Infoteca's E-Journal

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New drug 'can treat more cancers'

A promising new drug may be able to treat more types of cancer than first thought.

PARP inhibitors have shown early promise for treating cancers linked to BRCA gene mutations, including some breast and ovarian cancers.

But Breakthrough Breast Cancer research suggests they might also kill cancer cells with a faulty PTEN gene, found in some skin, womb and colon tumours.

The study appears in the journal EMBO Molecular Medicine.

" **This new class of drugs could potentially make a big difference for many thousands of cancer patients, including some with very limited treatment options** "
Dr Chris Lord Breakthrough Breast Cancer Research Centre

Scientists found that cells with faulty PTEN genes were up to 25 times more sensitive to PARP inhibitors than cells with normal PTEN.

Faults in the PTEN gene account for 30%-80% of breast, prostate, melanoma (skin), womb and colon cancers.

Professor Alan Ashworth, director of the Breakthrough Breast Cancer Research Centre at the Institute of Cancer Research, said: "These results are exciting because they show that PARP inhibitors are potentially a powerful targeted treatment with few side effects which may help a broad range of cancer patients.

"Clinical trials have already shown the potential of PARP inhibitors for patients with tumours caused by faulty BRCA genes.

"We now need to test whether the promising results from this study can be matched in the much larger group of patients with PTEN-related tumours."

Synthetic lethality

The use of PARP inhibitors is part of a new approach to cancer therapy called synthetic lethality.

A cell with a PTEN fault relies on a protein called PARP to keep its DNA undamaged.

PARP inhibitors work by blocking PARP, and when combined with defective PTEN, causes the cancer cell to die.

This means the tumour should either stop growing or get smaller.

Because the drug has a precise method of action it only affects cancer cells, leaving healthy cells unaffected, and minimising the risk of side effects.

PARP inhibitors have already produced impressive results when tested on patients with advanced breast, ovarian and prostate cancer caused by defects in the BRCA1 and BRCA2 genes.

In a recent clinical trial more than half of the patients' tumours shrank or stabilised, despite the fact that they had not responded well to standard therapies.

One of the first patients to be given the treatment is still in remission after two years.

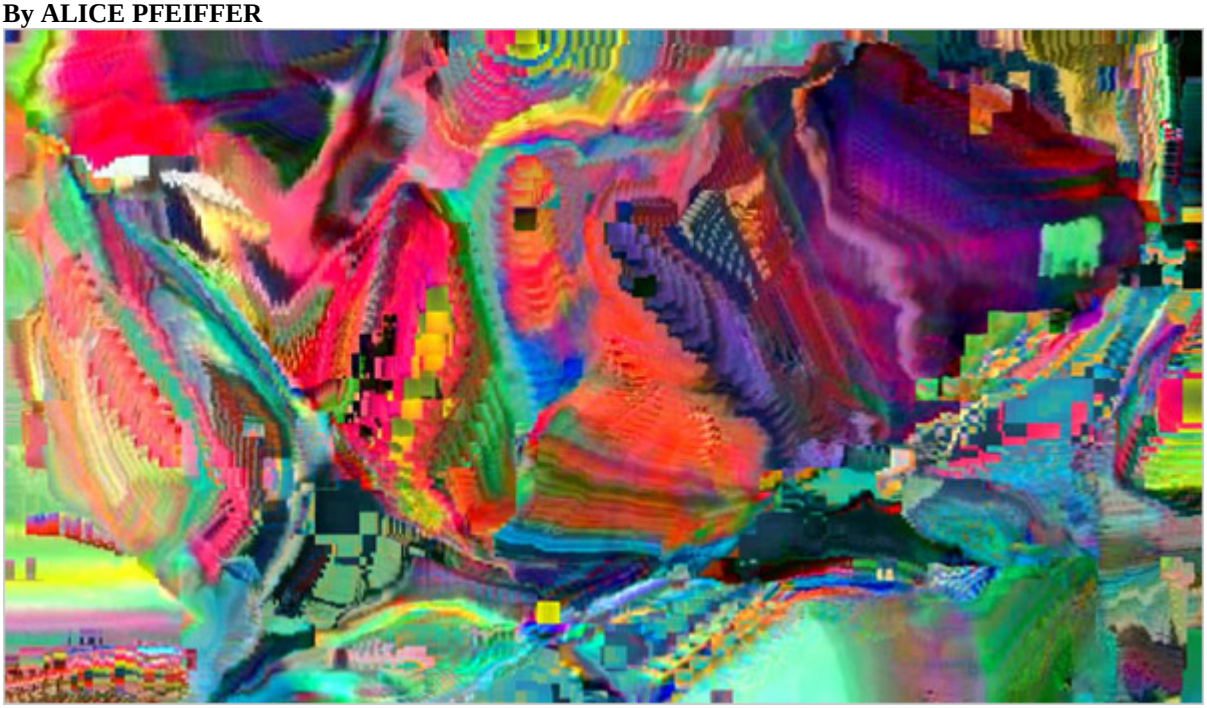
Lead researcher Dr Chris Lord said: "This new class of drugs could potentially make a big difference for many thousands of cancer patients, including some with very limited treatment options."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8256494.stm

Published: 2009/09/15 23:00:57 GMT

CONTEMPORARY ART
At Last, Artists Harness the Internet

By ALICE PFEIFFER



PARIS — In an era when even kitchen appliances connect to the Internet, and cellphones have more memory and data processing power than a 10-year-old PC, artists are engaging ever more creatively with computers — or maybe vice versa.

As with video art in the 1960s and early digital work in the ’80s and ’90s, technological progress is providing not only an array of new tools for artistic creation, but also new sources of reflection and new subjects for social commentary. Out of it is emerging a new aesthetic inspired by YouTube and Google. A global movement is hacking, subverting and critiquing the hardware, software, content, visuals — even the philosophy of the wired world.

Take Beige. A four-member U.S. computer programming art collective, Beige has built a reputation in the past few years by breaking into the code of old Nintendo game cartridges, and transforming them into animation artworks. Hijacked from its original purpose the famous, now-retro game platform becomes an abstract space where fluorescent squares float and bounce to the rhythms of electronic music.

Since 2000, when it first elaborated its basic technique, the collective has shown more durability than some of the technology it uses. Members have shown at prestigious events and galleries, including the Whitney Biennial for contemporary art in New York, the Institute of Contemporary Arts in London and the Guggenheim, New York.

Among Beige’s innovations is the exploitation of programming faults that cause a lapse in data transfer, leaving a pixellated effect known as a “residue” on the screen; this fault is used, and intentionally replicated, in several works.

“This is known as ‘glitch art,”’ said Paul Pieroni, co-curator of SEVENTEEN, a gallery in east London that has been a pioneer in showing technology-driven work in Britain. “It is essentially the aesthetization of a computer fault.”

In 2007, the gallery gave Paul B. Davis, one of Beige’s members, his first solo show. It has since held several shows for Mr. Davis as well as for other technology artists, including the New York duo John Michael Boling and Javier Morales and the Californian Eric Fensler.

“There is a new regime of aesthetics emerging out of technological practice,” Mr. Pieroni said. Datamoshing, also know as compression aesthetics, is an example: a recently developed form of glitch art, it manipulates compression frames, giving an overly pixellated appearance, he said.

Datamoshing was pioneered by Mr. Davis and two other artists, Sven Koenig and Takeshi Murata, in collaboration with Paper Rad, another influential new media collective. It has since been adopted by video directors including Nabil Elderkin, who used it in “Welcome To Heartbreak” by the rapper Kanye West.

The ubiquity of the Internet has radically changed the way we do the most basic things, Mr. Pieroni said: “Call it the ‘googlification’ of everything — YouTube is the perfect example: the sort of cultural content now readily available is simply mind-blowing and without precedent.”

Aleksansdra Domanovic, a Berlin artist, uses the Web to create on-line picture frames: On each site that she builds, she displays a single piece of conceptual art; her fellow Berliner Oliver Laric constructs pastiches of YouTube videos, mixing collages of YouTube footage that he then posts back to the site, as well as to his own. Mr. Boling and Mr. Morales, the New Yorkers, have brought the stretch-limo concept to Google, with a tongue-in-cheek pastiche — http://www.gooooooooooooooooo oooooooooooooooooooooooooooooooo ogle.com/.

“It’s comforting — in addition to seeing them provide a rigorous critique of the Internet age — to see artists catching on to these regimes in order to engage with the Internet on a purely visual level,” Mr. Pieroni said.

Technology-driven work often aims at social commentary as much as it aims at aesthetic effect, said Ceci Moss, senior editor of Rhizome, a nonprofit arts organization focused on information technology and affiliated with the New Museum of Contemporary Art in New York: “For some artists, their interest stems from an engagement with social or cultural questions linked to new technologies.”

One example is a Danish collective, Superflex, that has taken many of its ideas from the Open Source movement, Ms. Moss said. Open Source relies on programmers around the world who work collectively to improve and share software code like the Linux operating system.

Superflex’s 2005 project, “Copyshop,” designed like a real copy shop, allowed the free duplication and also the modification of texts and images in what the artists described as a calculated challenge to the idea of intellectual property.

“By encouraging the distribution of information in physical form, the artists hope to bring to light intellectual property issues that have become a major topic due to new technologies,” Ms. Moss said.

Collectif 1.0.3., a French artists’ group, explores the conservation of art works and knowledge through digital technology. Its computer system “Misma” — a French acronym meaning “intervention module for saving artistic methodologies” — generates digital maps.

The result is an abstract image that resembles Futuristic word art and that represents a coded record of its subject, which may be anything from a painting or a song to an entire library.

“The type of artwork being produced through technology can’t be compared to anything else, because, in many cases, it acts as a paradigm shift,” said Nils Aziosmanoff, director of Cube, a new media exhibition space in south-west Paris: “Some new piece of equipment comes by and it presents an entire new way of ‘telling a story.”’

http://www.nytimes.com/2009/09/12/arts/12iht-rcartech.html

Changing Un-Art's Tires

By KEN JOHNSON

IN 1961 Allan Kaprow, a pioneer of the Happening and forefather of today's installations and performance artists, filled the walled-in backyard of the Martha Jackson Gallery with car tires and objects wrapped in black tarpaper. Visitors were invited to climb on the tires and move them around. He called it "Yard."

This month the performance artist William Pope.L is to become the first of three artists to recreate — or, as the news release says, "reinvent" — "Yard." He'll work on the same site, newly occupied by the Swiss mega-gallery Hauser & Wirth. The property no longer has an open backyard, but Mr. Pope.L will fill the exhibition space with 1,200 tires.

He plans some alterations to Kaprow's original concept. Instead of objects wrapped in tarpaper there will be stacks of black body bags, seemingly filled. Also, the tirescape will be animated by lights and mirrors, and accompanied by the sound of distant train whistles and, according to the gallery notes, "a voice evoking the cadences of Barack Obama reading a poetic and politically inflected text that recontextualizes Kaprow's own instructions to 'rearrange the tires.' "

Two other artists will also reinvent "Yard," but elsewhere: Josiah McElheny, known for conceptually provocative re-creations of antique glassware, will present a billboard-size aerial photograph of a tire graveyard at the Queens Museum of Art (Oct. 1 to 3); and Sharon Hayes, whose performances, installations and videos deal with memory and history, will create her own version at the New York City Marble Cemetery in the East Village (Oct. 23 to 27). Inspired by Kaprow's poster for his installation — an image of a roughly painted yard-sale sign that simply says "Yard" — Ms. Hayes plans to augment a landscape of tires with a variety of hand-painted signs, large and small.

Organized by Helen Molesworth, curator of contemporary art at the Harvard Art Museums, the three-pronged project raises intriguing philosophical questions, like how such reinventions relate to Kaprow's legacy. Kaprow, who died in 2006, welcomed the re-creation of his works by others. He regarded his ephemeral productions as musical compositions that could be performed repeatedly by different players, and was happy for others to add their own improvisations. He himself reproduced "Yard" several times in other locations.

A purist might argue that however the reinventions turn out, there is an aspect that Kaprow might not have condoned. It is hard not to see the whole thing as a publicity stunt using the name of an artistic hero — a veritable saint of the avant-garde — to advertise the New York arrival of Hauser & Wirth, one of the richest purveyors of contemporary art. And publicity is something that Kaprow studiously avoided, especially after the mid-1960s, by which time Happenings had become a popular cultural phenomenon.

Kaprow stopped using the term to describe his own activities. Instead he called what he did experimental art or "un-art," and he abjured anything that could be considered conventionally artistic. He moved toward private, intimate, absurdist actions that only he and other participants (in some cases there were no other participants) knew about at the time they were occurring.
In one he traded buckets of dirt with other people. In another he and a friend agreed to wash each other's kitchen floors using only Q-tips and saliva. He wanted to do things in the context of life — not the museum or gallery — that were like life but different enough to alter his and others' experience of the world. As he saw it, anything identifiable as art was too easily slotted into an exhausted category. We learned about the things he did because he talked and wrote about them, but he didn't document them, and he had nothing to sell. (He supported himself by teaching.)
Kaprow's later activities were closer to a kind of Zen-like, consciousness-raising practice than what passes for performance art today. What he would have thought of the Hauser & Wirth extravaganza we'll never know, but he once wrote that "achieving a respected place in a museum or opera house nowadays may be flattering, but it is pointless, because it reframes the lifework as conventional art."

KEN JOHNSON

http://www.nytimes.com/2009/09/13/arts/design/13johnson.html?ref=design

WESTCHESTER
19th-Century Visions of New York's Splendor

By BENJAMIN GENOCCHIO

Every now and then, an exhibition comes along that is so perfectly lovely that you want to shout its merits from the closest rooftop, or in this case mountain. Peaks and valleys are among the predominant subjects of the 45 paintings exhibited in "The Hudson River to Niagara Falls: 19th Century American Landscape Paintings from the New-York Historical Society" at the Samuel Dorsky Museum of Art in New Paltz.

The exhibition is part of this year's protracted quadricentennial celebration of the voyages of Henry Hudson, Robert Fulton and Samuel Champlain. How it relates to this theme I am not entirely sure, for all the paintings in the show were made between 1818 and 1892. But I am not complaining, for apart from the skillfulness and dreaminess of so many of the pictures, the fact that several of them have not been on public display in half a century makes the exhibition even more remarkable. This is New York as you have never seen it before.
The mission of the early American landscape painters, as they saw it, was to capture the sublime in nature. Snowy peaks, sunsets, rainbows and waterfalls were especially popular subjects, as evidenced here by Thomas Cole's "Sunset, View on the Catskill" (1833) or Christopher Pearse Cranch's "View on the Catskill River" (1846), in which the setting sun casts a deep orange glow over an autumnal landscape. You could enjoy this for hours.
A tendency when viewing this exhibition is to gravitate toward the important works by recognizable artists. That is perfectly understandable, especially given that the checklist includes wonderful pieces not only by Cole and Cranch but also by Asher B. Durand, Albert Bierstadt, Jasper Cropsey, John W. Casilear and George Inness. Cropsey's "Greenwood Lake, New Jersey" (1871), a spectacular, atmospheric landscape (part of the lake is in New York), is among the highlights of the exhibition.
Then there is Durand's "Adirondack Mountains, N.Y." (circa 1870), probably the single most important work in the show. It is a masterpiece of landscape painting, presenting a panoramic view across a low-lying valley, the mountains rising to the clouds in the distance. It is possible that other visitors to this show, like me, have spent more time looking at Hudson River-area paintings — alone, in galleries, and with keen attention — than we have outdoors surveying the real thing, but my guess is that the artist nailed the view. It is a marvelously realistic and evocative depiction.

Many works by lesser-known artists will also reward prolonged looks, including Robert Havell's "View of Hudson River from Tarrytown Heights" (circa 1842), a sweeping landscape vista dotted with houses and farms. It is a celebration of the then-emerging riverside suburbs of Westchester, which were served by steamboats, visible on the river at the bottom left of the picture.

By the 1850s, railroads offered easier access to Westchester, and suburban development greatly increased. Several of the paintings show early commercial and industrial ventures along the Hudson. Andrew Bunner's winter view of Rockland Lake depicts the 19th-century industry of cutting and storing ice for shipment to New York, while Joseph Vollmering's lovely, expansive view of the Hudson at Ossining includes a view of Sing Sing prison. According to the exhibition catalog, the prison was built on the river to provide nearby marble quarries with a ready-made labor force; back then the town was known as Sing Sing, hence the name.

John Cornell's "View of the Hudson Highlands from Ruggles House, Newburgh, N.Y." (1838) and Thomas Chambers's "Lake George and the Village of Caldwell" (circa 1850) document the establishment of another important industry in the Hudson region — tourism. Caldwell was a tourist town at the south end of Lake George, while the Ruggles House was a popular resort hotel in Newburgh where wealthy New Yorkers would come, stay and explore the area's charming river towns, mountain trails and serene waterways.

Many touring exhibitions of Hudson River paintings in previous years have left us no wiser — in large part because curators played it safe with their selections.

Not so with this exhibition, which is stocked with pictures of such variety and interest that you can't help but be enthralled. Nor can you help wondering whether or not there is another state in this country that possesses a greater variety of admirable scenery than New York. It's time we all got out there to take a better look.

"The Hudson River to Niagara Falls: 19th Century American Landscape Paintings from the New-York Historical Society," Samuel Dorsky Museum of Art, 75 South Manheim Boulevard, State University of New York at New Paltz. Through Dec. 13. Information: (845) 257-3844 or newpaltz.edu/museum.

http://www.nytimes.com/2009/09/13/nyregion/13artwe.html?ref=design

Depression 'cuts cancer survival'

Depression can damage a cancer patient's chances of survival, a review of research suggests.

The University of British Columbia team said the finding emphasised the need to screen cancer patients carefully for signs of psychological distress.

The study, a review of 26 separate studies including 9,417 patients, features in the journal Cancer.

It found death rates were up to 25% higher in patients showing symptoms of depression.

“ **"Cancer patients need not panic if they are experiencing depressive symptoms, but it is certainly reasonable to talk to their physicians about their mental health."** ”
Jillian Satin University of British Columbia

In patients actually diagnosed with major or minor depression, death rates were up to 39% higher.

The increased risks remained even after other clinical characteristics that might affect survival were taken into consideration.

However, the researchers said more research was needed before any definitive conclusions could be drawn, as it was difficult to rule out the impact of other factors.

They also stressed that, overall, the increased risk of dying from cancer due to depression was small - so patients should not feel they had to maintain a positive attitude to beat their disease.

The studies looked at by the British Columbia team focused on a range of survival times, from one year to 10 years.

The researchers could find no firm evidence to show that depression impacted on the progression of disease - although the number of studies which specifically looked at this was very limited.

Stress impact

Research on animals has suggested that stress can have an effect on tumour growth and the spread of cancer to other parts of the body.

It is possible that depression could have an impact on hormones or the immune system, or that depressed people tend to engage in behaviour which might affect how long they live.

For instance, depressed people may be less likely to comply with treatment regimes.

However, at this stage there is no firm proof that depression actually causes cancer patients to die earlier than they otherwise would.

Previous research has suggested that depression has a much bigger impact on mortality from heart disease.

Lead researcher Jillian Satin said: "It is quite remarkable that the presence of depressive symptoms or a diagnosis of a depressive disorder can predict mortality in cancer patients.

"But it should be kept in mind that the increased risk is quite small.

"Cancer patients need not panic if they are experiencing depressive symptoms, but it is certainly reasonable to talk to their physicians about their mental health."

Dr Julie Sharp, of the charity Cancer Research UK, said: "This research adds weight to the importance of identifying depression early in people with cancer and offering them appropriate support and care."

But she added: "There are still many unanswered questions as the effects observed in this study are quite small and may be due to other factors.

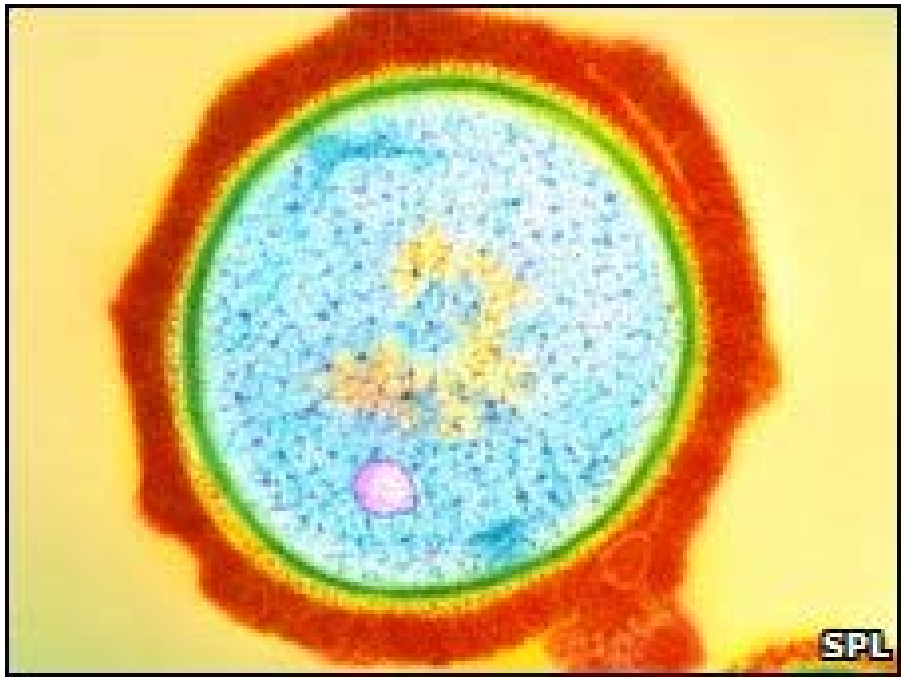
"More research will be needed to explain whether these observations are true and if so why."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8246829.stm

Published: 2009/09/14 04:21:16 GMT

Antibiotic resistance clue found

US scientists have uncovered a defense mechanism in bacteria that allows them to fend off the threat of antibiotics.



