Apparently he had a system of arranging baggage in some kind of highly complex, reverse-chronological order. The process took him 30 minutes.

Before he started the bus, the driver informed us that unless it was an emergency, we should not use the bathroom on board — it was, he said, not “really working, actually.” The bus would be making a few stops, he said, including one in a place called King City, where we would have 15 minutes at a McDonald’s. But we would not be permitted to go to the King City Taco Bell two parking lots over or to the King City Starbucks across the street. “Sorry, guys,” he said. Those places were too far away. “We’ll have to leave without you,” he added sternly. A simple journey up the coast had turned into a class trip with the assistant principal. But as we got on the highway, I was mostly concerned about the time and wondering how I could possibly connect, four hours from now, with my second train.

The Sacramento headquarters of the California High Speed Rail Authority occupy a suite of offices in a high-rise building a half-block from the state Capitol. That’s where I sat down with Tony Daniels, a bluff, silver-haired Englishman who works as project director on the rail plan. When Daniels asked about my

trip from Los Angeles the night before, I told him that our bus arrived in San Jose with seven minutes to spare. After a sprint through the station, I made it to a Sacramento-bound train that turned out to be surprisingly efficient. Daniels seemed amused. You should have taken the San Joaquin, he said; “that’s a nice train.” Too bad ours isn’t built yet, he added.

Daniels helps coordinate the hundreds of engineers — almost all of them private contractors at large firms — working on the California high-speed project. He reports to an executive director named Mehdi Morshed, an engineer whose résumé is filled with California transportation projects, as well as to a board of nine political appointees. After a few hours talking with Daniels and Morshed, I still couldn’t gauge the mood in the rail-authority offices. The place seemed to have an air of both defeat and giddy optimism. The rail authority has never been especially popular; for years its cause has been criticized as a science-fiction dream and, more recently, a government boondoggle to dwarf all previous government boondoggles. Even for the less cynical — editorial boards and legislators, mainly — legitimate philosophical questions about its mission have never fully subsided. Can California really afford such a project? Shouldn’t transportation dollars be spent instead on upgrading urban mass transit or commuter rail, both of which would also ease freeway traffic? Over the past decade, specific parts of the rail plan — tunnels, mountain passes, stations, environmental impacts, costs, ridership estimates, the technologies needed, you name it — have been challenged at nearly every turn by officials and citizens alike, as have the motives and wisdom of rail-authority board members and staff employees. All the while, the state’s governors (Pete Wilson at first, then Gray Davis) endorsed the authority’s existence but withheld full-throated support. And then suddenly last year, Arnold Schwarzenegger, who as governor had mostly displayed a “benign indifference” for the project, as the rail-authority chairman Quentin Kopp told me, revealed an extreme form of high-speed-train enthusiasm. Last fall Schwarzenegger agreed to put the $10 billion bond issue on the ballot, and to the surprise of many it won. When the recent federal stimulus plan offered the possibility of billions more for the California rail project, it was as if the perpetual losers in Sacramento won a huge talent contest they never expected to win.

In a country with no real experience of bullet trains — the Acela, which runs between Boston and Washington, doesn’t exceed 150 m.p.h. — it isn’t immediately obvious what makes the systems so advanced and expensive. When I met with Daniels he took me through the ways a high-speed train differs from, say, the Surfliner. “These are very powerful animals,” he said of the vehicles that run in Europe and Asia. It’s more accurate to think of them as lithe rather than brawny, however. They are light. Or as the French tend to say, the trains have a high power-to-weight ratio that allows them to attain terrific velocities. What’s more, the newest high-speed designs do not depend on locomotives pulling or pushing a string of cars. Instead, powerful motors are distributed throughout the undersides of the train cars. Up above, the trains are delicate: the pantograph that touches an overhead electrical wire (the catenary) is far more sensitive than its equivalent on regular trains in order to maintain electrical contact at extreme speeds. Things are different on the ground too. Crossties are made from concrete and not timber, and rails are sometimes set on a concrete bed rather than a ballast of crushed stone. The alignment of the rails cannot involve tight curves or sharp turns — because straighter track is faster, and faster track is the whole point. One of the most crucial distinctions with the trains, finally, is invisible: they have a signaling technology, called “positive train control,” that keeps tabs on the location of the trains in operation. If a train gets close to the one ahead of it, it slows down automatically — or shuts down altogether if it gets too close. A big seismic tremor or act of sabotage trips the system, too.

You can’t plunk a bullet train down on an existing corridor. High-speed lines in Asia and Europe are, in the argot of transportation engineers like Daniels, “dedicated lines without grade crossings.” That means vast stretches of the routes are for high-speed trains only (no freight or commuter trains allowed) and are built so that anything crossing the train’s path (local roads, highways, freight lines, white-tailed deer) must do so via overpass or underpass. Hence a virgin 400- or 500-mile track in California, in addition to its own construction, entails hundreds of massive construction projects in order to divert all sorts of cross traffic. A dedicated line also requires a secure fence on both sides of the tracks. Because it takes several miles to brake-stop a train barreling along at 200 m.p.h. — French authorities consider drivers incapable of reacting quickly enough to stimuli at top speed — fences are needed to keep cattle and curious kids from wandering near.

As Daniels described his project, I tried to scribble down his to-do list, but that seemed almost hopeless. In addition to the current financing, the rail system will need tens of billions of additional dollars from the state, the federal government and private investors to actually be finished. In addition to track beds and rails and fences and trains and signals — all built to withstand earthquakes — a large power supply and

vast new electrical system with substations every 30 miles will be needed. There will be as many as 24 passenger stations along the way, most of them built from scratch, while others, like Union Station in Los Angeles, will need to be expanded significantly to accommodate millions of new train riders every year. (A small but typical headache: Union Station is on the national register of historic places, which makes renovations and expansions especially fraught.) The train plan will also necessitate thousands of pages of environmental and public-review documents. And it will require an entirely new set of safety regulations from the Federal Rail Administration. The F.R.A. has largely focused on requiring trains to demonstrate crash worthiness, whereas in Europe and Asia the emphasis is on avoiding crashes. (There was a deadly high-speed-train accident in Germany in 1998, but in 45 years of operation in Japan, and in 28 years in France, there has never been a fatality on a high-speed train.)

And these aren't even the biggest problems. The monumental difficulty of the California rail project is finalizing the route. An approximate plan has been approved, but over the next year the authority will pinpoint precisely where the train will run, down to the inch. Significant purchases of land will have to be made, and in some places the state might have to exercise eminent domain. At one point Daniels took me down into what he calls his war room, a large space with huge maps on the wall and thousands of pages of regulatory documents piled on tables. One thing you notice if you spend time with rail planners is that it's difficult to separate engineering concerns from economic and political issues. It's as if the relationship between these competing forces forms a set of interrelated mathematical equations; change one variable and you have to rework the entire calculus. One of the largest maps in Daniels's war room is of the 58 miles between Bakersfield and Merced. It's a stretch of pancake-flat farmland — "the train will just whistle here," Daniels said — through which the lines of two freight railroads, the Union Pacific and the Burlington Northern Santa Fe, already pass. Both companies own strips of land bordering their own tracks that they can sell or lease. Union Pacific apparently isn't interested in the high-speed-rail authority's offers; Burlington Northern is. The Union Pacific route is a straight line; the Burlington route arcs between the towns. All told, the Burlington route is several miles longer, which leads to a dilemma. By law — that is, according to the bond measure that authorizes the rail project — the California train has to travel between San Francisco and Los Angeles in 2 hours 40 minutes. Adding distance might add too much time. Daniels showed me a printout of a computer model demonstrating how a particular German high-speed train, one of the best in the world, would do on the longer route. "It comes in at 2 hours 39 minutes and 53 seconds," he said. "That's too tight for me." It's possible the Germans (or other manufacturers) could build a souped-up train. Or it's possible the route could be shortened in other spots. It's also possible that a portion of the route elsewhere could be engineered with a lesser gradient that would permit greater speed. But that could require a longer tunnel — and more money. And what about buying some farmland for a more direct route? Reduced time, but more money. And no doubt a political headache as well. "It's tough," Daniels said, almost to himself, as he looked at the map. And this was just one segment.

For the moment, it's fair to assume that the high-speed-rail project will be a vivid, 10-year nightmare for many engineers and Californians. On the positive side, the start of construction — beginning, say, with all those grade crossings — will instantly create thousands of jobs, a considerable boost given the state's double-digit unemployment rate. But it will disrupt dozens of communities and almost certainly raise the ire of many civic activists. If recent history is any lesson — and you might consider Boston's "Big Dig" — the train will likely encounter cost overruns, delays and perhaps even tragic accidents and corruption. Antagonistic politicians and environmental lawsuits may drive its costs even higher. And through it all there will be a lingering question: Is demand strong enough to support the projected annual ridership between Los Angeles and San Francisco of about 54 million passengers by 2030? Quentin Kopp, the chairman of the rail authority, told me that he thinks the estimates are accurate. "But if we're off on that," he acknowledged, "then we won't succeed."

Mehdi Morshed, the authority's executive director, doesn't really try to play down the risks. But he is certain that once the train is completed (in 2020, according to current estimates), it will never be second-guessed. It seems to amuse Morshed that everyone sees his group as dreamers, whereas he sees them as realists. The fundamental case made by his rail authority is that the stupendous cost of the rail plan is still tens of billions of dollars lower than the other option — expanding the highways and airports to accommodate the state's population growth. "It is one of those things that you can't avoid," Morshed said. "It's just, when do you face it? We are a state that depends on high mobility. We move around. That's one reason the economy is vibrant. There was no physical way to expand without building a high-speed rail." It's the only choice, Morshed insisted again. "And the longer we wait the more it will cost."

Just about everyone involved with the California rail project tends to make the point that, its huge expense notwithstanding, the state isn't attempting the hypothetical. There's some reality behind it. From the very start, various Japanese, German and French consultants have all found the state's plans to be sound. "This is not a demonstration project," Daniels said. "We don't want to produce anything that is not absolutely proven in Europe or Asia. No experiments." At some point soon, perhaps by 2012, the rail planners will start the procurement process, Daniels told me. The project calls for around 100 trains, each about 656 feet long, each holding 400 to 500 passengers and each costing $30 million to $35 million. Only five or six companies in the world can make such trains, and of them, only two at the moment — Siemens in Germany and Alstom in France — can build them to be reliably fast enough for the California corridor. It is too early to predict which company could make the most appealing bid; it's also premature to say whether some companies might team up to form a consortium, one that perhaps offers California a deal on trains, signaling, maintenance and electrical infrastructure. In any event, one of the most sophisticated trains in the world right now is the AGV (the letters stand for Automotrice à Grande Vitesse), which is designed and built by Alstom in France. The train was introduced at the beginning of 2008 as the successor to the TGV (Train à Grande Vitesse), France's high-speed workhorse that has been in operation through various upgrades since the first high-speed line opened in that country in 1981, connecting Paris and Lyon. On any given day, there are about 450 TGVs running in France and another three dozen TGV "Eurostar" trains that travel between Britain and the Continent.

I went to see the AGV in early April. There is a single prototype at the moment, and it resides on a fenced-in railway siding in La Rochelle, an ancient, windswept city on France's Atlantic coast. The day before I traveled to La Rochelle, I had breakfast in a Paris cafe with Philippe Mellier, the president of Alstom Transport, and François Lacôte, the head of Alstom's research and development efforts. Both men have already met with the California team, and for good reason: Lacôte happens to be one of the primary and original architects of the French high-speed-train system. Mellier, who is his boss, referred to him, only half in jest, as "the father and the mother of the TGV."

On his laptop, Lacôte showed me charts and graphs relating to the origins of the French high-speed system. Judging by his experience, the rail network now considered the world's gold standard had some difficult early years. Japan was the first country to build a bullet train in the mid-1960s. "For France, that was a kind of shock," Lacôte told me. His country always prided itself on its trains, he said, and here was a technology that threatened its eminence. Lacôte said that in the beginning there was great skepticism among government officials that a high-speed line for France was practical or necessary. Nevertheless, the French national railway agency, S.N.C.F., teamed up with Alstom to build the first TGV in 1972. It was a gas-powered test model that, according to Lacôte, worked well enough to convince a handful of important politicians that the idea was viable. "The president of France, Georges Pompidou, a few months before he died in 1974, decided to launch the new line between Paris and Lyon, with a target speed of 260 k.p.h.," or about 162 m.p.h., Lacôte recalled. Over the next few years the TGV design evolved into a more efficient, electricity-driven train. When it began operating in the 1980s, ridership quickly met projections. In the decades since, the airline business between the two cities mostly evaporated, and the top speed on the line — which turns an operating profit — has risen to about 320 k.p.h., which, at nearly 200 m.p.h., translates into a two-hour trip. (Paris is about 460 kilometers, or 285 miles, from Lyon.) At peak times, double-decker trains carrying more than 1,000 people leave Paris every 30 minutes for Lyon. "Those trains are full, full, full," Mellier told me. Generally speaking, Mellier added, Alstom's high-speed trains suffer two or three "faults" — delays of more than five minutes — for every one million kilometers, or about every 621,000 miles, they travel.

When I toured the AGV prototype the next evening in La Rochelle, I was shown around by Eric Marie, who manages the high-speed trains at the La Rochelle factory, and Laurent Baron, the engineer in charge of developing the prototype. Marie and Baron each told me that in Europe, high-speed trains have cornered, or would soon corner, the market for any trip under three hours. "If you look at rail, this California corridor is a perfect one," Marie said. "You have a distance that falls between this definition of three hours. And the traffic of airplanes is incredible." With the AGV, Baron added, Alstom was trying to increase the train speed so that it could do 1,000 kilometers (about 620 miles) in three hours. "Basically that allows us to go from one extremity of France to another" in that time or less, he said. "So the idea is really to kill the interior plane system." The success of such efforts depends as much on pricing as performance, of course. Railway operators essentially choose between maximizing ridership (through lower prices), maximizing profits (through higher prices) or opting for some middle ground. The numbers are quite elastic. In California, the rail authority tested 13 different pricing schemes, comparing the

effects, for instance, of prices set at averages of 50 percent and 77 percent of airfares. The lower price projected 15 million more riders annually.

Only two of the seven AGV cars were outfitted with seats to explore possible interior designs. The other cars were filled with long, makeshift wooden tables where Alstom engineers worked at their laptops. As we walked through the length of the AGV, the contrast between its sleek, silver exterior and its internal chaos — tools, cables and calibrating equipment were strewn everywhere — was disorienting. Baron and Marie explained that the train, which cost about 100 million euros, or about $141 million, to develop, was driven extensively last year on test tracks in the Czech Republic and in France (where it achieved speeds of 360 k.p.h., or about 223 m.p.h.). Until the La Rochelle factory begins delivering trains next year, the parked prototype remains a laboratory for tests — on noise, lighting, interior layout and the like.

Perfecting the train's hardware and software is especially crucial, since in many ways it is a rolling computer. The AGV's first car is loaded with databanks and communications equipment, in part because of the European Union's vestigial provincialism. Signaling systems can change several times on a single route, as can voltages and currents (there is AC as well as DC), which means the train's computers must frequently compensate for power variations. In some ways, accommodating for these inconsistencies means that designing an AGV train for Europe is more complex than designing one for, say, California.

The first order for the model, 25 trains, has come from Italy, where a group of private investors has founded a train operator called Nuovo Trasporto Viaggiatori. In Europe, at least, the high-speed market may soon start to resemble the early days of the airline industry, in which private operators like NTV, not just state-owned corporations, see an opportunity to buy trains from companies like Alstom or Siemens, pay a fee for track usage and start hauling passengers. Alstom's engineers thus set out to design a faster, more cost-efficient (and environmentally efficient) train. Compared with a single-decker TGV, the new AGV holds 20 percent more passengers. At the same time, it's lighter, thanks partly to new composite materials that have replaced steel, and it uses significantly less energy than previous models.

I left La Rochelle late the next morning and caught the train to Paris, from where I later took the TGV to Strasbourg, the country's newest high-speed route. On the way to Strasbourg I rode in the driver's cabin, which narrows aerodynamically toward the nose of the train, where the driver's chair is located. More than anything, the room resembled the cone of a forward-facing rocket, with a confusing variety of screens, dials and communications equipment and a large, sloping windshield that carried the splattered remains of high-speed encounters with French insects. The four of us in the small space — the driver, his supervisor, an Alstom representative and myself — made for a tight fit. We eased out of Paris slowly on track shared with slower commuter lines; once we moved onto dedicated track, however, the driver used a hand throttle to accelerate the train to 320 kilometers per hour, or about 199 m.p.h. Looking out the windshield was an experience of onrushing geometry: the rails stretching out one way and the crossties going another; and above, the long electric catenary wire, held aloft by evenly spaced poles, reaching straight to the horizon. In the cabin, there was a steady noise of electronic buzzers and bleats. When a TGV driver's foot loses contact with a floor sensor for more than 30 seconds, for instance, a warning bell sounds, alerting the driver that he has 2.5 seconds to push a button and demonstrate he hasn't taken ill for some reason. If he doesn't answer the signal, the train shuts down.

The Strasbourg line, about 300 miles long, took seven years and five billion euros to plan and build, including one billion euros for the trains. Since it opened in 2007 it has exceeded ridership projections and has expanded rail's share of that travel market to about 70 percent from 40 percent. (The ultimate goal is 90 percent.) On the way to Strasbourg we passed mostly pasture land. Cows grazed under cloudy skies. Occasionally, we sped past fields of colza, blooms of mustard-colored flowers that turned the countryside a blurred, brilliant yellow. Gabriel Nonnemacher — a compact and ebullient train supervisor who answered my questions so the driver would not be distracted — pointed out landmarks as we went along. The train route dated to the 1860s, he said, when the trip usually took seven hours or so. In more recent years, Paris-to-Strasbourg was four hours by rail. The high-speed line had brought the journey down to 2 hours 20 minutes, but there were already discussions, he said, about creating a longer dedicated track for this same corridor, so trains could go faster for a longer time and reduce the trip to 1 hour 50 minutes. As we glided into the Strasbourg station, Nonnemacher pointed to the digital clock to the left of the driver. "Voilà," he said. Our train was supposed to arrive at 7:41 p.m. We were five seconds early.

In the spring, as California teetered on the edge of bankruptcy, it seemed conceivable that state budget cuts might affect the high-speed-rail planners, perhaps forcing some of the engineers to pause their work. Yet because the money for the train comes from state bond sales and is not part of the state's "general fund," several members of the rail authority told me that they doubted budget shortfalls would have any

near-term impact. In fact, the project appeared finally to have taken on momentum. In April, when Obama sketched out a vision for various regional corridors — in California, Florida, Pennsylvania, the Pacific Northwest and the Midwest — he and Transportation Secretary Ray LaHood made the case that forthcoming federal investments in rail projects like California's were akin to Dwight Eisenhower's decision 53 years ago to build a national network of Interstate highways. The federal high-speed-rail money was only a down payment, Obama acknowledged, but it would allow Americans "to imagine what's possible." When I spoke with LaHood, I asked what the administration learned from the experiences of Japan and France. "That these things can't happen unless you have real intense involvement from the government," he replied. "That these things are very expensive. But we wouldn't have an Interstate system if there weren't an involvement from the government. And it still took us three decades to do it. That's how we should look at high-speed rail." By 2012, LaHood said, "I think you'll see construction on high-speed rail in California. I think you'll see final plans in the Midwest. And I think you'll see final plans of what to do in the Northeast corridors."

One fundamental challenge of high-speed rail is that construction time generally exceeds the term, or terms, of elected politicians. When I spoke to Schwarzenegger in early May, he mainly seemed to view the rail plan with a mixture of near-term and long-term pragmatism. It would immediately create jobs; and in time it would cut pollution, reduce congestion and obviate the need to expand the airports. He had been riding high-speed trains for decades, he told me, even back in his early days of attending bodybuilding competitions in Japan. "I came to America because America is No. 1 in just about everything: the biggest bridges, the biggest buildings," he said. "Everything here was always huge and generous. The greatest opportunities. And then as you live here you see we are slipping in some areas. Look at the train system. They're running the same speed as they were 100 years ago. Is that what No. 1 does? Live in the past?" I didn't have the heart to tell him that some trains actually run slower now than they did nearly 100 years ago. Instead, I asked if he expected to break ground on the rail project before he finishes his term in January 2011. "That's my goal," he said.

This is probably too optimistic. Most people I spoke with think a few years is more likely, because of the time-consuming nature of the environmental-review process. And even a groundbreaking ceremony doesn't mean the rail link between Northern and Southern California is imminent. Think of the train — as those at the rail authority do — not as one line but as eight connected segments. Some parts of the route (from San Francisco to San Jose, or Anaheim to Los Angeles) could open long before others, possibly generating renewed political support for the project several years from now. An opening of a particular segment, moreover, could help attract private-sector investors who think the rail line might turn an operating profit. Clearly, the thing is so expensive and complex that it's easier to think of in parts than the whole.

That's not to say that the parts are easy. Already this spring, the board of the California High Speed Rail Authority was getting a bitter taste of the battles to come. Among other things, potential problems had arisen over the size of a planned rail station in San Francisco. Meanwhile, a not-in-my-backyard standoff with the city of Palo Alto, still unresolved, was raging over the route of the train through town.

It is sometimes easy to forget in the disputes over state money and local politics that the train project has national implications too. For one thing, it represents the challenge of getting big and risky things built following a boom-time era when it often seemed as if America was content to build little else besides cars, houses and shopping malls. In the United States and France, I encountered the belief that if California could break ground and actually see its rail project through, that could permanently change public opinion about big infrastructure spending and would represent a departure from a half-century of federal transportation policy focused mostly on financing highways and airports. "If California is a success, I believe in the U.S. we'll see a lot more high-speed lines," Philippe Mellier, the head of Alstom Transport, told me when we met in Paris. "I believe it will be the showcase. But if it's not working well? In the end it could be a failure for many years for this idea in the U.S. So it has to be very carefully done." There aren't really any recent examples of high-speed rail as a technical failure. Yet it is entirely plausible that the financial and political difficulties in California could keep other regions from trying to replicate its rail project. Disappointing ridership numbers, without question, could do the same. If, on the other hand, the California train does succeed, it will likely spur economic development in the state as well as some less predictable social impacts. In France, Mellier pointed me to the small city of Reims, about 90 miles from Paris, which has effectively become a Parisian suburb since the opening of the Strasbourg line in 2007. You wonder if Bakersfield could become a bedroom community of Los Angeles. In recent years, moreover, some French cartographers who think about the social effects of train transportation have taken

to creating new maps of Europe that simultaneously reflect the time and the distance between cities. These "time space" drawings of France (the technical name is anamorphic maps) have a distorted look as if someone crumpled a paper rendering of the country and pulled all the surrounding cities closer to Paris than they really are. Marseille is half its real distance from the capital, as are Strasbourg and Lyon. Mostly this is because of the TGV, which seems to have knit the country together in a way that air travel never did. Alain L'Hostis, a geographer at the Université Paris-Est, told me that the train has undoubtedly changed the psychological distance between places. For the French, he said, the mobility has created among many citizens "a feeling of belonging to a common or interconnected city."

As a survivor of an Amtrak journey up the coast, I recalled those 13 hours unconnected to any California city at all — not a particularly pleasant feeling. When I asked Schwarzenegger about the social effects of a rail line, he quickly replied, "I think people will look at the state and not just say, 'Oh, my God, I have to go from the south to the north, what a schlep.' " That was kind of like what L'Hostis said to me, but in a different way. After Schwarzenegger thought for a moment more, he said, speaking of his own commute by private jet: "I fly from Sacramento to Los Angeles, and it takes two hours. And if I would fly commercial, you would have to add an hour, or an hour and a half. Imagine. What if I could do high-speed rail?" I could picture a crumpled time-space drawing of his state. In my mind, and maybe in his, too, the big cities of California were already moving closer together.

Jon Gertner, a frequent contributor to the magazine, often writes about business and the environment.

http://www.nytimes.com/2009/06/14/magazine/14Train-t.html?ref=magazine

Behind Bars ... Sort Of
By JIM LEWIS

Go ahead and say it; everyone does. Certainly I did. Here's a striking building, perched on a slope outside the small Austrian town of Leoben — a sleek structure made of glass, wood and concrete, stately but agile, sure in its rhythms and proportions: each part bears an obvious relationship to the whole. In the daytime, the corridors and rooms are flooded with sunshine. At night, the whole structure glows from within. A markedly well-made building, and what is it? A prison.

Everybody says this, or something like it: I guess crime does pay, after all. Or, That's bigger than my apartment. (New Yorkers, in particular, tend to take this route.) Or, Maybe I should move to Austria and rob a couple of banks. It's a reflex, and perfectly understandable, though it's also foolish and untrue — about as sensible as looking at a new hospital wing and saying, Gee, I wish I had cancer.
To be more accurate, free people say these things. Prisoners don't. Nor, for the most part, do the guards, the wardens or the administrators; nor do legal scholars or experts on corrections; nor does Josef Hohensinn, who designed the Leoben prison. They all say something else: No one, however down-and-out or cynical, wants to go to prison, however comfortable it may be.
Still, the argument goes, the place must be a country club for white-collar criminals. (No, it holds everyone from prisoners awaiting trial to the standard run of felons.) Then it must cost a fortune. (A little more than other prisons, maybe, but not by much — as a rule, the more a corrections center bristles with overt security, with cameras, and squads of guards, and isolation cells, the more expensive it's going to be.) And that's glass? (Yes, though it's shatterproof. And yes, those are the cells and that is a little balcony, albeit caged in with heavy bars, and below it is a courtyard.) The whole thing seems impossible, oxymoronic, like a luxury D.M.V., and yet there it is.
One gray day in February, Hohensinn drove me from his office in Graz down to Leoben, an hourlong trip through a region isolated by mountains and still transitioning out of an industrial economy. He is a compact man in his early 50s, with bushy eyebrows, a gappy smile and an air about him of cheerful confidence, mixed with a kind of Alpine soulfulness. Before the prison opened, late in 2004, he had a solid career building public housing. Now he is the Man Who Built That Prison, a distinction that dismays him slightly, if only because, as he says, "One always has mixed feelings about having one work singled out for attention."
Leoben has received quite a lot of attention. In America, its public profile has been limited to a series of get-a-load-of-this e-mail messages and mocking blog posts (where the prison is often misidentified as a

corrections center outside Chicago), but in Europe, Hohensinn's design has become more of a model — not universally accepted, but not easily ignored either. It is the opening statement in a debate about what it means to construct a better prison. Already there are plans to build something like it outside of Berlin.
The day Hohensinn and I visited, Leoben was dreary, and there were traces of sleet in the air; as we approached, the building looked both idle and inviting, like a college library during winter break — or it would have, anyway, were it not for the razor wire coiled along the concrete wall of the yard and the sentence carved below it, a line from the International Covenant on Civil and Political Rights (which the United States signed and ratified) that reads: "All persons deprived of their liberty shall be treated with humanity and with respect for the inherent dignity of the human person."
Inside the prison it felt like Sunday afternoon, though in fact it was a Tuesday. There was a glassy brightness over everything, and most surprising, an unbreakable silence. Prisons are usually clamorous places, filled with the sound of metal doors opening and closing, and the general racket that comes with holding large numbers of men in a confined space. Noise is part of the chaos of prison life; Leoben was serene. I mentioned as much to Hohensinn, and he smiled and pointed to the whitewashed ceilings. He had taken great care to install soundproofing.
An assistant warden accompanied us on our tour, one of three guards on duty tasked with watching more than 200 inmates. On one side of the prison there was a block of prisoners on remand; on the other side were the convicts, living in units called pods — groups of 15 one-person cells with floor-to-ceiling windows, private lavatories and a common space that includes a small kitchen. We came upon one prisoner cooking a late lunch for a few of his podmates; we stood there for a bit, chatting. They were wearing their own clothes. The utensils on the table were metal. "They are criminals," Hohensinn said to me, "but they are also human beings. The more normal a life you give them here, the less necessary it is to resocialize them when they leave." His principle, he said, was simple: "Maximum security outside; maximum freedom inside." (The bars over the balconies are there to ensure the inmates' safety, Hohensinn said; the surrounding wall outside is more than enough to make sure no one gets free.)
We walked around some more. There was a gymnasium, a prayer room, a room for conjugal visits. I asked Hohensinn what he would do if, contrary to fact, it were conclusively proved that prisons like his encouraged crime rather than diminished it. Would he renounce the design? He shook his head. "The prisoners' dignity is all I really care about," he told me.
Suppose we can't bring ourselves to be quite so magnanimous. Suppose all we're interested in is reducing crime. If you trust a criminal with a better environment, will he prove trustworthy? As far as Leoben is concerned, it's too soon to tell. The place has been open for only four years. But I noticed something as we were leaving, and in the absence of any other data it seemed significant. In the three or four hours we spent roaming all through the place, I hadn't seen a single example of vandalism.
It sounds odd to say, but it's nonetheless true: we punish people with architecture. The building is the method. We put criminals in a locked room, inside a locked structure, and we leave them there for a specified period of time.
It wasn't always so. Prison is an invention, and a fairly recent one at that: it wasn't until the 18th century that incarceration became our primary form of punishment. True, there have been dungeons and the like for quite some time, but they were generally for traitors and political enemies and, later, debtors. More common criminals could expect other forms of penalty: execution, for example, and various kinds of corporal punishment; forced labor and conscription; public humiliation; the levying of fines; exile; loss of privileges and offices; and so on. We've come to consider most of these barbaric, unjust or wildly impractical, but their very existence should tend against the idea that settling with criminals by putting them in a building is a natural thing to do.
To be sure, there's something about prisons that engages man's imagination. Alberti discussed them, Piranesi drew them, Jeremy Bentham proposed them. But the imagination of incarceration rarely translates directly into design. Bentham's Panopticon, a circular structure with an all-seeing guardhouse in the middle, was meant to show that surveillance was as powerful a method of control as shackles and door locks — an idea that has proved enticing to many an academic, though it was never built.
In fact, for a long time many prisons, including some of the most well known — the Tower of London, for example — were repurposed castles, fortresses and gates; and even in the U.S., where such legacy buildings didn't exist, prison construction was an ad hoc affair. Among the first people to try to blend ideology, morality and design principles into a carefully planned building were the Quakers of Pennsylvania, whose late-18th-century model was characteristically spare, consisting primarily of cells where convicts were to be kept in strict isolation, that they might better explore their own souls and find a

way to God. A competing system, known as the Auburn model, arose a few years later. It focused more on the potential rehabilitative powers of labor, so it included larger spaces where prisoners could work together; but it, too, called for them to spend the rest of their time alone.