It is hoped the findings could help researchers boost the effectiveness of existing treatments.

The study published in Science found that nitric oxide produced by the bacteria eliminates some key effects of a wide range of antibiotics.

One UK expert said inhibiting nitric oxide synthesis could be an important advance for tackling tricky infections.

Antibiotic resistance, for example with MRSA, is a growing problem and experts have long warned of the need to develop new treatments.

" **Here, we have a short cut, where we don't have to invent new antibiotics** "
Dr Evgeny Nudler, study leader

The latest research, done by a team at New York University, showed that in bacteria the production of nitric oxide - a small molecule made up of one nitrogen and one oxygen atom - increased their resistance to antibiotics.

They found the enzymes responsible for producing nitric oxide were activated specifically in response to the presence of the antibiotics.

They also showed that nitric oxide alleviates damage caused by the drugs as well as helping to neutralise many of the toxic compounds within the antibiotic.

The researchers then showed that eliminating nitric oxide production in the bacteria allowed the antibiotics to work at lower, less toxic doses.

More effective

Study leader, Dr Evgeny Nudler, said developing new medicines to fight antibiotic resistance, such as that seen with MRSA is a "huge hurdle".

"Here, we have a short cut, where we don't have to invent new antibiotics.

"Instead we can enhance the activity of well-established ones, making them more effective at lower doses.

Dr Matthew Dryden, consultant in microbiology and communicable disease at Royal Hampshire County Hospital and general secretary of the British Society for Antimicrobial Chemotherapy, said if the enzyme which creates nitric oxide could be inhibited, it could suppress the ability of the bacteria to counteract antibiotics.

"This would be a useful therapeutic advance, especially as we are running out of new classes of antibiotics and there is less antibiotic development in general."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8248020.stm

Published: 2009/09/13 00:35:07 GMT

Direct Evidence Of Role Of Sleep In Memory Formation Is Uncovered

For the first time, researchers have pinpointed the mechanism that takes place during sleep that causes learning and memory formation to occur. (Credit: iStockphoto/Mads Abildgaard)

ScienceDaily (Sep. 16, 2009) — A Rutgers University, Newark and Collége de France, Paris research team has pinpointed for the first time the mechanism that takes place during sleep that causes learning and memory formation to occur.

It's been known for more than a century that sleep somehow is important for learning and memory. Sigmund Freud further suspected that what we learned during the day was "rehearsed" by the brain during dreaming, allowing memories to form. And while much recent research has focused on the correlative links between the hippocampus and memory consolidation, what had not been identified was the specific processes that cause long-term memories to form.

As posted online September 11, 2009 by *Nature Neuroscience*, György Buzsaki, professor at the Center for Molecular and Behavioral Neuroscience at Rutgers University, Newark, and his co-researchers, Gabrielle Girardeau, Karim Benchenane, Sidney I. Wiener and Michaël B. Zugaro of the Collége de France, have determined that short transient brain events, called "sharp wave ripples," are responsible for consolidating memory and transferring the learned information from the hippocampus to the neocortex, where long-term memories are stored.

Sharp wave ripples are intense, compressed oscillations that occur in the hippocampus when the hippocampus is working "off-line," most often during stage four sleep, which, along with stage three, is the deepest level of sleep.

During stage four sleep, Buzsaki explains, "it's as if many instruments and members of the orchestra come together to generate a loud sound, a sound so loud that it is heard by wide areas of the neocortex. These sharp, 'loud' transient events occur hundreds to thousands of times during sleep and 'teach' the neocortex to form a long-term form of the memory, a process referred to as memory consolidation." The intensity and multiple occurrence of those ripples also explain why certain events may only take place once in the waking state and yet can be remembered for a lifetime, adds Buzsaki.

The researchers were able to pinpoint that sharp wave ripples are the cause behind memory formation by eliminating those ripple events in rats during sleep. The rats were trained in a spatial navigation task and

then allowed to sleep after each session. Those rats that selectively had all ripple events eliminated by electrical stimulation were impeded in their ability to learn from the training, as compressed information was unable to leave the hippocampus and transfer to the neocortex.

Identification of a specific brain pattern responsible for strengthening learned information could facilitate applied research for more effective treatment of memory disorders.

"This is the first example that if a well-defined pattern of activity in the brain is reliably and selectively eliminated, it results in memory deficit; a demonstration that this specific brain pattern is the cause behind long-term memory formation," says Buzsaki.

The research also represents a move toward a new direction in neuroscience research. While previous research largely has focused on correlating behavior with specific brain events through electroencephalogram, neuronal spiking and functional magnetic resonance imaging studies, increasingly researchers are challenging those correlations as they seek to identify the specific process or processes that cause certain events and behaviors to take place.

The research was performed at the Collége de France, Paris where Buzsaki worked as a distinguished visiting professor in 2008.

Journal reference:

1. Gabrielle Girardeau, Karim Benchenane, Sidney I Wiener, György Buzsáki & Michaël B Zugaro. **Selective suppression of hippocampal ripples impairs spatial memory**. *Nature Neuroscience*, 2009; DOI: 10.1038/nn.2384

Adapted from materials provided by Rutgers University.

http://www.sciencedaily.com/releases/2009/09/090915174506.htm

Beans' Defenses Mean Bacteria Get Evolutionary Helping Hand

Bean plants' natural defences against bacterial infections could be unwittingly driving the evolution of more highly pathogenic bacteria. (Credit: iStockphoto)

ScienceDaily (Sep. 16, 2009) — Bean plants' natural defences against bacterial infections could be unwittingly driving the evolution of more highly pathogenic bacteria, according to new research published September 10 in *Current Biology.*

The study sheds new light on how bacterial pathogens evolve and adapt to stresses from host plants. This information could help researchers develop new ways of tackling pathogens that cause extensive and costly damage to beans and other food crops.

The scientists from Imperial College London and the University of the West of England (UWE) focused on a bacterial pathogen called *Pseudamonas syringae*, which causes a disease called halo blight, in bean plants. Symptoms include brown spots on the leaves, surrounded by a yellow halo. The disease can cause bean plants to lose their leaves, wilt and die, and is a serious problem for farmers worldwide.

The research team observed that a French bean plant's defensive moves against infection caused *P. syringae* bacterial cells to 'swap' bits of DNA with each other. When one bacterial cell takes up DNA released by another like this, it is known as genetic transformation. This process, occurring within infected plant tissue, could speed up the evolution of more virulent forms of disease-causing microbes say the researchers.

Professor John Mansfield from Imperial College London's Department of Life Sciences, one of the authors of the new paper, explains: "In the course of fighting off infection, and putting the invading bacteria under stress, it seems that the plants inadvertently do them a big favour. By causing the bacteria to throw out selected fragments of their DNA, which can then be taken up by other bacteria cells, the

plants are effectively stimulating the bacteria to evolve. For disease-causing bacteria, this means that mechanisms meant to disable them could actually contribute to their continued survival."

When a French bean plant is infected by *P. syringae* it defends itself by sending a suicide signal to the plant cells surrounding the bacteria. When the affected plant cells die they release antimicrobial compounds that are toxic to the microbes. The toxic environment places the bacterial cells under enormous stress.

The new study shows that along with restricting bacterial multiplication, the release of these toxins seems to stimulate *P. syringae* cells to cut out small sections of their own DNA containing genes linked to pathogenicity. These gene 'islands' are then thrown out of the bacterial cell, and absorbed and incorporated into the DNA of other bacteria within the plant.

Professor Mansfield and colleagues are not yet sure exactly how the suicide of nearby plant cells brings about this DNA separation and removal, but say their results could have a much wider implication for how scientists understand the relationship between pathogen, host and pathogen evolution.

Dr Dawn Arnold, co author of the study from UWE's School of Life Sciences, concluded: "Although this work involves plant-bacteria interactions it also has a wider significance in that it could lead to a greater understanding of how bacteria evade the immune system of different hosts including humans."

The research was funded by the Biotechnology and Biological Sciences Research Council (BBSRC).

Journal reference:

1. Helen C. Lovell, John W. Mansfield, Scott A.C. Godfrey, Robert W. Jackson, John T. Hancock, Dawn L. Arnold. **Bacterial Evolution by Genomic Island Transfer Occurs via DNA Transformation In Planta**. *Current Biology*, 2009; DOI: 10.1016/j.cub.2009.08.018

Adapted from materials provided by Imperial College London, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090910121805.htm

As Ash Borer Claims More Trees, Researcher Works For Species Survival

Mark Widrlechner looks at a few of the1,000s of seeds currently in the storage facility. Widrlechner is in charge of a nationwide effort to collect seeds from ash trees before they are destroyed by a pest accidentally imported from Asia to Michigan by an unknown source several years ago. (Credit: Image courtesy of Iowa State University)

ScienceDaily (Sep. 16, 2009) — Mark Widrlechner may someday be known as the modern-day Johnny Appleseed for ash trees.

As the devastating insect emerald ash borer is working its way across North America destroying almost all the native ash trees it encounters, Widrlechner is rapidly collecting and storing ash tree seeds.

Like the legendary Appleseed who planted apple trees across the country, Widrlechner's seed stocks can serve as a national source for reintroducing ash trees once the devastation can be controlled.

Widrlechner, horticulturist for the United States Department of Agriculture's Agricultural Research Service (ARS) and assistant professor of agronomy and horticulture at ISU, is a curator at the North Central Regional Plant Introduction Station in Ames, Iowa, responsible for collecting and maintaining seeds for several species of trees, including ash, for the USDA's National Plant Germplasm System.

As the pest devours ash tree populations on its way across North America, there may soon be few, if any, ash trees left.

"Where these borers have been present the longest, it has basically been a total wipeout," said Widrlechner.

"That is something we rarely see in nature," he said. "It's uncommon for a pest to come in and just clean something out. It doesn't just attack sick trees. Emerald ash borer attacks healthy trees. It attacks small trees. So you don't have just big, old trees falling to this, you've got 2 to 3 inch saplings falling to this."

Estimates from New York -- one of the states the insect will infest as the devastation grows in circles spreading outward from Michigan, where it was first discovered in June 2002 -- put the total number of ash trees destroyed at 70 million as of June.

Emerald ash borer is native to Asia, and North American ash trees have not shown any natural resistance to it. The pest's larvae burrow just under the bark and into the circulatory system of the tree. The larvae interrupt the tree's water and nutrient delivery system. Starved of nutrients, the branches die. Eventually the entire tree is lost.

Now, Widrlechner is racing the clock to collect seeds from different ash species including green, white, blue, and black ash, and many variations within each species.

He thinks he may be about 10 percent there.

"When I first found out about the emerald ash borer, we had about 60 different types of ash tree germplasm (seed) in our system," said Widrlechner. "Now we have about 220. Ultimately, I think we'll need at least a couple thousand to represent the diversity that's out there. In the next two years, we should really start to make a dent in it."

The situation has mobilized members of the ARS, the United States Forest Service, the Animal and Plant Health Inspection Service, the Natural Resources Conservation Service, the Bureau of Land Management and many state agencies and public gardens all to find ways to contain the pest, save the ash trees and conserve their seeds.

In January, Widrlechner became the national coordinator for all the agencies involved with seed collection and conservation.

"We've got a lot of people working on it," he said. "I just got back from southern Wisconsin and northern Illinois looking for good, natural populations that have seed. We find them, mark them with the GPS coordinates and then go back when the seeds are ready in September and October."

One of the problems this year is that many of the trees are not producing very many or very good quality seeds.

Widrlechner says this happens in certain years and is not very well understood.

Widrlechner's recent trips to New England and throughout the Midwest are designed to collect seeds ahead of the growing infestation.

"The strategy that we're following right now is focused on the area just outside the range of the insect or the area where the insect is just moving into," he said. "Places where the insect has been for a while we've lost. There's just so little ash to go back to."

Once Widrlechner collects the seeds, he stores them in the Plant Introduction Station and also at a secure backup site at the National Center for Genetic Resources Preservation in Fort Collins, Co.

The Plant Introduction Station is a joint project of Iowa State University, the USDA and the State Agricultural Experiment Stations of the 12 north central states as part of the National Plant Germplasm System. The facility keeps an inventory of many types of plant germplasm. The seeds are used in research locally and sent to researchers around the world as needed.

The effect of losing the nation's ash trees would be felt in many areas.

Throughout much of the U.S., ash is a popular shade tree along streets and in residential landscapes. The dead and dying trees pose major hazards and are expensive to remove, and will leave many city streets without trees for shade or beauty.

Also, Native Americans use ash trees for baskets and other crafts, and baseball bats are traditionally made from the wood.

The biggest problem might be in the hole that's created in the ecosystem.

"I'm really concerned," said Widrlechner. "You take a major tree out of the forest and what is going to fill the hole? Another native tree might do it or something non-native could fill the gap and change the ecosystem."

Despite the challenges, Widrlechner says there are reasons for long-term optimism.

Ash seeds tend to remain viable even after years of cold storage. If, and when, the germplasm in the Plant Introduction Station is needed, new ash trees should grow from the stored seeds.

A similar episode nearly wiped out the American chestnut nearly a century ago. In that case, fungus called chestnut blight brought in from Asia caused the devastation. After much work, researchers have developed blight-resistant trees.

Now American chestnut trees are being re-introduced into their historical home, primarily in the Eastern United States and in the Appalachian hardwood forest ecosystem where they can help restore those forests to their former diversity.

Adapted from materials provided by Iowa State University.

http://www.sciencedaily.com/releases/2009/09/090910184308.htm

Scary Music Is Scarier With Your Eyes Shut

The power of the imagination is well-known: it's no surprise that scary music is scarier with your eyes closed. (Credit: iStockphoto/Mirko Pernjakovic)

ScienceDaily (Sep. 16, 2009) — The power of the imagination is well-known: it's no surprise that scary music is scarier with your eyes closed. But now neuroscientist and psychiatrist Prof. Talma Hendler of Tel Aviv University's Functional Brain Center says that this phenomenon may open the door to a new way of treating people with Alzheimer's, Parkinson's and other neurological diseases.

In her new study, Prof. Hendler found that the simple act of voluntarily closing one's eyes — instead of listening to music and sounds in the dark — can elicit more intense physical responses in the brain itself. This finding may have therapeutic value in treating people with brain disorders. Her research was just published in *PLoS One* and builds on her 2007 study published in *Cerebral Cortex.*

Prof. Hendler's research suggests that, when our eyes are closed, a region in our brain called the amygdala is fired up. The experience of scary music becomes more emotionally and physically intense. And the converse of the scary music effect may be true: happy music could produce a joyous effect when our eyes are shut as well.

Listening to sounds with our eyes closed seems to wire together a direct connection to the regions of our brains that process emotions, says Prof. Hendler. "Music is a relatively abstract emotional carrier," says Prof. Hendler. "It can easily take one's subjective personal experience and manipulate it. Our new findings, however, suggest that the effect is not only subjective. Using a functional MRI (fMRI), we can see that distinct changes in the brain are more pronounced when a person's eyes are not being used."

Alfred Hitchcock in the laboratory

Dr. Yulia Lerner, a post-doctoral fellow at Prof. Hendler's lab, had 15 healthy volunteers listen to spooky Hitchcock-style music, and then neutral sounds with no musical melody. They listened to these twice, once with their eyes open and a second time with their eyes shut, as she monitored their brain activity with an fMRI. While volunteers were listening to the scary music, Dr. Lerner found that brain activity peaked when the subjects' eyes were closed. This medical finding corresponded to volunteer feedback that the subjects felt more emotionally charged by the scary music.

The amygdala, the region of the brain in which emotions are located, was significantly more active when the subjects' eyes were closed. "It's possible that closing one's eyes during an emotional stimulation, like in our research, may help people through a variety of mental states. It synchs connectivity in the brain," Dr. Hendler says. "We don't know exactly how or why this happens — it's like a light switch gets turned off, allowing the brain to better integrate the highs and lows of the emotional experience when the eyes are shut."

Music brings balance to the brain and more readily integrates the affective and cognitive centers of our mind. Music may help us think better and even improve our learning abilities. But, she warns, more studies are needed before you let your teen crank up the hip-hop music as a study aid.

Applications for dementia and systemic brain disorders

"This study is the first time scientists have looked inside the brain non-invasively, to examine what happens to the brain under these conditions," says Prof. Hendler. Small physical behaviors can radically alter the balance and color of emotions. Not long ago in U.S. classrooms, teachers found that hyperactive students learned better while standing, rather than sitting at their desks. Now, Prof. Hendler's latest study with scary music is "just an example of how a small manipulation in one's physical state such as eyes open or shut can change our mental experience," she says.

The findings, researchers hope, can be applied to therapies that achieve more significant and longer-lasting effects without chemical intervention. While her study just touches on the connection of physical and emotional activity in the brain, Prof. Hendler doesn't rule out music therapy in alleviating symptoms in chronic mental disorders such as depression, Schizophrenia and Parkinson's, in the future.

Adapted from materials provided by Tel Aviv University.

http://www.sciencedaily.com/releases/2009/09/090915154854.htm

Virtual Maps For The Blind

Researchers have developed a new software tool to help the blind navigate through unfamiliar places. It is connected to an existing joystick, a 3-D haptic device, that interfaces with the user through the sense of touch. (Credit: Image courtesy of American Friends of Tel Aviv University)

ScienceDaily (Sep. 16, 2009) — The blind and visually impaired often rely on others to provide cues and information on navigating through their environments. The problem with this method is that it doesn't give them the tools to venture out on their own, says Dr. Orly Lahav of Tel Aviv University's School of Education and Porter School for Environmental Studies.

To give navigational "sight" to the blind, Dr. Lahav has invented a new software tool to help the blind navigate through unfamiliar places. It is connected to an existing joystick, a 3-D haptic device, that interfaces with the user through the sense of touch. People can feel tension beneath their fingertips as a physical sensation through the joystick as they navigate around a virtual environment which they cannot see, only feel: the joystick stiffens when the user meets a virtual wall or barrier. The software can also be programmed to emit sounds — a cappuccino machine firing up in a virtual café, or phones ringing when the explorer walks by a reception desk.

Exploring 3D virtual worlds based on maps of real-world environments, the blind are able to "feel out" streets, sidewalks and hallways with the joystick as they move the cursor like a white cane on the computer screen that they will never see. Before going out alone, the new solution gives them the control, confidence and ability to explore new streets making unknown spaces familiar. It allows people who can't see to make mental maps in their mind.

Dr. Lahav's software takes physical information from our world and digitizes it for transfer to a computer, with which the user interacts using a mechanical device. Her hope is that the blind will be able to explore the virtual environment of a new neighborhood in the comfort of their homes before venturing out into the real world.

A touchy-feely virtual white stick

"This tool lets the blind 'touch' and 'hear' virtual objects and deepens their sense of space, distance and perspective," says Dr. Lahav. "They can 'feel' intersections, buildings, paths, and obstacles with the

joystick, and even navigate inside a shopping mall or a museum like the Louvre in a virtual environment before they go out to explore on their own."

The tool transmits textures to the fingers and can distinguish among surfaces like tiled floors, asphalt, sidewalks and grass. In theory, any unknown space, indoors or out, can be virtually pre-explored, says Dr. Lahav. The territory just needs to be mapped first — and with existing applications like GIS (geography information system), the information is already there.

A new road to independence

The tool, called the BlindAid, was recently unveiled at the "Virtual Rehabilitation 2009 International Conference," where Dr. Lahav demonstrated case studies of people using the tool at the Carroll Center for the Blind, a rehabilitation center in Newton, Massachusetts. There, a partially blind woman first explored the virtual environment of the center — as well as the campus and 10 other sites, including a four-story building. After just three or four sessions, the woman was able to effectively navigate and explore real-world target sites wearing a blindfold.

The virtual system becomes a computerized "white cane" for the blind, says Dr. Lahav. "They get feedback from the device that lets them build a cognitive map, which they later apply in the real world. It's like a high-tech walking cane," she says. "Our tool lets people 'see' their environment in advance so they can walk in it for real at a later time."

Today the blind and visually impaired are very limited in their movements, which necessarily influences their quality of life. This solution could help them find new options, like closer routes from train or bus stations to the safety of home. "Ultimately, it helps the blind determine their own paths and gives them the ability to take control of their lives," says Dr. Lahav, who first began this research at Tel Aviv University, under Prof. David Mioduser, where she now works. She then further developed it with her MIT colleagues Dr. Mandayam Srinivasan and Dr. David W. Schloerb.

Adapted from materials provided by American Friends of Tel Aviv University.

http://www.sciencedaily.com/releases/2009/09/090910114152.htm

50 Millionth Unique Chemical Substance Recorded In Chemical Abstracts Service Registry

ScienceDaily (Sep. 16, 2009) — Chemical Abstracts Service (CAS), a division of the American Chemical Society, announced that on September 7 it recorded the 50 millionth substance in CAS REGISTRY, the world's most comprehensive and high-quality compendium of publicly disclosed chemical information. The recently registered substance is a novel arylmethylidene heterocycle with analgesic properties. Reaching the 50 million mark so quickly is an indicator of the accelerating pace of scientific knowledge. CAS registered the 40 millionth substance just nine months ago—in contrast, it took 33 years for CAS to register the 10 millionth compound in 1990.

Information professionals and scientists around the world have taken note of this important milestone. "The rapid growth of CAS REGISTRY is a mirror of the breadth and depth of creativity in research labs throughout the world," said Grace Baysinger, head librarian at the Swain Chemistry and Chemical Engineering Library at Stanford University. "CAS REGISTRY is an indispensable resource for users in research, education, and industry.""Achieving a milestone of 50 million small molecules registered, which I congratulate CAS for, has given us two major insights; one is that a novel substance is either isolated or synthesized every 2.6 seconds on the average during the past 12 months, day and night, seven days a week in the world, showing an almost unbelievable rate of progress in science," said Dr. Hideaki Chihara, Ph.D. chemist and former president of Japan Association for International Chemical Information. "The other is that CAS is maintaining its reputation as the world's largest compilation of substance information that every scientist in the world relies on either directly or indirectly."

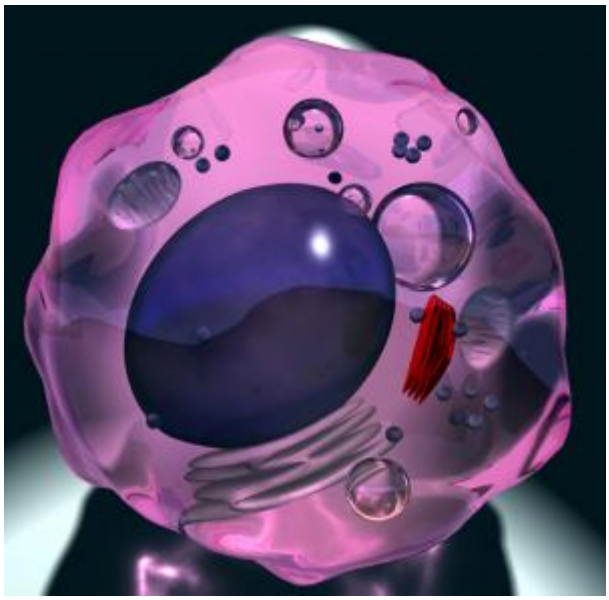
REGISTRY is the only integrated collection of chemical information from a full range of patent and journal literature, plus Web and other commercial sources that is curated and quality-controlled by a global team of scientists. REGISTRY not only provides chemical names, the unique CAS Registry Number®, and vital literature references but also ancillary information such as experimental and predicted property data (boiling and melting points, etc.), commercial availability, preparation details, spectra, and regulatory information from international sources.The 50 millionth substance (CAS Registry Number 1181081-51-5) was uncovered by CAS scientists from the Examples section of a nearly 200-page patent issued by the World Intellectual Property Organization on August 13, 2009. According to the patent, "Few therapeutics are approved by the US Food and Drug Administration and other regulatory agencies for the treatment of neuropathic pain." To address this concern, a series of novel arylmethylidene heterocycles were synthesized, which included the most recent substance registered by CAS.

"The 50 million substances in CAS REGISTRY have the potential to enable new discoveries in every field of scientific study, from cancer research to the development of new consumer goods, the creation of more effective drugs, or the discovery of faster and smaller computer processors," said Dr. Matthew Toussant, senior vice president of editorial operations at CAS. "Scientific discoveries build upon past discoveries, and it is the quality and comprehensiveness of CAS REGISTRY that enables chemistry innovation."CAS REGISTRY is available to scientists through CAS' award-winning product, SciFinder®, and its STN® family of products. With these advanced search and analysis technologies, CAS helps scientists find reliable information that is vital to their research process.CAS, a division of the American Chemical Society, provides the world's largest and most current collection of chemical and related scientific information, including the most authoritative database of chemical substances, the CAS REGISTRYSM. CAS combines these databases with advanced search and analysis technologies to deliver the most complete, cross-linked, and effective digital information environment for scientific research and discovery, including such products as SciFinder, STN, STN Express®, and STN® AnaVistTM, among others.

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

http://www.sciencedaily.com/releases/2009/09/090910184310.htm

Molecular Evidence Supports Key Tenet Of Darwin's Evolution Theory



Artist's rendering of a human cell. As a model system, the research focused on one specific molecular machine, the TIM complex, which transports proteins into mitochondria. Mitochondria are a compartment of human cells that serve as the energy-producing 'powerhouses'. At a very early stage in evolution, mitochondria were derived from bacteria that lived within the first eukaryotic cells. (Credit: iStockphoto/Gary Caviness)

ScienceDaily (Sep. 15, 2009) — An international team of researchers, including Monash University biochemists, has discovered evidence at the molecular level in support of one of the key tenets of Darwin's theory of evolution.

Monash University's Professor Trevor Lithgow said the breakthrough, funded by the Australian Research Council and published recently in the journal *Proceedings of the National Academy of Sciences*, provides a blueprint for a general understanding of the evolution of the "machinery" of our cells.

"Our cells, and the cells of all organisms, are composed of molecular machines. These machines are built of component parts, each of which contributes a partial function or structural element to the machine. How such sophisticated, multi-component machines could evolve has been somewhat mysterious, and highly controversial." Professor Lithgow said.

A non-Darwinian explanation, from believers of Intelligent Design, proposed these complex machines to be "irreducibly complex". In other words they are so neatly complex and complete that they couldn't have evolved but rather must have been designed by an intelligent entity.

"Our research shows that these machines although complete and complex, were a result of evolution. Simple 'core' machines were established in the first eukaryotes by drawing on pre-existing proteins that had previously provided distinct, simplistic functions," Professor Lithgow said.

As a model system, the research focused on one specific molecular machine, the TIM complex, which transports proteins into mitochondria. Mitochondria are a compartment of human cells that serve as the energy-producing 'powerhouses'. At a very early stage in evolution, mitochondria were derived from bacteria that lived within the first eukaryotic cells.

"Our cells literally are chimeras of a "host" cell and these intracellular bacteria. Yet bacteria don't have TIM complexes – to understand where the TIM complex came from we simply applied scientific reasoning and looked at a modern-day bacterium akin to the organism that gave rise to mitochondria." Professor Lithgow said.

The group looked at the bacterium *Caulobacter crescentus* and found bacterial proteins related to the components of the mitochondrial TIM complex. They then showed that these bacterial proteins are not found as part of protein transport machines.

"François Jacob described evolution as a tinkerer, cobbling together proteins of one function to yield more complex machines capable of new functions." Professor Lithgow said.

"Our work describes a perfect example of Jacob's proposition, and shows that Darwin's theory of evolution beautifully explains how molecular machines came to be."

Professor Lithgow was joined by Monash researchers Dr Abigail Clements, Dr Dejan Bursac, Dr Xenia Gatsos, Dr. Andrew Perry, Mr. Srgjan Civciristov and Ms. Nermin Celik together with researchers from the University of Melbourne and Yale University in the US.

Adapted from materials provided by Monash University.

http://www.sciencedaily.com/releases/2009/09/090914111102.htm

Water Quality In Orbit: H_2O Disinfection Tested On International Space Station

University of Utah chemist Lorraine Siperko (right) works on a water quality monitoring system while experiencing weightless conditions at the top of an arc-shaped flight path by a NASA C-9 research plane nicknamed the "vomit comet." Other scientists working on the project include Bob Lipert of Iowa State University (left) and John Straub of Wyle Laboratories. (Credit: Courtesy of NASA)

ScienceDaily (Sep. 15, 2009) — Space is not a fun place to get a stomach bug. To ensure drinking water is adequately disinfected, University of Utah chemists have developed a two-minute water quality monitoring method that just started six months of tests aboard the International Space Station.

"Now they bring water back on the space shuttle and analyze it on the ground. The problem is there is a big delay. You'd like to be able to maintain iodine or silver [disinfectant] levels in real time with an onboard monitor," says Marc Porter, a University of Utah professor of chemistry and chemical engineering.

The new method involves sampling space station or space shuttle galley water with syringes, forcing the water through a chemical-imbued disk-shaped membrane, and then reading the color of the membrane with a commercially available, handheld color sensor normally used to measure the color and glossiness of automobile paint.

The sensor detects if the drinking water contains enough iodine (used on U.S. spacecraft) or silver (used by the Russians) to kill any microbes. The International Space Station has both kinds of water purification systems.

"Our focus was to develop a small, simple, low-cost testing system that uses a handheld device, doesn't consume materials or generate waste, takes minimal astronaut time, is safe and works in microgravity," says Porter.

As a spinoff, the test is being modified so it can quickly check water for the level of arsenic – a natural pollutant in places like Bangladesh and the U.S. Southwest and Northeast – and it can be adapted to quickly, inexpensively test for other pollutants.

"It is a general method," says Lorraine Siperko, a senior research scientist in Porter's laboratory. "It could be used on the ground for testing all kinds of water contaminants such as arsenic, chromium, cadmium, nickel and other heavy metals."

The method is easy to use and much cheaper than existing tests, says Porter.

From the 'Vomit Comet' to the Shuttle to the International Space Station

The water-monitoring system fits in a pack the size of a small ice chest. It was launched Aug. 28 on space shuttle Discovery bound for the International Space Station.

The project is funded by the National Aeronautics and Space Administration, the Utah Science, Technology and Research (USTAR) economic development initiative and two universities where Porter worked previously: Arizona State and Iowa State. The project team now includes NASA, USTAR and the University of Utah, Iowa State University and Wyle Laboratories. Porter is a professor hired under the USTAR program.

During the past decade, the water quality monitoring method was developed and tested during about two dozen low-gravity flights on NASA's "vomit comet" research aircraft such as the KC-135 and C-9, which took off from Ellington Air Force Base in Texas. During a flight, each plane makes 40 parabola-shaped arcs through the sky, climbing steeply, then leveling and diving. Weightless conditions exist for about 30 seconds at the top of each arc.

Porter rode the KC-135 twice in 2002 and 2004, and became very motion sick. Siperko rode the C-9 five times in 2006 and 2007, developing and testing the water-quality monitoring technique, including how to remove drinking water samples from collection bags without excessive bubbles, which don't easily separate from water in weightless conditions. The handheld sensor and chemicals used in the testing process also were checked for reliability during the low-gravity plane flights.

Now, "the experiment is in space for the first time," Siperko says. "It's very rewarding and exciting to know that something you worked on is so important that NASA put it on the shuttle for a six-month test on the International Space Station."

Porter called the space station "the coolest place to do experiments."

On the space station, "once per month they will check the water for iodine and silver," Siperko says. "That data will be downloaded and relayed back to Earth, to Johnson Space Center" in Texas.

"We have teleconferences with them, and they will transfer the data to us electronically for us to look at," she adds. "That way we can judge if the experiment is working correctly. If any unforeseen problems arise, then we can advise them as to what we think might be the problem and how to correct it."

Keeping It Clean in Orbit

The project began a decade ago, before Porter joined the Utah faculty, when NASA sought proposals for disinfectant or "biocide" monitors to check the safety of drinking water on manned spacecraft.

"You can't sterilize water well enough to keep things from growing in it," Porter says. "Nature happens."

NASA uses iodine as a disinfectant on U.S. spacecraft. The Russians use colloidal silver – pure silver nanoparticles, some of which go into solution.

The problem for both iodine and silver is that microbes grow in the water if levels are too low. If levels are too high, iodine-treated water tastes bad and eventually might cause thyroid problems, and silver at excessive levels can turn the skin grayish blue.

Space station water now is sampled and returned to Earth for testing at intervals of months because "they don't have an acceptable onboard technique," Porter says.

He says the space station is a proving ground for technologies for longer manned flights to the moon and Mars – even though those flights are unlikely anytime soon due to high costs and other priorities.

Water for astronauts is carried into orbit and also produced on the space station as a byproduct of hydrogen and oxygen reacting in fuel cells. Disinfectants or biocides are added during flight, but actual levels in drinking water cannot be tested until samples are brought back to Earth. Porter says required biocide levels in drinking water are 0.1 to 1 part per million silver and 0.1 to 5 parts per million iodine.

How It Works

To test whether drinking water is adequately disinfected, space station astronauts will collect galley water in sealed plastic bags, and then use syringes to remove some water from the bags and push it through a cartridge that contains a half-inch-diameter, polymer, porous-membrane disk impregnated with a chemical to detect either iodine or silver. The disks, known as "solid phase extraction membranes," capture either iodine or silver, depending on the chemical in the disk.

Next, the bottom half of the cartridge, which contains the disk, is placed against a German company's handheld "diffuse reflectance spectrometer," which shines light on the disk so it can read the disk's color in about two seconds. Porter says the device was developed to measure the reflectivity or gloss, and thus the quality, of finishes such as automotive paint, industrial surfaces, stainless steel and decorative metals.

Each handheld device – two are in the kit taken to the space station – weighs 1.1 pounds, runs on four AA batteries, has a readout screen and measures 7 inches by 3.7 inches by 3.2 inches.

To test for iodine, the disk is impregnated with PVP (polyvinylpyrrolidone), a nontoxic chemical in contact lens cleaning solutions. The PVP reacts with iodine, and the intensity of the resulting yellow color reveals the concentration of iodine in the water.

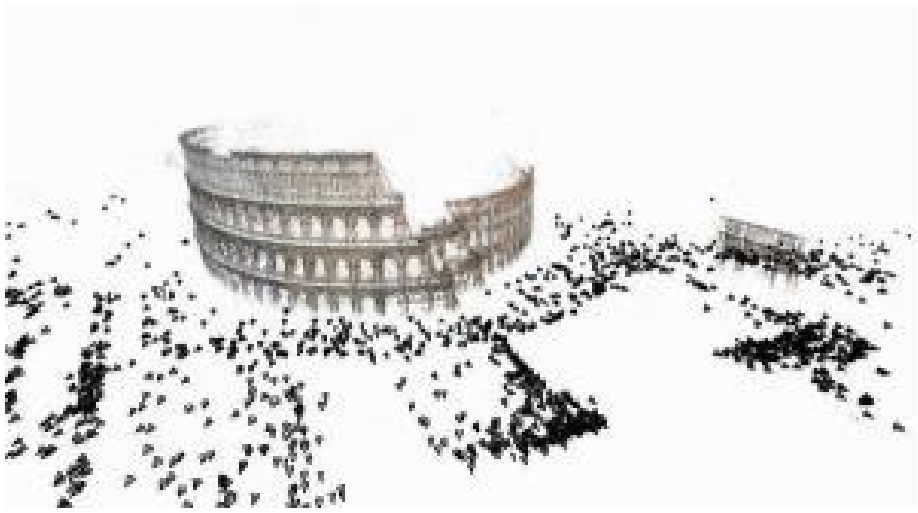
To test for silver in water, the disk is imbued with DMABR, which is short for 5-(dimethylaminobenzylidene)rhodanine. A yellowish color indicates silver is absent, while flesh to brighter pink reveals how much silver is present.

"We can do this whole analysis in about two minutes on the ground or in space," Porter says.

Adapted from materials provided by University of Utah.

http://www.sciencedaily.com/releases/2009/09/090914110959.htm

Rome Was Built In A Day, With Hundreds Of Thousands Of Digital Photos



The Colosseum as seen in the digital reconstruction. Each triangle is where a person was standing when he or she took a photo. The building's shape is determined by analyzing photos taken from all these different perspectives. (Credit: University of Washington)

ScienceDaily (Sep. 15, 2009) — The ancient city of Rome was not built in a day. It took nearly a decade to build the Colosseum, and almost a century to construct St. Peter's Basilica. But now the city, including these landmarks, can be digitized in just a matter of hours.

A new computer algorithm developed at the University of Washington uses hundreds of thousands of tourist photos to automatically reconstruct an entire city in about a day.

The tool is the most recent in a series developed at the UW to harness the increasingly large digital photo collections available on photo-sharing Web sites. The digital Rome was built from 150,000 tourist photos tagged with the word "Rome" or "Roma" that were downloaded from the popular photo-sharing Web site, Flickr.

Computers analyzed each image and in 21 hours combined them to create a 3-D digital model. With this model a viewer can fly around Rome's landmarks, from the Trevi Fountain to the Pantheon to the inside of the Sistine Chapel.

"How to match these massive collections of images to each other was a challenge," said Sameer Agarwal, a UW acting assistant professor of computer science and engineering and lead author of a paper being presented in October at the International Conference on Computer Vision in Kyoto, Japan. Until now, he said, "even if we had all the hardware we could get our hands on and then some, a reconstruction using this many photos would take forever."

Earlier versions of the UW photo-stitching technology are known as Photo Tourism. That technology was licensed in 2006 to Microsoft, which now offers it as a free tool called Photosynth.

"With Photosynth and Photo Tourism, we basically reconstruct individual landmarks. Here we're trying to reconstruct entire cities," said co-author Noah Snavely, who developed Photo Tourism as his UW doctoral work and is now an assistant professor at Cornell University.

Other co-authors of the new paper are Rick Szeliski of Microsoft Research, UW computer science professor Steve Seitz and UW graduate student Ian Simon.

In addition to Rome, the team recreated the Croatian coastal city of Dubrovnik, processing 60,000 images in less than 23 hours using a cluster of 350 computers, and Venice, Italy, processing 250,000 images in 65 hours using a cluster of 500 computers. Many historians see Venice as a candidate for digital preservation before water does more damage to the city, the researchers said.

Transitioning from landmarks to cities -- going from hundreds of photos to hundreds of thousands of photos -- is not trivial. Previous versions of the Photo Tourism software matched each photo to every other photo in the set. But as the number of photos increases the number of matches explodes, increasing with the square of the number of photos. A set of 250,000 images would take at least a year for 500 computers to process, Agarwal said. A million photos would take more than a decade.

The newly developed code works more than a hundred times faster than the previous version. It first establishes likely matches and then concentrates on those parts. The code also uses parallel processing techniques, allowing it to run simultaneously on many computers, or even on remote servers connected through the Internet.

The new, faster code makes it possible to tackle more ambitious projects.

"If a city reconstruction took several months, it would be just about building Rome," Seitz said. "But on a timeline of one day you can methodically start going through all the cities and start building models of them."

This technique could create online maps that offer viewers a virtual-reality experience. The software could build cities for video games automatically, instead of doing so by hand. It also might be used in architecture for digital preservation of cities, or integrated with online maps, Seitz said.

In the near term, the "Rome in a Day" code could be used with Photo Tourism, Photosynth or other software designed to view the model output.

The research was supported by the National Science Foundation, the Office of Naval Research and its Spawar lab, Microsoft Research, and Google.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2009/09/090915140928.htm

Largest-ever Collection Of Coins From Period Of Revolt Against Romans Found In Judean Hills

Coins that were found in the cave. (Credit: Sasson Tiram)

ScienceDaily (Sep. 15, 2009) — The largest cache of rare coins ever found in a scientific excavation from the period of the Bar-Kokhba revolt of the Jews against the Romans has been discovered in a cave by researchers from the Hebrew University of Jerusalem and Bar-Ilan University.

The coins were discovered in three batches in a deep cavern located in a nature reserve in the Judean hills. The treasure includes gold, silver and bronze coins, as well as some pottery and weapons.

The discovery was made in the framework of a comprehensive cave research and mapping project being carried out by Boaz Langford and Prof. Amos Frumkin of the Cave Research Unit in the Department of Geography at the Hebrew University, along with Dr. Boaz Zissu and Prof. Hanan Eshel of the Martin (Szusz) Department of Land of Israel Studies and Archaeology at Bar-Ilan University, and with the support of the Israel Nature and Parks Authority.

The some 120 coins were discovered within a cave that has a "hidden wing," the slippery and dangerous approach to which is possible only via a narrow opening discovered many years ago by Dr. Gideon Mann, a physician who is one of the early cave explorers in modern Israel. The opening led to a small chamber which in turn opens into a hall that served as a hiding place for the Jewish fighters of Bar-Kokhba.

Most of the discovered coins are in excellent condition and were overstruck as rebels' coins on top of Roman coins. The new imprints show Jewish images and words (for example: the facade of the Temple in Jerusalem and the slogan "for the freedom of Jerusalem"). Other coins that were found, of gold, silver and bronze, are original Roman coins of the period minted elsewhere in the Roman Empire or in the Land of Israel.

Bar-Kokhba coins of this quality and quantity have never before been discovered in one location by researchers in the Land of Israel, although over the years antiquities looters have found and sold large numbers of coins from this period. The high value of such coins has served as an incentive for thefts in recent decades, especially in the Judean hills, where many such caves exist.

Prof. Frumkin points out the significance of this particular cave, owing to its size, its proximity to Betar, and the large collection of coins found there. Ancient Betar was the site of the "last stand" of the rebels led by Bar-Kokhba in their struggle against Roman rule in Judea from 132-35 CE.

"This discovery verifies the assumption that the refugees of the revolt fled to caves in the center of a populated area in addition to the caves found in more isolated areas of the Judean Desert," said Prof. Frumkin. He also noted that the discovery adds significantly to our knowledge of the Bar-Kokhba revolt, about which there is not a great deal of historical information.

Dr. Zissu points out that one of the fascinating aspects of the Bar-Kokhba revolt is the intensive use of the rebels and Jewish refugees of natural and man-made caves as hiding and refuge places in the face of extensive Roman search-and-destroy missions. Those who fled to the caves took with them food, weapons, drinks, coins and various documents. Sometimes they even took with them the keys to their houses that they abandoned in the hope that one day they would be able to return to them.

Apparently, the people who left behind the cache of coins that has now been found did so during the period of the revolt, following their flight from their homes or from battle with the Romans; however they were unable to return to their hiding place to recover their valuables.

Adapted from materials provided by Hebrew University of Jerusalem, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090909095100.htm

Jupiter Captured Comet For 12 Years In Mid-20th Century

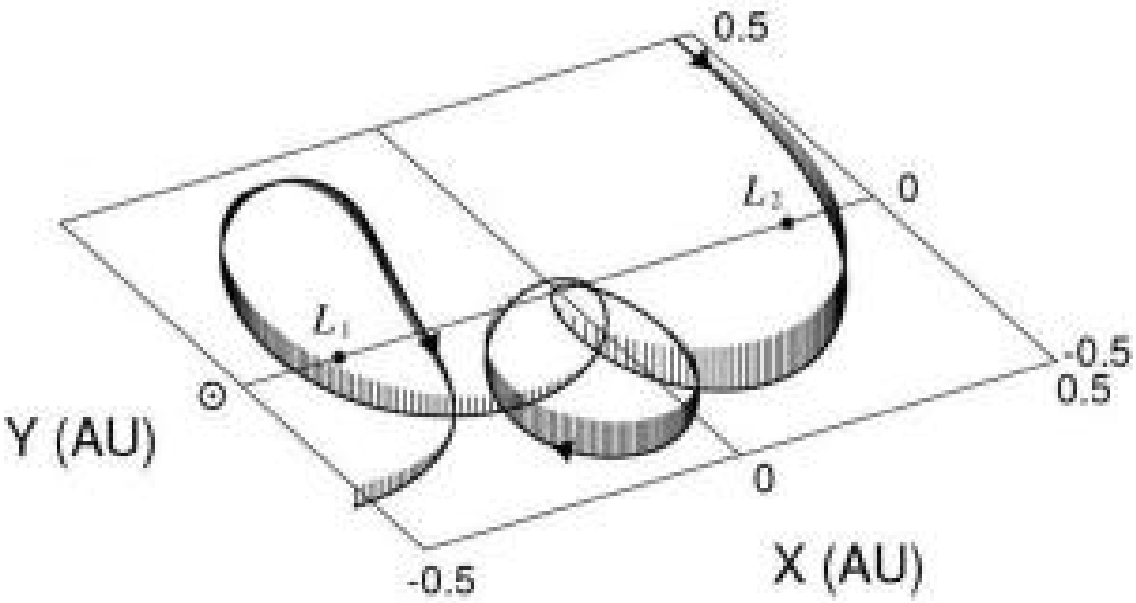


Figure showing comet Kushida-Muramatsu's orbital path around Jupiter. (Credit: Ohtsuka/Asher)

ScienceDaily (Sep. 15, 2009) — Comet 147P/Kushida-Muramatsu was captured as a temporary moon of Jupiter in the mid-20th century and remained trapped in an irregular orbit for about twelve years.