And there, for the most part, the thinking simply stops. Surveillance techniques come and go, materials change, levels of security are introduced and refined. The language changes, from "penitence" to "incarceration" to "corrections," but very little is fundamentally different than it was. You can get it in a rectangle or a circle, in a radiant or a telephone-pole style, in brick or concrete or shipping containers; you can get guardhouses conducting surveillance via closed-circuit TV, electronic doors, an isolation room. But it's pretty much the same building: a large institution, holding many convicts in small cells for years at a time.

Does imprisonment work? It seems like a bottom-line question, but the answer depends on what you want prisons to do, and that's not an easy thing to decide. Even if we assume that there are good and sensible reasons to incarcerate people, there remains some debate about what purpose is served. Deterrence is often proposed as a goal, but no one really knows whether the prospect of incarceration gives would-be criminals pause, and in any case we quickly reach the realm of diminishing returns. "It's absurd to think that the worse you make these places, the less recidivism you'll have," said Michael Jacobson, who was commissioner of the New York City Department of Corrections under Mayor Rudy Giuliani and is now the director of the Vera Institute of Justice, a research group that focuses on criminal justice. "For one thing, it's hard to make a lot of these places worse. Besides, people commit crimes after serving sentences in the third ring of hell. You're not going to stop them by demoting them to the fourth ring." Moreover, most crimes are committed either in the heat of the moment or by career criminals who consider themselves invincible. Few people in either group think about where they might wind up. When I asked one of the prisoners at Leoben if he was surprised by how nice it was, he said no; what surprised him was that he'd been caught in the first place.

In fact, though most of us are reluctant to admit it, we mainly use prisons as storage containers, putting people there with the hope that, if nothing else, five years behind bars means five years during which they can't commit more crimes. It's called warehousing, and we do a lot of it. The United States has the highest incarceration rate in the world, by far — it is more than five times as high as in the U.K. About 1 in every 100 American adults is in federal or state prisons or local jails — 1 in 30 men between 20 and 34, 1 in 9 black men of the same age. All told, we keep about 2.3 million adults behind bars: if the entire prison population were treated as a single city, it would be the fourth-largest in the United States, just behind Chicago and just ahead of Houston. Moreover, our incarceration rate has climbed, or rather rocketed, for the past 30 years: adjusted for population growth, there are about four times as many people in prison this year as there were in 1980. In response, we've hastily thrown up hundreds of prisons. But not nearly enough: facilities are strained, units are grotesquely overcrowded and space for medical and psychological services has become profoundly inadequate. We pay lip-service to the idea of rehabilitation, but we do little to make it happen. About 67 percent of the prisoners who are released are arrested again within three years. The result, to borrow a phrase from a Conservative British home secretary, has been "an expensive way of making bad people worse."

To be fair, prominent architects aren't lining up to take on the task of making prisons better. Most of Hohensinn's colleagues would be happy to design a courthouse, but few are quite as eager to build a penitentiary, though the two are merely opposite ends of a single system. New prison construction is generally parceled out to a handful of large and more-or-less anonymous firms — a process that discourages innovation. Whoever gets the commission is told how many beds are needed, what kinds of security, how much room for the clinic, the recreation area, the guardhouses. They're big-box prisons, as anonymous and uninflected as so many Wal-Marts.

Jeff Goodale, the director of correctional design at HDR, a large architectural firm based in Omaha, was disarmingly frank about what he faced. "When I got into the business in the '70s," he told me, "there was a very progressive approach to prison design. There was an emphasis on creating an environment that would lend itself to rehabilitation — low-rise buildings, more human scale. In the '80s and '90s, the trend became very much about throwing people in jail, locking them up, taking amenities away from them. We spent a fortune on security, and it did little for recidivism." He went on to describe what he'd like to see happen instead, and it was much like Leoben. "That works great," he said. "It doesn't cost significantly more to build, and you save on maintenance, vandalism, lawsuits, assaults, medical care." But, he added sharply, "at the end of the day, my clients are my clients. We've been told we can't make it look too good, because the public won't accept it."

Perhaps that's because most people never see prisons. The facilities at Leoben are part of a complex designed by the same architect, which houses both courtrooms and a variety of more mundane offices — the local property registrar and the like. You commit a crime, you go to jail, you go to court and, if you're convicted, you go to prison, and the fact that all three are contiguous is meant to remind you, and everyone around you, that the process relies on a set of institutions that flow from one to the next.

By contrast, new American prisons are usually built out in the countryside, where land and labor are cheaper, and security is easier to establish. And since site selection is the first step in design, everything stems from that. A rural prison needs no public face. It needn't articulate any sense of civic pride or communal justice, because there's no one around to see it, beyond the prisoners themselves, the guards and the occasional visitor.

There are other social costs. As Jonathan Simon, a law professor at Berkeley, pointed out to me, convicts tend to come from cities; guards do not. Culture clashes inevitably arise. Skilled labor — doctors, psychologists and the like — is harder to find in rural areas, and so are the volunteers who work in the many rehabilitation programs. The families of working-class and poor convicts often can't afford to travel a few hundred miles to visit their relatives. As a result, prisoners have a harder time maintaining ties with the lives they left behind.

And it isn't only inmates and their loved ones who suffer. Almost everyone I spoke to was quick to point out that guards and inmates are essentially imprisoned together. As Michael Jacobson, the head of the Vera Institute, put it, "Officers serve life sentences eight hours at a time." To a surprising degree, then, both groups want the same thing: They want prisons to be safer and more humane, and they believe that can best be achieved by building in more face time between convicts and their keepers. They want smaller, less anonymous units. They want more natural light. The debate over prison design shouldn't begin and end with our asking what it's like to live in one. We should also be asking what it's like to work in one.

Let's admit at once that the Leoben facility isn't the Jesus Prison: It's not going to single-handedly heal us and carry us up to Paradise. Even if you endorse its goals, it may not be the best implementation of them. Its windows might create an unnerving lack of privacy in a dense city. Allowances would have to be made for the breadth of our landscapes and the nature of our crimes — a prison in California, with California's gang presence, would most likely be built differently from a prison in Vermont. What's more, no institutional architecture can be expected to consistently manifest the clarity and elegance of Hohensinn's design.

More to the point, it's unlikely that anything even remotely like it will be built in this country anytime soon. John Baldwin, the director of the Iowa Department of Corrections, looked at pictures of the Leoben design and, like many people, found it both intriguing and a bit much. "We're more focused on putting our money into mental-health and re-entry treatment units," he told me. "I didn't see a great deal of treatment space, or the kind of classroom space where you can teach job skills. Nice views, great basketball court, but I didn't think Iowans want to put their money into that sort of thing.

"Still," he said with atypical enthusiasm, "architecture is huge." Iowa is in the process of building new facilities for both men and women. To that end, the state held a design competition and received 17 entries. While the winning submissions are not as luxurious as the Leoben prison, they do share certain principles: a smaller number of cells in each unit, more sunlight, security made deliberately unobtrusive.

Other states may soon be joining Iowa, if not because they want to then because they have to. Earlier this year, federal judges in California tentatively ruled that the state release almost a third of its prisoners because the conditions in which they're kept amount to cruel and unusual punishment. If the ruling holds up on appeal, it's quite likely that other states will face similar sanctions. And then what?

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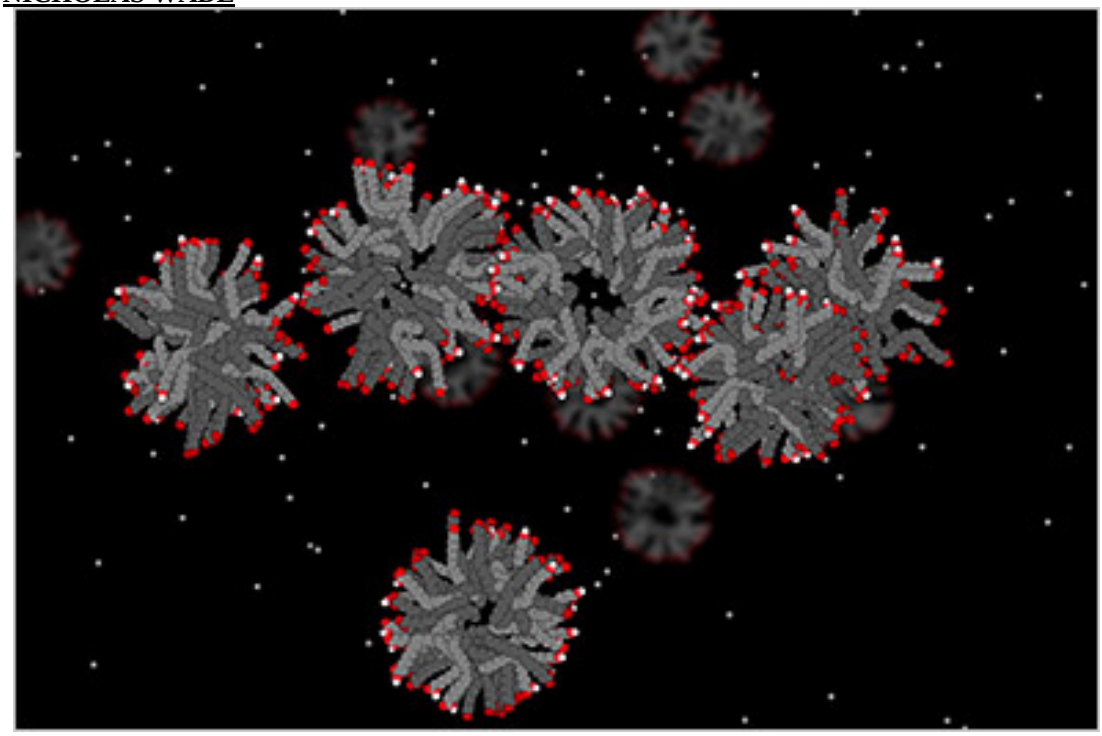
New Glimpses of Life's Puzzling Origins

By NICHOLAS WADE



Some 3.9 billion years ago, a shift in the orbit of the Sun's outer planets sent a surge of large comets and asteroids careening into the inner solar system. Their violent impacts gouged out the large craters still visible on the Moon's face, heated Earth's surface into molten rock and boiled off its oceans into an incandescent mist.

Yet rocks that formed on Earth 3.8 billion years ago, almost as soon as the bombardment had stopped, contain possible evidence of biological processes. If life can arise from inorganic matter so quickly and easily, why is it not abundant in the solar system and beyond? If biology is an inherent property of matter, why have chemists so far been unable to reconstruct life, or anything close to it, in the laboratory?
The origins of life on Earth bristle with puzzle and paradox. Which came first, the proteins of living cells or the genetic information that makes them? How could the metabolism of living things get started without an enclosing membrane to keep all the necessary chemicals together? But if life started inside a cell membrane, how did the necessary nutrients get in?
The questions may seem moot, since life did start somehow. But for the small group of researchers who insist on learning exactly how it started, frustration has abounded. Many once-promising leads have led only to years of wasted effort. Scientists as eminent as Francis Crick, the chief theorist of molecular biology, have quietly suggested that life may have formed elsewhere before seeding the planet, so hard does it seem to find a plausible explanation for its emergence on Earth.
In the last few years, however, four surprising advances have renewed confidence that a terrestrial explanation for life's origins will eventually emerge.
One is a series of discoveries about the cell-like structures that could have formed naturally from fatty chemicals likely to have been present on the primitive Earth. This lead emerged from a long argument between three colleagues as to whether a genetic system or a cell membrane came first in the development of life. They eventually agreed that genetics and membranes had to have evolved together. The three researchers, Jack W. Szostak, David P. Bartel and P. Luigi Luisi, published a somewhat adventurous manifesto in Nature in 2001, declaring that the way to make a synthetic cell was to get a protocell and a genetic molecule to grow and divide in parallel, with the molecules being encapsulated in

the cell. If the molecules gave the cell a survival advantage over other cells, the outcome would be "a sustainable, autonomously replicating system, capable of Darwinian evolution," they wrote.
"It would be truly alive," they added.
One of the authors, Dr. Szostak, of the Massachusetts General Hospital, has since managed to achieve a surprising amount of this program.
Simple fatty acids, of the sort likely to have been around on the primitive Earth, will spontaneously form double-layered spheres, much like the double-layered membrane of today's living cells. These protocells will incorporate new fatty acids fed into the water, and eventually divide.
Living cells are generally impermeable and have elaborate mechanisms for admitting only the nutrients they need. But Dr. Szostak and his colleagues have shown that small molecules can easily enter the protocells. If they combine into larger molecules, however, they cannot get out, just the arrangement a primitive cell would need. If a protocell is made to encapsulate a short piece of DNA and is then fed with nucleotides, the building blocks of DNA, the nucleotides will spontaneously enter the cell and link into another DNA molecule.
At a symposium on evolution at the Cold Spring Harbor Laboratory on Long Island last month, Dr. Szostak said he was "optimistic about getting a chemical replication system going" inside a protocell. He then hopes to integrate a replicating nucleic acid system with dividing protocells.
Dr. Szostak's experiments have come close to creating a spontaneously dividing cell from chemicals assumed to have existed on the primitive Earth. But some of his ingredients, like the nucleotide building blocks of nucleic acids, are quite complex. Prebiotic chemists, who study the prelife chemistry of the primitive Earth, have long been close to despair over how nucleotides could ever have arisen spontaneously.
Nucleotides consist of a sugar molecule, like ribose or deoxyribose, joined to a base at one end and a phosphate group at the other. Prebiotic chemists discovered with delight that bases like adenine will easily form from simple chemicals like hydrogen cyanide. But years of disappointment followed when the adenine proved incapable of linking naturally to the ribose.
Last month, John Sutherland, a chemist at the University of Manchester in England, reported in Nature his discovery of a quite unexpected route for synthesizing nucleotides from prebiotic chemicals. Instead of making the base and sugar separately from chemicals likely to have existed on the primitive Earth, Dr. Sutherland showed how under the right conditions the base and sugar could be built up as a single unit, and so did not need to be linked.
"I think the Sutherland paper has been the biggest advance in the last five years in terms of prebiotic chemistry," said Gerald F. Joyce, an expert on the origins of life at the Scripps Research Institute in La Jolla, Calif.
Once a self-replicating system develops from chemicals, this is the beginning of genetic history, since each molecule carries the imprint of its ancestor. Dr. Crick, who was interested in the chemistry that preceded replication, once observed, "After this point, the rest is just history."
Dr. Joyce has been studying the possible beginning of history by developing RNA molecules with the capacity for replication. RNA, a close cousin of DNA, almost certainly preceded it as the genetic molecule of living cells. Besides carrying information, RNA can also act as an enzyme to promote chemical reactions. Dr. Joyce reported in Science earlier this year that he had developed two RNA molecules that can promote each other's synthesis from the four kinds of RNA nucleotides.
"We finally have a molecule that's immortal," he said, meaning one whose information can be passed on indefinitely. The system is not alive, he says, but performs central functions of life like replication and adapting to new conditions.
"Gerry Joyce is getting ever closer to showing you can have self-replication of RNA species," Dr. Sutherland said. "So only a pessimist wouldn't allow him success in a few years."
Another striking advance has come from new studies of the handedness of molecules. Some chemicals, like the amino acids of which proteins are made, exist in two mirror-image forms, much like the left and right hand. In most naturally occurring conditions they are found in roughly equal mixtures of the two forms. But in a living cell all amino acids are left-handed, and all sugars and nucleotides are right-handed.
Prebiotic chemists have long been at a loss to explain how the first living systems could have extracted just one kind of the handed chemicals from the mixtures on the early Earth. Left-handed nucleotides are a poison because they prevent right-handed nucleotides linking up in a chain to form nucleic acids like RNA or DNA. Dr. Joyce refers to the problem as "original syn," referring to the chemist's terms syn and anti for the structures in the handed forms.

The chemists have now been granted an unexpected absolution from their original syn problem. Researchers like Donna Blackmond of Imperial College London have discovered that a mixture of left-handed and right-handed molecules can be converted to just one form by cycles of freezing and melting. With these four recent advances — Dr. Szostak's protocells, self-replicating RNA, the natural synthesis of nucleotides, and an explanation for handedness — those who study the origin of life have much to be pleased about, despite the distance yet to go. "At some point some of these threads will start joining together," Dr. Sutherland said. "I think all of us are far more optimistic now than we were five or 10 years ago."

One measure of the difficulties ahead, however, is that so far there is little agreement on the kind of environment in which life originated. Some chemists, like Günther Wächtershäuser, argue that life began in volcanic conditions, like those of the deep sea vents. These have the gases and metallic catalysts in which, he argues, the first metabolic processes were likely to have arisen.

But many biologists believe that in the oceans, the necessary constituents of life would always be too diluted. They favor a warm freshwater pond for the origin of life, as did Darwin, where cycles of wetting and evaporation around the edges could produce useful concentrations and chemical processes.

No one knows for sure when life began. The oldest generally accepted evidence for living cells are fossil bacteria 1.9 billion years old from the Gunflint Formation of Ontario. But rocks from two sites in Greenland, containing an unusual mix of carbon isotopes that could be evidence of biological processes, are 3.830 billion years old.

How could life have gotten off to such a quick start, given that the surface of the Earth was probably sterilized by the Late Heavy Bombardment, the rain of gigantic comets and asteroids that pelted the Earth and Moon around 3.9 billion years ago? Stephen Mojzsis, a geologist at the University of Colorado who analyzed one of the Greenland sites, argued in Nature last month that the Late Heavy Bombardment would not have killed everything, as is generally believed. In his view, life could have started much earlier and survived the bombardment in deep sea environments.

Recent evidence from very ancient rocks known as zircons suggests that stable oceans and continental crust had emerged as long as 4.404 billion years ago, a mere 150 million years after the Earth's formation. So life might have had half a billion years to get started before the cataclysmic bombardment.

But geologists dispute whether the Greenland rocks really offer signs of biological processes, and geochemists have often revised their estimates of the composition of the primitive atmosphere. Leslie Orgel, a pioneer of prebiotic chemistry, used to say, "Just wait a few years, and conditions on the primitive Earth will change again," said Dr. Joyce, a former student of his.

Chemists and biologists are thus pretty much on their own in figuring out how life started. For lack of fossil evidence, they have no guide as to when, where or how the first forms of life emerged. So they will figure life out only by reinventing it in the laboratory.

http://www.nytimes.com/2009/06/16/science/16orig.html?ref=science

Magic carpets hide objects in plain sight

- 15 June 2009 by **Jeff Hecht**

A carpet cloak could provide a new way of hiding objects (Image: Jana Leon / Stone / Getty)

THE latest twist on invisibility cloaks won't hide Harry Potter in the middle of a room, but it might just let spies conceal microphones under the rug or the wallpaper.

So called "carpet cloaks" are the first technology to succeed in hiding objects by deflecting light across a range of wavelengths. Two groups described different cloaks last week at the International Quantum Electronics Conference in Baltimore, Maryland.

Invisibility cloaks work by deflecting light waves so the light that reaches the eye shows no trace of the hidden object. Conventional optical materials can't do this, but a dozen years ago John Pendry of Imperial College London showed it was possible to bend light around objects by building materials made of components smaller than the wavelength of the light.

In theory, the principle will work across the electromagnetic spectrum, but early experiments with invisibility cloaks have been done at microwave frequencies, which have wavelengths in the centimetre range, meaning sub-wavelength components are relatively easy to make.

Both new carpet cloaks work in infrared light, which has a wavelength far shorter than microwaves, and provide the first demonstrations of optical cloaking. As they are not limited to a narrow range of wavelengths, in principle the cloaks could hide objects in normal light. Other cloaks, even if scaled down to the optical range, would work only in rooms lit with a single-colour lamp.The cloaks were made at the University of California, Berkeley, and at Cornell University in Ithaca, New York. Instead of deflecting light waves around an object, both set-ups involve hiding bumps on a thin layer of material. Illuminating the bump from the side would normally cast a dark shadow. But with the cloaks, the light is reflected uniformly so that there is no shadow, and the cloaked surface appears flat (see diagram).At Berkeley, Jensen Li and colleagues made their invisibility cloak by drilling nanoscale holes into a micrometre-thick layer of silicon. At Cornell, Lucas Gabrielli and colleagues achieved a similar effect by embedding 50-nanometre silicon posts into silicon dioxide.

So far the carpet cloaks only work in two dimensions, but the results are encouraging because the cloaks use only well-known materials and production methods. The demonstrations are "very charming", says Georg von Freymann of the Institute of Nanotechnology at the University of Karlsruhe in Germany. "It looks like real-world applications may come from this."

In the short term, such materials could be used to create new optical devices such as super-lenses for concentrating sunlight. In principle the cloaks might one day hide objects on walls and floors or in satellite images.

http://www.newscientist.com/article/mg20227126.700-magic-carpets-hide-objects-in-plain-sight.html?DCMP=OTC-rss&nsref=online-news

Chronic asthma study offers hope

Scientists believe they have discovered a key component in the development of chronic asthma, pointing the way to new treatments.

As asthma progresses, the airways are changed or remodelled and become more muscular and reactive to allergens. Critical to this process is a cellular pump in the muscles called SERCA2, Proceedings of the National Academy of Sciences reports. Ultimately drugs acting on SERCA2 might stop lung damage, the UK experts hope. Professor Tak Lee, of King's College London, who led the research, said: "It is widely believed that this remodelling in asthma is in large part responsible for the chronicity of the disease."There are many features responsible for remodelling but a key component of this process involves an increased amount of smooth muscle in the airways." His team, working with colleagues at Imperial College London, discovered that in people with moderate asthma SERCA2 levels within the airway muscle cells were reduced.

" **This research into the causes of asthma provides us with vital clues as to how such symptoms could be stopped.** "
Dr Elaine Vickers of Asthma UK

It is SERCA2's job to pump calcium out of the muscle cells to enable the muscles to relax. The researchers believe the relative lack of SERCA2 plays an important role in causing asthma symptoms.

Indeed, they found that if they removed SERCA2 from the cells of healthy people who did not have asthma these cells started to behave more like asthma cells. Professor Lee suggests that replacing SERCA2 in the airway muscle cells might be an effective way of creating new asthma treatments to reduce asthma symptoms and prevent the irreversible long term lung changes which can make some people's asthma almost impossible to control. Dr Elaine Vickers, of Asthma UK, said: "This research into the causes of asthma provides us with vital clues as to how such symptoms could be stopped and it has uncovered important information, which we hope will lead to the creation of effective new treatments for the millions of people in the UK affected by asthma symptoms."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8100127.stm

Published: 2009/06/15 23:08:58 GMT

Men warned of greater cancer risk

The reluctance of men to adopt a healthy lifestyle and visit the doctor may be fuelling a gender gap in cancer cases and deaths, experts say.

Among cancers which affect both sexes, men are 60% more likely to develop the disease and 70% more likely to die from it, Cancer Research UK said.

There is no known biological reason for this but it may be because women take better care of themselves, they said.

Experts said men needed to be made aware of the risks they faced.

It is thought half of all cancers can be prevented through lifestyle changes.

For the latest report, published to coincide with Men's Health Week, researchers first analysed data on all cancers from 2006 and 2007.

" **Delays in reporting symptoms to a doctor could be helping to fuel this gender gap in cancer mortality** "
Sara Hiom, Cancer Research UK

They found that overall men are 40% more likely than women to die from cancer and 16% more likely to develop the disease in the first place.

But excluding breast cancer and cancers that are gender specific, as well as lung cancer which is more likely to affect men because more men smoke, the difference between the sexes was far greater.

TOP MALE CANCER KILLERS 2007
Lung: 24% of all cancer deaths
Prostate: 13%
Colorectal: 10%

Oesophagus: 6%
Pancreas: 5%

The researchers had expected to see that men and women are just as likely as each other to develop and die from the disease.

However, the figures showed that men are significantly more likely than women to be diagnosed with and die from every one of the specific types of cancer considered, apart from melanoma.

'Surprise result'

Professor David Forman, information lead for the National Cancer Intelligence Network, which helped carry out the research, said: "For many of the types of cancer we looked at that affect both sexes, there's no known biological reason why men should be at a greater risk than women, so we were surprised to see such consistent differences."

He added: "Men have a reputation for having a 'stiff upper lip' and not being as health conscious as women.

"What we see from this report could be a reflection of this attitude, meaning men are less likely to make lifestyle changes that could reduce their risk of the disease and less likely to go to their doctor with cancer symptoms."

" **We have to look very much more at how we change the services so they are more male appropriate** "
Professor Alan White

Professor Alan White, chairman of the Men's Health Forum, said men were generally less aware that factors such as smoking, carrying excess weight around the waist, having a high alcohol intake, a poor diet and family history all contributed to an increased cancer risk.

However, he said more research was needed on the causes of the gender gap and services needed to do more to reach out to men.

Professor White told the BBC: "Men have got a certain degree of responsibility to look to their lifestyle, but the services also have to be reaching out to men.

"If you think that nearly 14m men work full-time and of those 28% are working over 45 hours, then getting to the services is actually very problematic.

"And it's not just the GP, it's smoking cessation services, it's weight loss services.

'Get it checked'

"We have to look very much more at how we change the services so they are more male appropriate.

"I think if you are suffering from something and it's not going away, then get it checked out. That's the simple message."

The government's cancer tsar, Professor Mike Richards, said there was no doubt of the gravity of the findings.

HAVE YOUR SAY Men are more reluctant to visit the doctor and monitor themselves for signs of illness
Julie, London

Prof Richards told the BBC: "I agree with Professor White that the scale of this has come as a surprise even to researchers.

"There seems to be no doubt - there is a higher risk of getting cancer and a higher risk of death.

"That maybe due to different ways of approaching the health services and being less likely to seek help.

"We certainly need to make men of these risks, of the lifestyle factors."

Sara Hiom, director of health information at Cancer Research UK, said: "We know that around half of all cancers could be prevented by changes to lifestyle and it's worrying that this message could be falling on deaf ears for men.

"Delays in reporting symptoms to a doctor could be helping to fuel this gender gap in cancer mortality."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8097639.stm

Published: 2009/06/15 06:57:22 GMT

Sea gives up Neanderthal fossil

By Paul Rincon
Science reporter, BBC News

Part of a Neanderthal man's skull has been dredged up from the North Sea, in the first confirmed find of its kind.