There are only a handful of known comets where this phenomenon of temporary satellite capture has occurred and the capture duration in the case of Kushida-Muramatsu, which orbited Jupiter between 1949 and 1961, is the third longest.

The discovery will be presented at the European Planetary Science Congress in Potsdam by Dr David Asher on Monday 14 September.

An international team led by Dr Katsuhito Ohtsuka modelled the trajectories of 18 “quasi-Hilda comets," objects with the potential to go through a temporary satellite capture by Jupiter that results in them either leaving or joining the “Hilda” group of objects in the asteroid belt. Most of the cases of temporary capture were flybys, where the comets did not complete a full orbit. However, Dr Ohtsuka’s team used recent observations tracking Kushida-Muramatsu over nine years to calculate hundreds of possible orbital paths for the comet over the previous century. In all scenarios, Kushida-Muramatsu completed two full revolutions of Jupiter, making it only the fifth captured orbiter to be identified.

Dr Asher said, “Our results demonstrate some of the routes taken by cometary bodies through interplanetary space that can allow them either to enter or to escape situations where they are in orbit around the planet Jupiter.”

Asteroids and comets can sometimes be distorted or fragmented by tidal effects induced by the gravitational field of a capturing planet, or may even impact with the planet. The most famous victim of both these effects was comet D/1993 F2 (Shoemaker-Levy 9), which was torn apart on passing close to Jupiter and whose fragments then collided with that planet in 1994. Previous computational studies have shown that Shoemaker-Levy 9 may well have been a quasi-Hilda comet before its capture by Jupiter.

“Fortunately for us Jupiter, as the most massive planet with the greatest gravity, sucks objects towards it more readily than other planets and we expect to observe large impacts there more often than on Earth.

Comet Kushida-Muramatsu has escaped from the giant planet and will avoid the fate of Shoemaker-Levy 9 for the foreseeable future," said Dr Asher.

The object that impacted with Jupiter this July, causing the new dark spot discovered by Australian amateur astronomer Anthony Wesley, may also have been a member of this class, even if it did not suffer tidal disruption like Shoemaker-Levy.

“Our work has become very topical again with the discovery this July of an expanding debris plume, created by the dust from the colliding object, which is the evident signature of an impact. The results of our study suggest that impacts on Jupiter and temporary satellite capture events may happen more frequently than we previously expected,” said Dr Asher.

The team has also confirmed a future moon of Jupiter. Comet 111P/Helin-Roman-Crockett, which has already orbited Jupiter three times between 1967 and 1985, is due to complete six laps of the giant planet between 2068 and 2086.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090914111825.htm

Blood Vessels Contribute To Their Own Growth And Oxygen Delivery To Tissues And Tumors

ScienceDaily (Sep. 15, 2009) — Researchers at the University of North Carolina at Chapel Hill School of Medicine and the College of Arts & Sciences have identified a new biological process that spurs the growth of new blood vessels.Vascular networks form and expand by "sprouting," similar to the way trees grow new branches. The process allows fresh oxygen and nutrients to be delivered to tissues, whether in a developing embryo or a cancerous tumor. Up until now, scientists thought that the molecular signals to form new sprouts came from outside the vessel. But new research from UNC has shown that signals can also come from within the blood vessel, pushing new blood vessel sprouts outward.

The findings, published in the Sept. 15 issue of the journal *Developmental Cell*, could give important insights into the formation of the vasculature needed to feed new tumors.

In experiments using mouse embryonic stem cells and mouse retinas, the researchers found that defects in a protein called Flt-1 lead to abnormal sprouts and poor vessel networks. Other research recently showed that levels of Flt-1 protein are particularly low in the dilated and leaky blood vessels that supply tumors with oxygen. "The blood vessels themselves seem to participate in the process guiding the formation of the vascular network," said senior study author Victoria L. Bautch, Ph.D., professor of biology at UNC. "They do not just passively sit there getting acted upon by signals coming from the outside in. Rather, they produce internal cues that interact with external cues to grow."

The growth of new blood vessels can be stimulated by cascades of events within the cell – known as pathways – the most notable of which centers around the three proteins Flt-1, Flk-1 and VEGF. Scientists have known for years that Flk-1 is a positive regulator that responds to VEGF by pulling the emerging sprout outward from its parent blood vessel.The role of its sister protein Flt-1, however, was not clearly understood. Bautch and colleagues hypothesized that Flt-1 is a negative regulator -- soaking up VEGF molecules so they are not available to interact with Flk-1 and signal for new blood vessels.

The researchers mixed two different types of mouse embryonic stem cells – one batch with normal Flt-1 protein levels, the other with no Flt-1 protein. They found that the genetic makeup of the area at the base of the sprout – rather than at the sprout itself – determined whether the sprout behaved normally or abnormally.

"The cells on each side of sprout produce and send out the soluble form of the protein, blocking the sprout from forming anywhere but in one spot and in one direction," says Bautch. "So when the sprout first forms, instead of flopping back onto its parent vessel, it has a corridor to push it forward away from the parent."

Bautch, who is also a member of the Program in Molecular Biology and Biotechnology, the UNC McAllister Heart Institute and UNC Lineberger Comprehensive Cancer Center, notes that the more scientists understand about the sophistication and complexity of the mechanisms guiding the formation of blood vessel sprouts, the better equipped they will be to develop therapeutic interventions to produce or to halt new blood vessels.

Funding for study came from the National Institutes of Health and the American Heart Association. Study co-authors from UNC include John C. Chappell, Ph.D., postdoctoral fellow; and Sarah M. Taylor, graduate student.

Adapted from materials provided by University of North Carolina School of Medicine.

http://www.sciencedaily.com/releases/2009/09/090914173014.htm

Getting Plants To Rid Themselves Of Pesticide Residues

Scientists have discovered that a naturally occurring plant hormone helps plants rid themselves of certain pesticide residues.

ScienceDaily (Sep. 15, 2009) — Scientists in China are reporting the "intriguing" discovery that a natural plant hormone, applied to crops, can help plants eliminate residues of certain pesticides.

Jing Quan Yu and colleagues note that pesticides are essential for sustaining food production for the world's growing population. Farmers worldwide use about 2.5 million tons of pesticides each year. Scientists have been seeking new ways of minimizing pesticide residues that remain in food crops after harvest — with little success. Previous research suggested that plant hormones called brassinosteroids (BRs) might be an answer to the problem.

The scientists treated cucumber plants with one type of BR then treated the plants with various pesticides, including chloropyrifos (CPF), a broad-spectrum commercial insecticide. BR significantly reduced their toxicity and residues in the plants, they say. BRs may be "promising, environmentally friendly, natural substances suitable for wide application to reduce the risks of human and environmental exposure to pesticides," the scientists note. The substances do not appear to be harmful to people or other animals, they add.

Journal reference:

1. Xia et al. **Brassinosteroids Promote Metabolism of Pesticides in Cucumber**. *Journal of Agricultural and Food Chemistry*, 2009; 090820125955050 DOI: 10.1021/jf901915a

http://www.sciencedaily.com/releases/2009/09/090909103116.htm

Researchers Using Parallel Processing Computing Could Save Thousands By Using An Xbox

Dr Simon Scarle with XBox. (Credit: Image courtesy of University of Warwick)

ScienceDaily (Sep. 15, 2009) — A new study by a University of Warwick researcher has demonstrated that researchers trying to model a range of processes could use the power and capabilities of a particular XBox chip as a much cheaper alternative to other forms of parallel processing hardware.

Dr Simon Scarle, a researcher in the University of Warwick's WMG Digital Laboratory, wished to model how electrical excitations in the heart moved around damaged cardiac cells in order to investigate or even predict cardiac arrhythmias (abnormal electrical activity in the heart which can lead to a heart attack). To conduct these simulations using traditional CPU based processing one would normally need to book time on a dedicated parallel processing computer or spend thousands on a parallel network of PCs.

Dr Scarle however also had a background in the computer games industry as he had been a Software Engineer at the Warwickshire firm Rare Ltd, part of Microsoft Games Studios. His time there made him very aware of the parallel processing power of Graphical Processing Unit (GPU) of the XBox 360, the popular computer games console played in many homes. He was convinced that this chip could, for a few hundred pounds, be employed to conduct much the same scientific modelling as several thousand pounds of parallel network PCs.

The results of his work have just been published in the journal *Computational Biology and Chemistry*. The good news is that his hunch was right and the XBox 360 GPU can indeed be used by researchers in exactly the money saving way he envisaged.

Scarle said: "This is a highly effective way of carrying out high end parallel computing on "domestic" hardware for cardiac simulations. Although major reworking of any previous code framework is required,

the Xbox 360 is a very easy platform to develop for and this cost can easily be outweighed by the benefits in gained computational power and speed, as well as the relative ease of visualization of the system."

However, his research does have some bad news for a particular set of cardiac researchers in that his study demonstrates that it is impossible to predict the rise of certain dangerous arrhythmias, as he has shown that cardiac cell models are affected by a specific limitation of computational systems known as the Halting problem.

Journal reference:

1. Simon Scarle. **Implications of the Turing completeness of reaction-diffusion models, informed by GPGPU simulations on an XBox 360: Cardiac arrhythmias, re-entry and the Halting problem**. *Computational Biology and Chemistry*, 2009; 33 (4): 253 DOI: 10.1016/j.compbiolchem.2009.05.001

Adapted from materials provided by University of Warwick.

http://www.sciencedaily.com/releases/2009/09/090914111100.htm

Spanking Found To Have Negative Effects On Low-income Toddlers

A child is verbally disciplined by his father. Spanking 1-year-olds leads to more aggressive behaviors and less sophisticated cognitive development in the next two years. Verbal punishment is not associated with such effects. (Credit: iStockphoto/Andrew Penner)

ScienceDaily (Sep. 15, 2009) — A new longitudinal study that looks at how low-income parents discipline their young children has found that spanking 1-year-olds leads to more aggressive behaviors and less sophisticated cognitive development in the next two years. Verbal punishment is not associated with such effects, especially when it is accompanied by emotional support from moms. In addition, 1-year-olds' fussiness predicted spanking and verbal punishment at ages 1, 2, and 3.

The study, which explored whether mothers' behaviors lead to problematic behavior in children, whether children's challenging behaviors elicit harsher discipline, or both, appears in the September/October 2009 issue of the journal *Child Development*. It was conducted by researchers at Duke University, the University of Missouri-Columbia, the University of South Carolina, Columbia University, Harvard University, and the University of North Carolina at Chapel Hill.

Beliefs on spanking vary across cultures. In this study, the researchers looked at more than 2,500 exclusively low-income White, African American, and Mexican-American mothers and their young children, interviewing and observing them at home when the children were 1, 2, and 3 years old. All participants' family incomes were at or below the federal poverty level.

Using their own interpretations of spanking, mothers reported how often anyone in the home had spanked their children in the past week. Researchers also made in-home observations of how often mothers verbally punished (scolded, yelled, or made negative comments) their children during the visits.

The study found that African American children were spanked and verbally punished significantly more than the other children in the study. The authors speculated that this may be due to cultural factors, such as belief in the importance of children's respect for elders and in the value of physical discipline to instill that respect. Moreover, some African American mothers say that in preparing their children for a harsh, physically dangerous, and racially discriminating world, there is little room for error in their childrearing.

The authors also uncovered information about the effects of those types of discipline.

"Our findings clearly indicate that spanking affects children's development," according to Lisa J. Berlin, research scientist at the Center for Child and Family Policy at Duke University and the study's lead author. Specifically, children who were spanked more often at 1 behaved more aggressively when they were 2 and had lower scores on tests measuring thinking skills when they were 3. These findings held up even after taking into consideration such family characteristics as mothers' race and ethnicity, age, and education; family income and structure; and the children's gender. The study also found that children who were more aggressive at age 2 and had lower cognitive development scores at ages 1 and 2 were not spanked more at ages 2 and 3. "So the mothers' behaviors look more influential than the children's," said Berlin.

Unlike spanking, however, verbal punishment alone didn't affect either children's aggression or their cognitive development. But interestingly, when verbal punishment was accompanied by emotional support from moms, the children did better on the tests of cognitive ability.

The study was funded by the National Institute of Mental Health.

Journal reference:

1. Berlin et al. **Correlates and Consequences of Spanking and Verbal Punishment for Low-Income White, African American, and Mexican American Toddlers**. *Child Development*, 2009; 80 (5): 1403 DOI: 10.1111/j.1467-8624.2009.01341.x

Adapted from materials provided by Society for Research in Child Development.

http://www.sciencedaily.com/releases/2009/09/090915100941.htm

Evidence Points To Conscious 'Metacognition' In Some Nonhuman Animals

Dolphins like Natua, pictured here, may share with humans the ability reflect upon their states of mind, says UB researcher David Smith. (Credit: Image courtesy of University at Buffalo)

ScienceDaily (Sep. 15, 2009) — J. David Smith, Ph.D., a comparative psychologist at the University at Buffalo who has conducted extensive studies in animal cognition, says there is growing evidence that animals share functional parallels with human conscious metacognition -- that is, they may share humans' ability to reflect upon, monitor or regulate their states of mind.

Smith makes this conclusion in an article published the September issue of the journal *Trends in Cognitive Science* (Volume 13, Issue 9). He reviews this new and rapidly developing area of comparative inquiry, describing its milestones and its prospects for continued progress.

He says "comparative psychologists have studied the question of whether or not non-human animals have knowledge of their own cognitive states by testing a dolphin, pigeons, rats, monkeys and apes using perception, memory and food-concealment paradigms.

"The field offers growing evidence that some animals have functional parallels to humans' consciousness and to humans' cognitive self-awareness," he says. Among these species are dolphins and macaque monkeys (an Old World monkey species).

Smith recounts the original animal-metacognition experiment with Natua the dolphin. "When uncertain, the dolphin clearly hesitated and wavered between his two possible responses," he says, "but when certain, he swam toward his chosen response so fast that his bow wave would soak the researchers' electronic switches.

"In sharp contrast," he says, "pigeons in several studies have so far not expressed any capacity for metacognition. In addition, several converging studies now show that capuchin monkeys barely express a capacity for metacognition.

"This last result," Smith says, "raises important questions about the emergence of reflective or extended mind in the primate order.

"This research area opens a new window on reflective mind in animals, illuminating its phylogenetic emergence and allowing researchers to trace the antecedents of human consciousness."

Smith, a professor in the UB Department of Psychology and Center for Cognitive Sciences, is recognized for his research and publications in the field of animal cognition.

He and his colleagues pioneered the study of metacognition in nonhuman animals, and they have contributed some of the principal results in this area, including many results that involve the participation of Old World and New World monkeys who have been trained to use joysticks to participate in computer tasks.

Their research is supported by the National Institute of Child Health and Development and the National Science Foundation.

Smith explains that metacognition is a sophisticated human capacity linked to hierarchical structure in the mind (because the metacognitive executive control processes oversee lower-level cognition), to self-awareness (because uncertainty and doubt feel so personal and subjective) and to declarative consciousness (because humans are conscious of their states of knowing and can declare them to others).

Therefore, Smith says, "it is a crucial goal of comparative psychology to establish firmly whether animals share humans' metacognitive capacity. If they do, it could bear on their consciousness and self-awareness, too."

In fact, he concludes, "Metacognition rivals language and tool use in its potential to establish important continuities or discontinuities between human and animal minds."

Adapted from materials provided by University at Buffalo.

http://www.sciencedaily.com/releases/2009/09/090914172644.htm

Common Pain Cream Could Protect Heart During Attack, Study Shows

Keith Jones. (Credit: Image courtesy of University of Cincinnati Academic Health Center)

ScienceDaily (Sep. 15, 2009) — New research from the University of Cincinnati shows that a common, over-the-counter pain salve rubbed on the skin during a heart attack could serve as a cardiac-protectant, preventing or reducing damage to the heart while interventions are administered.

These findings are published in the Sept. 14 edition of the journal *Circulation*.

Keith Jones, PhD, a researcher in the department of pharmacology and cell biophysics, and scientists in his lab have found that applying capsaicin to specific skin locations in mice caused sensory nerves in the skin to trigger signals in the nervous system. These signals activate cellular "pro-survival" pathways in the heart which protect the muscle.

Capsaicin is the main component of chili peppers and produces a hot sensation. It is also the active ingredient in several topical medications used for temporary pain relief.

Capsaicin is approved for use by the U.S. Food and Drug Administration.

Jones is working with Neal Weintraub, MD, a UC Health cardiologist and director of UC's cardiovascular diseases division, and other clinicians to construct a translational plan to test capsaicin in a human population.

"Topical capsaicin has no known serious adverse effects and could be easily applied in an ambulance or emergency room setting well in advance of coronary tissue death," Jones says. "If proven effective in humans, this therapy has the potential to reduce injury and/or death in the event of a coronary blockage, thereby reducing the extent and consequences of heart attack."

Researchers observed an 85 percent reduction in cardiac cell death when capsaicin was used.

They also found that a small incision made on the abdomen triggered an 81 percent reduction.

"Both this and the capsaicin effect are shown to work through similar neurological mechanisms," Jones says. "These are the most powerful cardioprotective effects recorded to date.

"This is a form of remote cardioprotection, using a skin stimulus that activates cardioprotection long before the blocked coronary artery is opened."

Weintraub adds that this finding offers an important distinction between existing therapies.

"All of the current interventions require the vessel to be opened before doctors can act, and since it takes time to elicit protection, tissue dies," he says. "This treatment will protect the heart before the vessel is opened while producing a strong protective effect that is already active when we open the vessel."

Jones and Weintraub think that skin—the main sensor and largest human body organ—has evolved to protect animals, including humans, in a variety of ways.

"By activating these sensors in the nervous system, via skin, we think that a response to preserve and protect the heart is triggered," Weintraub says.

"We think that this technique is fooling the body into sending out protective signals," Jones adds. "This may be similar to the way certain acupuncture treatments work; there may be a neurological basis. In a broad sense, this work may provide a 'Rosetta stone' for translating alternative medicine techniques—like acupuncture—to Western medicine. Perhaps we can understand the biological mechanisms of how alternative treatments may be successful for patients."

Now, researchers will further explore this concept by investigating which sensors are associated with certain aspects of organ protection—and how much of specific stimuli are needed to produce the desired responses.

"This could help create favorable outcomes for those who are experiencing stroke, shock or are in need of an organ transplant, and the best part is that it is done non-invasively and is relatively inexpensive," Jones says.

But he warns against rubbing capsaicin on your belly if you feel like you are having a heart attack.

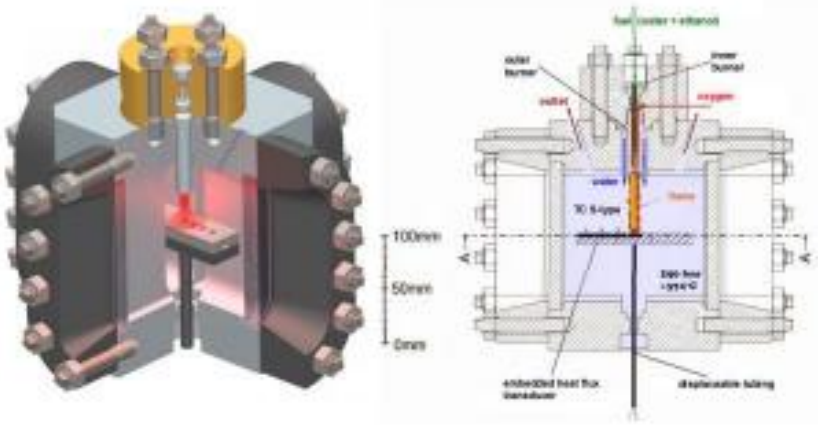
"We don't know if it will work for all indications, for all patients, and we don't know if it will work over an extended amount of time," he says. "A major goal is testing this therapy in clinical trials, but we still need to study more about dosage and application—where we put it on the body for the best results. However, this has tremendous clinical potential and could eventually save lives."

This study was funded by the National Institutes of Health and by the University of Cincinnati. Jones and Weintraub have filed a patent for this funding but have received no honoraria from the makers of capsaicin.

Adapted from materials provided by University of Cincinnati Academic Health Center.

http://www.sciencedaily.com/releases/2009/09/090914173010.htm

Tapping Geothermal Energy: New Drilling Method With Fire And Flame In The Depths



Model of the experimental reactor.

ScienceDaily (Sep. 15, 2009) — With increasing depth, geothermal energy offers an almost inexhaustible potential for renewable energy. The drilling costs however, rise exponentially with depth in the case of conventional rotary drilling. A thermal drilling method, which will allow for reaching greater drilling depths in a more efficient and more cost-effective way, is currently being developed at the ETH Zurich.