Scientists in Leiden, in the Netherlands, have unveiled the specimen - a fragment from the front of a skull belonging to a young adult male.

Analysis of chemical "isotopes" in the 60,000-year-old fossil suggest a carnivorous diet, matching results from other Neanderthal specimens.

The North Sea is one of the world's richest areas for mammal fossils.

But the remains of ancient humans are scarce; this is the first known specimen to have been recovered from the sea bed anywhere in the world.

For most of the last half million years, sea levels were substantially lower than they are today.

Significant areas of the North Sea were, at times, dry land. Criss-crossed by river systems, with wide valleys, lakes and floodplains, these were rich habitats for large herds of ice age mammals such as horse, reindeer, woolly rhino and mammoth.

" **Even with this rather limited fragment of skull, it is possible to securely identify this as Neanderthal** "
Jean-Jacques Hublin, Max Planck Institute

Their fossilised remains are brought ashore in large numbers each year by fishing trawlers and other dredging operations.

According to Professor Chris Stringer, from London's Natural History Museum, some fishermen now concentrate on collecting fossils rather than their traditional catch.

"There were mammoth fossils collected off the Norfolk and Suffolk coasts 150 years ago, so we've known for some time there was material down there that was of this age, or even older," Professor Stringer, a museum research leader, told BBC News. Indeed, some of the fossil material from the North Sea dates to the Cromerian stage, between 866,000 and 478,000 years ago.

It had been "only a matter of time", he said, before a human fossil came to light.

Professor Stringer added: "The key thing for the future is getting this material in a better context.

"It would be great if we could get the technology one day to go down and search (in the sea floor) where we can obtain the dating, associated materials and other information we would get if we were excavating on land."

Private collection

Neanderthals (*Homo neanderthalensis*) were our close evolutionary cousins; they appear in the fossil record some 400,000 years ago.

These resourceful, physically powerful hunter-gatherers dominated a wide range spanning Britain and Iberia in the west, Israel in the south and Siberia in the east.

Our own species, *Homo sapiens* , evolved in Africa, and replaced the Neanderthals after entering Europe about 40,000 years ago. The specimen was found among animal remains and stone artefacts dredged up 15km off the coast of the Netherlands in 2001.

The fragment was spotted by Luc Anthonis, a private fossil collector from Belgium, in the sieving debris of a shell-dredging operation.

Study of the specimen has been led by Professor Jean-Jacques Hublin, from the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

"Even with this rather limited fragment of skull, it is possible to securely identify this as Neanderthal," Professor Hublin told BBC News.

For instance, the thick bony ridge above the eyes - known as a supraorbital torus - is typical of the species, he said.

The fragment's shape best matches the frontal bones of late Pleistocene examples of this human species, particularly the specimens known as La Chapelle-aux-Saints and La Ferrassie 1.

These examples, which were both unearthed in France, date from between 50,000 and 60,000 years ago.

The North Sea fossil also bears a lesion caused by a benign tumour - an epidermoid cyst - of a type very rare in humans today.

The research links up with the Ancient Human Occupation of Britain 2 (AHOB 2) project, which aims to set Britain's prehistory in a European context. Dutch archaeologist Wil Roebroeks, a collaborator on this study, is also a member of the AHOB 2 research team.

Carnivorous diet

Dr Mike Richards, from the Max Planck Institute in Leipzig, analysed different forms, or isotopes, of the elements nitrogen and carbon in the fossilised bone. This shed light on the types of foods eaten by this young male.

The results show survived on a diet dominated by meat.

"High in the food chain, (Neanderthals) must have been quite rare on the ground compared to other mammals," said Wil Roebroeks from the University of Leiden.

The results of the stable isotope analysis fit with what is known about other examples of this species, though other research suggests that in Gibraltar, on the southern coast of Iberia, some Neanderthals were exploiting marine resources, including dolphins, monk seals and mussels. Researchers decided against carbon dating the specimen; this requires the preservation of a protein called collagen.

Professor Hublin explained that while there was some collagen left in the bone, scientists would have needed to destroy approximately half of the fossil in order to obtain enough for direct dating.

Professor Roebroeks told BBC News: "Dutch scientists - geologists and archaeologists alike - are hoping this find will convince governmental agencies that the Netherlands needs to invest much more in that... archive of Pleistocene sediments off our coast - and off the coast of Britain."

He said this submerged repository contained "high resolution information on past climate change and its environmental consequences, points of reference for how rivers 'worked' before any human interference and now, as this find shows, remains of people who once roamed these landscapes."

Extreme ways

Chris Stringer said that studying the landscape beneath the North Sea was crucial for a better understanding of prehistoric movements of humans into the British Isles. "We have Neanderthals at Lynford (in Norfolk) 60,000 years ago, though we only have stone tools. This specimen might indeed be the kind of Neanderthal that was crossing into Norfolk around that time. It will help us understand our British sequence when we can much more precisely map what's under the North Sea," he said.

Professor Hublin said the individual was living at the extreme edge of the Neanderthals' northern range, where the relatively cold environment would have challenged their capabilities to the limit. Neanderthal remains have been found at only two sites this far north.

"What we have here is a marginal population, probably with low numbers of people," Professor Hublin explained. "It's quite fascinating to see that these people were able to cope with the environment and be so successful in an ecological niche which was not the initial niche for humans."

While these hunting grounds would at times have provided plentiful sources of meat for a top carnivore, Neanderthals living in these areas would also have been at the mercy of fluctuations in the numbers of big game animals. Periodic dips in populations of mammals such as reindeer could have caused local extinctions of Neanderthal groups which hunted them, Dr Hublin explained.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8099377.stm

Published: 2009/06/15 13:59:41 GMT

Meteorite Grains Divulge Earth's Cosmic Roots

This is University of Chicago postdoctoral scientist Philipp Heck with a sample of the Allende meteorite. The dark portions of the meteorite contain dust grains that formed before the birth of the solar system. The Allenda meteorite is of the same type as the Murchison meteorite, the subject of Heck's Astrophysical Journal study. (Credit: Dan Dry)

ScienceDaily (June 16, 2009) — The interstellar stuff that became incorporated into the planets and life on Earth has younger cosmic roots than theories predict, according to the University of Chicago postdoctoral scholar Philipp Heck and his international team of colleagues.

Heck and his colleagues examined 22 interstellar grains from the Murchison meteorite for their analysis. Dying sun-like stars flung the Murchison grains into space more than 4.5 billion years ago, before the birth of the solar system. Scientists know the grains formed outside the solar system because of their exotic composition.

"The concentration of neon, produced during cosmic-ray irradiation, allows us to determine the time a grain has spent in interstellar space," Heck said. His team determined that 17 of the grains spent somewhere between three million and 200 million years in interstellar space, far less than the theoretical estimates of approximately 500 million years. Only three grains met interstellar duration expectations (two grains yielded no reliable age).

"The knowledge of this lifetime is essential for an improved understanding of interstellar processes, and to better contain the timing of formation processes of the solar system," Heck said. A period of intense star formation that preceded the sun's birth may have produced large quantities of dust, thus accounting for the timing discrepancy, according to the research team.

Funding sources for the research include the National Aeronautics and Space Administration, Swiss National Science Foundation, the Australian National University, and the Brazilian National Council for Scientific and Technological Development.

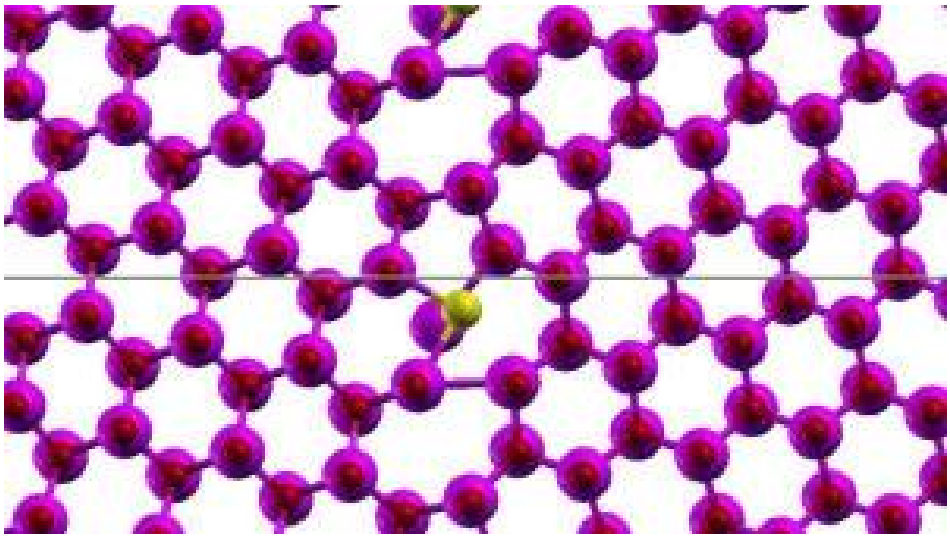
Journal reference:

1. Philipp R. Heck, Frank Gyngard, Ulrich Ott, Matthias M. M. Meier, Janaína N. Ávila, Sachiko Amari, Ernst K. Zinner, Roy S. Lewis, Heinrich Baur, and Rainer Wieler. **Interstellar Residence Times of Presolar SiC Dust Grains from the Murchison Carbonaceous Meteorite**. *The Astrophysical Journal*, 2009; 698 (2): 1155 DOI: 10.1088/0004-637X/698/2/1155

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

http://www.sciencedaily.com/releases/2009/06/090615171722.htm

Transparent Solar Cells Made For Windows



Transparent solar cells. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (June 16, 2009) — Offering a view of the garden and an adjacent field, it looks like any other window. But this window offers an additional feature: it also produces electricity. The facades of the house, too, harness solar energy to supply the occupants with electrical power. This is what the domestic power supply of the future could look like. The surface area used to produce energy would increase greatly with transparent solar cells.To translate the vision of see-through solar cells and transparent electronics into reality, two different transparent coatings would be required – one to conduct the electricity via electrons, the n-conductors, and one in which electron holes enable the electricity to flow, the p-conductors. To produce these coatings the engineers dope the base material with a few other atoms. Depending on which atoms they use, they obtain the differently conducting coatings. N-conducting transparent materials are state of the art, but the p-conductors are problematic. Their conductivity is too low and often their transparency is poor. Manufacturers need a transparent base material which is amenable to both n- and p-doping.

At present, indium tin oxide is mainly used for the n-conductors, but this is costly. Indium has become a rare commodity and its price has increased tenfold since 2002. The search for substitute materials is therefore in full swing. At the same time, various questions need to be answered, such as which materials would be best suitable, what they should be doped with to obtain good conductivity, and how good their transparency is. Research scientists at the Fraunhofer Institute for Mechanics of Materials IWM working in cooperation with other Fraunhofer colleagues have developed material physics models and methods which help in the search.“If transparent p-conductors with adequate conductivity could be produced, it would be possible to realize completely transparent electronics,” says Dr. Wolfgang Körner, research scientist at the IWM. Using electron microscope images, the researchers initially determine the grain boundaries which most frequently occur in the material – i.e. irregularities in the ordered crystal structure. These defect structures are modeled atom by atom. Special simulation methods calculate how the electrons are distributed in the structures and thus in the solid body. From the data the researchers extract how conductive and transparent the material is. “We have found, for example, that phosphorus is suitable for p-doping zinc oxide, but that nitrogen is more promising,” says Körner.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/06/090610161004.htm

What Limits The Size Of Birds?

Bald Eagle soaring. What limits the size of birds? (Credit: iStockphoto/Bruce Leonard)

ScienceDaily (June 16, 2009) — Why aren't birds larger? Fifteen-kilogram swans hold the current upper size record for flying birds, although the extinct Argentavis of the Miocene Epoch in Argentina is estimated to have weighed 70 kilograms, the size of an average human. In a forthcoming article in *PLoS Biology*, Sievert Rohwer, and his colleagues at the Burke Museum at the University of Washington, provide evidence that maximum body size in birds is constrained by the amount of time it takes to replace the flight feathers during molt.

As bird size increases, feather growth rate fails to keep up with feather length until, eventually; feathers wear out before they can be replaced. This fundamental relationship requires basic changes in the molt strategy as size increases, ultimately limiting the size of flying birds.

Feathers deteriorate with continued exposure to ultra-violet light and bacterial decomposition, and must be replaced periodically to maintain adequate aerodynamic support for flight. Small birds accomplish this in an annual or twice-annual molt, during which the 9 or 10 primary flight feathers are replaced sequentially, taking about three weeks for each feather. Large species of birds need different approaches to feather replacement. These involve several alternative strategies: prolonging the total molt to two or even three years; simultaneously replacing multiple feathers from different molt-origination points in the feather sequence; and, in species that do not require flight to feed or escape enemies (ducks and geese, for example), replacing all feathers simultaneously.

With increasing body size, the length of the primary feathers increases as the one-third power of mass, approximately doubling with each 10-fold increase in mass. However, the rate of feather growth increases only as the one-sixth power of mass, meaning that the time required to replace each feather increases by a factor of about 1.5 for each 10-fold increase in mass, until 56 days are required to replace a single flight feather in a 10-kg bird. The cause of this discrepancy is not known, but the authors speculate that it probably depends on the geometry of producing a two-dimensional feather structure from a one-dimensional growing zone in the feather shaft.

The avian feather is one of the most striking adaptations in the animal world, and yet its growth dynamics are poorly understood. It might be possible to achieve more rapid feather growth with a larger growth zone, but this could also weaken the structure of the growing feather, resulting in frequent breakage in large birds. Understanding the engineering complexities of the growing feather will require further study of the dynamics and structure of the growing zone. And what about Argentavis? The authors speculate that this giant bird most likely molted all its feathers simultaneously during a long fast, fueled by accumulated fat deposits much in the same way as emperor penguins do today.

Travel to the American Museum was supported by the Burke Museum, the American Museum, and a University of Washington Department of Biology Casey Award. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Journal reference:

1. Rohwer S, Ricklefs RE, Rohwer VG, Copple MM. **Allometry of the Duration of Flight Feather Molt in Birds**. *PLoS Biol*, 7(6): e1000132 DOI: 10.1371/journal.pbio.1000132

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

http://www.sciencedaily.com/releases/2009/06/090615203056.htm

Computer System For Dementia Patients

These ladies have tested the system and enjoyed the experience. (Credit: SINTEF Technology and Society)

ScienceDaily (June 16, 2009) — The labour force in the health services is shrinking, there are more and more old people, and a very high proportion of them are plagued by deteriorating short- and long-term memory. All this has created a need for computer-based solutions that will enable elderly people to live safely in their own homes, but at the same time, the technology needed to take special care of them is expensive. On top of this, different standards for home sensors create problems.

This situation formed the backcloth for the EU's decision a couple of years ago to launch a series of projects to make it simpler for industry to develop new equipment in this field. One of these projects was called Mpower, and its aim was to create a computer platform that could be used for various purposes and meet a wide range of needs among its target group.

Reminder board

What is being tested out in Norway today is a simple communication system based on a computer screen, aimed at elderly people who live at home but whose memory is failing. No keyboard is needed, only a touch on the screen, which displays the sun and the moon to indicate whether it is day or night, while a large clock-face shows the time.

"This is also a system for sharing information", explains project manager Marius Mikalsen. The families of these patients are often anxious about how it is going with their parents, and this allows both them and the home help to enter messages that will be automatically displayed by the system. On the screen, for example, the elderly person might find "Remember to drink some water", or "Take the number 52 bus". Or current messages such as "The home help will be coming at nine o'clock this morning to give you a shower".

Another useful feature is that family members can also access the system to check whether the elderly person's appointments have been kept. Has she been to the doctor? Has he remembered to go to the day-care unit today?

"SINTEF has been project manager here, and it is nice to think that what we are now testing in Norway was develop by the University of Cyprus in collaboration with two Spanish companies, and that it runs on a server in Austria," says Mikalsen.

Trials

Since last summer, a handful of elderly people have been trialling the system in Trondheim and Grimstad. Meanwhile, a variant of the system is being tested in a nursing home near Krakow in Poland. This version uses sensors and GPS to offer smart solutions both in the house and outdoors to sound the alarm if and elderly person is moving around in an unsafe area.

Mpower will come to an end in June this year. SINTEF will try to prolong the project in collaboration with Trondheim's local authorities.

Adapted from materials provided by SINTEF, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090611065837.htm

The Dawn Of Quantum Applications

ScienceDaily (June 16, 2009) — Technologies that exploit the unique weirdness of quantum mechanics could debut in the very near future, thanks to the groundbreaking work of a huge European research consortium.

Unbreakable cryptography, unimaginable simulations of profoundly complex problems and super-fast networks are just some of the promise held out by quantum computing. And now European scientists are poised to deliver on that promise, thanks to the work of the Qubit Applications (QAP) project.

The integrated project has cherry-picked major obstacles in the path of quantum computing, problems that could have immediate applications and could command a ready market.

Chief among them is quantum cryptography. “Quantum computing, when it arrives, could make all current cryptographic technology obsolete,” notes QAP co-coordinator Professor Ian Walmsley.

Thankfully, researchers have developed quantum cryptography to deal with that issue.

“Quantum cryptography over short distances was demonstrated in a previous project,” explains Walmsley. “The problem is, it only works over a short distance.”

Weaving entangled webs

That is because quantum cryptography relies on entanglement. Entanglement is a concept that explains how two or more particles exhibit correlation – a relationship if you like – that would be impossible to explain unless you supposed that they belonged to the same entity, even though they might be separated by vast distance.

Imagine you were playing a game of quantum coin flipping with a colleague: you are heads and the colleague tails. You are two distinct individuals, but if the coin comes up heads your colleague loses, and you win. There is a correlation between the coin tossing. Now, with a quantum coin, it is heads the colleague wins and tails you win at the same time.

This is the extra bit that quantum mechanics gives us, and which we use in secure communications, suggests Walmsley.

That explains, with a little inaccuracy, the concept of entanglement, and it is at the core of quantum key distribution, or QKD. It is far too complex to break quantum encryption by brute force, and it is immune to eavesdropping because, at the quantum level, the act of observing an object changes the object observed. It means that encryption is guaranteed by the laws of physics.

The technique was demonstrated in Vienna 2008, but it works only over short distances. EU-funded QAP hopes to develop a quantum repeater that can maintain entanglement over large distances. It has already had considerable success up to the 200km range, and growing.

Ideal information carrier

Maintaining entanglement over long distances – so essential to QKD, but also communications and networks – is the most immediate and compelling application in the QAP programme, but it is far from the only one. Many other areas of work show signs of progress, too. Storage and memory are essential for quantum computing.

It is not too difficult to encode a piece of information on a photon, which is an ideal information carrier because of its high speed and weak interaction with the environment.

It is difficult to store that information for any length of time, so QAP is developing ways of transferring quantum information from photons to and from atoms and molecules for storage, and the project is making steady progress.

Similarly, QAP's work to develop quantum networks is progressing well. One team within the overall research effort has managed to develop a reliable way to calibrate and test detectors, a prime element in the network system.

"This is important because it will be essential to develop reliable methods to test results if work on quantum networks is to progress," notes Walmsley. The research group has submitted a patent application for this work.

Stimulating simulation

Quantum simulation, too, offers some tantalising opportunities. The primary goal of QAP's Quantum Simulations and Control subproject is to develop and advance experimental systems capable of simulating quantum systems whose properties are not approachable on classical computers.

Imagine, for example, trying to model superconducting theory. It is hugely complex, and classic computers are quickly overwhelmed by the size of the problem.

But quantum methods are inherently capable of dealing with far greater complexity, because of the nature of the qubit, or quantum bit. Classical, digital bits operate on the basis of on or off, yes or no. But quantum bits can be yes, no, or both. It takes classical computing from 2D, into the 3D information world.

One could say that, while classical computers attack problems linearly, quantum computers attack problems exponentially. As a result, with just a few qubits, it is possible to do incredibly large computations, and that means that quantum simulation of complex problems could be a medium-term application.

"We are not saying we will solve all the problems in the area of simulation, but we will make a good start," warns Walmsley.

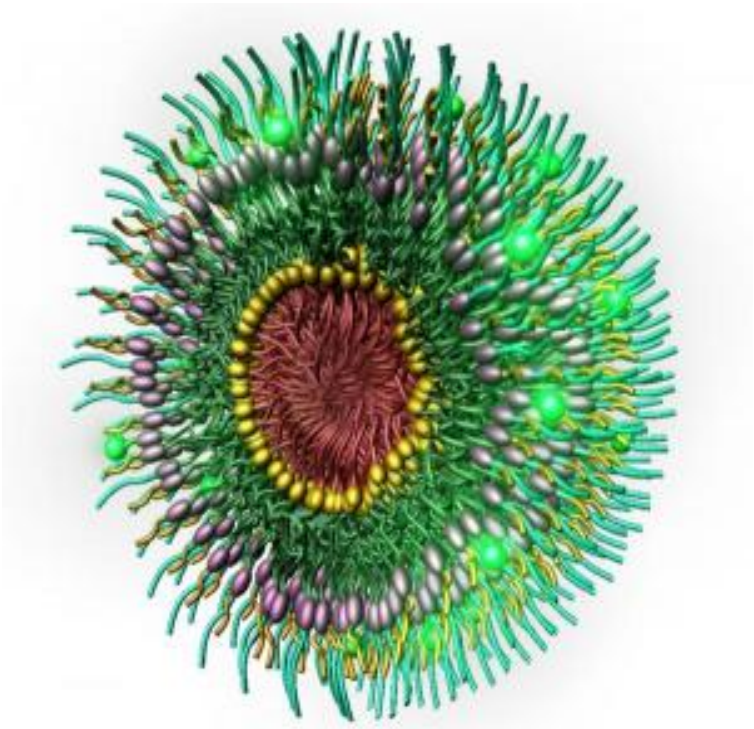
That defines QAP nicely: a kick-start for quantum applications in Europe.

The QAP project received funding from the ICT strand of the EU's Sixth Framework Programme for research.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com/releases/2009/06/090615152926.htm

Researchers Test Nanoparticle To Treat Cardiovascular Disease In Mice



An image of a multifunctional micelle designed by research team at UCSB. (Credit: Peter Allen, UCSB College of Engineering)

ScienceDaily (June 15, 2009) — Scientists and engineers at UC Santa Barbara and other researchers have developed a nanoparticle that can attack plaque — a major cause of cardiovascular disease. The new development is described in a recent issue of the *Proceedings of the National Academy of Sciences*.

The treatment is promising for the eventual development of therapies for cardiovascular disease, which is blamed for one third of the deaths in the United States each year. Atherosclerosis, which was the focus of this study, is one of the leading causes of cardiovascular disease. In atherosclerosis, plaque builds up on the walls of arteries and can cause heart attack and stroke.

"The purpose of our grant is to develop targeted nanoparticles that specifically detect atherosclerotic plaques," said Erkki Ruoslahti, distinguished professor at the Burnham Institute for Medical Research at the University of California, Santa Barbara. "We now have at least one peptide, described in the paper, that is capable of directing nanoparticles to the plaques."

The nanoparticles in this study are lipid-based collections of molecules that form a sphere called a micelle. The micelle has a peptide, a piece of protein, on its surface, and that peptide binds to the surface of the plaque.

Co-author Matthew Tirrell, The Richard A. Auhll Professor and dean of UCSB's College of Engineering, specializes in lipid-based micelles. "This turned out to be a perfect fit with our targeting technology," said Ruoslahti.

To accomplish the research, the team induced atherosclerotic plaques in mice by keeping them on a high-fat diet. They then intravenously injected these mice with the micelles, which were allowed to circulate for three hours.

"One important element in what we did was to see if we could target not just plaques, but the plaques that are most vulnerable to rupture," said Ruoslahti. "It did seem that we were indeed preferentially targeting those places in the plaques that are prone to rupture."

The plaques tend to rupture at the "shoulder," where the plaque tissue meets the normal tissue. "That's also a place where the capsule on the plaque is the thinnest," said Ruoslahti. "So by those criteria, we seem to be targeting the right places."

Tirrell added:"We think that self-assembled micelles (of peptide amphiphiles) of the sort we have used in this work are the most versatile, flexible nanoparticles for delivering diagnostic and therapeutic biofunctionality in vivo. The ease with which small particles, with sufficiently long circulation times and carrying peptides that target and treat pathological tissue, can be constructed by self-assembly is an important advantage."

Ruoslahti said that UCSB's strength in the areas of materials, chemistry, and bioengineering facilitated this research. He noted that he and Tirrell have been close collaborators.

The work was funded by a grant from the National Heart, Lung and Blood Institute of the National Institutes of Health.

In addition to Ruoslahti and Tirrell, the article, "Targeting Atherosclerosis Using Modular, Multifunctional Micelles," was authored by David Peters of the Burnham Institute at UCSB and the Biomedical Sciences Graduate Group at UC San Diego; Mark Kastantin of UCSB's Department of Chemical Engineering; Venkata Ramana Kotamraju of the Burnham Institute at UCSB; Priya P. Karmali of the Cancer Research Center, Burnham Institute for Medical Research in La Jolla; and Kunal Gujraty of the Burnham Institute at UCSB.

Journal reference:

1. David Peters, Mark Kastantin, Venkata Ramana Kotamraju, Priya P. Karmali, Kunal Gujraty, Matthew Tirrell, and Erkki Ruoslahti. **Targeting atherosclerosis by using modular, multifunctional micelles**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0903369106

Adapted from materials provided by University of California - Santa Barbara.

http://www.sciencedaily.com/releases/2009/06/090604155619.htm

Dentures: 3D Digital Images Of Tooth Contours May Replace Plaster Models

Dental snapshot. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (June 15, 2009) — Using current technology, dental technicians can only make dentures using a bite impression. The silicone template for this plaster model is made by the dentist, in a procedure which is unpleasant for the patient. In the future, a 3-D digitizer will provide the teeth contours – without a plaster model.

When a toothache makes a visit to the dentist unavoidable this often marks the start of a time-consuming treatment marathon for the patient. If the tooth cannot be saved and a dental prosthesis is necessary, the dentist first has to make a silicone impression for the dental laboratory. The patient is sent home with a provisional repair and dental technicians set to work on modeling a plaster impression. The model is then scanned using digital cameras and from the geometric measurement data obtained the matching dental prosthesis is produced.

The intricate and laborious route from bite impression and plaster mold to model scanning in the laboratory could soon be a thing of the past. “The three-dimensional coordinates of the tooth surface can be determined on the basis of measurements taken in the patient’s mouth,” says Dr. Peter Kühmstedt, group manager for 3-D measurement technology at the Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena.

Under a contract from German dental company Hint-Els, an expert team at the Fraunhofer institute developed an optical digitization system which scans the oral cavity and captures three-dimensional data of the teeth using camera optics. A complete picture of the individual tooth is created from several data records. After an all-round measurement, it is even possible to represent the complete jaw arch as a virtual computer image. The measurement conditions in the confined oral cavity are, however, unfavorable.

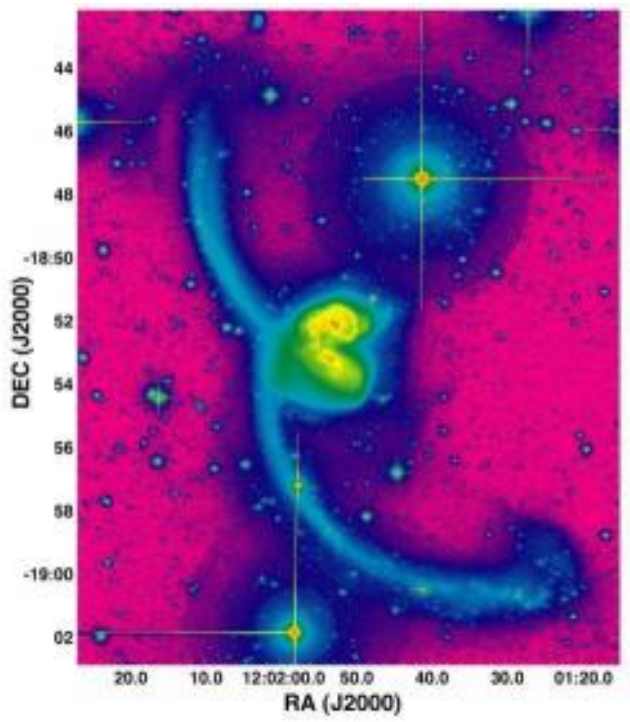
To obtain precise results, the scientists use fringe projections in which a projector shines strips of light on the tooth area to be measured. From the phase-shifted images the evaluation software determines the geometric contour data of the tooth. Two camera optics provide the sensor chip with image information from different measurement perspectives. After the pixel-precise comparison of various camera images, the evaluation program recognizes any image faults and removes them from the complete image.

It is problematic if the patient moves while the images are being taken in the oral cavity. The scientists have therefore made sure that the process takes place quickly. “The image sequence for each measurement position is captured in less than 200 milliseconds,” explains Kühmstedt.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/06/090605091852.htm

New Tidal Debris Discovered From Colliding Galaxies



Deep optical image of the Antennae galaxies. New tidal debris is found at the northern tip. (Credit: Stony Brook University)

ScienceDaily (June 15, 2009) — Astronomers have discovered new tidal debris stripped away from colliding galaxies. New debris images are of special interest since they show the full history of galaxy collisions and resultant starburst activities, which are important in 'growing' galaxies in the early Universe.

In this study, new tidal debris were found with 8.2-meter Subaru telescope on Mauna Kea, Hawaii, which is operated by the National Astronomical Observatory of Japan. The international team took extremely deep exposures of archetypal colliding galaxies, including "the Antennae" galaxies in constellation Corvus (65 million light years away from us), "Arp 220" in constellation Serpens (250 million light years) and "Mrk 231" in constellation Big Dipper (590 million light years), and 10 additional objects. Often seen in public media and textbooks, these galaxies are well-known galaxy collisions.

The research will be being presented at the 214th annual American Astronomical Society meeting in Pasadena, California by Drs. Jin Koda at Stony Brook University, Long Island, New York; Nick Scoville of California Institute of Technology; Yoshiaki Taniguchi of Ehime University, Ehime, Japan; and, the COSMOS survey team.

"We did not expect such enormous debris fields around these famous objects," says Dr. Koda, Assistant Professor of Astronomy at Stony Brook University. "For instance, the Antennae – the name came from its resemblance of insect ‘antennae’ – was discovered early in 18th century by William Herschel, and has been observed repeatedly since then."

Colliding galaxies eventually merge, and become a single galaxy. When the orbit and rotation synchronize, galaxies merge quickly. New tidal tails therefore indicate the quick merging, which could be the trigger of starburst activities in Ultra Luminous Infrared Galaxy (ULIRG). Further studies and

detailed comparison with theoretical model may reveal the process of galaxy formation and starbursts activities in the early Universe.

"Arp 220 is the most famous ULIRG," says Dr. Taniguchi, who is Professor of Ehime University in Japan. "ULIRGs are very likely the dominant mode of cosmic star formation in the early Universe, and Arp 220 is the key object to understand starburst activities in ULIRGs."

"The new images allow us to fully chart the orbital paths of the colliding galaxies before they merge, thus turning back the clock on each merging system," says Dr. Scoville, the Francis L. Moseley professor of astronomy at Caltech. "This is equivalent to finally being able to trace the skid marks on the road when investigating a car wreck."

According to Dr. Koda, the extent of the debris had not been seen in earlier imaging of these famous objects.

"Subaru's sensitive wide-field camera was necessary to detect and properly analyze this faint, huge, debris," he said. "In fact, most debris are extended a few times bigger than our own Galaxy. We were ambitious to look for unknown debris, but even we were surprised to see the extent of debris in many already famous objects."

Galactic collisions are one of the most critical processes in galaxy formation and evolution in the early Universe. However, not all galactic collisions end up such large tidal debris.

'The orbit and rotation of colliding galaxies are the keys," says Dr. Koda. "Theory predicts that large debris are produced only when the orbit and galactic rotation synchronize each other. New tidal debris are of significant importance since they put significant constrains on the orbit and history of the galactic collisions."

Adapted from materials provided by Stony Brook University.

http://www.sciencedaily.com/releases/2009/06/090611083746.htm

Are Changes In Earth's Main Magnetic Field Induced By Oceans' Circulation?

A controversial new theory suggests that long-term changes (the secular variation) in Earth's main magnetic field are possibly induced by the oceans' circulation. (Credit: iStockphoto/René Mansi)

ScienceDaily (June 15, 2009) — Some 400 years of discussion and we're still not sure what creates the Earth's magnetic field, and thus the magnetosphere, despite the importance of the latter as the only buffer between us and deadly solar wind of charged particles (made up of electrons and protons). New research raises question marks about the forces behind the magnetic field and the structure of Earth itself.

The controversial new paper, published in *New Journal of Physics* (co-owned by the Institute of Physics and the German Physical Society), will deflect geophysicists' attention from postulated motion of conducting fluids in the Earth's core, the twentieth century's answer to the mysteries of geomagnetism and magnetosphere.

Professor Gregory Ryskin from the School of Engineering and Applied Science at Northwestern University in Illinois, US, has defied the long-standing convention by applying equations from magnetohydrodynamics to our oceans' salt water (which conducts electricity) and found that the long-term changes (the secular variation) in the Earth's main magnetic field are possibly induced by our oceans' circulation.

With calculations thus confirming Ryskin's suspicions, there were also time and space correlations - specific indications of the integral relationship between the oceans and our magnetospheric buffer. For example, researchers had recorded changes in the intensity of current circulation in the North Atlantic; Ryskin shows that these appear strongly correlated with sharp changes in the rate of geomagnetic secular variation ("geomagnetic jerks").

Tim Smith, senior publisher of the New Journal of Physics, said, "This article is controversial and will no doubt cause vigorous debate, and possibly strong opposition, from some parts of the geomagnetism community. As the author acknowledges, the results by no means constitute a proof but they do suggest the need for further research into the possibility of a direct connection between ocean flow and the secular variation of the geomagnetic field."

In the early 1920s, Einstein highlighted the large challenge that understanding our Magnetosphere poses. It was later suggested that the Earth's magnetic field could be a result of the flow of electrically-conducting fluid deep inside the Earth acting as a dynamo.

In the second half of the twentieth century, the dynamo theory, describing the process through which a rotating, convecting, and electrically conducting fluid acts to maintain a magnetic field, was used to explain how hot iron in the outer core of the Earth creates a magnetosphere.

The journal paper also raises questions about the structure of our Earth's core.

Familiar text book images that illustrate a flow of hot and highly electrically-conducting fluid at the core of the Earth are based on conjecture and could now be rendered invalid. As the flow of fluids at the Earth's core cannot be measured or observed, theories about changes in the magnetosphere have been used, inversely, to infer the existence of such flow at the core of the Earth.

While Ryskin's research looks only at long-term changes in the Earth's magnetic field, he points out that, "If secular variation is caused by the ocean flow, the entire concept of the dynamo operating in the Earth's core is called into question: there exists no other evidence of hydrodynamic flow in the core."

On a practical level, it means the next time you use a compass you might need to thank the seas and oceans for influencing the force necessary to guide the way.

Dr Raymond Shaw, professor of atmospheric physics at Michigan Technological University, said, "It should be kept in mind that the idea Professor Ryskin is proposing in his paper, if valid, has the potential to deem irrelevant the ruling paradigm of geomagnetism, so it will be no surprise to find individuals who are strongly opposed or critical."

Journal reference:

1. Gregory Ryskin. **Secular variation of the Earth's magnetic field: induced by the ocean flow?** *New Journal of Physics*, 2009; 11 (6): 063015 DOI: 10.1088/1367-2630/11/6/063015

Adapted from materials provided by Institute of Physics.

http://www.sciencedaily.com/releases/2009/06/090615094038.htm

Father's Sperm Delivers Much More Complex Material Than Previously Thought

ScienceDaily (June 15, 2009) — It was long believed that conception does not involve a meeting of equals. The egg is a relatively large, impressive biological factory compared with the tiny sperm, which delivers to the egg one copy of the father's genes. However, a new study from Huntsman Cancer Institute (HCI) at the University of Utah reveals that the father's sperm delivers much more complex genetic material than previously thought. The findings could lead to a diagnostic test to help couples deal with infertility.

Researchers discovered particular genes packaged in a special way within the sperm, and that may promote the development of the fetus.

"Our findings show that the father plays an active role in packaging his genome to help ensure a healthy baby," says study co-leader Brad Cairns, Ph.D., investigator with HCI and the Howard Hughes Medical Institute, and professor of oncological sciences at the University of Utah. "However, they also raise the possibility that a man's aging, health and lifestyle may alter this packaging and negatively affect fertility and embryo development."

During fetal development, certain genes make decisions about organ and tissue development. The new research shows that in sperm, these genes are wrapped in special packaging materials called 'modified histones.' These modified histones appear to be key factors in ensuring genes are activated or repressed at the right level, place and time, which helps the fertilized egg develop properly.

Chromosomes are long strands of DNA containing thousands of genes, and their packaging helps determine which genes turn on and off. Understanding how these genes are activated or repressed leads to a better understanding of how disorders like birth defects and cancer develop.

"Genes have on-and-off switches, and understanding them allows us to target them, leading to possible treatments, cures or prevention strategies," says Cairns. "That's the good news."

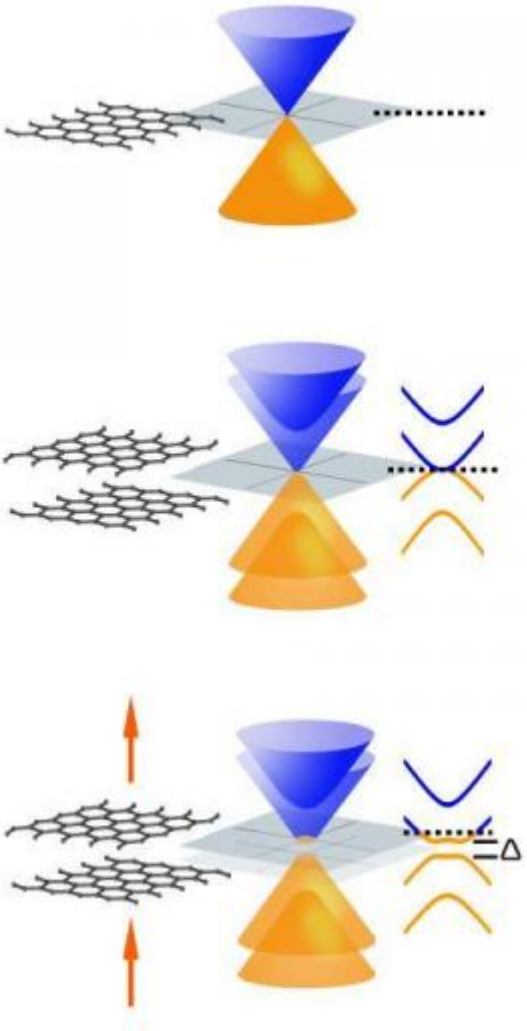
The study is set for publication June 14 – a week before Father's Day – in the online edition of the journal *Nature*. The research involved collaboration between Cairns' lab at HCI and the University of Utah's in vitro fertilization (IVF) and andrology lab led by Doug Carrell – along with their joint graduate student, Sue Hammoud.

An implication of this study is that factors such as genetic mutations, age or lifestyle may affect sperm chromosome packaging, leading to infertility. "We are hopeful that this work will soon lead to a clinical diagnostic test that will help couples with infertility problems make better informed decisions regarding their prospects for a healthy child. We will also be testing if aspects of a man's lifestyle – such as age, diet or health – affect proper packaging and fertility," says Cairns. Other future work includes how decision-making genes are packaged in eggs, which remains a major mystery.

Adapted from materials provided by University of Utah Health Sciences.

http://www.sciencedaily.com/releases/2009/06/090614153253.htm

Tunable Graphene Bandgap Opens The Way To Nanoelectronics And Nanophotonics



One of the most unusual features of single-layer graphene (top) is that its conical conduction and valence bands meet at a point -- it has no bandgap. Symmetrical bilayer graphene (middle) also lacks a bandgap. Electrical fields (arrows) introduce asymmetry into the bilayer structure (bottom), yielding a bandgap (") that can be selectively tuned. (Credit: Lawrence Berkeley National Laboratory)

ScienceDaily (June 15, 2009) — Graphene is the two-dimensional crystalline form of carbon, whose extraordinary electron mobility and other unique features hold great promise for nanoscale electronics and photonics. But there's a catch: graphene has no bandgap.

"Having no bandgap greatly limits graphene's uses in electronics," says Feng Wang of the U.S. Department of Energy's Lawrence Berkeley National Laboratory, where he is a member of the Materials Sciences Division. "For one thing, you can build field-effect transistors with graphene, but if there's no bandgap you can't turn them off! If you could achieve a graphene bandgap, however, you should be able to make very good transistors."

Wang, who is also an assistant professor in the Department of Physics at the University of California at Berkeley, has achieved just that. He and his colleagues have engineered a bandgap in bilayer graphene that can be precisely controlled from 0 to 250 milli-electron volts (250 meV, or .25 eV).

Moreover, their experiment was conducted at room temperature, requiring no refrigeration of the device. Among the applications made possible by this breakthrough are new kinds of nanotransistors and – because of its narrow bandgap – nano-LEDs and other nanoscale optical devices in the infrared range.

The researchers describe their work in the June 11 issue of *Nature.*

Constructing a bilayer graphene transistor

As with monolayer graphene, whose carbon atoms are arranged in "chickenwire" configuration, bilayer graphene – which consists of two graphene layers lying one on the other – also has a zero bandgap and thus behaves like a metal. But a bandgap can be introduced if the mirror-like symmetry of the two layers is disturbed; the material then behaves like a semiconductor.

Previously, in 2006, researchers at Berkeley Lab's Advanced Light Source (ALS) observed a bandgap in bilayer graphene in which one of the layers was chemically doped by adsorbed metal atoms. But such chemical doping is uncontrolled and not compatible with device applications.

"Creating and especially controlling a bandgap in bilayer graphene has been an outstanding goal," says Wang. "Unfortunately chemical doping is difficult to control."

Researchers then tried to tune the bilayer graphene bandgap by doping the substrate electrically instead of chemically, using a perpendicularly applied, continuously tunable electrical field. But when such a field is applied with a single gate (electrode), the bilayer becomes insulating only at temperatures below one degree Kelvin, near absolute zero – suggesting a bandgap value much lower than predicted by theory.

Says Wang, "With these results it was hard to understand exactly what was happening electronically, or why."

Wang and his colleagues made two key decisions that led to their successful attempt to introduce and determine a bandgap in bilayer graphene. The first was to build a two-gated bilayer device, fabricated by Yuanbo Zhang and Tsung-Ta Tang of the UC Berkeley Department of Physics, which allowed the team to independently adjust the electronic bandgap and the charge doping.

The device was a dual-gated field-effect transistor (FET), a type of transistor that controls the flow of electrons from a source to a drain with electric fields shaped by the gate electrodes. Their nano-FET used a silicon substrate as the bottom gate, with a thin insulating layer of silicon dioxide between it and the stacked graphene layers. A transparent layer of aluminum oxide (sapphire) lay over the graphene bilayer; on top of that was the top gate, made of platinum.

The other key decision the researchers made was to get a better grasp of what was really going on in the device as they varied the voltage. Rather than try to measure the bandgap by measuring the device's electrical resistance, or transport, they decided to measure its optical transmission.

"The problem with transport measurements is that they are too sensitive to defects," says Wang. "A tiny amount of impurity or defect doping can create a big change in the resistance of the graphene and mask the intrinsic behavior of the material. That's why we decided to go with optical measurements at the Advanced Light Source."

Using infrared beamline 1.4 at the ALS, under the direction of ALS physicist Michael Martin and Zhao Hao of the Earth Sciences Division, Wang and his colleagues were able to send a tight beam of synchrotron light, focused on the graphene layers, right through the device. As the researchers tuned the electrical fields by precisely varying the voltage of the gate electrodes, they were able to measure variations in the light absorbed by the gated graphene layers. The absorption peak in each spectrum provided a direct measurement of the bandgap at each gate voltage.

"In principle we could have used a tunable laser to measure the optical transmission, but the 1.4 beamline is very bright and can be focused down to the diffraction limit – an important consideration when the graphene-flake target is so small," Wang says. "Also, compared to a laser, the beamline provides a wider range of frequencies all at once, so we don't have to painstakingly tune to each absorption frequency we're trying to measure."

The malleable electronic structure of bilayer graphene

The results from the ALS measurements were obtained with relative ease and efficiency, and showed that by independently manipulating the voltage of the two gates, the researchers could control two important parameters, the size of the bandgap and the degree of doping of the graphene bilayer. In essence, they created a virtual semiconductor from a material that is not inherently a semiconductor at all.

In ordinary semiconductors, the gap between the conduction band (unoccupied by electrons) the valence band (occupied by electrons) is finite, and fixed by the crystalline structure of the material. In bilayer graphene, however, as Wang's team demonstrated, the bandgap is variable and can be controlled by an electrical field. Although a pristine graphene bilayer has zero bandgap and conducts like a metal, a gated bilayer can have a bandgap as big as 250 milli-electron volts and behave like a semiconductor.

With precision control of its bandgap over a wide range, plus independent manipulation of its electronic states through electrical doping, dual-gated bilayer graphene becomes a remarkably flexible tool for nanoscale electronic devices.

Wang emphasizes that these first experiments are only the beginning. "The electrical performance of our demonstration device is still limited, and there are many routes to improvement, for example through extra measures to purify the substrate."

Nevertheless, he says, "We've demonstrated that we can arbitrarily change the bandgap in bilayer graphene from zero to 250 milli-electron volts at room temperature, which is remarkable in itself and shows the potential of bilayer graphene for nanoelectronics. This is a narrower bandgap than common semiconductors like silicon or gallium arsenide, and it could enable new kinds of optoelectronic devices for generating, amplifying, and detecting infrared light."

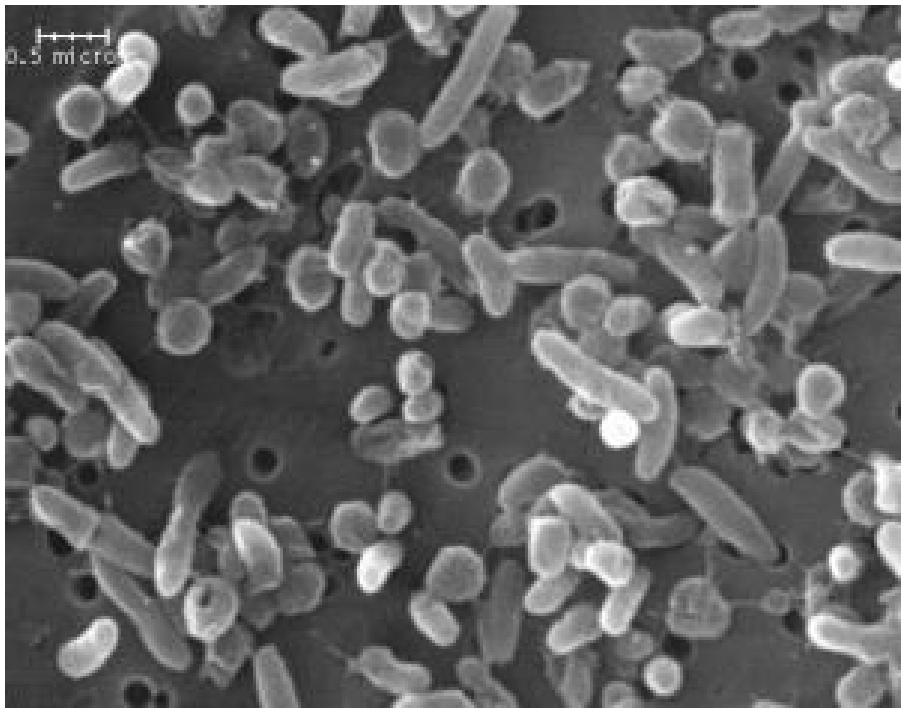
"Direct observation of a widely tunable bandgap in bilayer graphene," by Yuanbo Zhang, Tsung-Ta Tang, Caglar Girit, Zhao Hao, Michael C. Martin, Alex Zettl, Michael F. Crommie, Y. Ron Shen, and Feng Wang, appears in the June 11, 2009 issue of Nature. Zhang, Tang, and Girit are members of UC Berkeley's Department of Physics, in the groups of Professors Crommie, Shen, and Zettl respectively; Zettl, Crommie, and Shen are also members of Berkeley Lab's Materials Sciences Division.

This work was supported by the U.S. Department of Energy's Office of Science, Office of Basic Energy Sciences.

Adapted from materials provided by DOE/Lawrence Berkeley National Laboratory.

http://www.sciencedaily.com/releases/2009/06/090610133453.htm

Tiny Frozen Microbe May Hold Clues To Extraterrestrial Life



Trapped more than three kilometers under glacial ice in Greenland for over 120,000 years, a dormant bacterium -- Herminiimonas glaciei -- has been coaxed back to life by researchers. (Credit: Image courtesy of Society for General Microbiology)

ScienceDaily (June 15, 2009) — A novel bacterium -- trapped more than three kilometres under glacial ice in Greenland for over 120,000 years -- may hold clues as to what life forms might exist on other planets.

Dr Jennifer Loveland-Curtze and a team of scientists from Pennsylvania State University report finding the novel microbe, which they have called *Herminiimonas glaciei*, in the current issue of the *International Journal of Systematic and Evolutionary Microbiology*. The team showed great patience in coaxing the dormant microbe back to life; first incubating their samples at 2˚C for seven months and then at 5˚C for a further four and a half months, after which colonies of very small purple-brown bacteria were seen.

H. glaciei is small even by bacterial standards – it is 10 to 50 times smaller than *E. coli*. Its small size probably helped it to survive in the liquid veins among ice crystals and the thin liquid film on their surfaces. Small cell size is considered to be advantageous for more efficient nutrient uptake, protection against predators and occupation of micro-niches and it has been shown that ultramicrobacteria are dominant in many soil and marine environments.

Most life on our planet has always consisted of microorganisms, so it is reasonable to consider that this might be true on other planets as well. Studying microorganisms living under extreme conditions on Earth may provide insight into what sorts of life forms could survive elsewhere in the solar system.

"These extremely cold environments are the best analogues of possible extraterrestrial habitats", said Dr Loveland-Curtze, "The exceptionally low temperatures can preserve cells and nucleic acids for even millions of years. *H. glaciei* is one of just a handful of officially described ultra-small species and the only one so far from the Greenland ice sheet; studying these bacteria can provide insights into how cells

can survive and even grow under extremely harsh conditions, such as temperatures down to -56˚C, little oxygen, low nutrients, high pressure and limited space."

"*H. glaciei* isn't a pathogen and is not harmful to humans", Dr Loveland-Curtze added, "but it can pass through a 0.2 micron filter, which is the filter pore size commonly used in sterilization of fluids in laboratories and hospitals. If there are other ultra-small bacteria that are pathogens, then they could be present in solutions presumed to be sterile. In a clear solution very tiny cells might grow but not create the density sufficient to make the solution cloudy."

Journal reference:

1. Loveland-Curtze et al. **Herminiimonas glaciei sp. nov., a novel ultramicrobacterium from 3042 m deep Greenland glacial ice**. *International Journal of Systematic and Evolutionary Microbiology*, 2009; 59 (6): 1272 DOI: 10.1099/ijs.0.001685-0

Adapted from materials provided by Society for General Microbiology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090614201734.htm

Evolution Can Occur In Less Than 10 Years, Guppy Study Finds

Guppies are small fresh-water fish that biologists have studied for long. (Credit: Paul Bentzen)

ScienceDaily (June 15, 2009) — How fast can evolution take place? In just a few years, according to a new study on guppies led by UC Riverside's Swanne Gordon, a graduate student in biology.

Gordon and her colleagues studied guppies — small fresh-water fish biologists have studied for long — from the Yarra River, Trinidad. They introduced the guppies into the nearby Damier River, in a section above a barrier waterfall that excluded all predators. The guppies and their descendents also colonized the lower portion of the stream, below the barrier waterfall, that contained natural predators.

Eight years later (less than 30 guppy generations), the researchers found that the guppies in the low-predation environment above the barrier waterfall had adapted to their new environment by producing larger and fewer offspring with each reproductive cycle. No such adaptation was seen in the guppies that colonized the high-predation environment below the barrier waterfall.

"High-predation females invest more resources into current reproduction because a high rate of mortality, driven by predators, means these females may not get another chance to reproduce," explained Gordon, who works in the lab of David Reznick, a professor of biology. "Low-predation females, on the other hand, produce larger embryos because the larger babies are more competitive in the resource-limited environments typical of low-predation sites. Moreover, low-predation females produce fewer embryos not only because they have larger embryos but also because they invest fewer resources in current reproduction."

Natural guppy populations can be divided into two basic types. High-predation populations are usually found in the downstream reaches of rivers, where they coexist with predatory fishes that have strong effects on guppy demographics. Low-predation populations are typically found in upstream tributaries above barrier waterfalls, where strong predatory fishes are absent. Researchers have found that this broad contrast in predation regime has driven the evolution of many adaptive differences between the two guppy types in color, morphology, behavior, and life history.

Gordon's research team performed a second experiment to measure how well adapted to survival the new population of guppies were. To this end, they introduced two new sets of guppies, one from a portion of the Yarra River that contained predators and one from a predator-free tributary to the Yarra River into the high-and low-predation environments in the Damier River.

They found that the resident, locally adapted guppies were significantly more likely to survive a four-week time period than the guppies from the two sites on the Yarra River. This was especially true for juveniles. The adapted population of juveniles showed a 54-59 percent increase in survival rate compared to their counterparts from the newly introduced group.

"This shows that adaptive change can improve survival rates after fewer than ten years in a new environment," Gordon said. "It shows, too, that evolution might sometimes influence population dynamics in the face of environmental change."

She was joined in the study by Reznick and Michael Bryant of UCR; Michael Kinnison and Dylan Weese of the University of Maine, Orono; Katja Räsänen of the Swiss Federal Institute of Technology, Zurich, and the Swiss Federal Institute of Aquatic Science and Technology, Dübendorf; and Nathan Miller and Andrew Hendry of McGill University, Canada.

Study results appear in the July issue of *The American Naturalist.*

Financial support for the study was provided by the National Science Foundation, the Natural Sciences and Engineering Research Council of Canada, the Le Fonds Québécois de la Recherche sur la Nature et les Technologies, the Swedish Research Council, the Maine Agricultural and Forestry Experiment Station, and McGill University.

Adapted from materials provided by University of California - Riverside.

http://www.sciencedaily.com/releases/2009/06/090610185526.htm

Desertec Solar Project 'an Encouraging Economic Sign'

With the planned Desertec project, Europe wants to build a giant solar power plant to convert the endless sun in the Sahara Desert into CO2-free electricity. The mega project isn't without its critics, but most German commentators are welcoming Tuesday's announcement that the ambitious solar plans may soon move forward.

The vision is an attractive one. Imagine a gigantic solar thermal power plant stretching across the deserts of North Africa, sending huge quantities of energy across the Mediterranean to Europe -- and emitting no CO2 in the process.

REUTERS

Workers in China putting together a solar energy facility in Shanghai in preparation for the 2010 Expo.

That, at least, is the idea behind Desertec, a €400 billion ($555 million) project which has been in the works for years. On Tuesday, a group of 20 companies, groups and governments revealed they would meet in mid-July to discuss the way forward. Should the venture ultimately become reality, it could cover up to 15 percent of Europe's energy needs as well as provide power to North African countries.

Perhaps the most attractive part of the plan is the relative simplicity of the technology involved. Massive fields of collectors would concentrate sunlight to heat water, with the resulting steam then driving energy-producing generators. A similar power plant has been in operation in California since the 1980s and three of them have recently been built in Spain. The Desertec project, though, would be the largest of them all. The current consortium hopes to be able to present concrete plans for the facility within two to three years. German commentators on Wednesday take a look at the project.

The financial daily **Handelsblatt** writes:

Despite the fact that the technical difficulties have been solved, "political hurdles remain. Countries in North Africa are hardly models of political stability. But that is even truer of some gas and oil suppliers on whom we are currently reliant. The European Union would be well advised to intensify its relations with the Maghreb states and thereby promote the idea of electricity generation in the desert."

"Of course it would be naïve to believe that all of our power could come from the Sahara within just a few years. But desert electricity could become an important element of Europe's climate-friendly energy

mix. Either way, much will change in coming years. The importance of large fossil-fuel-driven power plants will shrink; decentralized power-generation structures will increasingly prevail. Part of that will be a radical reconstruction of the power grid, which could easily be modified to include solar-generated power from the south."

"It is even possible that tax subsidies would, for once, make sense. For the moment, in any case, we in Germany are pumping billions into domestic solar power every year -- with absurdly low returns."