Tobias Rothenfluh, a doctoral student at the Institute for Process Engineering, climbs up a small ladder into the three-story pilot plant. Pipelines lead through metering and safety valves into the reactor, which is affectionately known as “Betsy”. Inch-thick plates, made of heat-resistant steel, prevent the reactor from bursting, even at a pressure of 300 bars. “In our experimental reactor we are able to ignite a flame underwater at a pressure of around 250 bars and 450 degrees Celsius” says Rothenfluh. “Thus we are able to experimentally simulate the temperature and pressure conditions prevailing in a borehole, about three kilometers below the earth’s surface.” He has constructed a first burner prototype over the last few months together with his colleagues Martin Schuler and Panagiotis Stathopoulos.

Laboratory experiments at high pressure

Heated oxygen, ethanol and water are pumped into the reactor burner through various pipelines and valves and mix under temperature and pressure conditions, which correspond to the supercritical state of water (see box). The auto-ignition of the mixture is being observed through small sapphire-glass windows by means of a camera. A newly developed sensor plate measures the heat flux from the flame to the plate and records the temperature distribution on the surface for different distances between the burner outlet and the plate.

Based on these experimental results, conclusions are drawn concerning the heat transfer from the flame to the rock. “The heat flux is the crucial parameter for the characterization of this alternative drilling method”, explains Philipp Rudolf von Rohr, professor at the Institute of Process Engineering of the ETH Zurich and supervisor of the three PhD students.

Erosion in fast motion

During the experiment, the flame reaches a maximal temperature of about 2000°C. Rapid heating of the upper rock layer induces a steep temperature gradient in it. “The heat from the flame causes the rock to crack due to the induced temperature difference and the resulting linear thermal expansion”, explains Tobias Rothenfluh. The expansion of the upper rock layer causes natural flaws, already existing in the rock, act as origin points for cracks. Disc - like rock fragments in the millimeter scale are formed in the spallation zone. These particles are transported upwards with the ascending fluid stream of the surrounding medium. “One of the main challenges of the spallation process is to prevent the rock from melting, whilst it’s being rapidly heated”, says Tobias Rothenfluh. “The lager the temperature gradient in the rock, the faster you can drill.”The method is particularly suitable for hard, dry rock, normally encountered at depths greater than three kilometers. In such depths conventional drilling bits wear out much faster, and their frequent replacement, renders the conventional drilling techniques uneconomic: a 10 km borehole costs around 60 million US dollars. In the case of the so-called “hydrothermal spallation drilling” method, however, the burner - drill bit wear is considerably less, because there is no mechanical contact with the rock. “It is expected that the drilling costs will rise linearly with depth in the case of spallation drilling, instead of exponentially, which is the case of the conventional methods”, says Philipp Rudolf von Rohr.

Simulation and demonstration

In order to test the flame’s behavior under different conditions, the doctoral student Martin Schuler is developing a tool for the numerical simulation of the reaction and transport processes in cooperation with the master’s student Karl Goossens. “The simulation enables us to change and optimize parameters like fuel mass flow rates, temperature and pressure, as well as the geometry of the burner”, says Martin Schuler.

The experimental results from the current test set-up are being used to design a pilot plant, on which Panagiotis Stathopoulos is working. The 1.2 million-Swiss-franc plant should demonstrate that it is actually possible to drill through rock by means of hydrothermal flames. The project is funded by the Swiss Federal Office of Energy, the industrial organization swisselectric research, ETH Zurich and the Swiss National Science Foundation.

Research in breadth and depth

The interest of federation and industry confirms the high potential of “hydrothermal spallation drilling”. Some time will pass until the method is industrially applicable, but the feasibility is undoubted so far. “It is for sure possible to speed up the project towards the industrial application”, Philipp Rudolf von Rohr realizes, “but we still want to focus on basic research at a university like the ETH Zurich”.After all, the Institute of Process Engineering is currently worldwide the only group investigating the heat transfer characteristics of a flame in supercritical water. “We literally want to research in both depth and breadth”, says Tobias Rothenfluh. In the future, the knowledge acquired might be useful not only for geothermal energy, but also for other applications.

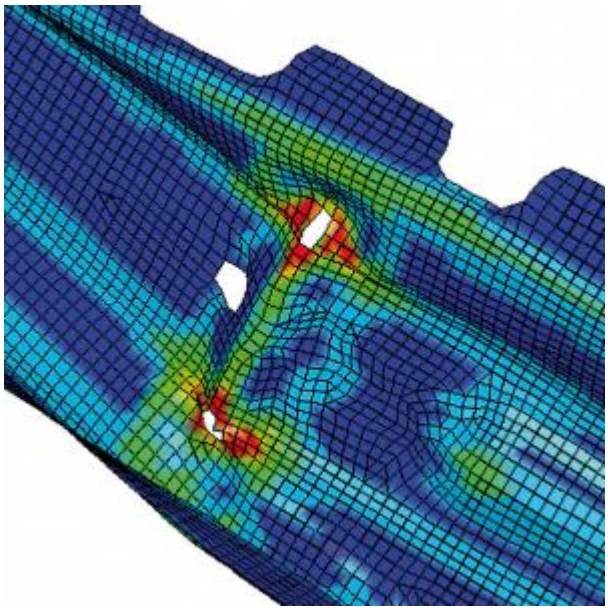
Supercritical water

Above a temperature of 374.12°C and a pressure of 221.2 bars, water vapor and liquid water can no longer be distinguished from each other in terms of their density. In this supercritical state, water is less polar, has no phase boundaries any more and is a good solvent for non-polar gases like oxygen. Under these conditions fuel and oxygen can be mixed without any bubble formation and in the case of ethanol as fuel, auto-ignition occurs at approximately 450°C.

Adapted from materials provided by ETH Zurich.

http://www.sciencedaily.com/releases/2009/09/090912144809.htm

Dual Simulation Improves Crash Performance



Computed damage in a crash simulation. (Credit: Copyright Fraunhofer IWM)

ScienceDaily (Sep. 15, 2009) — Crash tests often produce startling results. A new simulation process which factors in deformation during production as well as preliminary damage can predict the results of a crash test more accurately than ever.

There are components that save lives: if a car rolls over during an accident, the 'B-pillar' plays a key role. It forms one of the connections between the floor and roof of the vehicle and is designed to prevent the passenger cell from deforming too much. The materials from which the B-pillar is manufactured therefore need to meet very exacting requirements: to save fuel they need to be ultra-lightweight, yet at the same time need to be tremendously strong and must not break. Yet what does the optimum component actually look like? With the aid of countless experiments, simulations and crash tests, the auto industry has been getting nearer to answering this question. Now Fraunhofer researchers are providing further impetus to development.

Engineers will usually carry out a range of virtual tests. Known materials properties provide the basic knowledge in such a scenario. "We are well aware of the physical and mechanical characteristics of the materials in their original state," says Dr. Dong-Zhi Sun, Group leader at the Fraunhofer Institute for Mechanics of Materials IWM. Yet during the course of the manufacturing process, the components change: with a B-pillar, for instance, the material goes through a complicated manufacturing chain. As it is deformed and stretched, minor damage such as pore formation may occur. "If you're going to fit these kinds of parts into vehicles, you need to take into account their deformation history during manufacture," explains Sun.

That's why the researchers have developed a special method: "With our failure model, we can simulate manufacturing processes more effectively," explains Sun. "To ensure we understand the manufacturing processes inside out, we work together closely with automakers and materials producers." Thanks to the simulation, the researchers can precisely model and analyze the deformation of the component during manufacture. So they know to what extent the process affects the properties of the end product, and whether the manufacturing process gives rise to potential preliminary damage such as pore formation and microcracks. The engineers combine the results of the process simulation with a crash simulation, which is conducted using a newly developed material model.

The new method enables components with optimum properties and improved crash performance to be developed. "Unlike conventional crash simulations, we can predict far more accurately how extensively the component will deform during the crash before it fails," says Sun.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/09/090914110947.htm

How Did Economists Get It So Wrong?

By PAUL KRUGMAN

I. MISTAKING BEAUTY FOR TRUTH

It's hard to believe now, but not long ago economists were congratulating themselves over the success of their field. Those successes — or so they believed — were both theoretical and practical, leading to a golden era for the profession. On the theoretical side, they thought that they had resolved their internal disputes. Thus, in a 2008 paper titled "The State of Macro" (that is, macroeconomics, the study of big-picture issues like recessions), Olivier Blanchard of M.I.T., now the chief economist at the International Monetary Fund, declared that "the state of macro is good." The battles of yesteryear, he said, were over, and there had been a "broad convergence of vision." And in the real world, economists believed they had things under control: the "central problem of depression-prevention has been solved," declared Robert Lucas of the University of Chicago in his 2003 presidential address to the American Economic Association. In 2004, Ben Bernanke, a former Princeton professor who is now the chairman of the Federal Reserve Board, celebrated the Great Moderation in economic performance over the previous two decades, which he attributed in part to improved economic policy making.

Last year, everything came apart.

Few economists saw our current crisis coming, but this predictive failure was the least of the field's problems. More important was the profession's blindness to the very possibility of catastrophic failures in a market economy. During the golden years, financial economists came to believe that markets were inherently stable — indeed, that stocks and other assets were always priced just right. There was nothing in the prevailing models suggesting the possibility of the kind of collapse that happened last year. Meanwhile, macroeconomists were divided in their views. But the main division was between those who insisted that free-market economies never go astray and those who believed that economies may stray now and then but that any major deviations from the path of prosperity could and would be corrected by the all-powerful Fed. Neither side was prepared to cope with an economy that went off the rails despite the Fed's best efforts.

And in the wake of the crisis, the fault lines in the economics profession have yawned wider than ever. Lucas says the Obama administration's stimulus plans are "schlock economics," and his Chicago colleague John Cochrane says they're based on discredited "fairy tales." In response, Brad DeLong of the University of California, Berkeley, writes of the "intellectual collapse" of the Chicago School, and I myself have written that comments from Chicago economists are the product of a Dark Age of macroeconomics in which hard-won knowledge has been forgotten.

What happened to the economics profession? And where does it go from here?

As I see it, the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth. Until the Great Depression, most economists clung to a vision of capitalism as a perfect or nearly perfect system. That vision wasn't sustainable in the face of mass unemployment, but as memories of the Depression faded, economists fell back in love with the old, idealized vision of an economy in which rational individuals interact in perfect markets, this time gussied up with fancy equations. The renewed romance with the idealized market was, to be sure, partly a response to shifting political winds, partly a response to financial incentives. But while sabbaticals at the Hoover Institution and job opportunities on Wall Street are nothing to sneeze at, the central cause of the profession's failure was the desire for an all-encompassing, intellectually elegant approach that also gave economists a chance to show off their mathematical prowess.

Unfortunately, this romanticized and sanitized vision of the economy led most economists to ignore all the things that can go wrong. They turned a blind eye to the limitations of human rationality that often lead to bubbles and busts; to the problems of institutions that run amok; to the imperfections of markets — especially financial markets — that can cause the economy's operating system to undergo sudden, unpredictable crashes; and to the dangers created when regulators don't believe in regulation.

It's much harder to say where the economics profession goes from here. But what's almost certain is that economists will have to learn to live with messiness. That is, they will have to acknowledge the importance of irrational and often unpredictable behavior, face up to the often idiosyncratic imperfections of markets and accept that an elegant economic "theory of everything" is a long way off. In practical terms, this will translate into more cautious policy advice — and a reduced willingness to dismantle economic safeguards in the faith that markets will solve all problems.

II. FROM SMITH TO KEYNES AND BACK

The birth of economics as a discipline is usually credited to Adam Smith, who published "The Wealth of Nations" in 1776. Over the next 160 years an extensive body of economic theory was developed, whose central message was: Trust the market. Yes, economists admitted that there were cases in which markets might fail, of which the most important was the case of "externalities" — costs that people impose on others without paying the price, like traffic congestion or pollution. But the basic presumption of "neoclassical" economics (named after the late-19th-century theorists who elaborated on the concepts of their "classical" predecessors) was that we should have faith in the market system.

This faith was, however, shattered by the Great Depression. Actually, even in the face of total collapse some economists insisted that whatever happens in a market economy must be right: "Depressions are not simply evils," declared Joseph Schumpeter in 1934 — 1934! They are, he added, "forms of something which has to be done." But many, and eventually most, economists turned to the insights of John Maynard Keynes for both an explanation of what had happened and a solution to future depressions.

Keynes did not, despite what you may have heard, want the government to run the economy. He described his analysis in his 1936 masterwork, "The General Theory of Employment, Interest and Money," as "moderately conservative in its implications." He wanted to fix capitalism, not replace it. But he did challenge the notion that free-market economies can function without a minder, expressing particular contempt for financial markets, which he viewed as being dominated by short-term speculation with little regard for fundamentals. And he called for active government intervention — printing more money and, if necessary, spending heavily on public works — to fight unemployment during slumps.

It's important to understand that Keynes did much more than make bold assertions. "The General Theory" is a work of profound, deep analysis — analysis that persuaded the best young economists of the day. Yet the story of economics over the past half century is, to a large degree, the story of a retreat from Keynesianism and a return to neoclassicism. The neoclassical revival was initially led by Milton Friedman of the University of Chicago, who asserted as early as 1953 that neoclassical economics works well enough as a description of the way the economy actually functions to be "both extremely fruitful and deserving of much confidence." But what about depressions?

Friedman's counterattack against Keynes began with the doctrine known as monetarism. Monetarists didn't disagree in principle with the idea that a market economy needs deliberate stabilization. "We are all Keynesians now," Friedman once said, although he later claimed he was quoted out of context. Monetarists asserted, however, that a very limited, circumscribed form of government intervention — namely, instructing central banks to keep the nation's money supply, the sum of cash in circulation and bank deposits, growing on a steady path — is all that's required to prevent depressions. Famously, Friedman and his collaborator, Anna Schwartz, argued that if the Federal Reserve had done its job properly, the Great Depression would not have happened. Later, Friedman made a compelling case

against any deliberate effort by government to push unemployment below its "natural" level (currently thought to be about 4.8 percent in the United States): excessively expansionary policies, he predicted, would lead to a combination of inflation and high unemployment — a prediction that was borne out by the stagflation of the 1970s, which greatly advanced the credibility of the anti-Keynesian movement.
Eventually, however, the anti-Keynesian counterrevolution went far beyond Friedman's position, which came to seem relatively moderate compared with what his successors were saying. Among financial economists, Keynes's disparaging vision of financial markets as a "casino" was replaced by "efficient market" theory, which asserted that financial markets always get asset prices right given the available information. Meanwhile, many macroeconomists completely rejected Keynes's framework for understanding economic slumps. Some returned to the view of Schumpeter and other apologists for the Great Depression, viewing recessions as a good thing, part of the economy's adjustment to change. And even those not willing to go that far argued that any attempt to fight an economic slump would do more harm than good.
Not all macroeconomists were willing to go down this road: many became self-described New Keynesians, who continued to believe in an active role for the government. Yet even they mostly accepted the notion that investors and consumers are rational and that markets generally get it right.
Of course, there were exceptions to these trends: a few economists challenged the assumption of rational behavior, questioned the belief that financial markets can be trusted and pointed to the long history of financial crises that had devastating economic consequences. But they were swimming against the tide, unable to make much headway against a pervasive and, in retrospect, foolish complacency.

III. PANGLOSSIAN FINANCE

In the 1930s, financial markets, for obvious reasons, didn't get much respect. Keynes compared them to "those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those that he thinks likeliest to catch the fancy of the other competitors."
And Keynes considered it a very bad idea to let such markets, in which speculators spent their time chasing one another's tails, dictate important business decisions: "When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done."
By 1970 or so, however, the study of financial markets seemed to have been taken over by Voltaire's Dr. Pangloss, who insisted that we live in the best of all possible worlds. Discussion of investor irrationality, of bubbles, of destructive speculation had virtually disappeared from academic discourse. The field was dominated by the "efficient-market hypothesis," promulgated by Eugene Fama of the University of Chicago, which claims that financial markets price assets precisely at their intrinsic worth given all publicly available information. (The price of a company's stock, for example, always accurately reflects the company's value given the information available on the company's earnings, its business prospects and so on.) And by the 1980s, finance economists, notably Michael Jensen of the Harvard Business School, were arguing that because financial markets always get prices right, the best thing corporate chieftains can do, not just for themselves but for the sake of the economy, is to maximize their stock prices. In other words, finance economists believed that we should put the capital development of the nation in the hands of what Keynes had called a "casino."
It's hard to argue that this transformation in the profession was driven by events. True, the memory of 1929 was gradually receding, but there continued to be bull markets, with widespread tales of speculative excess, followed by bear markets. In 1973-4, for example, stocks lost 48 percent of their value. And the 1987 stock crash, in which the Dow plunged nearly 23 percent in a day for no clear reason, should have raised at least a few doubts about market rationality.
These events, however, which Keynes would have considered evidence of the unreliability of markets, did little to blunt the force of a beautiful idea. The theoretical model that finance economists developed by assuming that every investor rationally balances risk against reward — the so-called Capital Asset Pricing Model, or CAPM (pronounced cap-em) — is wonderfully elegant. And if you accept its premises it's also extremely useful. CAPM not only tells you how to choose your portfolio — even more important from the financial industry's point of view, it tells you how to put a price on financial derivatives, claims on claims. The elegance and apparent usefulness of the new theory led to a string of Nobel prizes for its creators, and many of the theory's adepts also received more mundane rewards: Armed with their new models and formidable math skills — the more arcane uses of CAPM require physicist-level

computations — mild-mannered business-school professors could and did become Wall Street rocket scientists, earning Wall Street paychecks.

To be fair, finance theorists didn't accept the efficient-market hypothesis merely because it was elegant, convenient and lucrative. They also produced a great deal of statistical evidence, which at first seemed strongly supportive. But this evidence was of an oddly limited form. Finance economists rarely asked the seemingly obvious (though not easily answered) question of whether asset prices made sense given real-world fundamentals like earnings. Instead, they asked only whether asset prices made sense given other asset prices. Larry Summers, now the top economic adviser in the Obama administration, once mocked finance professors with a parable about "ketchup economists" who "have shown that two-quart bottles of ketchup invariably sell for exactly twice as much as one-quart bottles of ketchup," and conclude from this that the ketchup market is perfectly efficient.

But neither this mockery nor more polite critiques from economists like Robert Shiller of Yale had much effect. Finance theorists continued to believe that their models were essentially right, and so did many people making real-world decisions. Not least among these was Alan Greenspan, who was then the Fed chairman and a long-time supporter of financial deregulation whose rejection of calls to rein in subprime lending or address the ever-inflating housing bubble rested in large part on the belief that modern financial economics had everything under control. There was a telling moment in 2005, at a conference held to honor Greenspan's tenure at the Fed. One brave attendee, Raghuram Rajan (of the University of Chicago, surprisingly), presented a paper warning that the financial system was taking on potentially dangerous levels of risk. He was mocked by almost all present — including, by the way, Larry Summers, who dismissed his warnings as "misguided."

By October of last year, however, Greenspan was admitting that he was in a state of "shocked disbelief," because "the whole intellectual edifice" had "collapsed." Since this collapse of the intellectual edifice was also a collapse of real-world markets, the result was a severe recession — the worst, by many measures, since the Great Depression. What should policy makers do? Unfortunately, macroeconomics, which should have been providing clear guidance about how to address the slumping economy, was in its own state of disarray.

IV. THE TROUBLE WITH MACRO

"We have involved ourselves in a colossal muddle, having blundered in the control of a delicate machine, the working of which we do not understand. The result is that our possibilities of wealth may run to waste for a time — perhaps for a long time." So wrote John Maynard Keynes in an essay titled "The Great Slump of 1930," in which he tried to explain the catastrophe then overtaking the world. And the world's possibilities of wealth did indeed run to waste for a long time; it took World War II to bring the Great Depression to a definitive end.

Why was Keynes's diagnosis of the Great Depression as a "colossal muddle" so compelling at first? And why did economics, circa 1975, divide into opposing camps over the value of Keynes's views?

I like to explain the essence of Keynesian economics with a true story that also serves as a parable, a small-scale version of the messes that can afflict entire economies. Consider the travails of the Capitol Hill Baby-Sitting Co-op.

This co-op, whose problems were recounted in a 1977 article in The Journal of Money, Credit and Banking, was an association of about 150 young couples who agreed to help one another by baby-sitting for one another's children when parents wanted a night out. To ensure that every couple did its fair share of baby-sitting, the co-op introduced a form of scrip: coupons made out of heavy pieces of paper, each entitling the bearer to one half-hour of sitting time. Initially, members received 20 coupons on joining and were required to return the same amount on departing the group.

Unfortunately, it turned out that the co-op's members, on average, wanted to hold a reserve of more than 20 coupons, perhaps, in case they should want to go out several times in a row. As a result, relatively few people wanted to spend their scrip and go out, while many wanted to baby-sit so they could add to their hoard. But since baby-sitting opportunities arise only when someone goes out for the night, this meant that baby-sitting jobs were hard to find, which made members of the co-op even more reluctant to go out, making baby-sitting jobs even scarcer. . . .

In short, the co-op fell into a recession.