The **Financial Times Deutschland** writes:

"Of course it isn't ecological concerns that have led several large companies to (join the desert power project). A hoped-for image boost is likewise not the decisive factor, even if companies like the coal-power plant concern RWE and the nuclear reactor manufacturer Siemens could use the green hue."

"Rather, the project is sending a strong signal that investments in renewable energies don't just make ecological sense -- they make economic sense as well. The potential partners are convinced that they can, in the foreseeable future, use giant solar thermal power plants in sunny regions to generate power and competitive prices. Particularly in the economic crisis, that is an encouraging sign -- because the economic crisis has threatened to take a bite out of investment in future-oriented technologies, even if that would be negligent."

The left-leaning daily **Die Tageszeitung** writes:

"There is reason to be wary (of the solar project) on at least one point: The desert plans cannot be allowed to impinge in the slightest on the further development of solar power in Germany. Should politicians use the Sahara facility as an excuse to one day slow down domestic solar power projects, it would be a disaster.""Particularly given the promising nature of the North Africa project, it must once again be pointed out that the most successful method of harvesting solar power is with rooftop panels. In just three to five years, power from the roof will be cheaper than electricity from the wall plug. The economic bar for desert power is, in other words, high. Solar power produced in a decentralized manner will likely always be the cheaper variety -- because no matter how powerful the sun is in the Sahara, the costs of transporting the resulting electricity will be difficult to compensate for."

Conservative daily **Die Welt** writes:

"The solar panels that were installed on German roofs in 2008 created €10 billion in extra costs for consumers due to (the requirement that German energy concerns buy solar-generated power at a fixed, higher-than-market price). With that amount of money, one could have saved Karstadt, Quelle and Opel all at once -- but in the hands of Germany's solar-billionaires, the money resulted only in a tiny, hardly measurable increase in the amount of renewable energy in the German mix."

"Desert power from solar thermal power plants would be cheaper and there would be a constant supply. But Germany's solar lobby apparently wants to teach environmentally aware consumers that solar power is good when it is generated domestically with billions in subsidies. And it's bad when it comes from projects that benefit the poor in Africa."

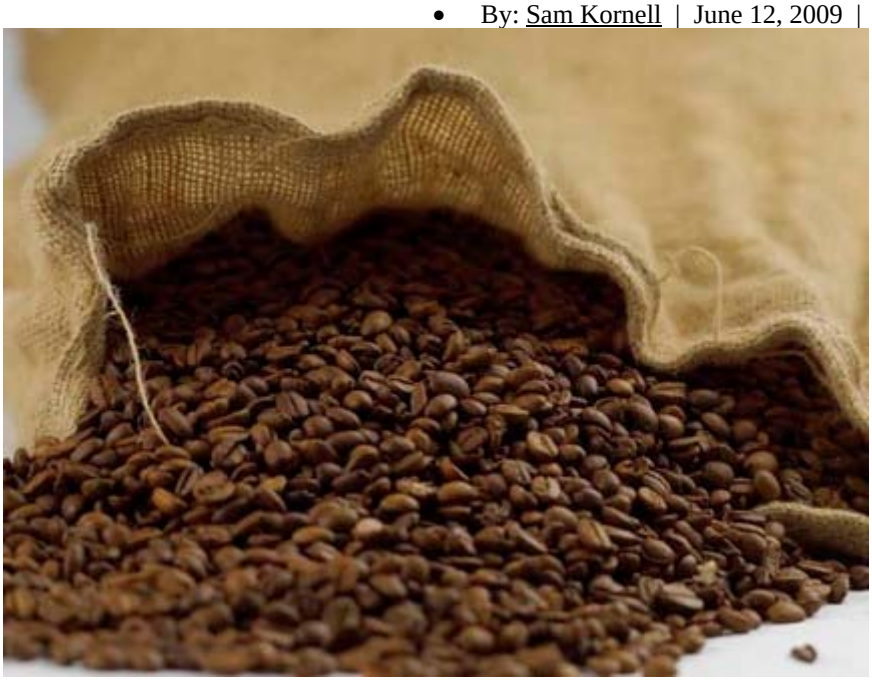
-- *Charles Hawley, 12:15 p.m. CET*

http://www.spiegel.de/international/world/0,1518,630948,00.html

Coffee Won't Keep Your Conscience Up At Night

Is fancy-schmancy, fair-trade, shade-grown, bird-friendly, etc., etc., specialty coffee better for the planet's climate, too?

- By: Sam Kornell | June 12, 2009 |



High-end specialty coffees already go to great lengths to stress their environmental credentials, but one they don't point to is how climate friendly much coffee production remains.stockxpert.com

In recent years, buying a pound of coffee has come to require a moral and gastronomical scrupulousness not normally associated with food staples. Walk into the supermarket today, and you'll be confronted by bags of organic, fair-trade, shade-grown, bird-friendly, single-source coffees, each proudly emblazoned with a wordy label and an assortment of certifications. It can be a disorienting experience.

"Sometimes I look at my own coffee, and I scratch my head and I say, 'How could anybody figure this out?'" says Donald Schoenholt, the proprietor of New York-based Gillies Coffee, a specialty coffee merchant. "It's got a born-on date. It's got a fair-trade label. It's got an organic-certified label. Sometimes it's got a Smithsonian bird-friendly label. It's got a kosher label. People look at it, and I think they just get bleary-eyed."

Bleary-eyed or not, Americans clearly enjoy the fine Arabica beans — from East Africa, the Pacific Islands and Central and South America — that Schoenholt and an expanding pool of specialty roasters around the country are offering, often at prices well in excess of $10 a pound. A boutique industry in 2000, today specialty accounts for between 15 and 20 percent of all coffee consumption in the United States, according to the National Coffee Association.

And it's not just specialty coffee: It's specialty coffee produced in environmentally and socially virtuous ways, as ratified by an assortment of certifying organizations such as the Fair Trade Labeling Organization.

Considering the size of the market for high-quality "cause" coffees, it's a little surprising that specialty roasters and certifiers haven't been bolder in highlighting the climate credentials of their wares, not even on the ecology pages on Web sites for retail roasters like Green Earth or Rappahannock. Studies consistently show that consumers are more likely to buy a product if they know it's been produced in an environmentally responsible way. And, according to Matt Warning, a development economist at the University of Puget Sound, "It would be an easy case to make that the attributes that make a particular coffee climate friendly are also attributes common to quality coffees."

The brief for specialty coffee is straightforward. It can be boiled down to the fact that many of the best coffees grown today are done so in a fashion not terribly dissimilar to the way coffee was grown in the ninth century, when, legend has it, it was first discovered by a goatherd in the Ethiopian highlands.

"Coffee is one of the few global crops that lends itself to a reasonably holistic ecological approach," said Daniele Giovannucci, an agriculture consultant to the World Bank and the United Nations. "It naturally exists in the understory of a forest, whereas most global crops — cotton, wheat, rice — have been so evolved over the centuries that almost nowhere are they grown in the natural way."

The distinctions used to separate "specialty" from "commercial" coffee can lack clarity and consistency — some top roasters disdain Starbucks, for example, though it's widely credited with sparking the specialty coffee boom in the U.S.

Giovannucci finds it's easier to distinguish between specialty and commercial coffee if agriculture is the criterion. Specialty coffee beans are grown at high elevation, between 3,000 and 6,000 feet, often by smallholder farmers organized into collectives. The coffee is usually interspersed beneath the canopies of tropical or sub-tropical forests. And it's likely to be grown organically for a simple reason: Many, if not most, specialty coffee farmers don't have enough money to use fertilizer or pesticides to improve their crop yields. (This is particularly true in East Africa, the source of some of the finest coffees in the world).

Commercial coffees, by contrast, are generally grown on low-lying plantations, in direct sunlight, by operators who avail themselves of the standard repertoire of industrial farming techniques, including irrigation and the heavy application of pesticides and artificial fertilizer.

The damage industrial farming causes to the atmosphere — as well as the earth — is well known. Operating a large, modern farm results in a great deal of fossil fuel emissions, most dramatically from agrochemicals, which are manufactured using oil, coal and natural gas. As much as 40 percent of the energy used in the global food system goes toward the production of artificial fertilizers and pesticides.

"Climate change is one of the arguments for the organic movement across the board," explained Dan Clay, the director of the Institute of International Agriculture at Michigan State University. "Any crop that's produced without using fertilizer or petrochemicals is likely to have a significantly smaller greenhouse gas footprint."

But that's only the first of two major benefits, from a climate vantage, to growing coffee in the "natural" way — and not necessarily the more important. Tropical forests sequester carbon better than anything else on the world's land surfaces. No one knows exactly how much forestland has been cleared for commercial coffee cultivation, but the amount is significant.

"There's a major difference if we're growing shade or sun coffee," said Holly Gibbs, a Stanford researcher who studies the role of deforestation in accelerating climate change. (Deforestation is the second-largest source of greenhouse gas emissions in the world, after the energy sector.)

She said that in addition to the increased likelihood that commercial coffee is grown on deforested land, specialty coffee provides an incentive to conserve rainforest. If tree canopies are valuable, inasmuch as they protect specialty coffee operations, they're less likely to be cut down and burned. In the last three

decades, El Salvador has destroyed 80 to 90 percent of its cultivatable forestland; what remains is devoted to shade coffee.

Of course, in some ways, coffee isn't well adapted to the imperatives of the low-impact, low-carbon lifestyle. For one thing, the very process of making it suitable for consumption — roasting it — is carbon intensive.

"When you roast coffee, that stuff that goes up the flue? That's all carbon," said Donald Schoenholt. "What we're doing, basically, is we're running a big fireplace."

But both Clay and Giovannucci emphasized that because coffee is a global food crop — more like wheat than wine — that a significant portion of it is still grown without recourse to industrial farming techniques is important.

"The amount of coffee still grown in the natural way is not the majority anymore," Giovannucci said, "but it's still significant."

By the same token, both were at pains to stress that in the world of coffee — which is grown in many different ways in many different parts of the world — exceptions exist to every rule. Simply because a coffee is of high quality does not ensure its carbon credentials. Moreover, the possible emissions consequences of various methods of coffee farming have not been widely researched, resulting in a dearth of empirical evidence on the subject. And yet the sheer scope of global coffee production is such that what is generally true — such as the fact that commercial coffees are likely to have a larger carbon footprint than specialty coffee — holds global import.

In 2008, nearly 6 billion tons of coffee was exported worldwide. (Clay estimated that shipping coffee from origin to the United States, by sea, accounts for between 2 and 3 percent of a coffee's typical carbon footprint.) By value, coffee has for decades been the second most traded commodity in the world, after oil. As a result, the way coffee is grown and produced — or even moved — has considerable environmental and social consequences.

Fortunately, the "natural" way of growing coffee — to use Giovannucci's term — tends also to be the best way. So as perplexing as buying a pound of coffee can nowadays be, odds are that searching out a more expensive, better tasting roast will pay environmental dividends, especially if it's certified organic and shade grown.

As Warning put it, "It's a win-win kind of thing. It's one of those harmonies of interest between people who want to buy good quality coffee and people who want to limit the negative effects of climate change."

http://www.miller-mccune.com/business_economics/coffee-conscience-up-at-night-1296

Sprinkling of Facts Dramatically Alters Schools Debate

Giving people basic facts changes their opinions on major schools issues — which may dismay those seeking more school funding.

- By: Ryan Blitstein | June 11, 2009 |

Providing just a few solid facts about major schools issues can dramatically alter opinions.

Education often sparks rancorous debate, but most Americans argue over school issues without knowledge of even basic facts. People know so little that providing them with even small pieces of information, new research shows, can significantly alter their views on school funding and administration.

The findings also provide clues to how opinions might be shaped by a more fact-oriented political process.For several years, William Howell, a political science professor at the University of Chicago, and Martin West, an education professor at Brown University, have overseen an annual survey sponsored by the Program on Education Policy and Governance at Harvard University and *Education Next*, a journal from the conservative Hoover Institution, where West is an executive editor.

Like others who have examined public knowledge about education, they are well aware of how little Americans know. In their 2007 survey, for example, people estimated, on average, that per-pupil spending in their school district was $4,231, whereas the actual average exceeded $10,000. The respondents had formed opinions based on faulty assumptions, and the researchers wanted to know more about the reasoning behind their choices."Marty and I got interested in exploring — not just what is the expression of their views, but what are the foundations of their views? And what would it take to nudge them?" Howell said.They thought the answers might also give them a better sense of what public opinion might look like if people were given a chance to deliberate over solid information — as opposed to strident political speech and advertisements. To tease out those ideas, they embedded several experiments into the survey, conducted by Knowledge Networks during February and March 2008.

They randomly divided the 2,500 respondents and an additional 700 public school teachers nationwide into two groups. All were asked their opinion about education issues, but only some were primed with information. For example, before a question on whether public school funding should be increased, the experimental group was informed of the average per-pupil expenditure in their district. Support for increased school funding was 10 percentage points lower among the informed group — 51 percent vs. 61 percent.

"If you can change 10 percent of the public's view on a particular issue by giving them a single fact, that's pretty striking," Howell said.The survey produced similar effects when people were asked whether increased spending would bolster student achievement, and the dynamics weren't undermined by differences in class, race, location or political ideology. Even schoolteachers' support was lower when given the facts.

The differences were more pronounced on the issue of teacher salaries — providing accurate teacher salary numbers depressed support for increased teacher pay by 14 percent. The changes varied among subgroups — support among African Americans decreased from 91 to 71 percent with more information, but support among teachers dropped just 8 points to 81 percent."It does show that information does matter," says nonpartisan public opinion researcher Steve Farkas of the FDR Group. "Public policy people want to know, if we give information to people will it make a difference? This shows it sometimes does."

The most unexpected results came from questions about support for charter schools, the state-funded, locally managed entities that are exempt from many regulations that apply to traditional public schools.Some respondents were told that charters "cannot charge tuition and they cannot provide religious instruction." Those facts produced little effect on overall opinion — roughly 40 percent of Americans tell pollsters they're undecided about the schools, and that didn't change much. As with the teacher salary question, though, the aggregate numbers masked serious shifts among certain groups.

Without information, 49 percent of conservatives and 36 percent of liberals supported charters; with it, those figures changed to 43 and 47. Presumably, the religion restriction had a lot to do with that flip: Liberal church non-attendees increased support from 32 to 55 percent, while conservative church attendees dropped from 57 to 44 percent.

In surveys, charter schools often receive more support from conservatives than from liberals — partly because people confuse them with voucher programs, which in some incarnations use public money to send children to private or religious schools. The *Education Next* research implies that if Americans knew more about charter schools, many might cross to the opposite side of the battle line. Such effects are particularly surprising given that the researchers tried to steer away from politically tinged facts, such as, "each voucher drains X dollars from local public schools."

Yet control like that isn't always possible outside of a survey.

"In the noisy, real policy world, where media coverage is not that attentive and people are not exposed to the same sources of information, you can't replicate a survey like this that has an introduction of a single, clean fact," Farkas said.It's difficult to successfully marshal facts against emotional appeals and advertisements aimed at producing a visceral reaction. Nevertheless, charter schools do successfully recruit many students among religious populations. In urban areas, for instance, charters often serve children in churchgoing African-American families. "They don't seem troubled by these issues," said Nelson Smith, president of the National Alliance for Public Charter Schools.

What concerns Howell most about the results, however, is that they seem to show that a well-informed public is a polarized public. Yet he's encouraged by the facts' significant effect on people's opinions.

"They're willing to update. They're not locked into their current views," he says. "Possibly, if we had a serious conversation about these issues, people would be willing to rethink."

http://www.miller-mccune.com/culture_society/facts-alter-schools-debate-1290

Trading 'Virtual' Water

Do exports of water-intensive crops hurt drought-prone California?

- By: Melinda Burns | June 10, 2009

Water-hungry crops grown in drought-plagued California lead some conservationists to question the wisdom of shipping 'virtual water' overseas while agriculturalists cite the unique advantages of the status quo.Dan Shirley

In the Imperial Valley of California, a region drier than part of the Sahara Desert, farmers have found a lucrative market abroad for a crop they grow with Colorado River water: They export bales of hay to land-poor Japan.

Since the mid-1980s, this arid border region of California has been supplying hay for Japan's dairy cows and black-haired cattle, the kind that get daily massages, are fed beer and produce the most tender Kobe beef.

Container ships from Japan unload electronics and other goods in the Port of Long Beach, and the farmers fill up the containers with hay for the trip back across the Pacific. Since the containers would otherwise return empty, it ends up costing less to ship hay from Long Beach to Japan than to California's Central Valley.

"Everything is done for economics," said Ronnie Leimgruber, an Imperial Valley hay grower who is expanding into the export market. "Japan cannot get hay cheaper. The freight is cheaper from Long Beach than from anywhere else in the world."

Water is cheap for valley farmers, too: urban rates there are four times as high. It costs only $100 to irrigate an acre of hay in the desert for a year.

But what makes economic sense to farmers may not be rational behavior for California in the third year of a severe drought, say some conservationists. At the very least, they contend, the growing state debate over water allocation should take into account the exports of crops such as hay and rice — two of the most water-intensive crops in the West — because they take a toll on local rivers and reservoirs.

"This is water that is literally being shipped away," said Patrick Woodall, research director at Food and Water Watch, an international consumer advocacy group with headquarters in Washington, D.C. "There's a kind of insanity about this. Exporting water in the form of crops is giving water away from thirsty communities and infringing on their ability to deal with water scarcity. This is a place where some savings could be made now, and it's just not being discussed."

Now, estimates of hay exports from California range from 1.5 to 7 percent of the state's total hay production. In 2008, according to researchers at the University of California, Davis, California exported between 617,000 and 765,000 tons of hay, some of it originally brought in from other western states. Most of it was shipped to Japan. A minimum of 450,000 acre-feet of water was required to grow the exported hay - roughly what the city of San Diego uses in two years.

In 2008, the U.C. Davis data show, California exported 52 percent of its rice production, much of it to Japan. The California Rice Commission, a trade group representing 2,500 rice farmers, estimates that rice uses 2.2 million acre-feet of irrigation water yearly, about 2.6 percent of the state's total water supply. Rice exports, then, soaked up about 1.1 million acre-feet of water in 2008, or enough water to supply the city of Los Angeles for a year and eight months.

By another estimate, with every pound of rice that leaves the U.S., about 250 gallons of "virtual" or "embedded" water used in growing and processing rice leaves along with it, according to "Water Footprints of Nations," a 2004 study from the Netherlands for UNESCO (The report spawned the Web site www.waterfootprint.com.)

But Tim Johnson, president and CEO of the California Rice Commission, said water statistics and the notion that rice is a "monsoon crop grown in the desert" don't tell the whole story.

"These are the same old arguments we heard back in 1990 when California had its last drought," he said.

Rice exports help bolster Japan's aging farm base and they provide high-paying jobs at California ports, Johnson said. Moreover, he said, rice is grown on heavy clay soil that can't be used for other crops, and the paddies provide a habitat for more than 200 wildlife species.

"There's no other crop that does as much for wildlife in the West as rice," Johnson said. "The fullness of the discussion — not just how many units of water goes into an individual crop — is what's needed."

Research on virtual water trade is centered in Europe, where countries such as the Netherlands are dependent on crop imports from Brazil and other water-rich nations. Here, the virtual trade in water is viewed as beneficial because it can relieve the pressure on scarce water supplies in small countries and help developing countries farm out some of the cost of building new dams and aqueducts. Worldwide, studies show, the countries most dependent on imports of virtual water are the Netherlands, Jordan, Japan and Korea, in that order.

But organizations such as the France-based World Water Council caution that "countries can in some cases damage their environment by exporting virtual water."

The UNESCO research shows that Australia, a country now in the grips of its worst drought on record, is the largest net exporter of virtual water in the world. Recently, Australia set up an independent water authority for the first time to set sustainable limits on water use in the country's most important agricultural region. Still, no one is telling farmers what they can and can't grow.

"That is not our role," said Howard Conkey, a spokesman for the country's Department of Environment, Water, Heritage and the Arts.

As the drought deepened last fall in California, the Pacific Institute, one of the world's leading think tanks on water conservation, suggested that a shift of just 25 percent of hay and rice and other low-value, high-water-use field crops in the Central Valley to higher value, more water-efficient vegetable crops could be beneficial both to farmers and the environment.

The institute's report, "More With Less, Agricultural Conservation and Efficiency in California," estimated that such a shift would raise crop value by $5 billion and, at the same time, save 1.1 million acre-feet of irrigation water, an amount equivalent to what seven dams could provide.

Neither hay nor rice ranks in the top five California export crops in terms of total value. In 2007, according to the U.C. Davis Agricultural Issues Center, the state's top-value export crop was almonds, at $1.9 billion. Rice was eighth on the list and hay was 18th, with export values of $313 million and $134 million, respectively.

Peter Gleick, co-founder and president of the Pacific Institute, believes that if the drought "gets bad enough," politicians will start questioning how California uses its water, including for trade.

"I think it's inevitable that the growing scarcity of water is going to force policymakers to come to grips with some of these issues like appropriate exports of water," Gleick said. "We need someone challenging the way water rights are allocated."

But Dan Putnam, an alfalfa specialist with the U.C. Cooperative Extension at Davis, says the institute is "dead wrong" in its analysis of potential crop shifts in the Central Valley. Vegetables are riskier than hay, a bread-and-butter crop that pays the bills and guarantees farmers a steady cash flow, Putnam said. Alfalfa improves the soil in rotation with vegetables, he said, and it has a higher yield per unit of water than, say, walnuts or lettuce. Hay also produces more nutritional value, Putnam said, because of its importance to the dairy industry.

"If you take the viewpoint that only the highest-value uses of water should prevail, that's a policy of urbanization," he said. "A high-rise for lawyers in Sacramento will yield more dollars per unit of water than any agricultural crop. ... What does it matter whether we export hay or not? It is kind of an odd thing to ship hay to Japan, but we ship lumber around the world. We should allow farmers to make intelligent decisions about what crops to grow."

Leimgruber, the Imperial Valley hay farmer and vice chairman of the California Farm Bureau's hay advisory committee, says that's exactly what he's doing. Hay exports help the U.S. trade balance, allow products to be brought into California more cheaply, and employ a lot of local truck drivers and loaders, he said.

"I would rather use the water to grow a product we can sell to Japan than sell to a golf course to grow grass. It's a global market, a whole economic circle."

http://www.miller-mccune.com/business_economics/trading-virtual-water-1279

A Literary Legend Fights for a Local Library

By JENNIFER STEINHAUER

VENTURA, Calif. — When you are pushing 90, have written scores of famous novels, short stories and screenplays, and have fulfilled the goal of taking a simulated ride to Mars, what's left?

"Bo Derek is a really good friend of mine and I'd like to spend more time with her," said Ray Bradbury, peering up from behind an old television tray in his den.
An unlikely answer, but Mr. Bradbury, the science fiction writer, is very specific in his eccentric list of interests, and his pursuit of them in his advancing age and state of relative immobility.
This is a lucky thing for the Ventura County Public Libraries — because among Mr. Bradbury's passions, none burn quite as hot as his lifelong enthusiasm for halls of books. His most famous novel, "Fahrenheit 451," which concerns book burning, was written on a pay typewriter in the basement of the University of California, Los Angeles, library; his novel "Something Wicked This Way Comes" contains a seminal library scene.
Mr. Bradbury frequently speaks at libraries across the state, and on Saturday he will make his way here for a benefit for the H. P. Wright Library, which like many others in the state's public system is in danger of shutting its doors because of budget cuts.
"Libraries raised me," Mr. Bradbury said. "I don't believe in colleges and universities. I believe in libraries because most students don't have any money. When I graduated from high school, it was during the Depression and we had no money. I couldn't go to college, so I went to the library three days a week for 10 years."
Property tax dollars, which provide most of the financing for libraries in Ventura County, have fallen precipitously, putting the library system roughly $650,000 in the hole. Almost half of that amount is attributed to the H. P. Wright Library, which serves roughly two-thirds of this coastal city about 50 miles northwest of Los Angeles.
In January the branch was told that unless it came up with $280,000 it would close. The branch's private fund-raising group, San Buenaventura Friends of the Library, has until March to reach its goal; so far it has raised $80,000.
Enter Mr. Bradbury. While at a meeting concerning the library, Berta Steele, vice president of the friends group, ran into Michael Kelly, a local artist who runs the Ray Bradbury Theater and Film Foundation, a group dedicated to arts and literacy advocacy. Mr. Kelly told Ms. Steele that he could get Mr. Bradbury up to Ventura to help the library's cause.

On Saturday, the two organizations will host a $25-a-head discussion with Mr. Bradbury and present a screening of "The Wonderful Ice Cream Suit," a film based on his short story of the same name.
The fund-raiser's financial goal is not a long-term fix. That would come only if property taxes crawl back up or voters approve a proposed half-cent increase in the local sales tax in November, some of which would go to libraries.
Fiscal threats to libraries deeply unnerve Mr. Bradbury, who spends as much time as he can talking to children in libraries and encouraging them to read.
The Internet? Don't get him started. "The Internet is a big distraction," Mr. Bradbury barked from his perch in his house in Los Angeles, which is jammed with enormous stuffed animals, videos, DVDs, wooden toys, photographs and books, with things like the National Medal of Arts sort of tossed on a table.
"Yahoo called me eight weeks ago," he said, voice rising. "They wanted to put a book of mine on Yahoo! You know what I told them? 'To hell with you. To hell with you and to hell with the Internet.'
"It's distracting," he continued. "It's meaningless; it's not real. It's in the air somewhere."
A Yahoo spokeswoman said it was impossible to verify Mr. Bradbury's account without more details.
Mr. Bradbury has long been known for his clear memory of some of life's events, and that remains the case, he said. "I have total recall," he said. "I remember being born. I remember being in the womb, I remember being inside. Coming out was great."
He also recalled watching the film "Pumping Iron," which features Gov. Arnold Schwarzenegger in his body-building days, and how his personal recommendation of the film for an Academy Award helped spark Mr. Schwarzenegger's Hollywood career. He remembers lining his four daughters' cribs with Golden Books when they were tiny. And he remembers meeting Ms. Derek on a train in France years ago. "She said, 'Mr. Bradbury.' I said, 'Yes.' She said: 'I love you! My name is Bo Derek.' "
Ms. Derek's spokeswoman, Rona Menashe, said the story was true. She said her client would like to see some more of Mr. Bradbury, too.
Mr. Bradbury's wife, Maggie, to whom he was married for over five decades, died in 2003. He turns 89 in August.
When he is not raising money for libraries, Mr. Bradbury still writes for a few hours every morning ("I can't tell you," is the answer to any questions on his latest book); reads George Bernard Shaw; receives visitors including reporters, filmmakers, friends and children of friends; and watches movies on his giant flat-screen television.
He can still be found regularly at the Los Angeles Public Library branch in Koreatown, which he visited often as a teenager.
"The children ask me, 'How can I live forever, too?' " he said. "I tell them do what you love and love what you do. That's the story on my life."

http://www.nytimes.com/2009/06/20/us/20ventura.html?th&emc=th

1.02 Billion People Hungry: One Sixth Of Humanity Undernourished, More Than Ever Before

Poor children in Ethiopia. (Credit: iStockphoto/Klaas Lingbeek- Van Kranen)

ScienceDaily (June 20, 2009) — World hunger is projected to reach a historic high in 2009 with 1,020 million people going hungry every day, according to new estimates published by United Nation's Food and Agriculture Organization (FAO).

The most recent increase in hunger is not the consequence of poor global harvests but is caused by the world economic crisis that has resulted in lower incomes and increased unemployment. This has reduced access to food by the poor, the UN agency said.

"A dangerous mix of the global economic slowdown combined with stubbornly high food prices in many countries has pushed some 100 million more people than last year into chronic hunger and poverty," said FAO Director-General Jacques Diouf. "The silent hunger crisis — affecting one sixth of all of humanity — poses a serious risk for world peace and security. We urgently need to forge a broad consensus on the total and rapid eradication of hunger in the world and to take the necessary actions."

"The present situation of world food insecurity cannot leave us indifferent," he added.

Poor countries, Diouf stressed, "must be given the development, economic and policy tools required to boost their agricultural production and productivity. Investment in agriculture must be increased because for the majority of poor countries a healthy agricultural sector is essential to overcome poverty and hunger and is a pre-requisite for overall economic growth."

"Many of the world's poor and hungry are smallholder farmers in developing countries. Yet they have the potential not only to meet their own needs but to boost food security and catalyse broader economic growth. To unleash this potential and reduce the number of hungry people in the world, governments, supported by the international community, need to protect core investments in agriculture so that smallholder farmers have access not only to seeds and fertilisers but to tailored technologies, infrastructure, rural finance, and markets," said Kanayo F. Nwanze, President of the International Fund for Agricultural Development (IFAD).

"For most developing countries there is little doubt that investing in smallholder agriculture is the most sustainable safety net, particularly during a time of global economic crisis," Nwanze added.

"The rapid march of urgent hunger continues to unleash an enormous humanitarian crisis. The world must pull together to ensure emergency needs are met as long term solutions are advanced," said Josette Sheeran, Executive Director of the UN World Food Programme.

Hunger on the rise

Whereas good progress was made in reducing chronic hunger in the 1980s and the first half of the 1990s, hunger has been slowly but steadily on the rise for the past decade, FAO said. The number of hungry people increased between 1995-97 and 2004-06 in all regions except Latin America and the Caribbean. But even in this region, gains in hunger reduction have been reversed as a result of high food prices and the current global economic downturn.

This year, mainly due to the shocks of the economic crisis combined with often high national food prices, the number of hungry people is expected to grow overall by about 11 percent, FAO projects, drawing on analysis by the U.S. Department of Agriculture.

Almost all of the world's undernourished live in developing countries. In Asia and the Pacific, an estimated 642 million people are suffering from chronic hunger; in Sub-Saharan Africa 265 million; in Latin America and the Caribbean 53 million; in the Near East and North Africa 42 million; and in developed countries 15 million in total.

In the grip of the crisis

The urban poor will probably face the most severe problems in coping with the global recession, because lower export demand and reduced foreign direct investment are more likely to hit urban jobs harder. But rural areas will not be spared. Millions of urban migrants will have to return to the countryside, forcing the rural poor to share the burden in many cases.

Some developing countries are also struggling with the fact that money transfers (remittances) sent from migrants back home have declined substantially this year, causing the loss of foreign exchange and household income. Reduced remittances and a projected decline in official development assistance will further limit the ability of countries to access capital for sustaining production and creating safety nets and social protection schemes for the poor.

Unlike previous crises, developing countries have less room to adjust to the deteriorating economic conditions, because the turmoil is affecting practically all parts of the world more or less simultaneously. The scope for remedial mechanisms, including exchange-rate depreciation and borrowing from international capital markets for example, to adjust to macroeconomic shocks, is more limited in a global crisis.

The economic crisis also comes on the heel of the food and fuel crisis of 2006-08. While food prices in world markets declined over the past months, domestic prices in developing countries came down more slowly. They remained on average 24 percent higher in real terms by the end of 2008 compared to 2006. For poor consumers, who spend up to 60 percent of their incomes on staple foods, this means a strong reduction in their effective purchasing power. It should also be noted that while they declined, international food commodity prices are still 24 percent higher than in 2006 and 33 percent higher than in 2005.

The 2009 hunger report (*The State of Food Insecurity in the World, SOFI*) will be presented in October.

Adapted from materials provided by Food and Agriculture Organization of the United Nations.

http://www.sciencedaily.com/releases/2009/06/090619121443.htm

Online Tutorials Help Elementary School Teachers Make Sense Of Science

ScienceDaily (June 20, 2009) — Interactive Web-based science tutorials can be effective tools for helping elementary school teachers construct powerful explanatory models of difficult scientific concepts, and research shows the interactive tutorials are just as effective online as they are in face-to-face settings, says a University of Illinois expert in science education.

David Brown, a professor of curriculum and instruction in the College of Education, said that elementary school teachers need high-quality, research-based resources to help them build a meaningful scientific knowledge base.

“Refining one’s scientific knowledge base through online interactive resources can help teachers develop a deeper conceptual understanding of scientific phenomena, making them better prepared to engage students in science-based activities,” Brown said.

In any curriculum, there is teacher background literature or other forms of digested information that teachers can study to refresh their memories or get the broad stroke outlines of what they’re going to teach.

The trouble with those teaching aids, according to Brown, is that the information they contain is “usually fairly terse” and isn’t interactive or research-based.

If teachers lack confidence in their scientific knowledge base, they’re probably going to avoid situations where they might be caught flat-footed by a student’s question, because they don’t want to be asked a question they don’t know how to answer, Brown said.

So they’ll fall back on more traditional lesson plans that emphasize the rote memorization of scientific terms over inquiry-based forms of learning, such as hands-on activities and discussions of those activities.

But an emphasis on routinized learning doesn’t help students grasp the foundational science behind what they’re learning, Brown said. “If online tutorials focus on explaining the underlying scientific concepts behind the phenomena rather than on the rote memorization of facts, that can help teachers form a more meaningful conceptual understanding of what they’re going to teach,” he said. “A teacher who has a firm scientific knowledge base can then help students understand the fundamental scientific ideas and concepts behind what they’re learning better.”

To test his hypothesis, Brown developed “Making Sense of Science,” an online multimedia tutorial that tested subjects’ pre- and post-test knowledge of the scientific concept of buoyancy.

In the first 10 interviews, the average post-test score increased by 16 percent; in the second group of 10, by 28 percent; and for a group of 68 online users, by 33 percent. Similarly, Brown discovered that the average post-test confidence scores nearly doubled after the respondents interacted with the tutorials, and the written explanations of their ideas went from “somewhat incoherent” to “coherent explanations that made use of relevant ideas,” he said.

“We found that our resources were effective, and they were as effective online as they were face-to-face,” Brown said.

The tutorials were also crafted to address the perceived deficiencies that Brown thought other teacher background information and online resources suffered from.

"The resources are designed to help teachers develop their ideas," Brown said. "They're not designed for teachers to use directly with the students, but rather as background information for the teachers to develop their ideas so they'll be in a better position to engage students in activities."

Those positive results make Brown guardedly optimistic that online resources for teachers can be developed that will be helpful in advancing reform in elementary science education.

"The focus in both national and state standards is involving students in inquiry-oriented activities," he said. "This is just trying to provide a resource for teachers for what they're already being asked to do at the national and state levels."

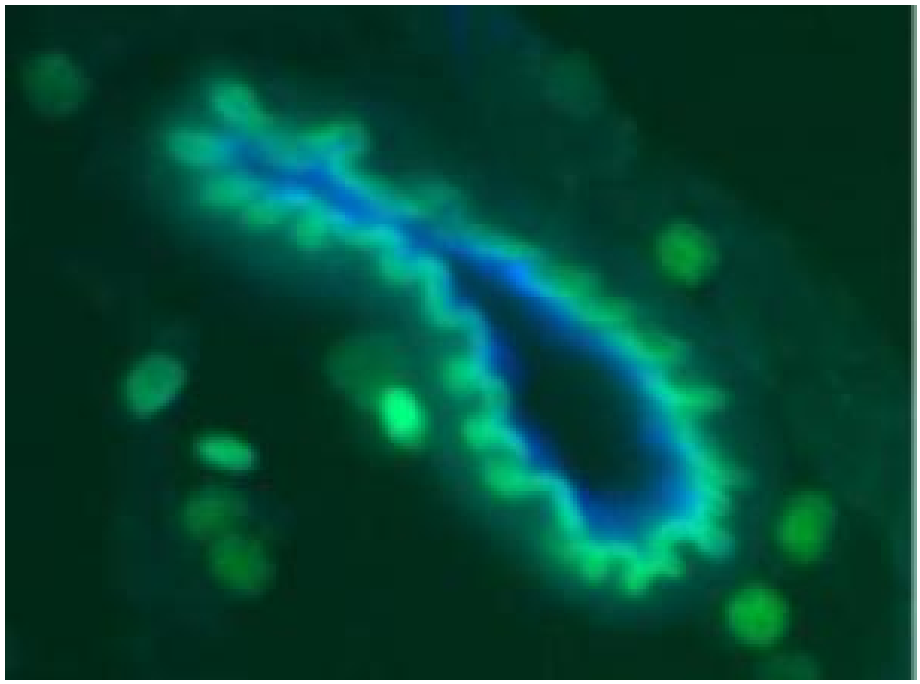
Brown believes having better prepared elementary school science teachers will ultimately lead to more students interested in science.

"There's a world of difference between a drill-and-kill lesson versus an inquiry-oriented one in terms of student engagement and retention," he said. "There's a wealth of potential there that we're not tapping into."

Adapted from materials provided by University of Illinois at Urbana-Champaign.

http://www.sciencedaily.com/releases/2009/06/090618144034.htm

Key Found To How Tumor Cells Invade The Brain In Childhood Cancer



When two chemokine receptors in the brain interact, leukemic cells (stained green) creep out of a small vein in the membrane covering the brain of a mouse and enter the cerebrospinal fluid. The chemokine CCL19, which is in the endothelium lining the vein, is stained blue in this immunofluorescent image. (Credit: NYU School of Medicine)

ScienceDaily (June 19, 2009) — Despite great strides in treating childhood leukemia, a form of the disease called T-cell acute lymphoblastic leukemia (T-ALL) poses special challenges because of the high risk of leukemic cells invading the brain and spinal cord of children who relapse.

Now, a new study in the June 18, 2009, issue of the journal *Nature* by scientists at NYU School of Medicine reveals the molecular agents behind this devastating infiltration of the central nervous system. The finding may lead to new drugs that block these agents and thus lower the risk of relapse.

T-ALL, a blood-borne cancer in which the bone marrow makes too many lymphocytes, or white blood cells, strikes several hundred children and adolescents in the U.S. annually. While greater than 90% percent go into remission through a combination of chemotherapy and radiation, up to one third of this group end up relapsing. These patients are at particular risk for tumor cells to invade the brain and spinal cord, and to prevent this all patients receive chemotherapy injections into the central nervous system and in some cases cranial irradiation—approaches that cause dangerous side effects, including secondary tumors and potentially permanent cognitive and developmental deficits.

“In general, T-cell acute lymphoblastic leukemia is treatable with chemotherapy and radiation,” said Ioannis Aifantis, PhD, associate professor of pathology and co-director of the Cancer Stem Cell Program at the NYU Cancer Institute, who led the new study. “But you have a very high rate of relapse. And after the relapse, it is not treatable because the cancer occurs in tricky places like the central nervous system,” said Dr. Aifantis, who is also an Early Career Scientist at the Howard Hughes Medical Institute.

“We are very proud of this research and very excited about the potential implications for new therapeutic approaches to prevent or reduce the spread of leukemic cells into the central nervous system,” said Vivian S. Lee MD, PhD, MBA, the vice dean for science, senior vice president and chief scientific officer of NYU Langone Medical Center.

In the new study, Dr. Aifantis and his colleagues found that a key protein receptor embedded on the outer surface of leukemic cells is responsible for infiltrating the brain and spinal cord. “What we have found is that leukemic cells over-express this receptor.” said Dr. Aifantis, “If you knock out this receptor, these cells will not go to the brain under any circumstances.”

Previous research had strongly implicated a famous gene regulator called Notch1 in the progression of T-ALL. The Notch1 gene (a mutated version gives fruit flies notched wings) is an oncogene, or cancer-causing gene, in humans. Certain kinds of mutations in this gene have been found in nearly half of all T-ALL patients, and current estimates suggest that the gene’s regulatory influence might be implicated in nearly 90 percent of all T-ALL cases.

For their new study, Dr. Aifantis and his colleagues first introduced overactive forms of Notch1 into mice. As a result, the mice developed leukemia and the leukemic cells efficiently infiltrated the inner layers of the membrane covering the brain. “What happens is that the leukemic cells get into the cerebrospinal fluidthat protects our brain and spine, where they fill up the space and they can affect brain function, either by secreting chemicals and toxic factors or even by simple pressure,” Dr. Aifantis said.

His team then examined an array of other mouse genes to identify candidates that might fall under the regulatory spell of Notch1 to promote the brain and spinal cord infiltration. The screen revealed a promising gene for a protein named CCR7, which is embedded on the surface of lymphocytes. This chemokine receptor, as it’s known, normally senses and responds to small chemical attractants called chemokines, which act like recruitment signals for lymphocytes to converge on a specific site during the body’s response to infection or injury. In leukemia, however, these lymphocytes proliferate abnormally.

CCR7 was already known as a key player in normal lymphocyte migration and as a binding partner of two chemokines named CCL19 and CCL21. Previous studies had implicated these protein interactions in the metastasis of other tumors such as melanomas and breast cancers. Dr. Aifantis’s team also discovered that the gene for CCR7 was overactive in four of five T-ALL cell lines derived from human patients, bolstering suspicions that it played a central role in the disease. Conversely, a mutation that knocked out Notch1 also led to dramatically reduced CCR7 levels.

To characterize CCR7’s potential role in T-ALL, the researchers used two sets of mice: one in which the receptor was turned on, and a second in which it was turned off. When the team delivered an identical number of human-derived leukemic cells to both sets of mice, those with the CCR7 chemokine receptor turned off lived almost twice as long. Using bioluminescent imaging, the researchers quickly understood why: animals with the active CCR7 receptor had many more tumors. Tellingly, the T-ALL cells had infiltrated the brain and spinal cord of those mice.

Further experiments suggested that when healthy mice received leukemic cells in which the gene for CCR7 had been turned off, the cells could not migrate to the brain even though they reached other body tissues. As a result, the mice survived significantly longer than counterparts with an active copy of the gene. On the other hand, introducing a normal version of the same gene to mice otherwise lacking it was enough to recruit leukemic cells to the brain and spine.

“We wanted to determine whether CCR7 by itself was sufficient for entry into the central nervous system and that’s what this experiment shows,” Dr. Aifantis said. “By changing one specific gene, you now have your function back.”

Finally, the researchers identified the small protein that acted as the “come hither” signal for the CCR7 protein receptors. One candidate, CCL21, was undetectable in leukemic mice. But a second, CCL19, appeared in tiny veins of the brain near the infiltrating tumor cells. When the researchers introduced leukemic cells carrying a gene for CCR7 to mice that naturally lacked the CCL19 chemokine, the mice survived longer, suggesting that their increased life spans might be due to a disrupted interaction of the

two proteins. The leukemic cells had no trouble infiltrating other tissue like the lymph nodes, but were completely incapable of infiltrating the brains of CCL19-deficient mice, the researchers report.

“Perhaps there are antibodies or small molecules that can block the interaction between these two proteins or reduce their interactions,” Dr. Aifantis said, “and hopefully that could be used as a type of prophylactic treatment to prevent a relapse in the central nervous system among patients who have already been treated for leukemia.” Such a treatment, he said, could prove a good alternative to the intensive and often poorly tolerated radiation and chemotherapy now used to try to block such a relapse.

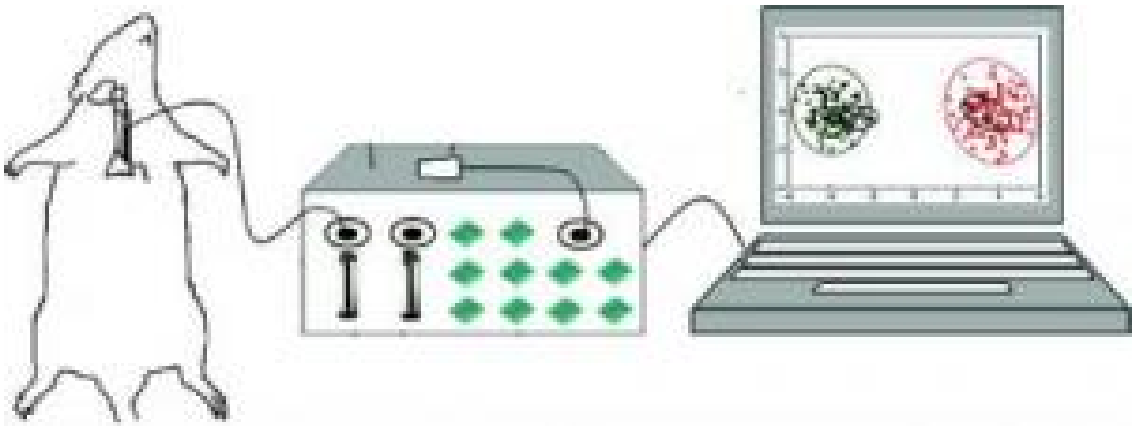
The study was led by Dr. Silvia Buonamici, a post-doctoral fellow in the laboratory of Dr. Aifantis in the Department of Pathology and the NYU Cancer Institute, and in the Helen L. and Martin S. Kimmel Stem Cell Center at NYU Langone Medical Center. Other study investigators are; Thomas Trimarchi, Maria Grazia Ruocco, Linsey Reavie, Severine Cathelin, Yevgeniy Lukyanov, Jen-Chieh Tseng, Filiz Sen, Mengling Li, Elizabeth Newcomb, Jiri Zavadil, Daniel Meruelo, Sherif Ibrahim, David Zagzag, and Michael L. Dustin from NYU Langone Medical Center; Brenton G. Mar, Apostolos Klinakis, and Argiris Efstratiadis from Columbia University Medical Center; Eric Gehrie and Jonathan S. Bromberg from Mount Sinai School of Medicine; and Martin Lipp from the Max Delbrück Center for Molecular Medicine in Berlin.

The study was supported by grants from the National Institutes of Health, the American Cancer Society, the Dana Foundation, The Chemotherapy Foundation, the Alex’s Lemonade Stand Foundation, the Lauri Strauss Leukemia foundation, the G&P Foundation, an NYU School of Medicine Molecular Oncology and Immunology training grant, the American Society of Hematology, the Juvenile Diabetes Research Foundation, the National Cancer Institute, a gift from the Berrie Foundation, and a fellowship from the Jane Coffin Childs Memorial Fund for Medical Research.

Adapted from materials provided by NYU Langone Medical Center / New York University School of Medicine.

http://www.sciencedaily.com/releases/2009/06/090617131350.htm

Toward An 'Electronic Nose' To Sniff Out Kidney Disease In Exhaled Breath



Scientists report advances toward an "electronic nose" that could detect kidney disease. (Credit: The American Chemical Society)

ScienceDaily (June 19, 2009) — Scientists in Israel have identified the key substances in exhaled breath associated with healthy and diseased kidneys — raising expectations, they say, for development of long-sought diagnostic and screening tests that literally sniff out chronic renal failure (CRF) in its earliest and most treatable stages.

In the new study, Hossam Haick and colleagues point out that the blood and urine tests now used to diagnose CRF can be inaccurate and may come out "normal" even when patients have lost 75 percent of their kidney function. The most reliable test, a kidney biopsy, is invasive and may result in infections and bleeding. Doctors have long hoped for better tests for early detection of kidney disease.

The scientists describe tests of an experimental "electronic nose" on exhaled breath of laboratory rats with no kidney function and normal kidney function. The device identified 27 so-called volatile organic compounds that appear only in the breath of rats with CRF.

The results presented in this study "raise expectations for future capabilities for diagnosis, detection, and screening various stages of kidney disease," they said, noting that the tests could detect patients with early disease who could be treated in ways that could slow its progression.

Journal reference:

1. Haick et al. **Sniffing Chronic Renal Failure in Rat Model by an Array of Random Networks of Single-Walled Carbon Nanotubes**. *ACS Nano*, 2009; 3 (5): 1258 DOI: 10.1021/nn9001775

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com/releases/2009/06/090615100053.htm

Teens Are Heading In Wrong Direction: Likely To Have Sex, But Not Use Contraception

ScienceDaily (June 19, 2009) — Between 2003 and 2007, the progress made in the 1990s and early 2000s in improving teen contraceptive use and reducing teen pregnancy and childbearing stalled, and may even have reversed among certain groups of teens, according to a new study. Between 1991 and 2003, teens' condom use increased while their use of no contraceptive method declined, leading to a decreased risk of pregnancy and to declines in teen pregnancy and childbearing. The new findings paint a very different picture since 2003.

The study was performed by John S. Santelli, MD, MPH, professor and chair of the Heilbrunn Department of Population and Family Health at Columbia University Mailman School of Public Health in conjunction with researchers at Guttmacher Institute.

Using data from young women in grades 9–12 who participated in the Youth Risk Behavior Survey, the authors estimated teens' risk of becoming pregnant based on their sexual activity, the contraceptive method they used and the effectiveness of that method in preventing pregnancy. The authors found no change in teen sexual activity between 2003 and 2007, but did find a small decline in contraceptive use.

"After major improvements in teen contraceptive use in the 1990s and early 2000s, which led to significant declines in teen pregnancy, it is disheartening to see a reversal of such a positive trend," says Dr. Santelli. "Teens are still having sex, but it appears many are not taking the necessary steps to protect themselves from unwanted pregnancy or sexually transmitted infections."

Previous research by the Mailman School of Public Health and Guttmacher Institute showed that contraceptive use was a key factor in reducing teen pregnancy rates in the 1990s, despite little significant change in teen sexual activity. The authors suggest that the recent decline in teen contraceptive use since 2003 could be the result of faltering HIV prevention efforts among youth, or of more than a decade of abstinence-only-until-marriage sex education that does not mention contraception unless it is to disparage its use and effectiveness.

This reversal in contraceptive use is consistent with increases in the teen birth rate in 2006 and 2007 as reported by the Centers for Disease Control and Prevention (CDC), and may well portend further increases in teen pregnancies and births in 2008. The authors recommend reinvigorated efforts at both the state and national levels to promote contraceptive use among teens through medically accurate sex education and increased access to health services, to effectively address the problem of teen pregnancy. The Western European experience in reducing teen pregnancy and childbearing—with rates that are far lower than in the United States—suggests that efforts to improve teen contraceptive use are warranted.

Journal reference:

1. John S. Santelli, Mark Orr, Laura D. Lindberg and Daniela C. Diaz. **Changing Behavior Risk for Pregnancy Among High School Students in the United States, 1991-2007**. *Journal of Adolescent Health*, 2009

Adapted from materials provided by Columbia University's Mailman School of Public Health.

http://www.sciencedaily.com/releases/2009/06/090618084306.htm

Feverish Liaisons

By KATIE ROIPHE

A VINDICATION OF LOVE

Reclaiming Romance for the Twenty-First Century

By Cristina Nehring

328 pp. Harper/HarperCollins Publishers. $24.99

For most of us love is largely a matter of shared mortgage payments, evenings curled up on the couch in front of a video, or maybe a night in a hotel for an anniversary. But Cristina Nehring has a different idea. Her ardent polemic, "A Vindication of Love," puts forward a darker, more demanding vision of love. This is not, it should be said right away, a book without ambition: the subtitle is "Reclaiming Romance for the Twenty-First Century," though it is not exactly romance Nehring is writing about, but a more difficult, vital image of passion she believes we have lost.

"We have been pragmatic and pedestrian about our erotic lives for too long," she writes, and in an examination of real and invented figures from the Wife of Bath to Frida Kahlo, she revels in love affairs that do not rely on our more hackneyed narratives. The result of Nehring's literary and historical inquiry is a celebration of the wilder, messier connections. Her heroes and heroines tend to die, like Young Werther, who shoots himself; or try to die, like Mary Wollstonecraft, who throws herself off a bridge; or suffer, like Abelard and Heloise, one of whom is castrated and one of whom ends up in a nunnery. And yet Nehring admires these flamboyant men and women for the creative force of their affairs, for their ability to live outside the lines, for the ferocity of their feelings. She sees our modern goals of marriage, security and comfort as limited and sad, and quotes approvingly Heloise's statement to Abelard: " 'I looked for no marriage bond,' she flashed. 'I never sought anything in you but yourself.' "

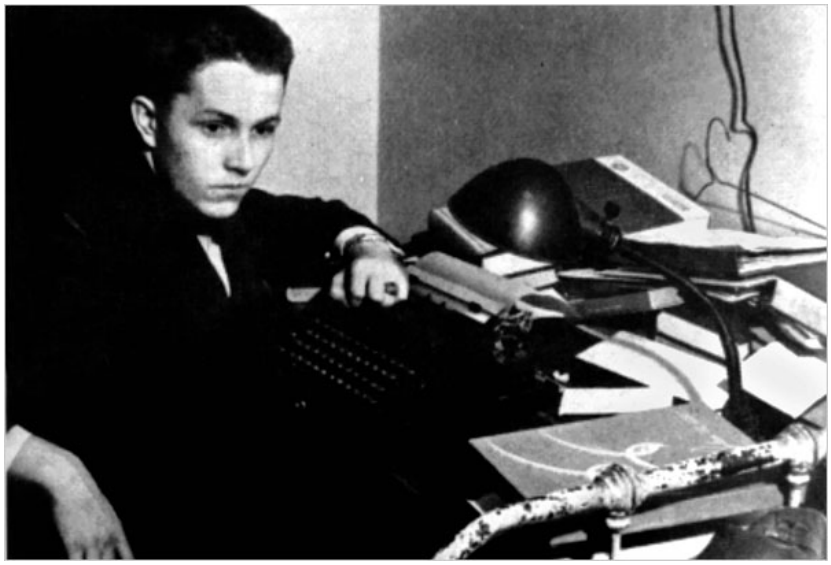
In her most provocative and interesting chapters, Nehring argues for the value of suffering, for the importance of failure. Our idea of a contented married ending is too cozy and tame for her. We yearn for what she calls "strenuously exhibitionistic happiness" — think of family photos on Facebook — but instead we should focus on the fullness and intensity of emotion. She writes of Margaret Fuller: "Fuller's failures are several times more sumptuous than other folks' successes. And perhaps that is something we need to admit about failure: It can well be more sumptuous than success. . . . Somewhere in our collective unconscious we know — even now — that to have failed is to have lived."

Nehring sees in the grandeur of feeling a kind of heroism, even if the relationship doesn't take conventional form or endure in the conventional way. For Nehring, one senses, true failure is to drift comfortably along in a dull relationship, to spend precious years of life in a marriage that is not exciting

or satisfying, to live cautiously, responsibly. Is the strength of feeling redeemed in the blaze of passion even if it does not end happily? she asks. Is contentment too soft and modest a goal?
Elsewhere, Nehring interrogates our steadfast insistence on balanced, healthy relationships, our readiness to condemn doomed, impossible entanglements. She argues that it may in fact be a sign of health to enter into a relationship that is turbulent, demanding or unorthodox. She praises long-distance relationships, arduous relationships, relationships with men who are elusive, relationships the therapeutic culture adamantly opposes. She asks, "Could it be that the choice of a challenging love object signals strength and resourcefulness rather than insecurity and psychological damage, as we so often hear?"
If there is anything unsatisfying about this fierce and lively book, it is a slight evasiveness at its core. Nehring does not quite take on the vast continent of quietly married people who must be her target. She attacks the blandness of our current forms of love without directly describing or explaining that blandness. Instead she spends too much time on self-help books like "He's Just Not That Into You" and not enough on the specifics of the way we live now. Yet in spite of this tactfulness, this polite vagueness at the heart of the book, she brings to life riveting stories and offers creative interpretations that, taken together, challenge current convention.
At various points, Nehring allows her rhetoric to outrun common sense. "To be respected as a thinker in our world, a woman must cease to be a lover," she writes. This is a nice flourish, but is it true? When one glances back at the women intellectuals of the last century, it seems not. Mary McCarthy, Rebecca West and Susan Sontag, for instance, all had colorful and irregular romantic lives and nonetheless managed to be taken quite seriously.
In her unapologetically subjective readings of literature and culture, Nehring goes in for a certain amount of melodrama and overstatement — "I embrace generalization," as she puts it — but in many ways this is the appeal, the freshness of the book. "A Vindication of Love" takes itself more seriously than does its distant cousin, Laura Kipnis's clever but coy manifesto "Against Love." Nehring is writing in a previous mold, in the lost tradition of the Simone de Beauvoirs and Mary Wollstonecrafts that existed before the clotted irony, the obligatory, cool self-mockery, the endlessly indulgent self-deflation so popular today.
The book raises practical questions. Can one actually live according to the rich and exhausting principles Nehring sets out? In the final pages, she offers this glimpse of her own life: "As I write these words, I bear the bodily scars of a loss or two in love. I have been derailed by love, hospitalized by love, flung around five continents, shaken, overjoyed, inspired and unsettled by love." Here is the essence of her vision: brutal, vivid, demanding, deranged. It is perhaps a little easier to fulfill this vision, to love fully, to surrender practical daily concerns to the whims and ardors of strong feeling, if you are not responsible for anyone else. Nehring also mentions that she has a newborn baby girl, and one wonders if this will temper her freedom and the storminess of her view. She does, however, give the example of Wollstonecraft, who took her illegitimate baby on a boat to Scandinavia, on a dangerous adventure unheard of for a woman alone, in the service of a difficult man she loved, and managed to write an excellent and popular book about it.
"With our cult of success," Nehring writes, "we have all but obliterated the memory that in pain lies grandeur." There is a romanticism here that could look, depending on where you stand, either pure or puerile, either bracing or silly, but it is, either way, an original view, one not generally taken and defended, one most of us could probably use a little more of. Nehring takes on our complaisance, our received ideas, our sloppy assumptions about our most important connections, and for that she deserves our admiration.
Even if one doesn't take her outlandish romantic arguments literally, this is one of those rare books that could make people think about their intimate lives in a new way. We do suffer, after all, from a certain lack of imagination when it comes to personal relationships. A solid, freckled 5-year-old from my daughter's class recently came up to me on seeing that I was pregnant. "Are you going to get married?" she demanded, hands on hips. "Not now," I said. Which either is or is not a vindication of love.
Katie Roiphe teaches in the Cultural Reporting and Criticism program at New York University and is the author of "Uncommon Arrangements: Seven Marriages."

http://www.nytimes.com/2009/06/21/books/review/Roiphe-t.html?_r=1&8bu&emc=bua1

Michael Harrington: Warrior on Poverty
By MAURICE ISSERMAN



If there is a heaven, and it has a place for virtuous skeptics, I imagine Michael Harrington is looking down, amused by the recent cover of Newsweek proclaiming, "We Are All Socialists Now," not to mention Newt Gingrich's lament that the United States is seeing "European socialism transplanted to Washington." Back in the 1960s, Harrington had some experience trying to "transplant" some socialist ideas to Washington — and the results were rather different from what he had hoped.