O.K., what do you think of this story? Don't dismiss it as silly and trivial: economists have used small-scale examples to shed light on big questions ever since Adam Smith saw the roots of economic progress in a pin factory, and they're right to do so. The question is whether this particular example, in which a

recession is a problem of inadequate demand — there isn't enough demand for baby-sitting to provide jobs for everyone who wants one — gets at the essence of what happens in a recession.
Forty years ago most economists would have agreed with this interpretation. But since then macroeconomics has divided into two great factions: "saltwater" economists (mainly in coastal U.S. universities), who have a more or less Keynesian vision of what recessions are all about; and "freshwater" economists (mainly at inland schools), who consider that vision nonsense.
Freshwater economists are, essentially, neoclassical purists. They believe that all worthwhile economic analysis starts from the premise that people are rational and markets work, a premise violated by the story of the baby-sitting co-op. As they see it, a general lack of sufficient demand isn't possible, because prices always move to match supply with demand. If people want more baby-sitting coupons, the value of those coupons will rise, so that they're worth, say, 40 minutes of baby-sitting rather than half an hour — or, equivalently, the cost of an hours' baby-sitting would fall from 2 coupons to 1.5. And that would solve the problem: the purchasing power of the coupons in circulation would have risen, so that people would feel no need to hoard more, and there would be no recession.
But don't recessions look like periods in which there just isn't enough demand to employ everyone willing to work? Appearances can be deceiving, say the freshwater theorists. Sound economics, in their view, says that overall failures of demand can't happen — and that means that they don't. Keynesian economics has been "proved false," Cochrane, of the University of Chicago, says.
Yet recessions do happen. Why? In the 1970s the leading freshwater macroeconomist, the Nobel laureate Robert Lucas, argued that recessions were caused by temporary confusion: workers and companies had trouble distinguishing overall changes in the level of prices because of inflation or deflation from changes in their own particular business situation. And Lucas warned that any attempt to fight the business cycle would be counterproductive: activist policies, he argued, would just add to the confusion.
By the 1980s, however, even this severely limited acceptance of the idea that recessions are bad things had been rejected by many freshwater economists. Instead, the new leaders of the movement, especially Edward Prescott, who was then at the University of Minnesota (you can see where the freshwater moniker comes from), argued that price fluctuations and changes in demand actually had nothing to do with the business cycle. Rather, the business cycle reflects fluctuations in the rate of technological progress, which are amplified by the rational response of workers, who voluntarily work more when the environment is favorable and less when it's unfavorable. Unemployment is a deliberate decision by workers to take time off.
Put baldly like that, this theory sounds foolish — was the Great Depression really the Great Vacation? And to be honest, I think it really is silly. But the basic premise of Prescott's "real business cycle" theory was embedded in ingeniously constructed mathematical models, which were mapped onto real data using sophisticated statistical techniques, and the theory came to dominate the teaching of macroeconomics in many university departments. In 2004, reflecting the theory's influence, Prescott shared a Nobel with Finn Kydland of Carnegie Mellon University.
Meanwhile, saltwater economists balked. Where the freshwater economists were purists, saltwater economists were pragmatists. While economists like N. Gregory Mankiw at Harvard, Olivier Blanchard at M.I.T. and David Romer at the University of California, Berkeley, acknowledged that it was hard to reconcile a Keynesian demand-side view of recessions with neoclassical theory, they found the evidence that recessions are, in fact, demand-driven too compelling to reject. So they were willing to deviate from the assumption of perfect markets or perfect rationality, or both, adding enough imperfections to accommodate a more or less Keynesian view of recessions. And in the saltwater view, active policy to fight recessions remained desirable.
But the self-described New Keynesian economists weren't immune to the charms of rational individuals and perfect markets. They tried to keep their deviations from neoclassical orthodoxy as limited as possible. This meant that there was no room in the prevailing models for such things as bubbles and banking-system collapse. The fact that such things continued to happen in the real world — there was a terrible financial and macroeconomic crisis in much of Asia in 1997-8 and a depression-level slump in Argentina in 2002 — wasn't reflected in the mainstream of New Keynesian thinking.
Even so, you might have thought that the differing worldviews of freshwater and saltwater economists would have put them constantly at loggerheads over economic policy. Somewhat surprisingly, however, between around 1985 and 2007 the disputes between freshwater and saltwater economists were mainly about theory, not action. The reason, I believe, is that New Keynesians, unlike the original Keynesians, didn't think fiscal policy — changes in government spending or taxes — was needed to fight recessions.

They believed that monetary policy, administered by the technocrats at the Fed, could provide whatever remedies the economy needed. At a 90th birthday celebration for Milton Friedman, Ben Bernanke, formerly a more or less New Keynesian professor at Princeton, and by then a member of the Fed's governing board, declared of the Great Depression: "You're right. We did it. We're very sorry. But thanks to you, it won't happen again." The clear message was that all you need to avoid depressions is a smarter Fed.

And as long as macroeconomic policy was left in the hands of the maestro Greenspan, without Keynesian-type stimulus programs, freshwater economists found little to complain about. (They didn't believe that monetary policy did any good, but they didn't believe it did any harm, either.)

It would take a crisis to reveal both how little common ground there was and how Panglossian even New Keynesian economics had become.

V. NOBODY COULD HAVE PREDICTED . . .

In recent, rueful economics discussions, an all-purpose punch line has become "nobody could have predicted. . . ." It's what you say with regard to disasters that could have been predicted, should have been predicted and actually were predicted by a few economists who were scoffed at for their pains.

Take, for example, the precipitous rise and fall of housing prices. Some economists, notably Robert Shiller, did identify the bubble and warn of painful consequences if it were to burst. Yet key policy makers failed to see the obvious. In 2004, Alan Greenspan dismissed talk of a housing bubble: "a national severe price distortion," he declared, was "most unlikely." Home-price increases, Ben Bernanke said in 2005, "largely reflect strong economic fundamentals."

How did they miss the bubble? To be fair, interest rates were unusually low, possibly explaining part of the price rise. It may be that Greenspan and Bernanke also wanted to celebrate the Fed's success in pulling the economy out of the 2001 recession; conceding that much of that success rested on the creation of a monstrous bubble would have placed a damper on the festivities.

But there was something else going on: a general belief that bubbles just don't happen. What's striking, when you reread Greenspan's assurances, is that they weren't based on evidence — they were based on the a priori assertion that there simply can't be a bubble in housing. And the finance theorists were even more adamant on this point. In a 2007 interview, Eugene Fama, the father of the efficient-market hypothesis, declared that "the word 'bubble' drives me nuts," and went on to explain why we can trust the housing market: "Housing markets are less liquid, but people are very careful when they buy houses. It's typically the biggest investment they're going to make, so they look around very carefully and they compare prices. The bidding process is very detailed."

Indeed, home buyers generally do carefully compare prices — that is, they compare the price of their potential purchase with the prices of other houses. But this says nothing about whether the overall price of houses is justified. It's ketchup economics, again: because a two-quart bottle of ketchup costs twice as much as a one-quart bottle, finance theorists declare that the price of ketchup must be right.

In short, the belief in efficient financial markets blinded many if not most economists to the emergence of the biggest financial bubble in history. And efficient-market theory also played a significant role in inflating that bubble in the first place.

Now that the undiagnosed bubble has burst, the true riskiness of supposedly safe assets has been revealed and the financial system has demonstrated its fragility. U.S. households have seen $13 trillion in wealth evaporate. More than six million jobs have been lost, and the unemployment rate appears headed for its highest level since 1940. So what guidance does modern economics have to offer in our current predicament? And should we trust it?

VI. THE STIMULUS SQUABBLE

Between 1985 and 2007 a false peace settled over the field of macroeconomics. There hadn't been any real convergence of views between the saltwater and freshwater factions. But these were the years of the Great Moderation — an extended period during which inflation was subdued and recessions were relatively mild. Saltwater economists believed that the Federal Reserve had everything under control. Freshwater economists didn't think the Fed's actions were actually beneficial, but they were willing to let matters lie.

But the crisis ended the phony peace. Suddenly the narrow, technocratic policies both sides were willing to accept were no longer sufficient — and the need for a broader policy response brought the old conflicts out into the open, fiercer than ever.

Why weren't those narrow, technocratic policies sufficient? The answer, in a word, is zero.

During a normal recession, the Fed responds by buying Treasury bills — short-term government debt — from banks. This drives interest rates on government debt down; investors seeking a higher rate of return move into other assets, driving other interest rates down as well; and normally these lower interest rates eventually lead to an economic bounceback. The Fed dealt with the recession that began in 1990 by driving short-term interest rates from 9 percent down to 3 percent. It dealt with the recession that began in 2001 by driving rates from 6.5 percent to 1 percent. And it tried to deal with the current recession by driving rates down from 5.25 percent to zero.

But zero, it turned out, isn't low enough to end this recession. And the Fed can't push rates below zero, since at near-zero rates investors simply hoard cash rather than lending it out. So by late 2008, with interest rates basically at what macroeconomists call the "zero lower bound" even as the recession continued to deepen, conventional monetary policy had lost all traction.

Now what? This is the second time America has been up against the zero lower bound, the previous occasion being the Great Depression. And it was precisely the observation that there's a lower bound to interest rates that led Keynes to advocate higher government spending: when monetary policy is ineffective and the private sector can't be persuaded to spend more, the public sector must take its place in supporting the economy. Fiscal stimulus is the Keynesian answer to the kind of depression-type economic situation we're currently in.

Such Keynesian thinking underlies the Obama administration's economic policies — and the freshwater economists are furious. For 25 or so years they tolerated the Fed's efforts to manage the economy, but a full-blown Keynesian resurgence was something entirely different. Back in 1980, Lucas, of the University of Chicago, wrote that Keynesian economics was so ludicrous that "at research seminars, people don't take Keynesian theorizing seriously anymore; the audience starts to whisper and giggle to one another." Admitting that Keynes was largely right, after all, would be too humiliating a comedown.

And so Chicago's Cochrane, outraged at the idea that government spending could mitigate the latest recession, declared: "It's not part of what anybody has taught graduate students since the 1960s. They [Keynesian ideas] are fairy tales that have been proved false. It is very comforting in times of stress to go back to the fairy tales we heard as children, but it doesn't make them less false." (It's a mark of how deep the division between saltwater and freshwater runs that Cochrane doesn't believe that "anybody" teaches ideas that are, in fact, taught in places like Princeton, M.I.T. and Harvard.)

Meanwhile, saltwater economists, who had comforted themselves with the belief that the great divide in macroeconomics was narrowing, were shocked to realize that freshwater economists hadn't been listening at all. Freshwater economists who inveighed against the stimulus didn't sound like scholars who had weighed Keynesian arguments and found them wanting. Rather, they sounded like people who had no idea what Keynesian economics was about, who were resurrecting pre-1930 fallacies in the belief that they were saying something new and profound.

And it wasn't just Keynes whose ideas seemed to have been forgotten. As Brad DeLong of the University of California, Berkeley, has pointed out in his laments about the Chicago school's "intellectual collapse," the school's current stance amounts to a wholesale rejection of Milton Friedman's ideas, as well.

Friedman believed that Fed policy rather than changes in government spending should be used to stabilize the economy, but he never asserted that an increase in government spending cannot, under any circumstances, increase employment. In fact, rereading Friedman's 1970 summary of his ideas, "A Theoretical Framework for Monetary Analysis," what's striking is how Keynesian it seems.

And Friedman certainly never bought into the idea that mass unemployment represents a voluntary reduction in work effort or the idea that recessions are actually good for the economy. Yet the current generation of freshwater economists has been making both arguments. Thus Chicago's Casey Mulligan suggests that unemployment is so high because many workers are choosing not to take jobs: "Employees face financial incentives that encourage them not to work . . . decreased employment is explained more by reductions in the supply of labor (the willingness of people to work) and less by the demand for labor (the number of workers that employers need to hire)." Mulligan has suggested, in particular, that workers are choosing to remain unemployed because that improves their odds of receiving mortgage relief. And Cochrane declares that high unemployment is actually good: "We should have a recession. People who spend their lives pounding nails in Nevada need something else to do."

Personally, I think this is crazy. Why should it take mass unemployment across the whole nation to get carpenters to move out of Nevada? Can anyone seriously claim that we've lost 6.7 million jobs because fewer Americans want to work? But it was inevitable that freshwater economists would find themselves

trapped in this cul-de-sac: if you start from the assumption that people are perfectly rational and markets are perfectly efficient, you have to conclude that unemployment is voluntary and recessions are desirable. Yet if the crisis has pushed freshwater economists into absurdity, it has also created a lot of soul-searching among saltwater economists. Their framework, unlike that of the Chicago School, both allows for the possibility of involuntary unemployment and considers it a bad thing. But the New Keynesian models that have come to dominate teaching and research assume that people are perfectly rational and financial markets are perfectly efficient. To get anything like the current slump into their models, New Keynesians are forced to introduce some kind of fudge factor that for reasons unspecified temporarily depresses private spending. (I've done exactly that in some of my own work.) And if the analysis of where we are now rests on this fudge factor, how much confidence can we have in the models' predictions about where we are going?

The state of macro, in short, is not good. So where does the profession go from here?

VII. FLAWS AND FRICTIONS

Economics, as a field, got in trouble because economists were seduced by the vision of a perfect, frictionless market system. If the profession is to redeem itself, it will have to reconcile itself to a less alluring vision — that of a market economy that has many virtues but that is also shot through with flaws and frictions. The good news is that we don't have to start from scratch. Even during the heyday of perfect-market economics, there was a lot of work done on the ways in which the real economy deviated from the theoretical ideal. What's probably going to happen now — in fact, it's already happening — is that flaws-and-frictions economics will move from the periphery of economic analysis to its center.

There's already a fairly well developed example of the kind of economics I have in mind: the school of thought known as behavioral finance. Practitioners of this approach emphasize two things. First, many real-world investors bear little resemblance to the cool calculators of efficient-market theory: they're all too subject to herd behavior, to bouts of irrational exuberance and unwarranted panic. Second, even those who try to base their decisions on cool calculation often find that they can't, that problems of trust, credibility and limited collateral force them to run with the herd.

On the first point: even during the heyday of the efficient-market hypothesis, it seemed obvious that many real-world investors aren't as rational as the prevailing models assumed. Larry Summers once began a paper on finance by declaring: "THERE ARE IDIOTS. Look around." But what kind of idiots (the preferred term in the academic literature, actually, is "noise traders") are we talking about? Behavioral finance, drawing on the broader movement known as behavioral economics, tries to answer that question by relating the apparent irrationality of investors to known biases in human cognition, like the tendency to care more about small losses than small gains or the tendency to extrapolate too readily from small samples (e.g., assuming that because home prices rose in the past few years, they'll keep on rising).

Until the crisis, efficient-market advocates like Eugene Fama dismissed the evidence produced on behalf of behavioral finance as a collection of "curiosity items" of no real importance. That's a much harder position to maintain now that the collapse of a vast bubble — a bubble correctly diagnosed by behavioral economists like Robert Shiller of Yale, who related it to past episodes of "irrational exuberance" — has brought the world economy to its knees.

On the second point: suppose that there are, indeed, idiots. How much do they matter? Not much, argued Milton Friedman in an influential 1953 paper: smart investors will make money by buying when the idiots sell and selling when they buy and will stabilize markets in the process. But the second strand of behavioral finance says that Friedman was wrong, that financial markets are sometimes highly unstable, and right now that view seems hard to reject.

Probably the most influential paper in this vein was a 1997 publication by Andrei Shleifer of Harvard and Robert Vishny of Chicago, which amounted to a formalization of the old line that "the market can stay irrational longer than you can stay solvent." As they pointed out, arbitrageurs — the people who are supposed to buy low and sell high — need capital to do their jobs. And a severe plunge in asset prices, even if it makes no sense in terms of fundamentals, tends to deplete that capital. As a result, the smart money is forced out of the market, and prices may go into a downward spiral.

The spread of the current financial crisis seemed almost like an object lesson in the perils of financial instability. And the general ideas underlying models of financial instability have proved highly relevant to economic policy: a focus on the depleted capital of financial institutions helped guide policy actions taken after the fall of Lehman, and it looks (cross your fingers) as if these actions successfully headed off an even bigger financial collapse.

Meanwhile, what about macroeconomics? Recent events have pretty decisively refuted the idea that recessions are an optimal response to fluctuations in the rate of technological progress; a more or less Keynesian view is the only plausible game in town. Yet standard New Keynesian models left no room for a crisis like the one we're having, because those models generally accepted the efficient-market view of the financial sector.

There were some exceptions. One line of work, pioneered by none other than Ben Bernanke working with Mark Gertler of New York University, emphasized the way the lack of sufficient collateral can hinder the ability of businesses to raise funds and pursue investment opportunities. A related line of work, largely established by my Princeton colleague Nobuhiro Kiyotaki and John Moore of the London School of Economics, argued that prices of assets such as real estate can suffer self-reinforcing plunges that in turn depress the economy as a whole. But until now the impact of dysfunctional finance hasn't been at the core even of Keynesian economics. Clearly, that has to change.

VIII. RE-EMBRACING KEYNES

So here's what I think economists have to do. First, they have to face up to the inconvenient reality that financial markets fall far short of perfection, that they are subject to extraordinary delusions and the madness of crowds. Second, they have to admit — and this will be very hard for the people who giggled and whispered over Keynes — that Keynesian economics remains the best framework we have for making sense of recessions and depressions. Third, they'll have to do their best to incorporate the realities of finance into macroeconomics.

Many economists will find these changes deeply disturbing. It will be a long time, if ever, before the new, more realistic approaches to finance and macroeconomics offer the same kind of clarity, completeness and sheer beauty that characterizes the full neoclassical approach. To some economists that will be a reason to cling to neoclassicism, despite its utter failure to make sense of the greatest economic crisis in three generations. This seems, however, like a good time to recall the words of H. L. Mencken: "There is always an easy solution to every human problem — neat, plausible and wrong."

When it comes to the all-too-human problem of recessions and depressions, economists need to abandon the neat but wrong solution of assuming that everyone is rational and markets work perfectly. The vision that emerges as the profession rethinks its foundations may not be all that clear; it certainly won't be neat; but we can hope that it will have the virtue of being at least partly right.

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http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html?th&emc=th

Darwin the abolitionist

Adrian Desmond

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The theory of evolution is regarded as a triumph of disinterested scientific reason. Yet, on the 150th anniversary of "On the Origin of Species," new research reveals that Darwin was driven to the idea of common descent by a great moral cause

Shackled legs, thumbscrews used to crush the fingers of errant female slaves, a six-year-old boy horse-whipped for handing out water in a dirty glass: these sound like scenes from a modern horror story, but all were seen by the young Charles Darwin on his travels with the Beagle around the slave-owning continent of South America. You will find no mention of them in the proudly reasoned, scientific pages of On the Origin of Species. Glance at Darwin's journals, private notebooks and family background, however, and you will find a man immersed in the rhetoric and fervent belief of the anti-slavery movement. Was the public man of science influenced by these private passions? In the light of painstaking archival investigations into Darwin's letters, papers and notes, I believe the answer is a firm "yes." Although he never admitted publicly to so political a motivation, anti-slavery sentiment was the handmaiden of Charles Darwin's great intellectual achievement—the theory of evolution. The standard tale of a disinterested gentleman-naturalist's journey of discovery will no longer wash. Rather, to understand both the man in his times and the true radicalism of his theory, we must look to the political and moral considerations that shaped his thought.

A wealthy young man fresh from the cloisters of Cambridge, Charles Darwin set sail in HMS Beagle from Plymouth on 27th December 1831. Aged just 23, a world of wonders lay before him. During the Beagle's five-year circumnavigation of the globe he spent most of his time on the east coast of South America, studying marine life and the rainforest fauna or galloping across Patagonian plains in search of fossils. Then the Beagle tacked round Cape Horn and up the Chilean coast to Valparaiso, where Darwin climbed the Andean foothills in 1835. After visiting the "frying hot" Galapagos islands, the ship steered a homeward journey, taking in Tahiti, New Zealand, Australia and the Cape of Good Hope, before berthing back in England in October 1836.

This itinerary of far-flung places is well-known. What is less generally realised is that the voyage had multiple objectives. Darwin sailed as gentleman companion to the prickly Captain Robert FitzRoy, whose first aim was to return three Alakaluf and Yahgan aboriginals ("Fuegians" to Darwin, as they came from Tierra del Fuego, an archipelago of islands at the southernmost tip of the Americas). They had been snatched during the Beagle's previous voyage and Christianised as an experiment. Darwin lived for months with these so-called civilised "savages" and came to understand first-hand how, as he put it, the savage-to-civilised distance was no more than that between wild and domestic animals.

Still more significantly, the voyage exposed Darwin to what few English gentlemen of his day would ever see—the full barbarity of slavery in the raw. The Beagle's official brief was to map South America's coastal waters, so making them safe for British merchantmen; but this mapping also had a more martial intent. Since 1807, when Britain had outlawed the trade in slaves (although not slavery itself within the empire), the Royal Navy had been enforcing a blockade in the Atlantic aimed at suppressing the export of African slaves—a trade that still flourished in the southern US and South America, even though it was technically banned in both. Naval ships thus constantly played a stop-and-search role.

The locally-bought supply boat used on the previous Beagle voyage to South America, in 1826-30, had itself been a slaver. And when Darwin was leaving the River Plate in 1833 this old boat was seen slipping into Rio harbour having apparently landed nearly 200 Africans up the coast—it had returned to slaving. Everywhere, Darwin passed ships readying for the Africa run: being fitted with chains and branding irons. Moreover, when FitzRoy purchased the Beagle's new supply boat, he tried to get the Admiralty to reimburse him by telling the Sea Lords that it "will make a good privateer" against the slavers. FitzRoy had learned that the Uruguay government had just illegally sanctioned the import of what it termed "2,000 negro colonists."

On shore in South America, we know from the Journal he published in 1845 that Darwin saw those shackles, thumbscrews and the six-year-old boy horse-whipped, as well as other "heart-sickening atrocities." He described himself being powerless, as a foreigner, to step in (only the horse-whipped boy had him interfering; we know of no other instance). But after the voyage the frustration spilled out in his evolutionary notebooks—a resource of crucial importance in the development of his thought—which damned the slaver "who has debased his Nature & violates every best instinctive feeling by making slave of his fellow black." In the Journal, too, Darwin excoriated slavery in the strongest language he would ever use. Like most Victorians, Darwin was loath to expose his innermost feelings, so this diatribe—in which he itemised the "revolting details" of the tortures he had seen—emphasises how incensed he remained. "It makes one's blood boil… to think that we Englishmen and our American descendants, with their boastful cry of liberty, have been and are so guilty." On no other subject would the usually mild Darwin talk so vehemently. He was a guest in one house, the Journal records, where "daily and hourly" a beating "enough to break the spirit of the lowest animal" was meted out to a poor "mulatto." Blacks were being bestialised before his eyes: broken in spirit the way wild animals are broken during domestication.

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At around the same time, slavery apologists in the US were asserting that Caucasians and Africans were distinct species. This was the claim not only of propagandists in the southern states, but also of slave-owning men of science. These various human species shared no common origin, it was argued—they passed back unchanged to the time of creation. There was no mixed blood; the notion was anathema in the south, where racial purity was paramount and any interbreeding was believed to result in "hybrids," who sooner or later became infertile.

Such plantation apologias appalled Darwin. But they weren't restricted to the US. A slave-owning southern physician, Charles Caldwell, spoke at the British Association for the Advancement of Science in 1841, to claim that Africans bore "a nearer resemblance" to the apes "than to the highest varieties of our own species." In fact, the times were moving away from the humanitarian sentiment that the abolitionists had ushered in. There was a reactionary hardening against the view that blacks could be turned into "gentlemen." Many anthropologists in Britain and America attracted large audiences after the 1840s by

arguing that whites were the only species capable of civilisation. Philanthropy was portrayed as bleeding-heart, sentimental tosh that science, based on racial skull measuring, would disprove. After all, it was argued, blacks had never produced a "Cicero, a Bacon, or a Shakespeare." They were fated only to be slaves or servants. Red Indians and black people were ineducable and, outside the protective embrace of slavery, they would be unable to adapt to a spreading white civilisation. Philanthropy only dragged out the misery for those remaining in the "wild," said Caldwell; "their extinction will be a dispensation of kindness."

Darwin was quite aware of the "separate species" view. On the Beagle, he carried a 17-volume standard work, the Dictionnaire Classique d'Histoire Naturelle, which divided humans into 15 species and, quite egregiously (in Darwin's eyes), even named the Fuegians and Patagonians as two of them. Darwin, who was familiar with these peoples, knew that they were closely related but adapted to different terrains. For the Dictionnaire, each species had its own bloodline. Fuegians and Patagonians were not kin, any more than white and black men.

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So Darwin returned to England thanking God "I shall never again visit a slave-country." The events were seared into his memory. "To this day," he wrote in 1845, "if I hear a distant scream, it recalls with painful vividness my feelings, when passing a house near Pernambuco [probably in the old town of Olinda in Brazil], I heard the most pitiable moans, and could not but suspect that some poor slave was being tortured, yet knew that I was as powerless as a child even to remonstrate."

Yet the voyage was not so much an awakening as a confirmation of the radical views in which Darwin had been raised. Even before setting foot on the Beagle, Darwin was primed to loathe what he saw in Brazil. The full extent of his family's commitment to the cessation of all slavery was revealed by Jim Moore after research among the neglected Wedgwood archives in the Potteries (Josiah Wedgwood, the master potter, was Darwin's maternal grandfather). Painstaking work with thousands of faded letters left no doubt of the commitment.

It is well-known that grandfather Wedgwood had produced the famous "Am I not a Man and a Brother?" seal for the Society for Effecting the Abolition of the Slave Trade—in fact he produced thousands of medallions with the slogan at his own expense, and these became fashionable pieces, worn in solidarity, the poppies of their day. But he also bankrolled the great abolitionist agitator, Thomas Clarkson, the man who rode 35,000 miles between ports collecting statistics on the trade. Wedgwood money stood behind the Sierra Leone Company, too, set up to assist liberated slaves settling in Africa.

Darwin's uncle, Jos Wedgwood, sat on the London abolition committee, entered parliament on an abolitionist ticket, poured the proceeds from the sale of the Wedgwood London showroom into his Hanley and Shelton Anti-Slavery Society, and printed and distributed huge numbers of propaganda tracts. Darwin's aunt Sarah donated tens of thousands of pounds (in today's money) to anti-slavery societies, astonishing even the family with her largesse. In fact, all the Wedgwood women were involved in anti-slavery activity. The depth of this commitment has never been fully appreciated.

The Darwins and Wedgwoods were much intermarried. Darwin's mother and wife were Wedgwoods, and his sister married his wife's brother. His mother died when he was eight and he was raised by his sisters; holidays were spent in and out of the Wedgwood home. Darwin himself was no less committed to the cause. Even now, letters are turning up that confirm this. In one of the latest he praises the world's most uncompromising "immediatist" abolitionist, the American William Lloyd Garrison, as "a man to be for ever revered," or (as another letter says), a man "whom I honour from the bottom of my soul." And we now know that, as a youngster in Shrewsbury, Darwin had been a friend of Clarkson's right-hand man in the region. Look, again, at Darwin's culminating work uniting the human races and, indeed, all living creatures, The Descent of Man. Who stands at the moral apex?—Thomas Clarkson.

Darwin's earliest encounter with a black person, too, is as intriguing as it is little known. Sent to study medicine at Edinburgh University late in 1825, Darwin was a failure, and his couple of years there are usually dismissed. Surgery terrified him; lectures bored him. But, by my reckoning, he spent 40 hours in the first winter learning bird-stuffing from a freed Guyanese slave John Edmonston, who had tales to tell of plantation life and the rainforest beyond. Guyana was in the news: a slave rebellion had been crushed there just months earlier, and John (presumably descended from west African captives) had travelled through the forest with the explorer Charles Waterton, whose Wanderings in South America were the sensation of the moment. So, for Darwin, who was nearly 17, there was a certain cachet to this man's company in the frosty winter of 1826. John became, in Darwin's own words, an "intimate."

Visiting Americans were appalled at the sight of blacks being treated as equals on British streets, but Darwin showed no sense of ignominy at being taught by a "full-blooded negro." His anti-slavery sisters had done their job. Add to this his subsequent experiences on the Beagle accompanied by Christianised Fuegians, and his four days travelling around the Cape with a white-gloved and well-spoken Khoikhoi guide (or "Hottentot," a people depicted by slavery apologists as little short of apes), and you have a young man primed to see through the "scientific" claims of pro-slavery racism.

He knew that black people could be civilised; he had even treated them as "intimates." He knew that the races were not separate species as slave-masters claimed, but was frustrated at being unable to do anything about slavery abroad. Now his pent-up feeling was poured into a new, strange science: one that rested on an opposite and obvious truth, that the black slave was a "Man and a Brother." For him, the corollary of brotherhood was a radically different racial image to that held by almost all of his contemporaries: one of "common descent." And it was this that would form the central image of Darwin's unique evolutionary science.

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To most of Darwin's peers, evolution in any guise was bizarre and abhorrent. It was "that most extravagant of all suppositions, that most grovelling of all religions—the self-created, self-endowed, and self-creating powers of Nature." Natural causes took the place of miraculous events, and with this spiritual emasculation the church lost its temporal power. In short, it was subversive. One of Darwin's church-ordained geology teachers wanted to stamp with "an iron heel upon the head of the filthy abortion." To announce similar abominations could even risk a court appearance. The radical surgeon William Lawrence was forced to recant for arguing in his materialistic Lectures on Man that humans were little more than sinews, nerves and muscles. The Court of Chancery declared the book blasphemous, which meant that it was stripped of copyright. One had to step gingerly as a rationalist gent in a straitlaced society whose mythology underwrote the Anglican order. Plenty of activists had spent a year at His Majesty's expense for denying Christianity—and Darwin's private evolution notebooks of 1837-39 could be interpreted as sapping its miraculous basis.

Darwin's agonies over his own theories are well-known. In our biography of Darwin, published eighteen years ago, Jim Moore and I drew attention to the retiring squire's strategy for dealing with his "blasphemous" views: to delay publication as long as possible. It took Darwin three decades to reveal fully his thinking on human evolution. He devised his theory in 1837-39, published On the Origin of Species, which all but avoided talk of mankind, in 1859 and finally summoned up the courage to announce his belief in human evolution in The Descent of Man in 1871.

The years that Darwin sat on his theory—an entire generation—were lonely ones, during which he confided only fleetingly in a few confidants or relations. Perhaps he feared upsetting his devout wife. Even then, he rarely said more than that he doubted "species stability"—the idea that animals had always existed, unchanged, in their present forms—or that he believed that the classification of animals and plants should be like a human genealogical tree, uniting blood kin. That was it. The stomach complaint that set in as he formulated his ideas in the later 1830s was possibly prompted by the fear and guilt he was experiencing. Darwin himself admitted that his covert evolutionary work caused "the main part of the ills to which my flesh is heir."

Even decades later, admitting to human evolution remained difficult. Alfred Russel Wallace, who precipitated Darwin's rush to publish The Origin of Species by threatening to pip him to the post, asked one of Darwin's naturalist friends in the 1860s why "men of science [are] so dreadfully afraid to say what they think" about human origins. The friend wrote caustically to Darwin that, if the footloose Wallace had "as many kind & good relations as I have, who would be grieved & pained to hear me say all I think… he would not wonder so much." "I fully agree," Darwin wrote back. With a pious wife, parish respectability and a good name, he had much to lose.

The burning question, in fact, is why a young man fresh off the Beagle with a glittering career in prospect—a gentleman for whom honour was paramount—would have considered risking everything by developing a "monkey-man" theory that affronted the most sacred principles of the Christian society to which he belonged; and why he then persevered with it through these long years of doubt and fearful isolation. It is in his relationship with slavery and the abolitionist cause that we find our answer.

There is, first of all, one nagging question to be answered. If his proudly-held abolitionist views were so central to his science, why did Darwin never explicitly mention the link between them? The answer is twofold. First, even if he did consciously recognise such moral principles as self-evident truths, there is the sheer secrecy in which he shrouded all his thinking on evolution. Second, there is a larger point about the way in which Darwin conceived of his own "motivations." Darwin was a man of science working at a time when such men were supposed to follow Baconian inductive principles. The Origin of Species itself presents his work as a patient accumulation of facts that forced him to evolutionary conclusions. His covert notebooks, written immediately after the Beagle voyage, tell a totally different story; but Darwin would never have conceived of his own studies as motivated by anything other than observation and reasoning. His underlying assumptions, as so often for men of science, went unexamined.

The key to understanding both Darwin's conflicted position and his ultimate actions is not so much the evidence that he collected as the particular way in which he shaped it. The mainstream account of this process—that the "facts" he had discovered forced his hand and compelled him to develop his theories in the way he did—does not hold water. There is no doubt that the Galapagos mockingbirds and pampas ground sloths were crucial. But many naval naturalists had seen as much as Darwin had and not cried "Evolution!" Take the drunken John MacGillivray, a brilliant naturalist ready to sit down with aboriginals and learn their language (not something Darwin ever did). On HMS Rattlesnake, charting Australia's barrier reef, MacGillivray realised that each island, even reef, had its unique snail species. But where Darwin's recognition of the Galapagos faunal variation led to his work on speciation, MacGillivray saw nothing that needed explaining.

Moreover, there were (a few) rival evolutionists even in Darwin's day—but, for them, nothing like Darwin's now famous "tree" image was conceivable; no common descent, no notion that living monkeys and humans shared an ancient ancestor. Their science was largely a series of parallel lines. One early line had reached humans, another later one had only got as far as monkeys, and the last to start had only risen to the amoeba stage. Each line passed through the same stages, so that today's monkeys would be tomorrow's humans. No forking, no joint ancestor—it seemed quite logical to race theorists that blacks were just "lower," less-developed humans.

Darwin was different. And the historian of science must try to understand what drove him to see evolution specifically, and uniquely, in terms of common descent, and thus to make man only a better sort of brute. What was the moral gain that outweighed the consequences: the sleepless nights, the fears of derision, ostracism or worse?

The answer is clear. Primed by his anti-slavery heritage and horrifying experience of Brazilian slavery, Darwin returned to England in 1836 and immediately conceived an image of common descent. His private evolutionary notebooks of 1837-38 show his thinking move outward from racial kinship and brotherhood to unite all suffering creation. He developed these ideas at a time of growing abolitionist euphoria as the slaves were ending their compulsory "apprenticeships" and finally being freed. It was no coincidence, either, that his dining companions in these critical months were the feisty "immediatist"

Harriet Martineau, proselytising after her two years in the American south, and her antithesis, the sour sage Thomas Carlyle, who saw "Mungo" better off in slavery. There was no escaping the battle.

Crucially, the model we can trace for Darwin's developing theory throughout his earliest evolutionary notes is the human pedigree itself. As he jotted in May 1838: "I cannot help thinking good analogy might be traced between relationship of all men now living & the classification of animals." His notes were often disjointed, but their meaning shines through—and always there were tantalising insights into the way his reasoning was forged from his abolitionist heritage. Human differences became the paradigm. Explain them, and the evolution of all life followed.

I have used the anachronistic word "evolution" throughout, but Darwin's preferred term was "descent," a heraldic word, used by pedigree-chasers. I doubt it had been used in such an evolutionary sense before; it came straight from genealogical lore.

Common origins, at this time, were almost unknown in natural history. But they were all-pervasive in abolitionist ideology. (They were basic, too, in books such as ethnologist James Cowles Prichard's monumental compendium Researches into the Physical History of Mankind. Prichard promoted a unity of the races springing from Adam, and Darwin found Prichard's evidence for common descent invaluable.) This abolitionist literature was Darwin's source. As in society, there was to be a new meritocracy of nature. Unlike Carlyle, who thought that black people had little cultural aptitude, Darwin had learned from an intelligent Guyanese teacher, lived with Fuegians and been guided by a well-mannered "Hottentot" at the Cape. Civilisation, he knew, was no white prerogative. Such feelings lay behind the gush of notes of 1838 in which Darwin pushed his conclusions to their limit.

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There are multiple ironies here. Darwin was freeing the slaves to make them equally human. But he was equally turning all humans into animals, dismissing those who "think mankind's origin godlike." For many of his critics, one abomination was replacing another; and the evolutionary medicine was as bad as slavery's disease. But others understood him.

There is, also, a sadder irony. Darwin's was a blinkered humanism. It reflected the conflicted nature of British society, where half the nation was trying to free slaves, while their expatriate peers in Australia and elsewhere were busy exterminating nomadic aborigines in the name of economic progress. In the economic depression that began in the late 1830s, some 400,000 unemployed were shipped from Britain to the colonies annually. The boatloads devastated local cultures to the extent that the annihilation of all aboriginal peoples was projected within a century.

Darwin himself had witnessed ethnic-cleansing on a world scale: the pampas Indians in Argentina butchered by General Rosas's gauchos to clear the ground for cattle; the last Tasmanians herded into camps. The Beagle arrived amid the Xhosa wars in the Cape, at the start of the Boers "great trek." Such events prefigured a darker side to Darwinism; and Darwin's own vision became bleaker after he read Malthus on the wars and famine stemming from population pressures. He used Malthusian ideas to normalise and naturalise the colonial genocide, making it part of the evolutionary process, suggesting how such conflict was not only "natural," but beneficial (inasmuch as the "fitter" survivors carried the human race forward). The uncivilised peoples of the plains were going the way of the megafauna he found fossilised under their feet. But Darwin took colonial conflict as an inevitability to be explained, not a policy choice to be challenged. It is a supreme irony that the gentle, squeamish abolitionist should end up justifying colonial eradication.

He didn't see the incongruity. And as the years passed he adopted more of the attitudes of his gentlemanly class about the "higher" moral, technological and intellectual order achieved by white Europeans. Sixty-two by the time he announced his views on human evolution, in The Descent of Man (1871), he was now mired in his contemporaries' "ladder" image of world cultures, with whites on the top civilisational rung

and blacks at the bottom. The notion of a unilinear "higher" and "lower," denounced in his old notebooks as meaningless, was effectively reinstated in cultural terms. He was following the trend, but in shifting the emphasis from a biological racial kinship to a single cultural yardstick for all races, standardised on western achievements, his science failed to live up to its early emancipatory promise.

"Darwinism," then, was never distinct from "social Darwinism." It is traditional to deflect blame away from Darwin himself for all the unpleasant social implications of this phrase, keeping his theory of natural selection scientific and ideologically untainted—the blame is conveniently shunted off on to his young contemporary Herbert Spencer. But this attempt to protect the purity of Darwinism won't wash. Indeed, Darwin, who thought Spencer a windbag, would not have recognised a separate category of "social Darwinism"—for him, the "social" was integral to his system. He dealt with race, slavery, genocide and colonial conflict from the first: his theory of evolution was intended to explain society.

So one has to live with Darwin warts and all. He was a man of his time, a mirror to his culture; racist while also race-saving, distressed by cruelty as he naturalised genocide, able to pass the blame to nature, rather than man. History is messy and Darwin was always a paradoxical thinker, the more so as he began to bend with the breeze late in life.

To celebrate historical figures we have first to understand them. In 2009, 200 years after his birth, it is time to switch the spotlight onto the younger Darwin—the man whose belief in human brotherhood transmuted into an evolutionary theory of common descent. Rather than being morally subversive, as his Christian critics claim, Darwin's achievement was morally grounded. Rather than being a dispassionate practice, his science had a humanitarian drive. It made brothers and sisters not only of all human races, but of all life.

http://www.prospectmagazine.co.uk/2009/02/darwintheabolitionist/

Strange New World

By JEANETTE WINTERSON

THE YEAR OF THE FLOOD

By Margaret Atwood

434 pp. Nan A. Talese / Doubleday. $26.95

Fatefulness about the survival of the species is not new. Religious thinking has end-time built in, and for most of our sentient life on the planet humankind has been predominantly religious. That has changed in Westernized countries, but only relatively recently, and alongside advances in scientific knowledge. Our new pessimism no longer depends on a deity to wipe out this wicked world. Since the Manhattan Project, we have learned how to do it ourselves.

Nuclear, ecological, chemical, economic — our arsenal of Death by Stupidity is impressive for a species as smart as Homo sapiens. Yet fire or flood may belong to an Armageddon whose awful grandeur may not be our fate. Plague — unlovely, heroic, unstoppable, might well get us first. That's what happens in Margaret Atwood's new novel, "The Year of the Flood," her latest excursion into what's sometimes called her "science fiction," though she prefers "speculative fiction." If we have to have a label, that's a better one, since part of Atwood's mastery as a writer is to use herself as a creative computer, modeling possible futures projected from the available data — in human terms, where we are now.

Her 1985 novel "The Handmaid's Tale" imagines a United States taken over by God-fearing fundamentalists sick of democracy and civil rights, especially women's rights. Atwood is chillingly brilliant in depicting the slick twists a technology of freedom can take, shifting ease of access — in this case to financial records and personal information — into theft and surveillance. Overnight, the bank accounts of every woman are transferred to her nearest male relative.

In "Oryx and Crake," published in 2003, Atwood leads us through a bioengineered world where a new species, the Crakers, has been invented by a Dr. Frankenstein figure — Crake — and given a chance at remaking the world, thanks to a near decimation of the human race, also masterminded by Crake. At the end of that novel, we are left in a clearing in the woods with a tribe of bewildered Crakers, a few old--fashioned human beings and Jimmy the Snowman, who's wondering whether he should finish off the last of his own kind and leave the whole rotten and rotting show to the nonviolent, unclothed human herbivores cell-created by his best friend, Crake.

That end is also the end of "The Year of the Flood." Here Atwood has brilliantly re-told her own tale, through other mouths and focusing on different details, showing us how the kids Jimmy and Glenn become the Snowman and Crake, and how an end — or the End — can happen in the name of a new beginning.

The Waterless Flood has long been predicted by God's Gardeners, a back-to-nature cult founded by Adam One. Its members live simply and organically, sing terrible hymns, have no dress sense and peddle a bolted-together theology, difficult to think about if you think at all. With values diametrically opposed to those of the ruling CorpSEcorps, the Gardeners aren't "the answer," but at least they've asked enough questions to avoid a life of endless shopping and face-lifts.

The Gardeners sometimes do evangelical work in the mean streets, known as the pleeblands, or picket a fast-food joint like SecretBurgers because it's wrong to eat anything with a face. At SecretBurgers they rescue a young woman named Toby from the murderous clutches of her sex-crazed boss, Blanco the Bloat, and it's Toby who is one of the central characters in the post-plague part of the story. As a Gardener, Toby rises to the position of Eve Six, in charge of bees, herbs and potions, but Blanco never stops pursuing her, and to save herself, and the group, she receives a new identity in the health spa AnooYoo. Recovering from plastic surgery, she avoids the deadly wipeout germ of the plague.

Less cosmetically, but just as effectively, Ren, a pole dancer at a local sex joint called Scales and Tails, is in an isolation room after a bloody attack by a punter, so she too misses the bio-bug. The women's past and present stories alternate and intertwine, bringing to life the world they must survive in — a world where pigs have human brain tissue and sheep are bred with human hair in different colors, silver and purple being hot hits for whole-head implants, providing you don't mind smelling of lamb chops when it rains.

My favorite Atwood genetic invention is the liobam — a cross between a lion and a lamb, engineered by a lunatic fringe religious group that's tired of waiting for the prophecy of the lion lying down with the lamb to come true. Their own breed has curly golden hair and long, sharp canines, and will look at you very gently while it rips your throat out — which is pretty much the metaphor for the world of lethal paternalism created by CorpSEcorps.

The sensitive CorpSEcorps elite boy Glenn, who becomes Crake, starts out as a teenage sympathizer for the Gardeners but is too seduced by his own brainpower to trust nature. Like his friend Jimmy, Glenn doesn't know how to love, and the awkward devotion he feels for the girl he calls Oryx is not returned. Atwood is very good at showing, without judging, what happens when human beings (usually men) cannot love. In the worst of them, like Blanco the Bloat, brutality and sadism take over. In the better of them, like Crake, a utopian desire for perfectability replaces the lost and lonely self. Crake designs out love and romance because he wants to design out the pain and confusion of emotion.

In this strangely lonely book, where neither love nor romance changes the narrative, friendship of a real and lasting and risk-taking kind stands against the emotional emptiness of the money/sex/power/consumer world of CorpSEcorps, and as the proper antidote to the plague-mongering of Crake and Jimmy, for whom humankind holds so little promise. As ever with Atwood, it is friendship between women that is noted and celebrated — friendship not without its jealousies but friendship that survives rivalry and disappointment, and has a generosity that at the end of the novel allows for hope. Atwood believes in human beings, and she likes women. It is Toby and Ren who take the novel forward from the last page, not the genetically engineered new humans.