Fifty years ago this July, Commentary magazine (at the time a journal of bracingly liberal sentiments) ran Harrington's article "Our Fifty Million Poor," in which he sought to overturn the conventional wisdom that the United States had become an overwhelmingly middle-class society. Using the poverty-line benchmark of a $3,000 annual income for a family of four, he demonstrated that nearly a third of the population lived "below those standards which we have been taught to regard as the decent minimums for food, housing, clothing and health."

Harrington's own knowledge of poverty was decidedly secondhand. Born in 1928 in St. Louis and educated at Holy Cross, Yale Law School and the University of Chicago, he moved to New York City in 1949 to become a writer. In 1951 he joined Dorothy Day's Catholic Worker movement as a volunteer at its soup kitchen. Within a few years he left the Catholic Worker (and the Roman Catholic Church) and joined the Young People's Socialist League, the youth affiliate of the battered remnants of the American Socialist Party.

In researching the Commentary essay, Harrington picked up the notion of the "culture of poverty," a casual bit of intellectual borrowing with fateful consequences. The phrase was coined by the anthropologist Oscar Lewis, who contended that being poor was not simply a condition marked by the absence of wealth; rather, poverty created "a subculture of its own," and those raised within it were unlikely to escape. However different their places of origin, he argued, poor people in Mexico might have more in common with their counterparts in New York than with better-off people from their own countries.

Echoing Lewis, Harrington argued that American poverty constituted "a separate culture, another nation, with its own way of life." He elaborated on this idea in "The Other America: Poverty in the United States," published in the spring of 1962. It was a short work with a simple thesis: poverty was both more extensive and more tenacious than most Americans assumed. An "invisible land" of the poor existed in rural isolation or in crowded slums where middle-class visitors seldom ventured. "That the poor are invisible is one of the most important things about them," Harrington wrote. "They are not simply neglected and forgotten. . . . What is much worse, they are not seen."

Harrington argued that poor Americans were "people who lack education and skill, who have bad health, poor housing, low levels of aspiration and high levels of mental distress. . . . And if one problem is solved, and the others are left constant, there is little gain." Instead of relying on a rising tide of affluence

to lift all boats, he argued, America needed a broad program of "remedial action" — a "comprehensive assault on poverty."
Harrington said he would be happy if "The Other America" sold 2,500 copies. Instead, it sold 70,000 within a year (and well over a million in successive editions). Among the book's readers, reputedly, was John F. Kennedy, who in the fall of 1963 began thinking about proposing antipoverty legislation. After Kennedy's assassination, Lyndon Johnson took up the issue, calling in his 1964 State of the Union address for an "unconditional war on poverty." Sargent Shriver headed the task force charged with drawing up the legislation, and invited Harrington to Washington as a consultant.
In February 1964 Harrington helped write a background paper, working with the radical writer Paul Jacobs and a Labor Department aide named Daniel Patrick Moynihan, an old drinking partner from the Greenwich Village days. The memo argued that "if there is any single dominant problem of poverty in the U.S., it is that of unemployment." The solution was a return to the model of the New Deal, creating massive public works projects to end unemployment and redistribute income to those most in need.
But of what relevance was the concept of the "culture of poverty" if all that was needed to counter it was jobs? In "The Other America," Harrington used the concept interchangeably with "vicious circle of poverty" — by which he meant poor living conditions leading to poor health, poor attendance at school or work, and so on. Nothing in this "vicious circle" was culturally rooted in the sense that Oscar Lewis had argued — so at any point additional income would suffice to break the circle.
Jobs programs, however, were expensive: the Works Progress Administration had cost $5 billion in 1936, and Johnson had made it clear that appropriations for his "unconditional" war on poverty had to be brought in under a billion dollars for the coming year. The strategy was to help the poor to improve themselves — a "hand up, not a handout," as Shriver put it. The resulting legislation, passed in August 1964, provided funds for preschool education, community action agencies, legal services and the like, but did little directly to provide jobs and income for the poor.
Harrington's active involvement with the war on poverty came to an end after his month of consulting. But Moynihan continued to fight for their alternate strategy from his Labor Department post. His famous 1965 position paper, "The Negro Family: The Case for National Action," better known as the Moynihan Report, was bitterly attacked from the left for describing the urban black family as a "tangle of pathology." Less noted was his continued advocacy of an expanded federal jobs program.
Indeed, that aspect of Moynihan's and Harrington's thinking was roundly rejected by the group of thinkers who ultimately carried the day on poverty. In the 1970s, neoconservatives — former liberals disillusioned with the welfare state (Harrington himself popularized the term in a 1973 article) — neatly turned the argument of "The Other America" on its head, arguing that welfare programs only strengthened the culture of poverty by encouraging single-parent families and discouraging work. The poor, in their view, would be better served by dismantling the welfare state and instituting tougher neighborhood policing than through further meddling by would-be social engineers. When Bill Clinton ran for office pledging to "end welfare as we know it," it was clear who had won the political argument.
In 1999, Time magazine named "The Other America" one of the 10 most influential nonfiction books of the 20th century. But how relevant does it remain today? As social theory, it is deeply flawed. Harrington's culture-of-poverty thesis was at best ambiguous, at worst an impediment to making the case for what he regarded as the real solution. (In later books, he made no use of the term.)
But what remains fresh and vital in "The Other America" is its moral clarity. Harrington argued that Americans should be angry and ashamed to live in a rich society in which so many remained poor. "The fate of the poor," he concluded, "hangs upon the decision of the better-off. If this anger and shame are not forthcoming, someone can write a book about the other America a generation from now and it will be the same or worse."
Today the poor are no longer invisible, thanks to writers like William Julius Wilson, Alex Kotlowitz and Adrian Nicole LeBlanc, and to a popular culture that has young people in middle-class suburbs emulating the styles of the inner city. But Harrington's prediction is otherwise correct. For all the changes ushered in by the 2008 election, a renewed war on poverty does not seem to be in the offing.
Maurice Isserman is a professor of history at Hamilton College and the author of "The Other American: The Life of Michael Harrington."

http://www.nytimes.com/2009/06/21/books/review/Isserman-t.html?8bu&emc=bub1

Into the Fray
By ROSS DOUTHAT

DIGITAL BARBARISM

A Writer's Manifesto

By Mark Helprin

232 pp. Harper/HarperCollins Publishers. $24.99

One of the more trenchant cartoons of the Internet era features a stick-figure man typing furiously at his keyboard. From somewhere beyond the panel floats the irritated voice of his wife.
"Are you coming to bed?"
"I can't," he replies. "This is important."
"What?"
"Someone is wrong on the Internet."
If you can't recognize this impulse, then you've probably never kept a blog, frequented a message board or engaged in an e-mail round robin over some obscure controversy. The Internet multiplies arguments as swiftly as it multiplies pornographic images, to a similarly addictive effect. And it multiplies cautionary tales as well — feuds better left unfeuded, and rabbit holes that have swallowed writers whole.
Tellingly, it's often older scriveners, unaccustomed to having their sallies met by waves of insta-disputation, who flail their way into embarrassment. Think of the sportswriter Buzz Bissinger, who's probably better known to younger fans — thanks to YouTube's unkind ministrations — for a spittle-flecked rant against blogging, delivered on Bob Costas's HBO roundtable last spring, than he is for writing "Friday Night Lights." Think of Lee Siegel, the scourge of literary cant, who was so overwhelmed by Internet hostility that he resorted to "sock puppetry," creating an online alter ego who hotly defended the "brave" and "brilliant" Siegel (that is, himself) in The New Republic's online comments section.
The novelist Mark Helprin is the latest distinguished writer to come undone this way. In 2007, he published an essay in the Op-Ed section of this newspaper arguing for the continuing extension of copyright, so that the rights to a novel or poem could be passed down not only to the author's children, but to his children's children's children as well. Since a more latitudinarian copyright regime is a cause célèbre for a certain class of Internetista, his argument ignited a storm of criticism, and the comments appended to the online version of the article ran into the hundreds of thousands. And since this was, after all, the Internet, most of them were stupid.
Helprin could have ignored the barrage; he could have sifted it for arguments worth replying to. Instead, he decided to write a furious treatise against the comment-happy horde. The resulting book, "Digital Barbarism: A Writer's Manifesto," is a vindication of the aphorism about the perils of wrestling with a pig. (You get dirty; the pig likes it.) Helprin can be a wonderful wordsmith, and there are many admirable passages and strong arguments in this book. But the thread that binds the work together is hectoring, pompous and enormously tedious.
"One could write a Talmud," Helprin notes at one point, "in reaction to the oceans of material supplied by commentators who either deliberately or otherwise (probably otherwise) cannot grasp the meaning of a simple sentence." True — but this does not mean that one should. In particular, one should never, ever

write a book that includes, in its footnotes, “Posting No. 12” from thelede.blogs.nytimes.com, or “Posting 3:41” from missnemesis.blogspot.com — or comments by “Peep,” “Constantine” and “Anon,” from Matthew Yglesias’s blog. Helprin acknowledges the peculiarity of arguing with anonymous commenters rather than training his fire on more intellectually serious targets. “Why talk to the monkey when the organ grinder is in the room?” he wonders, quoting Churchill; the answer, he explains, is that in this case only the monkeys really matter. “The philosophical basis of the war on copyright is crackpot and stillborn,” and “apart from unavoidable forays, it is best to stay out of such thickets.” Instead, the battle should be waged “wherever the gnats in their millions crudely make real the musings of the Mad Hatters.”

As the tone of that last line suggests, alas, it’s hard to write a polemic premised on the assumption that your opponents are monkeys without sounding like a particularly high-vocabulary monkey yourself. Helprin variously describes his foes as “wacked-out muppets,” “crapulous professors,” “regular users of hallucinogenic drugs,” “a My Little Pony version of the Khmer Rouge,” “a million geeks in airless basements,” “mouth-breathing morons in backwards baseball caps and pants that fall down” and so forth. The overall effect is like listening to an erudite gentleman employing $20 words while he screams at a bunch of punk kids to get off his front lawn.

Here it’s worth contrasting “Digital Barbarism” with a book by one of the “crapulous professors” in question — Stanford’s Lawrence Lessig, whose “Free Culture,” a 2004 brief against the current state of copyright law, provides a touchstone for the movement Helprin hates. Lessig is not a tenth the writer that Helprin is, but he has other gifts — the ability to argue in a calm and ordered fashion; the capacity to at least pretend to give the other side its due; and the ability to avoid fevered prose and name-calling while making a controversial case. He may be a Mad Hatter, but he comes across as deeply sane, and it’s hard to imagine a reader new to this debate who wouldn’t find “Free Culture” more convincing than “Digital Barbarism.”

This doesn’t mean that Lessig is right and Helprin is not. On the broader question of Internet culture, Helprin’s pessimistic vision has a great deal to recommend it. Where the critics of copyright perceive the Internet age as a potential Renaissance being blocked by overconsolidated corporations, Helprin worries, plausibly, that the spirit of perpetual acceleration threatens to carry all before it, frenzying our politics, barbarizing our language and depriving us of the kind of artistic greatness that isn’t available on Twitter feeds. The fact that he gave in to the frenzy himself is regrettable, but it doesn’t make him wrong.

On the narrower question of how and whether copyright law should be adjusted, meanwhile — and it is a narrow question, the claims of both sides notwithstanding — there might actually be a middle ground. Helprin is persuasive when he argues that copyright’s disappearance would be a slow-motion disaster, and plausible when he argues that the direct costs of letting his descendants continue to profit from sales of “A Soldier of the Great War” are minor or even nonexistent. But Lessig and company are equally plausible when they suggest that the copyright laws that protect the Helprin family’s intellectual property can be misused, usually by lawyered-up corporations, to block the kind of creative borrowing and reworking that early generations of artists took for granted.

Why not, then, simultaneously extend copyright and narrow its scope? Let the Helprins continue to earn royalties into the distant future, but let adaptations, derivations, parodies and borrowing flower more quickly and completely than the current system allows. Leave the Tolkiens the rights to “The Hobbit”in perpetuity, but not the right to prevent two enterprising film companies from going forward with competing adaptations. Leave the Mitchells the rights to “Gone With the Wind,” but not the right to tie up a would-be parodist in court for years on end because they don’t like what she’s doing to their Scarlett. Leave the Lucas family the right to “Stars Wars,” but not the right to prevent me from writing my own competing version of Anakin Skywalker’s life story.

Maybe this sort of system would turn out to be impractical. But it’s only one of the many bridges one could imagine between a principled defense of artistic property rights and a principled defense of artistic freedom. It’s a shame that Helprin was too busy wrestling with the monkeys and mouth-breathing morons to try building it.

Ross Douthat is an Op-Ed columnist at The Times.

http://www.nytimes.com/2009/06/21/books/review/Douthat-t.html?8bu&emc=bua2

Global Imperative

By GARY ROSEN

THE AGE OF THE UNTHINKABLE

Why the New World Disorder Constantly Surprises Us and What We Can Do About It

By Joshua Cooper Ramo

Little, Brown & Company. 279 pp. $25.99

Whatever else might be said about "The Age of the Unthinkable," you can't accuse its author, Joshua Cooper Ramo, of trying to kiss up to his boss. Ramo is the managing director of Kissinger Associates, the controversial "geostrategic advisory firm" founded by the former secretary of state, but his new book is, among other things, a sustained critique of Kissinger-style geostrategy. As Kissinger told a reporter for The New Yorker at a party he recently held to celebrate his young protégé, the book "has one basic theme that is a little difficult for me, which is that my generation is sort of a bunch of dodos."

As Ramo would have it, we live in a "revolutionary age," defined by problems whose complexity, unpredictability and interconnectedness increasingly defy our efforts at control (consider: terrorism, global warming, pandemic, financial meltdown). States no longer dominate, "new actors" abound, and the day belongs to the fleet and adaptive. These threatening new dynamics demand, in Ramo's view, nothing less than "a complete reinvention of our ideas of security," even the reversal of "a couple of millennia of Western intellectual habits." Outmoded notions like deterrence and balance of power must give way to the new "defining concept" of "resilience." We must "innovate" and "keep learning," as a society and in our dealings with the rest of the world.

To find instances of such thinking, Ramo (who worked previously as an editor at Time) parachutes into all the favored locales of globe-trotting power journalists. We meet a venture-capital titan in Silicon Valley, an AIDS doctor in South Africa and an Israeli spy chief; spend time at a high-tech military expo in China and with a reflective Mikhail S. Gorbachev; and bump along the bombed-out roads of southern Lebanon in order to learn the "management secrets of Hezbollah." We also encounter various intellectual figures who embody, for Ramo, the right sort of holistic thinking and appreciation for complexity, from Gertrude Stein and Picasso to the ancient Chinese military strategist Sun Tzu and the Danish physicist Per Bak, whose work on cascading sand piles provides Ramo with a metaphor for the possibility of unpredictable, catastrophic change.

The formula on display here — reported vignettes, grand theorizing, surprising juxtapositions — will be familiar to readers of Thomas L. Friedman and Malcolm Gladwell, and Ramo executes it with verve. But his hyperbolic thesis and often breathless presentation don't help his case. It is hard to find a serious observer of the international scene who denies the novel dangers he describes or the need to think creatively about how to address them. Even with the example of Iraq, Ramo's textbook case of old thinking gone awry, he notes that there were many (ignored) government experts who predicted the likely complexity of the postwar situation and that American policy makers over the past several years have made sophisticated adjustments. Ramo's "revolutionary" thinking, it would seem, has already taken hold in the halls of the Pentagon.

Nor is it clear that states and their traditionally defined interests can be pushed so easily to the margins of foreign policy discussion. Henry Kissinger is many things, but he's no "dodo." States will continue to matter, as will their forms of government. Ramo shares Kissinger's distaste for viewing the world through an ideological frame, but this leaves a great gap in his analysis. In the trying times ahead, the resilience and flexibility of nations will depend on nothing so much as their overarching principles of legitimacy and decision making.

Gary Rosen is the chief external affairs officer of the John Templeton Foundation and the former managing editor of Commentary.

http://www.nytimes.com/2009/06/21/books/review/Rosen-t.html?8bu&emc=bua2

Painkiller ban 'has cut suicides'

The controversial withdrawal of a common painkiller has dramatically cut suicides, say researchers.

A gradual phase-out of co-proxamol led to 350 fewer suicides and accidental deaths in England and Wales, a study in the British Medical Journal reports.

Regulators removed the drug's licence in 2007 after fears about the risk of overdose but the move proved unpopular with some patients and doctors.

Arthritis Care says some patients now struggle to control their pain.

The Medicines and Healthcare Products Regulatory Agency announced the withdrawal in 2005.

" **There is no robust evidence that co-proxamol offers any advantage over paracetamol or ibuprofen at normal doses** "
MHRA spokesman

GPs were encouraged to move patients to other painkillers before the drug's licence was revoked in 2007.

After that time doctors could prescribe the drug on a "named patient basis" for those who could not manage their pain with alternatives but as it is unlicensed they did so at their own risk.

Study leader Professor Keith Hawton, director of the Centre for Suicide Research at Oxford University, said before the restrictions co-proxamol was responsible for a fifth of all drug-related suicides.

By the 2007 deadline, prescribing of the drug had fallen by 59%, his analysis showed.

Over the two-year period, deaths from co-proxamol fell by 62%.

Specifically there were 295 fewer suicides and 349 fewer deaths from the drug including accidental overdoses.

The research also showed that had been no increase in deaths from other painkillers, despite large increases in their use.

Initiative 'effective'

Professor Hawton said authorities in the US were now considering withdrawing co-proxamol, which is a mixture of paracetamol and an opioid drug.

"This marked reduction in suicides and accidental poisonings involving co-proxamol during this period, with no evidence of an increase in deaths involving other analgesics, suggests the initiative has been effective," he added.

In 2008, there were 380,831 prescription items for co-proxamol, showing some GPs are still prescribing the drug.

A spokesman for the Medicines and Healthcare Products Regulatory Agency (MHRA) said prior to its withdrawal co-proxamol was involved in 300-400 self-poisoning deaths each year, of which around a fifth were accidental.

"Co-proxamol is extremely dangerous in overdose - only a small overdose can be fatal, and death can occur very rapidly - before medical attention can be sought."

He added: "There is no robust evidence that co-proxamol offers any advantage over paracetamol or ibuprofen at normal doses."

But Federico Moscogiuri, head of policy and campaigns at Arthritis Care, said many people who used to be prescribed co-proxamol were now struggling to control their pain.

A survey done last year by the charity found most people could no longer get prescriptions of the drug from their GPs and many said they had not found an effective alternative.

"For them, co-proxamol makes the difference between being able to perform simple everyday activities and living in chronic, debilitating pain.

"This is an intolerable situation for a society committed to high quality care for all.

"If the named patient system is to work, GPs should feel supported in prescribing co-proxamol for patients who really need it."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8107546.stm

Published: 2009/06/18 23:56:12 GMT

Green tea 'slows prostate cancer'

A chemical found in green tea appears to slow the progression of prostate cancer, a study has suggested.

Green tea has been linked to a positive effect on a wide range of conditions, including heart disease, cancer and Alzheimer's disease.

The research, in the US journal Cancer Prevention Research, found a significant fall in certain markers which indicate cancer development.

A UK charity said the tea might help men manage low-risk tumours.

" **This could mean completely avoiding, in some cases, any of the more usual medical interventions and their associated side effects** "
John Neate, The Prostate Cancer Charity

Although previous studies have shown benefits from drinking green tea - including some positive findings in relation to prostate cancer, there have been mixed results.

In this study, Philadelphia-based researchers tested a compound called Polyphenon E.

They were looking for a number of biomarkers - molecules - including vascular endothelial growth factor (VEGF) and hepatocyte growth factor (HGF) which are indicators of developing cancer.

They also looked for prostate specific antigen (PSA) - a protein only found in the prostate. Levels can rise if cancer is present.

'12 cups'

The study included 26 men, aged 41 to 72 years, who had been diagnosed with prostate cancer and who were scheduled for radical prostate surgery.

Patients took four capsules containing Polyphenon E for an average of 34 days, up until the day before surgery - the equivalent of around 12 cups of normally brewed concentrated green tea.

The study found a significant reduction in levels of HGF, VEGF and PSA, with some patients demonstrating reductions of more than 30%.

Dr James Cardelli, from the Feist-Weiller Cancer Center, who led the study, said the compound, which was provided by the company Polyphenon Pharma, "may have the potential to lower the incidence and slow the progression of prostate cancer."

There were only a few reported side effects associated with this study, and liver function remained normal.

Dr Cardelli said: "We think that the use of tea polyphenols alone or in combination with other compounds currently used for cancer therapy should be explored as an approach to prevent cancer progression and recurrence."

"There is reasonably good evidence that many cancers are preventable, and our studies using plant-derived substances support the idea that plant compounds found in a healthy diet can play a role in preventing cancer development and progression."

'Keep progression at bay'

John Neate, chief executive of the Prostate Cancer Charity, said: "There have been several studies into green tea and its potential benefits, but there is, as yet, no conclusive evidence.

"The results of this study do suggest that there is merit in further research into the effects of extracts of green tea, both in relation to its impact on the prevention of prostate cancer and in controlling progression in men already diagnosed with the disease, as was investigated in this instance."

"These initial positive findings could indicate that green tea could have a place in 'active surveillance', where a slow-growing, low risk tumour is monitored for changes and men want to take something which could help keep progression at bay.

"Potentially, this could mean completely avoiding, in some cases, any of the more usual medical interventions and their associated side effects."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8108831.stm

Published: 2009/06/19 23:00:53 GMT

'Surprise' prostate result probed

Researchers are probing an unexpected success in a study of an experimental treatment for prostate cancer.

In three men with advanced disease, use of an immune drug called ipilimumab, shrank their tumours to such an extent surgeons were able to operate.

The Mayo Clinic team in the US said the "startling" results in the study of 108 men had prompted them to set up a second trial using higher doses.

One UK expert said there were currently few treatments for advanced disease.

In men with advanced prostate cancer, which has spread outside the prostate, surgery cannot usually be done.

" **If these early and small scale results are replicated in larger trials, this represents a potentially very exciting development** "
John Neate, The Prostate Cancer Charity

Hormone therapy is usually given to try to shrink the tumour to some degree and buy some time.

The trial was set up to see if MDX-010, a type of drug called a monoclonal antibody, would improve on hormone treatment.

The idea is that the drug will encourage a strong immune response to attack the cancer cells.

Half the men had normal therapy and half also received MDX-010.

In three cases, where the experimental drug was given, the tumours shrank dramatically, enabling surgeons to operate and remove the tumour.

There are 20 other patients who are showing improvements and who are being monitored by the surgeons.

'Preliminary'

Dr Eugene Kwon, a surgeon at the Mayo Clinic in Rochester, said the results in those men were well beyond their expectations.

"Our surgeons had never seen this happen before and we were really taken by surprise."

They are now planning a trial in 30 men to test higher doses of the drug and hope to start much larger trials across many hospitals shortly after.

Dr Michael Blute, study leader and the surgeon involved said: "I had never seen anything like this before. I had a hard time finding the cancer.

"At one point the pathologist (who was working during surgery) asked if we were sending him samples from the same patient."

Until large scale studies are carried out it is unclear whether this response can be repeated in other patients or is an anomaly.

But John Neate, chief executive of The Prostate Cancer Charity said they would wait for further results with anticipation.

"If a cancerous tumour has spread beyond the prostate gland, it would currently be regarded as inoperable and alternative types of treatment, typically hormone therapy are necessary.

"If these early and small scale results are replicated in larger trials, this represents a potentially very exciting development.

"We urgently need a wider range of treatment options for prostate cancer which has spread outside the prostate gland.

"It must be remembered that this is a small trial however, and the findings are preliminary."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8110103.stm

Published: 2009/06/19 21:03:38 GMT

The plant that pretends to be ill

Matt Walker
Editor, Earth News

A plant that pretends to be ill has been found growing in the rainforests of Ecuador.

The plants feigns sickness to stop it being attacked by insect pests known as mining moths, which would otherwise eat its healthy leaves.

It is the first known example of a plant that mimics being ill, and could also explain a common pattern seen on plant leaves known as variegation.

The discovery is published in the journal Evolutionary Ecology.

Variegation is familiar to gardeners and affects many species of plant. Variegated plants have different coloured patterns on the leaf surface, produced by a variety of causes.

One of the most common is when cells in the leaf lose chlorophyll and their ability to photosynthesise, appearing white.

In theory, plants with variegated leaves should be at a disadvantage, because of this restricted ability to photosynthesise.

But a chance discovery by a team of botanists suggests this may not be true after all. Instead, some variegated plants may be mimicking illness to avoid being eaten, putting themselves at an advantage.

The fact that there are both plain green and variegated leaves in the population indicates to me that both are useful in the long-term success of the species
Botanist Sigrid Liede-Schumann

Sigrid Liede-Schumann and colleagues Ulf Soltau and Stefan Dotterl of the University of Bayreuth in Germany were studying understory plants in the forest of southern Ecuador, when they noticed that the

plain green leaves of a plant known as *Caladium steudneriifolium* were far more frequently damaged by mining moths than those of variegated leaves of the same species nearby.

Mining moths lay larvae into the leaves, and the caterpillars then munch through the leaf surface, leaving a white trail of damage behind.

"The similarity of the variegation patterns with the criss-cross munching traces of the larvae led to the idea that maybe they deter the mining moth from laying its eggs," says Liede-Schumann.

To test the idea, the researchers used white correction fluid to mimic the appearance of variegation on hundreds of healthy leaves.

After three months, they then counted the number of leaves affected by the mining moth caterpillars, comparing green leaves, variegated leaves and those painted white to appear variegated.

"The results were the same," says Liede-Schumann. "Visibly variegated leaves were significantly less frequently damaged by mining moth larvae than plain green ones."

While moths infested almost 8% of green leaves, they infested 1.6% of variegated ones and just 0.4% of those painted to look like they were variegated.

"I was quite surprised," says Liede-Schumann.

She believes that the plant essentially fakes being ill, producing variegated leaves that mimic those that have already been damaged by mining moth larvae. That deters the moths from laying any further larvae on the leaves, as the insects assume the previous caterpillars have already eaten most of the leaves' nutrients.

"The fact that there are both plain green and variegated leaves in the population indicates to me that both are useful in the long-term success of the species," says Liede-Schumann.

The reduction in a variegated leaf's ability to photosynthesise is likely to be more than offset by the benefits of not being eaten, the researchers believe, suggesting that variegation survives in wild plants because it confers a selective advantage.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8108000/8108940.stm

Published: 2009/06/19 12:57:08 GMT

Herschel gives glimpse of power
By Jonathan Amos
Science reporter, BBC News

Europe's new Herschel space observatory has provided a demonstration of its capability with a first image of the iconic Whirlpool Galaxy.

The billion-euro telescope opened its "eyes" to the cosmos last Sunday when a command was given to lift a protective hatch covering the instrument bay.

Herschel spied the galaxy, also known as M51, with its Photoconductor Array Camera and Spectrometer (PACS).

Scientists stress Herschel is still in its commissioning phase.

They need to learn how best to operate the facility.

" **When, finally, the first image showed up on the screen it was truly amazing** "
Dr Albrecht Poglitsch, Herschel scientist

Nonetheless, the very first test observation suggests the optical performance of Herschel will more than meet the design expectations.

Scientists connected with the mission said they were "ecstatic" with the results.

Albrecht Poglitsch, the lead scientist on PACS, told the BBC "nobody in their right mind would ever have predicted such a quality at the very first attempt".

HERSCHEL SPACE TELESCOPE

The observatory is tuned to see the Universe in the far-infrared
Its 3.5m diameter mirror is the largest ever flown in space
Herschel can probe clouds of gas and dust to see stars being born
It will investigate how galaxies have evolved through time
The mission will end when its helium refrigerant boils off

The European Space Agency (Esa) mission was launched from Earth on 14 May.

The observatory's quest is to study how stars and galaxies form, and how they evolve through cosmic time.

Herschel is sensitive to light at long wavelengths - in the far-infrared and sub-millimetre range.

PACS covers the shorter end of the spectrum; the SPIRE (Spectral and Photometric Imaging Receiver) instrument looks at the longer end. Whereas PACS got its opportunity to look out into the Universe immediately after the hatch opening on Sunday, SPIRE was not scheduled to make its first observation until Tuesday.

Its check-out targets were likely to include an object in our Solar System as well as something far-distant.

Left: The best view of M51 taken by Nasa's much smaller Spitzer space telescope and its Multiband Imaging Photometer
Right: The bigger Herschel telescope's image is sharper. The European observatory reveals new structures in M51

Dr Poglitsch described his feelings on getting the first imagery down from Herschel. "It certainly was a moment to remember," he told BBC News.

"We were anxiously watching the progress bar on the computer. When, finally, the first image showed up on the screen it was truly amazing - nobody in their right mind would ever have predicted such a quality at the very first attempt.

"So, it was a mix of disbelief and exaltation, with the latter one gradually prevailing as all three 'colours' rolled in one after the other.

"The nice colour picture, of course, took days of more advanced processing of the data in the three individual bands and then quite some optimisation at the colour image level to visualize the information it carries.

"So, when we had reached that level - three days after the initial arrival of the data - everybody on the team was absolutely enthusiastic about what we had achieved.

"I would say that it was a once-in-a-lifetime experience."

Dr Poglitsch is affiliated to the Max-Planck-Institut für extraterrestrische Physik, Garching.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8110345.stm

Published: 2009/06/19 19:03:02 GMT

In Athens, Museum Is an Olympian Feat

By ANTHEE CARASSAVA

ATHENS — On Monday morning, forklifts nosed through a sprawl of antiquities in the second-floor gallery of the New Acropolis Museum here, bearing marble statues and steles. Technicians tugged at bulky black cables, laborers drilled and welded, and a cleaning crew — many of its members working on hands and knees — scraped mounds of white plaster off the floor.

"My apologies," said Antonis Samaras, Greece's culture minister, who was overseeing the final preparations for the museum's debut on Saturday. "But it's like the Olympics," he added, referring to the 2004 Athens Games. "Everything will magically come together on opening night."

If it does, Greece will finally, after decades of preparation, procrastination and acrimonious debate, have a large-scale, architecturally ambitious and modern center for the care and display of artifacts from its most important ancient site. The museum, which cost $200 million and sits near the base of the Acropolis with a direct view of the Parthenon, is one of the highest-profile cultural projects undertaken in Europe in this decade.

Intended as "the ultimate showcase of classical civilization," Mr. Samaras said, it was built to promote tourism and, like any large, government-financed museum, to stir national pride. But it was also meant, not incidentally, to spark discomfort in another country in the European Union.

"We didn't build this for the sake of the British," Mr. Samaras said in an interview, adding at once, "but look around: does this not negate the argument that Athens has no place good enough to house the Parthenon Marbles?"

For more than 30 years, Greece has been working, through diplomacy and public relations offensives, to regain the Elgin Marbles, sections of a decorative frieze that adorned the Parthenon until Lord Elgin ordered them removed in the early 19th century, during his tenure as British ambassador to the Ottoman Empire. Years later, bankrupt, he sold them to the British Museum, where they have been a major attraction since 1816.

Today, almost two centuries on, many Greeks hope the opening of the museum will focus international attention on their country's claim to the so-called Elgin Marbles, and put an end to Britain's longtime argument that it is in a better position to look after those 2,500-year-old panels. Last week the Greek

government turned down an offer from the British Museum for a three-month loan of the collection, because it came with the condition that the Greeks formally acknowledge British ownership.
"This is a nonstarter for any discussion," Mr. Samaras said. "No Greek can sign up to that."
The new museum, 226,000 square feet of glass and concrete designed by the New York architect Bernard Tschumi, replaces the old Acropolis Museum, a small 1874 building tucked into the rock of the Acropolis next to the Parthenon. The design, introduced in 2001, was meant to be completed in time for the 2004 Olympics, but dozens of legal battles — many having to do with some 25 buildings that were demolished to make room for it — delayed the process for years.
Even now, not all Athenians are happy with the building, wedged in as it is among apartment buildings in a middle-class residential district. "It is as if a titanic U.F.O. landed in the neighborhood, obliterating all of its surrounding structures," said Nikos Dimou, a prominent Greek author.
The museum has five floors (including two basement levels that will not be open at first), which provide space for 4,000 artifacts, 10 times the number displayed in the old building. On the first level a glass floor offers visitors close-up views of an early Christian settlement, dating from the 7th to 12th centuries, that was discovered under part of the future building's footprint during excavations in 2002.
The second floor, reached by a glass ramp, features a rich trove of free-standing objects from the archaic and classical periods. But it's really the third and top floor — a glassy gallery — that Mr. Samaras and other Greeks hope will advance their country's cause with Britain and the rest of the world.
Rotated 23 degrees off the axis of the lower floors to parallel the Parthenon itself, this rectangular glass enclosure feels dramatically different from the rest of the museum. Like a 21st-century surrogate of the monument looming above, it displays what remains in Greece of the original Parthenon sculptures and frieze, alongside plaster casts of the works in London. The contrast between the glaring whiteness of the copies and the ancient, honey-colored marbles makes for a powerful, and calculated, statement.
"We wanted it this way," said Dimitris Pandermalis, the museum's director. "Who will fail to notice that a torso is here and a head in England?"
Greece retains only 36 of the 115 original panels from the Parthenon frieze, which depicts a procession in honor of the goddess Athena. Britain has long asserted that when Lord Elgin chiseled off the sculptures some 200 years ago, he was acting legally, since he had permission from Greece's Ottoman rulers. That legality, however, has been challenged by Greek scholars in recent years, with the government in Athens spurning it altogether.
"The claim is bogus," said George Voulgarakis, a former Greek culture minister. "It's like saying the Nazis were justified in plundering priceless works of art during the Second World War."
In recent years Greece has tried to build international support for its repatriation campaign by going beyond mere demands, for example joining forces with Italy in 2007 to crack down on antiquities theft and nefarious art dealers who trade in looted works. At least 25 artifacts have lately come back to Greece, including fragments from the Parthenon frieze that were displayed for decades at museums in Italy, Germany and the Vatican.
So far the British Museum trustees have not seemed to be swayed, beyond the offer of the three-month loan.
Late on Friday, about 50 Greek demonstrators marched at the base of the Acropolis to protest the British Museum's defiance.
"Enough with the excuses," said Alexis Mantheakis, the protest organizer. "The Parthenon Marbles now have a new Greek home."

http://www.nytimes.com/2009/06/20/arts/design/20acropolis.html?ref=arts

'PEN AND PARCHMENT'
Those Medieval Monks Could Draw

By ROBERTA SMITH

When you think of medieval art, drawing may not spring instantly to mind.

Medieval ivories and enamels? Definitely. Medieval sculpture, metalwork and stained glass? Sure.
Of course medieval artists — many of whom were anonymous monks working as scribes in scriptoria — drew. All those manuscript illuminations had to start somewhere. But did they actually make drawings that survived and were cherished as drawings, or that filled practical needs that only drawing can?
To most of us, European drawing before the Renaissance and its emphasis on individual genius and the artist's hand is a dark, uncharted void. Which may explain why "Pen and Parchment: Drawing in the Middle Ages" at the Metropolitan Museum of Art feels so startlingly full of light. You may even find yourself rubbing your eyes and blinking.
The 50 little-seen works on view span nearly five centuries and reveal medieval drawing to be vital, evolving, remarkably diverse and essential to the medium's Renaissance blossoming. The medieval period is often compared with its successor and found lacking. And the superficial clumsiness in some of these works may initially ratchet up your awe for the Renaissance and for the radical changes wrought by its embrace of antiquity and its obsession with the human body and linear perspective.
But with a little time at this show the gap starts to shrink. The skills of medieval artists dovetailed with their otherworldly goals: the bodies that interested them most were heavenly. But, as this exhibition demonstrates, realism was not beyond their reach.
The material on hand ranges from accidental drawings — that is, unfinished illuminations that inspired a new emphasis on line — to exquisite efforts like a breathtaking ink rendering of a facade of Strasbourg Cathedral from around 1260. Many of them crossed the Atlantic Ocean for the first time to be here. Adding to their freshness, almost all come from university or monastic libraries rather than museums.
Organized by Melanie Holcomb, an associate curator, and Elizabeth Williams, a research assistant, both in the Met's department of medieval art, the show comes with an excellent catalog that brings together a pithy introductory essay by Ms. Holcomb and lengthy entries by Ms. Williams and a dozen other curators and scholars. That number alone suggests both the broad scope of the works on view and the rarity of the occasion.
In the first gallery an assortment of illuminated manuscripts — psalters, gospels, epistles and a Bible or two — trace the liberation of drawing from its subservient role in richly colored illuminated texts. Hand-drawn line gradually assumes a life of its own, uncoiling from elaborate initials, existing on equal terms with color and abandoning carefully framed settings to exploit white parchment pages and the physical facts of the book as object.
In an 11th-century French codex, the Maccabees pursue their retreating foe across the gutter of a two-page spread as over adjacent hills. Shields are painted orange and green; chain mail is indicated with tiny

circles in ink on wash; otherwise line dominates, especially satisfying in its account of the lunging horses and contrasting body language of victors and vanquished.
Occasionally lines do all the work, as in a sinuous ink image from the late ninth century of St. Paul lecturing an agitated crowd of Jews and gentiles, rendered by a Swiss monk with a special talent for depicting hair. (Tonsures never looked so good, and Paul's beard ends in curling droplets of ink.) The image is part of a copy of the Pauline Epistles lent by the Monastery of St. Gall, having been made on the premises.
But luxury of material and execution were generally considered the Christian way, and this led to lavish minglings of colored line, solid or thinly washed color and gold leaf that reached its height among Anglo-Saxon draftsmen. In a Gospel from Canterbury around 1000, St. Matthew, seated by a lectern, is shown in robes that consist entirely of swirling lines of blue, green and red ink. His immediate background is a deep red wash surrounded by a more densely colored architecture; the book on which he works has gold-leaf pages.
Equally striking, and much nuttier, is an image of the evangelist John from the Corbie Gospels (French, 11th century). Both his robe and the columns flanking him are white parchment streaked with red, for an alluring candy-cane effect.
Antiquity makes it presence felt in an illustrated copy of the plays of the Roman playwright Terence made in St. Albans, England, in the 12th century. Here a wonderful portrait of Terence in a carved frame held by two masked attendants is joined, on the facing page, by additional theater masks displayed in a grand set of shelves. Classical motifs and details mix freely with medieval ones in plain ink and wash, which were considered appropriate for pre-Christian themes.
In the second gallery, drawing expands to provide knowledge itself with an infinitely flexible linear framework and to serve, as perhaps no other medium can, as a form of conjecture or speculation. In an array of charts, diagrams and maps, scholars both secular and ecclesiastic tried to organize received knowledge or depict the structure of the cosmos itself. A learned manuscript from a Benedictine monastery in 12th-century Germany tackles the human anatomy, tracing five systems of the body in separate images. The same monastery produced a copy of the "Etymologies" of Isidore of Seville in which a red-ink chart measures degrees of kinship with an elaborate pyramid of male and female faces. Bracketed top and bottom by the head and feet of Jesus, the totality has the bluntness of a drawing by Louise Bourgeois.
In contrast a drawing from Salzburg from about 1150-60 is all suave realism in its portrayal of Philosophy as a queenly figure adored by puttilike beings symbolizing the seven liberal arts. It has a naturalness and grace equal to that of many Renaissance Madonnas or Baroque portraits. Across the way a very long scroll presents a history of the world based on the genealogy of Jesus.
But there are also drawings that focus on specific events, like the charming "Privilegium Imperatoris," a land-granting charter issued by Alfonso VII, king of Castile and León in 12th-century Spain, and lent by the Hispanic Society of America. The main players line up along the bottom of the sheet, as if posing for a photograph. Nearby a Limoges cloisonné plaque, displayed facing the wall, suggests the preciousness of parchment; on its copper back, an artist practicing his drawing skills has incised a human head — small, sharp and very much alive.
In the third and final gallery the devout anonymity of the medieval artist begins to erode. A 13th-century English artist named Matthew Paris is represented by large close-up portraits of the Madonna and Child and two images of the adult Jesus that probably record paintings he saw. And not to be missed are three drawings by Opicinus de Canistris (1296 to about 1354), an Italian cleric trained in the arts of illumination and cartography.
Two of these works are tall, double-sided sheets of parchment on which Opicinus erected fantastic traceries of layered images and diagrams. They were among works rediscovered in the 1920s that Opicinus made in the 1330s after a strokelike illness. His aim was to express a new relationship between the earthly and spiritual church, and this comes across most spectacularly in an image of a haloed man whose robe and body encompass a scene of the Crucifixion. Looking at this extraordinary composition, you may rub your eyes and blink yet one more time.
"Pen and Parchment: Drawing in the Middle Ages" continues through Aug. 23 at the Metropolitan Museum of Art; (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/06/19/arts/design/19drawing.html?ref=design

'MICHELANGELO'S FIRST PAINTING'
A Saint, Demons and a Leap of Imagination

By HOLLAND COTTER

Every supernova starts as a modest spark. Even Michelangelo began his career with less than Sistine-worthy work. What, exactly, was he doing? According to the 16th-century art-stargazer Giorgio Vasari, the master's virgin effort was a smallish, slightly customized painted copy of a German print.

The print, an engraving by Martin Schongauer called "St. Anthony Tormented by Demons," was in wide circulation when Michelangelo began his art apprenticeship in Florence in 1488. It was at this time, according to Vasari, that he produced the painting. He would have been 12 or 13. It was only later that he turned his attention to sculpture.

Long out of sight, this early picture, or one now identified as such, has resurfaced. Recently bought by the Kimbell Art Museum in Fort Worth, it has been conserved and examined at the Metropolitan Museum, where it is making its American debut in a tiny gallery display titled "Michelangelo's First Painting." If the picture is indeed the real thing, it's quite a catch, being one of only four known easel paintings by Michelangelo, and the only one in an American collection.

The display, organized by Keith Christiansen, curator of European paintings at the Met, makes an active case for authenticity. It sets the painting and the Schongauer print side by side and flanks them with text panels spelling out some of the thinking that went into the attribution: a combination of historical research and stylistic analysis propelled by what Mr. Christiansen calls a "leap of the imagination."

The historical record is complicated. Vasari calls the painting an apprentice piece, done under the tutelage of Domenico Ghirlandaio after Michelangelo had entered Ghirlandaio's Florentine studio in 1488.

Another biographer, Ascanio Condivi, says no, the painting is slightly earlier, done maybe in 1487, before Michelangelo's apprenticeship. Michelangelo was given the Schongauer print by an artist friend and, self-starter that he was, tackled copying it on his own, no help required.

Further research suggests a compromise narrative. It turns out that Michelangelo was on Ghirlandaio's payroll, as an assistant on an altarpiece job, before officially beginning his apprenticeship. So the self-

starter image remains pretty much intact, but the possibility of guidance and influence, even if indirect, could also be part of the story.

Moving ahead in time, Mr. Christiansen notes that while the St. Anthony painting never entirely disappeared over the centuries, it led an oddly retiring life, forgotten if not ignored. Either a connection with Michelangelo was simply not made, or was made only to be dismissed on the grounds that the picture had no connection to anything else in his career. Mr. Christiansen argues otherwise.

We know that the young Michelangelo copied the work of other artists, customizing his versions with personal touches. We have his drawings of figures from Giotto and Masaccio. If the Schongauer image was a somewhat unusual choice, it might also have represented a gesture of independence, a way for the precocious adolescent to separate himself from the workshop herd. And it worked. Ghirlandaio was apparently unnerved by the newcomer's show of skill.

In any case, the image of the hermit-saint, locked in a midair tangle of straining, pulsating figures, created a template that Michelangelo would repeat in sculpture and painting for the rest of his life. It's there in the knotted nudes of the early marble relief "Battle of the Centaurs," from around 1490 and it's still there decades later in the images of frantic sinners and doom-trumpeting angels in the "Last Judgment."

And even in Michelangelo's first version of this theme, Mr. Christiansen finds promising inventiveness. He points out that Michelangelo doesn't merely replicate Schongauer's composition in paint; he bulks it up, makes it denser and more monumental. He introduces Renaissance naturalism to Gothic fantasy: Vasari reports that the young Michelangelo shopped for fish in Florentine markets to get the scales on the bodies of his demons right.

And Michelangelo makes adventurous use of color. The recent cleaning done by the Met conservator Michael Gallagher removed layers of darkening varnish. And in both the individual colors and combinations revealed, Mr. Christiansen discerns a forecast of the palette that would later be used on the Sistine ceiling.

In the end, Mr. Christiansen concludes, if you do the math — add documentation to style and to physical evidence — the Michelangelo attribution is all but conclusive, though we shouldn't forget the contribution made by the imaginative leap.

For some reason — many reasons — we need to have our superstars, our so-called geniuses, and we need them complete, every detail of their lives and works, however minor, accounted for, fitted into place, given significance. That is how traditional art history works, and "Michelangelo's First Painting" feels like a classic exercise in that tradition, equal parts science project, forensic document and romantic quest.

"Michelangelo's First Painting" remains through Sept. 7 at the Metropolitan Museum of Art; (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/06/19/arts/design/19michelangelo.html?ref=design

'PAGES OF GOLD'
Gemlike Paintings, Set Free From Words

By KAREN ROSENBERG

Most people would agree that tearing up an illuminated manuscript to sell it by the page is vandalism. But might it also liberate the art on those pages? That's the underlying question of "Pages of Gold," the Morgan Library & Museum's quietly compelling show of leaves separated from manuscripts and sold to collectors of medieval art.

The Morgan owns a large number of these "orphan" leaves, many acquired by the museum's founder, Pierpont Morgan, but it has never shown them as a group. With an eye to the convoluted provenances of these works, William M. Voelkle, the museum's medieval and Renaissance manuscripts curator, has installed 50 single leaves from the collection, 12 of which are being exhibited for the first time.
Some are whole pages, but many are excised and mounted illuminations. A few are montages that combine panels from different parts of a book.
Even though they are divorced, sometimes messily, from their texts, these images have much to tell us. They were given a new life as "illuminated miniature paintings," in the words of a 19th-century auction catalog.
The art of manuscript illumination flourished in the Middle Ages and died out with the invention of the printing press. It can take the form of decorative initials, scattered miniatures or full-page paintings. Most illuminated texts are religious in nature, usually commissioned by a monarch or wealthy donor to the church.
Organized geographically, the show allows a comparison of illumination styles in England, Italy, Spain and other countries and regions. It isn't necessary to be a medievalist to perceive that a softly modeled, jewel-tone Nativity from a Florentine gradual differs markedly from an angular, green-tinged Crucifixion from a German missal.

"Pages of Gold" also unfolds through the figures who created and participated in the market for single leaves. They include an Italian abbot, an English art historian and a mysterious artist known as the Spanish Forger. You might add Pierpont Morgan to the list, though most of the damage had been done centuries before he made his purchases.

The practice of liberating the occasional page from a manuscript goes back hundreds of years, but it became more common when medieval art started to pique collectors' interest in the 19th century. The market can be traced to an Italian abbot turned art dealer named Luigi Celotti.

In 1798 Celotti obtained choir books that had been looted from the Sistine Chapel in the French Revolution. Aware of a growing appetite for medieval art among English collectors, he cut out the miniatures and borders from the books and took them to London, where they were sold at Christie's in 1825.

Celotti's marketing strategy was partly a matter of convenience; the books were large and would have been subject to a weight-based import tax. But he also realized that the illustrations were art objects in themselves. Celotti not only mounted many of the books' miniatures, but also cut and pasted their patterned borders into inventive montages that look very much like intact leaves.

"Pages of Gold" opens with a dazzling Celotti montage in its original gilt frame, in which a miniature of Pope Clement VII is surrounded by medallions and classical decoration taken from four other sections of the book.

The English art historian William Young Ottley, who had cataloged the 1825 Christie's sale, picked up where Celotti left off. His own collection of single leaves, including some taken from the 12th-century Eadwine Psalter in Canterbury, was sold at Sotheby's in 1838.

Outshining both Celotti's montage and the Eadwine Psalter pages is a leaf from the Winchester Bible (around 1160-80), the largest English Romanesque Bible, depicting scenes from the life of David. Easily the most important single page in the Morgan's collection (scholars refer to the artist as the Master of the Morgan Leaf), it is as dynamic as a modern-day comic book but with quietly emotive breaks in the action. In the final panel King David, mourning the death of his young son, buries his face in his red robe.

In the case of eight pages from the Hungarian Anjou Legendary, a 14th-century manuscript depicting the lives of Christ, the Virgin and the Saints, surgery was needed to restore the narrative flow. Each page has four scenes that were separated when the manuscript's 17th-century owner cut out the miniatures and pasted them into a small devotional album.

After Pierpont Morgan bought the album, the miniatures were removed and reunited. They are exceptionally graphic and physical; the artist spared no detail in rendering Jesus' gushing wounds and the flaying of St. Bartholomew.

The selection of leaves from Northern Europe is smaller. At one extreme is a charming "Virgin and Child With Female Saints," illuminated by the Flemish painter Gerard David, in which the Christ Child props his chubby feet on a trompe l'oeil frame. At the other is a Crucifixion in a rocky landscape by the German artist Springinklee the Elder, who was evidently inspired by Dürer.

The show ends on an unexpected note, with three impostors: leaves painted sometime in the early 20th century by the shadowy artist known as the Spanish Forger. His fakery was exposed in the late 1920s by the Morgan Library's first director, Belle da Costa Greene. Tests led by Mr. Voelkle revealed that although the Forger painted on genuine medieval vellum or parchment, he used a type of pigment that wasn't available before 1814.

The Morgan gave the Spanish Forger his own show in 1978, and continues to celebrate his deviousness here. The curator even credits him with helping to preserve real manuscripts by flooding the market with fakes. As a wall label notes, "Unfortunately no new forger has come forward to help satisfy the demand for single leaves and cuttings, and some dealers are still shamelessly cutting up manuscripts."

Such was the fate of two leaves from another large Spanish choir book, which the Morgan considered for acquisition in 2005. The museum contacted the dealer only to find that the leaves had been sold to another buyer and were being offered, in pieces, on eBay. The starting bid for each fragment? A dollar.

"Pages of Gold: Medieval Illuminations From the Morgan" is on view through Sept. 13 at the Morgan Library & Museum, 225 Madison Avenue, at 36th Street; (212) 685-0008, themorgan.org.

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'PAINTINGS FROM THE REIGN OF VICTORIA'
Social Commentary on Canvas: Dickensian Take on the Real World

By KEN JOHNSON

Disdained, derided and dismissed by Modernist art critics from Roger Fry to Clement Greenberg, Victorian painting staged a comeback in the Postmodern era. Its novelistic storytelling, florid symbolism and polished, academic technique appealed to art lovers bored by the pure abstraction and abstruse conceptualism of the 1960s and '70s.

Though often sappy and moralistic, at its best late-19th-century British painting still delivers a rich mix of visual imagination, narrative intrigue and social commentary. An excellent exhibition at the Yale Center for British Art proves the point. Drawn from a collection created in the early 1880s for students at Royal Holloway College, then just for women, "Paintings From the Reign of Victoria: The Royal Holloway Collection, London" offers pictures that can make you wish painting today were as tuned in to the real world.

Consider "The Banker's Private Room: Negotiating a Loan" by John Callcott Horsley, a period piece set in 17th-century Holland in which a pretty young woman pleads her case before a recalcitrant loan officer. It is far from a great work of art, but you can't help thinking of all the heart-rending meetings between borrowers and lenders that have been taking place across America lately. Where are the artists who can picture the human pain of a contracted economy now? (Short answer: They make movies.)

These days you have to look to photography for anything approaching the Dickensian array of people spread out across William Powell Frith's nine-and-a-half-foot-wide painting "The Railway Station," in the midst of which young parents bid a tearful goodbye to their two boys whom they are sending off to boarding school. And for something like Edwin Landseer's "Man Proposes, God Disposes," a harrowing picture of fierce polar bears pawing the icy wreckage and gnawing the human bones of a failed Arctic expedition, you have to dial up the History Channel.

The story behind the Holloway Collection is remarkable. Apprenticed to a chemist as a teenager, Thomas Holloway (1800-83) made a fortune selling pills and ointments of doubtful medicinal value, mostly to women. He had a mansion full of old masters, including two that are now in the Frick Collection: Giovanni Bellini's great "St. Francis in Ecstasy" and Gerard David's "Deposition."

Acting on his dying wife's wish that he create an institution of higher learning for middle-class women, Holloway founded the all-female Holloway College in London, the first school of its kind in Britain. (Coeducational now, Royal Holloway, University of London is still considered a top academic institution.) When he was about 80, he decided to create a gallery of contemporary art for the college, and

he went on a sensational buying spree from 1881 to 1883. Shopping mainly at Christie's, he paid record-setting prices for some works, including "Man Proposes," for which he spent $1.3 million in today's dollars. (There are 77 paintings in the collection; the exhibition displays 60 of them.)

Hung salon style in a big hall, the Royal Holloway College Picture Gallery was the first painting display in Britain created for female viewers. In light of Victorian ideas about the fairer sex, it is a surprisingly grown-up collection. Excepting a few works like Briton Rivière's painting of a sad little girl sitting on the stairs and being comforted by her white mutt, which rests its chin on her shoulder, not much seems meant for overly delicate sensibilities — no flowers, kittens or fairies. There are history paintings, breathtaking mountain landscapes, images of ships at sea and several scenes of debtors in prisons. (Holloway did time in one as a result of bankruptcy early in his career.) "Spindrift" by John MacWhirter, in which a white horse drags a wagon piled high with seaweed beside the ocean on a windy, rainy day as the driver struggles along on foot, is an unflinching study of man and animal at work.

In one of the major paintings, "The Babylonian Marriage Market" by Edwin Longsden Long, teenage girls in ancient garb sit in a row before a busy scene in which a crowd of men study a woman posing on a stone platform. The work is based on an account by Herodotus about how Babylonian girls without dowries were auctioned off as wives. You wonder how such a picture might have affected the consciousness of the young women who would themselves be entering the marital marketplace. Might it have helped to germinate seeds of feminist revolt? (Holloway bought the painting for £6,615, then the highest price ever paid for a living painter's work.)

As you'd expect, a certain prudishness prevails in the collection: no nudity, no scenes in taverns or dance halls (not to mention brothels) where women of dubious repute might be found. Compare the often racy paintings of the same period by French artists from Manet to Toulouse-Lautrec.

You also might miss the physical sensuousness of French painting. Sometimes you wish the Victorians had given freer rein to their brushwork and expressive impulses. Still, there is hardly a painting in this exhibition that doesn't reward attentive examination, for technical merit if nothing else. Holloway may have been little more than a glorified snake-oil salesman, but he had a pretty good eye.

"Paintings From the Reign of Victoria: The Royal Holloway Collection, London" continues through July 26 at the Yale Center for British Art, 1080 Chapel Street, New Haven; (203) 432-2800, yale.edu/ycba.

http://www.nytimes.com/2009/06/19/arts/design/19victoria.html?ref=design