Atwood is funny and clever, such a good writer and real thinker that there's hardly any point saying that not everything in the novel works. Why should it? A high level of creativity has to let in some chaos; just as nobody would want the world as engineered by Crake, nobody needs a factory-finished novel. The flaws in "The Year of the Flood" are part of the pleasure, as they are with human beings, that species so threatened by its own impending suicide and held up here for us to look at, mourn over, laugh at and hope for. Atwood knows how to show us ourselves, but the mirror she holds up to life does more than reflect — it's like one of those mirrors made with mercury that gives us both a deepening and a distorting effect, allowing both the depths of human nature and its potential mutations. We don't know how we will evolve, or if we will evolve at all. "The Year of the Flood" isn't prophecy, but it is eerily possible.

Jeanette Winterson's latest novel is "The Stone Gods."

http://www.nytimes.com/2009/09/20/books/review/Winterson-t.html?_r=1&nl=books&emc=booksupdateema1

The Old Economist, Relevant Amid the Rubble

By DWIGHT GARNER

KEYNES

The Return of the Master

By Robert Skidelsky

221 pages. PublicAffairs. $25.95

John Maynard Keynes (1883-1946) was, on the page and off, formidable. He was tall, an impeccable dresser in dark suits and homburgs, a product of Eton and Cambridge, a director of the Bank of England. His words could be withering. “When I argued with him,” the philosopher Bertrand Russell said, “I felt that I took my life in my hands.”

Keynes also had, paradoxically, the sensitive soul of a poet. He was a member of the Bloomsbury group and a favorite of Virginia Woolf’s. He collected modern art and rare manuscripts. He married a Russian ballerina. He was an early environmentalist, given to utterances that stick in the mind. “We are capable of shutting off the sun and the stars,” he warned in 1933, “because they do not pay a dividend.”

These things matter about Keynes because his economic ideas, relevant again amid the rubble of the global financial crisis, had a humane and moral dimension, one that Robert Skidelsky underlines in “Keynes: The Return of the Master.”

Mr. Skidelsky is the author of a magisterial three-volume biography of Keynes (the final volume was published in 2000) and is emeritus professor of political economy at the University of Warwick in England. He knows more about Keynes than anyone alive, but his new book is not a pocket-size distillation of his earlier biography. It’s an attempt to translate and update Keynes’s ideas for a sleek, turbulent era.

This is not an obviously simple task. Keynes’s most influential book, “The General Theory of Employment, Interest and Money,” (1936) published during the Great Depression, is famously impenetrable. But its central idea held sway for nearly 30 years after World War II: that markets are not self-correcting.

In “Keynes: Return of the Master,” Mr. Skidelsky surveys the vast body of Keynes’s work. But he boils the thinking down to a few essential points. Central among them is that market economies are fundamentally uncertain; large shocks like the recent meltdown are not anomalies but normal if unpredictable events. Government should intervene in a crisis — as the Obama administration has since the fall of Lehman Brothers last year — supplying a judicious but firm hand on the tiller.

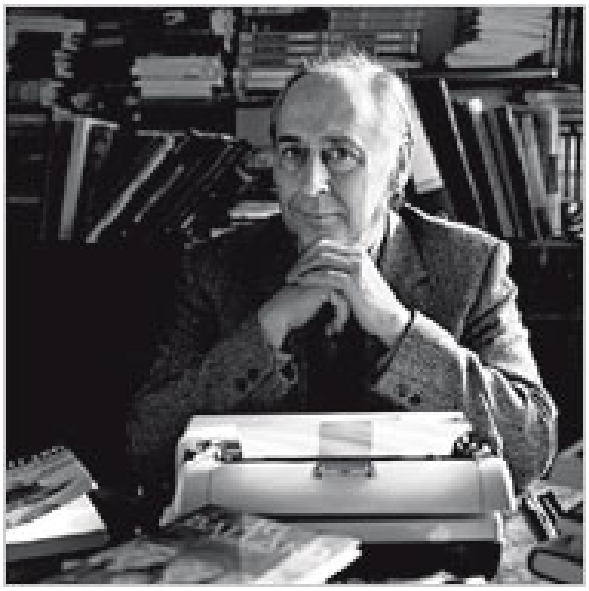
Mr. Skidelsky is righteous in his thunder about how Keynes’s ideas have been spurned in recent decades. He scolds the free-market ethos of the Reagan and Thatcher eras as well as the thinking of anti-Keynesian

New Classical economists. He does not entirely blame the usual suspects (banks, hedge funds, credit-rating agencies, the Fed) for the current crisis. He indicts laissez-faire philosophy.
"The root cause of the present crisis lies in the intellectual failure of economics," Mr. Skidelsky writes. "It was the wrong ideas of economists which legitimized the deregulation of finance, and it was the deregulation of finance which led to the credit explosion which collapsed into the credit crunch. It is hard to convey the harm done by the recent dominant school of New Classical economics. Rarely in history can such powerful minds have devoted themselves to such strange ideas."
When Mr. Skidelsky pulls out a napkin and begins to scribble down figures, this book is slower going. It is probably safe to say that "Keynes: The Return of the Master" is aimed at the general reader, if that general reader owns excellent reading glasses and enthusiastically devours the daily business section from front to back.
A not entirely untypical sentence is: "The most general I.M.F. commodity-price index (fuel + nonfuel) peaked in July 2008 at 218 (2005 = 100) and dropped to its lowest level in December, when it was down at 98, recovering to 102 in January 2009 and falling again to 100 in March." Oof.
This book is provocative in its discussion of the moral aspect of Keynes's thinking. He had the curious and refreshing idea that financial institutions have a duty to the public interest as well as to shareholders. He worried about the pursuit of money at the expense of all else. What ethical value, he asked, attends a life of "moneymaking and bridge"?
Mr. Skidelsky observes: "His conclusion was that the pursuit of money — what he called 'love of money' — was justified only to the extent that it led to a 'good life.' And a good life was not what made people better off: it was what made them good. To make the world ethically better was the only justifiable purpose of economic striving."
Keynes's altruism sometimes made him sound like Custer at the last stand. "I find no shame at being found still owning a share when the bottom of the market comes," he wrote. "Any other policy is antisocial, destructive of confidence and incompatible with the working of the economic system." Maybe this was how he explained himself to Virginia Woolf when, in 1920, he lost the money the Bloomsbury group had invested with him. (The debt was later cleared.)
Keynes ultimately saw economics not as a natural science but a moral one. He was loath to rely on pure mathematics and risk models. Not everything could be reduced to numbers.
When it comes to deciphering Keynes's ideas for the current moment, we can only speculate about details and particulars. As Mr. Skidelsky points out, "Keynes had little specific to say about financial regulation, since the banking system was not at the center of the storm of the early 1930s."
But Keynes has always seemed at his most appealing and prophetic at times of roiling financial discontent. Robert Lucas, the University of Chicago economist, joked last year that "everyone is a Keynesian in a foxhole." If the American economy stabilizes and begins a genuine rebound, there will be plenty of born-again Keynsians outside of those foxholes too.

http://www.nytimes.com/2009/09/18/books/18book.html?ref=books

Poet of Desolate Landscapes

By JONATHAN LETHEM



By the time J. G. Ballard died in April of this year, talk of his long struggle with cancer should have prepared his followers ("fans" is too pale a word for the devotion Ballard inspired), yet the news still came as a shock. Ballard was, unmistakably, a literary futurist, at ease in the cold ruins of the millennium a lifetime sooner than the rest of us; his passing registered as a disorienting claim of time upon the timeless. Whether you embrace or reject on his behalf the label "science-fiction writer" will indicate whether you regard it as praiseful or damning, but no one reading Ballard could doubt the tidal gravity of his intellect or the stark visionary consistency of the motifs that earned him that rarest of literary awards, an adjective: Ballardian. Now, and not a moment too soon, comes The Complete Stories of J. G. Ballard (Norton, $35), a staggering 1,200-page collection of a lifetime's labors in the medium in which Ballard was perhaps most at home.

Each of Ballard's 98 short stories is like a dream more perfectly realized than any of your own. His personal vocabulary of scenarios imprints itself from the very first, each image with the quality of a newly minted archetype. Ballard was the poet of desolate landscapes marked by signs of a withdrawn human presence: drained swimming pools, abandoned lots littered with consumer goods, empty space stations, sites of military or vehicular tragedies. Himself trained in medicine, Ballard frequently chose doctors or scientists as protagonists and narrators, yet expertise never spares them from the fates they see overtaking others. If Ballard's view of the human presence in his landscapes is grimly diagnostic, his scalpel is wielded with tenderness, his bedside manner both dispassionate and abiding.

Here, the panorama set before one such observer, from "The Day of Forever" (1966): "Despite the almost static light, fixed at this unending dusk, the drained bed of the river seemed to flow with colors. As the sand spilled from the banks, uncovering the veins of quartz and the concrete caissons of the embankment, the evening would flare briefly, illuminated from within like a lava sea. Beyond the dunes the spires of old water towers and the half-completed apartment blocks near the Roman ruins at Leptis Magna emerged from the darkness. To the south, as Halliday followed the winding course of the river, the darkness gave way to the deep indigo tracts of the irrigation project, the lines of canals forming an exquisite bonelike gridwork." Ballard in a grain of sand — the visual poetry of ruin; a syntax scientifically precise yet surreally oversaturated; and the convergence of the technological and the natural worlds into a stage where human life flits as a violent, temporary shadow. Yet Ballard at his best never seems to load the dice against humanity. He merely rolls them.

Every bit as striking as Ballard's feeling for entropy is his engagement with arts from which literature too often seems quarantined: music, sculpture, painting, architecture. He evokes artistic creation with the passion of an exile for a lost kingdom. Like his scientific characters, Ballard's overreaching artists

glimpse seeds of doom at the heart of their endeavors. And in perhaps his most famous vision, the novel "Crash," technology, sculpture, sex and death recede to the same vanishing point: the permanently contemporary site of the car crash.

Returning the favor, the arts relished Ballard. From the Comsat Angels, a rock band named for a 1968 story, to Radiohead, David Cronenberg, Wim Wenders, Alexis Rockman, John Gray, Joy Division, Gary Panter and countless others, Ballard probably inspired more rock musicians, philosophers, painters and filmmakers than fiction writers. Reversing the notion of the "writer's writer," he's less esteemed in literary culture than in the wider sphere. His presence is also far stronger in Britain than in the United States. "The Complete Stories" ought to alter both these imbalances.

My own favorite of Ballard's stories is "The Drowned Giant" (1964). This tale of a vast carcass awash on a local beach is as elegant and devastating as any of Kafka's or Calvino's fantasies, simply asking: What happens when Gulliver drifts home?

Equally perfect, "The Secret Autobiography of J. G. B.," posthumously published in The New Yorker and the penultimate story in the collection, gently inserts the writer himself into an emptied-out version of his beloved London suburb of Shepperton, there to discover himself at an endpoint that is also a beginning.

With his more celebrated role as a social critic of modernity, Ballard was also a poet of infinite regress (much as Borges described Kafka, in "Kafka and His Precursors"), gnawing at the Zeno's paradox of our place in the cosmos with the rigor of an Escher or Bach.

Not to take away from his verdict on the 20th century: Ballard's a bard of techno-anomie, of late-capitalist disaffection, and his writings are just the tonic if your local cloverleaf traffic jam or gated community or global warming harbinger has got you feeling out of sorts. But it's precisely his grounding in deeper undercurrents of cosmic-existentialist wonder that give that tonic its fizz. His is the voice reminding you not to take the postmodern hangover too personally: it was always going to happen this way.

A writer viewed as radical is rarely also so entrenched in formal reserve as was Ballard. Much of the energy in his fiction comes from the pull of his prophecy against the dutiful, typically middle-class English politesse of his characters, the unradicalism of their attitudes toward one another and themselves. In the "Vermilion Sands" stories, scattered through the first two decades of his career, much of the dialogue might be taken from a Barbara Pym novel, if instead of small-town vicarages Pym's milieu had been a crumbling desert resort inhabited by aging celebrities.

Ultimately, Ballard is simply a master story writer — the maker of unforgettable artifacts in words, each as absolute and perplexing as sculptures unviewable from a single perspective. In this book of 98 stories, there are at least 30 you can spend a lifetime returning to, to wander and wonder around. Even the lesser pieces are invaluable, because they support rather than diminish the masterworks and because Ballard's hand is always unmistakable.

Taking the measure of a writer's life's work can be intimidating, yet I hope this book will be not just purchased but read. Ballard's sensibility rewards immersion; indeed, it thrives there. He may have written both an autobiographical diptych of novels ("Empire of the Sun" and "The Kindness of Women") and an actual autobiography, but these stories form another version of autobiography: one inadvertent, oracular and deeply telling.

I should add that I'm no Ballard "expert." I quit keeping up with his novels after "Running Wild" (1988), never to return, and though I believed myself well schooled in his stories there were dozens here I'd never read before; in fact, my prime years reading him are a quarter-century behind me. Yet very few writers I've encountered, even those I've devoted myself to, have burrowed so deeply in my outlook, and in my work, where I find myself recapitulating Ballardian patterns not for their beauty (though they are beautiful) but for their tremendous aptness in attempting to confront the dying world before me, and inside me.

Consider this, then, a late-to-press elegy for perhaps the most cosmically elegiac writer in literature — and like all who mourn, Ballard had first to love.

Jonathan Lethem's new novel, "Chronic City," will be published in October.

http://www.nytimes.com/2009/09/13/books/review/Lethem-t.html?ref=books

When Grave Years Fueled Grand Art

By DWIGHT GARNER

DANCING IN THE DARK

A Cultural History of the Great Depression

By Morris Dickstein

598 pages. W. W. Norton & Company. $29.95.

A few years ago in The London Review of Books, Ferdinand Mount complained about "decaditis," the slightly absurd notion that "slicing the past up into periods of 10 years" is a useful thing to do. "Historians used to deal in reigns and centuries," Mr. Mount wrote. He added: "As far as I can see, the 1890s was the first tenner to be identified, and quite quickly identified, as having its own inimitable aroma."

In the last American century, only two decades genuinely pricked up the nostrils (as Mr. Mount might put it), the 1930s and the 1960s. Fundamentally different eras, they had a similarity. Political dissent — stoked by economic crisis in one case, an unwinnable war in the other — supplied radical thunder, while the best artists, who seemed to come out of nowhere, threw zigzagging lightning strikes that have retained their heat and illuminating light.

The critic Morris Dickstein has already written an authoritative cultural history of the '60s, "Gates of Eden" (1977), a book warmed by injections of his own experiences during the decade and by his willingness occasionally to shoot from the hip. He called "The Electric Kool-Aid Acid Test," by Tom Wolfe, "stupefyingly boring — I got through only half of it."

Mr. Dickstein returns now with "Dancing in the Dark: A Cultural History of the Great Depression," a sprawling bundle of ruminations on the books, music, art, movies and design of the 1930s. It's a heavier, slower, more lumbering book, at times a hard-drive-emptying round of plot summaries and historical filler.

Mr. Dickstein remains a serious and perceptive critic, however, adept at observations both macro ("Epic scenes from the Dust Bowl are part of our permanent shorthand for rural poverty and natural desolation") and micro. He describes the subject of "Migrant Mother," Dorothea Lange's searing 1936 photograph, as "a woman whose brow is furrowed like tractored-out land."

"Dancing in the Dark" is an extended meditation on what Mr. Dickstein calls "the crucial role that culture can play in times of national trial." In the '30s it was a decidedly dual role. "The crisis kindled America's social imagination," he notes, "firing enormous interest in how ordinary people lived, how they suffered, interacted, took pleasure in one another, and endured."

At the same time, audiences fled toward escapist entertainment. About the decade's split personality, Mr. Dickstein asks: "How can one era have produced both Woody Guthrie and Rudy Vallee, both the Rockettes high-stepping at the Radio City Music Hall and the Okies on their desperate trek?"

Mr. Dickstein doesn't and perhaps can't reconcile the decade's many overlapping strands. But it's when writing about Fred Astaire and Ginger Rogers, interestingly enough, that he shyly verges on a thesis

statement, as if speaking to our moment as well as to the ’30s. “Dancing in the dark,” he notes, “is a way of asserting a life-saving grace, unity and style against the encroaching darkness.”
Born in 1940, Mr. Dickstein obviously doesn’t have the direct experience of the ’30s he had of the 1960s. But his book nonetheless has an elusive personal quality that derives from his aesthetic choices. He’s made no effort to cover everything, he admits. He focuses on “unusually complex, enduring works for what they reveal about the age.”
Thus he dips deeply into the work of Henry Roth, Nathanael West and James Agee, three writers whose best work during the ’30s wouldn’t be recognized for decades. About West’s writing, he acutely notes that the “transformation of weakness or sympathy into violence is like the buried underside of the radical altruism of Depression writing, a streak of sadism submerged within that torrent of pity.”
He reprises the running feud between Richard Wright and Zora Neale Hurston. She thought his “Native Son” missed the shared experience and more joyful essence of black life, focusing instead on powerlessness and fear. Wright responded that Hurston’s characters “swing like a pendulum eternally in that safe and narrow orbit in which America likes to see the Negro live: between laughter and tears.”
Mr. Dickstein also zeroes in on the flaw in most of the decade’s proletarian writing, what he calls “the surprising fatalism, the ideologically enforced pattern of victimization.”
He charts the rise of gangster films as “immigrant fables,” captures the “coiled energy” of Edward G. Robinson, Paul Muni and James Cagney’s best performances and — because socially committed scholars pay little attention to them — dilates on comedies like “Bringing Up Baby.”
Mr. Dickstein sometimes wears his big, corny heart on his sleeve. He weeps during “It’s a Wonderful Life” (a 1946 movie influenced by the ’30s); he struggles mightily to overcome a dislike of Bing Crosby; he thrills to the music of George and Ira Gershwin, especially the way their rhymes “spice romantic feeling with an essentially comic flavor, harnessing wit to wooing, as Shakespeare’s comic heroes always did.”
“Criticism is personal or it is nothing,” Mr. Dickstein wrote in his 1992 book, “Double Agent: The Critic and Society.” The shreds of first person in “Dancing in the Dark” go a long way.
The book has its blind spots. Mr. Dickstein’s chapter on poetry deals at length with three writers, Robert Frost, Wallace Stevens and William Carlos Williams, who don’t seem entirely representative of the era, while avoiding Archibald MacLeish, Muriel Rukeyser, Hart Crane and Allen Tate.
A more nagging problem with “Dancing in the Dark” is that Mr. Dickstein has learned too well the lesson of Rotary speakers, which is that people pay keen attention only to first and last things. Thus he front-loads (and back-loads) his book’s sections with his essential thoughts, and stirs almost anything — mostly his plot summaries — into the lumpen middle.
Mr. Dickstein’s best writing, however, is nearly a cure for decaditis.

http://www.nytimes.com/2009/09/16/books/16garner.html?ref=books

Fasten Your Seat Belts, There's Code to Crack

By JANET MASLIN

THE LOST SYMBOL

By Dan Brown

509 pages. Doubleday. $29.95.

One of the theories espoused by Dan Brown's new book is that when many people share the same thought, that thought can have physical effects. Let's test it on Tuesday. Watch what happens to bloggers, booksellers, nitpickers, code crackers, conspiracy theorists, fans and overheated search engines when "The Lost Symbol," Mr. Brown's overdue follow-up to "Angels & Demons" (2000) and "The Da Vinci Code" (2003), finally sees the light of day.

As a man whose ideas have had their share of physical effects, Mr. Brown is well aware of how widely read and closely scrutinized "The Lost Symbol" will be. He even lets a character joke about this book's guaranteed popularity. Dr. Katherine Solomon specializes in noetic science, with its focus on mind-body connections. She admits that her field is not widely known. But when her story comes out, she suggests, noetics could get the kind of public relations bump that Mr. Brown gave to the Holy Grail.
Dr. Solomon accompanies Robert Langdon, the rare symbologist who warrants the word dashing as both adjective and verb, through much of this novel, his third rip-snorting adventure. As Browniacs have long predicted, the chase involves the secrets of Freemasonry and is set in Washington, where some of those secrets are built into the architecture and are thus hidden in plain sight. Browniacs also guessed right in supposing that "The Lost Symbol" at one point was called "The Solomon Key." That's a much better title than the generic one it got.

So much for safe predictions. What no one could guess, despite all advance hints about setting and subject matter, was whether Mr. Brown could recapture his love of the game. Could he still tell a breathless treasure-hunt story? Could he lard it with weirdly illuminating minutiae? Could he turn some form of profound wisdom into a pretext for escapist fun? By now his own formula has been damaged by so much copycatting that it's all but impossible for anyone to get it right.

Too many popular authors (Thomas Harris) have followed huge hits ("The Silence of the Lambs") with terrible embarrassments ("Hannibal"). Mr. Brown hasn't done that. Instead, he's bringing sexy back to a genre that had been left for dead.

The new book clicks even if at first it looks dangerously like a clone. Here come another bizarre scene in a famous setting (the Capitol, not the Louvre), another string of conspiratorial secrets and another freakish-looking, masochistic baddie (tattooed muscleman, not albino monk) bearing too much resemblance to a comic-book villain. "If they only knew my power," thinks this year's version, a boastful psycho and cipher calling himself Mal'akh. "Tonight my transformation will be complete."

Mal'akh appears in the stereotypically sinister prologue, disguising his identity as he is initiated into the highest echelon of Freemasonry. Next up is the return of Langdon, first seen here on a private plane en route to Washington. He has agreed on short notice to give a speech at the behest of Peter Solomon, Langdon's mentor and Katherine's brother. Why is Langdon in such demand? He's barely off the plane when a woman brings up his last book, the one about the church and the sacred feminine: it seems to have created some kind of stir. "What a delicious scandal that one caused!" she says. "You do enjoy putting the fox in the henhouse!"

Langdon heads for the National Statuary Hall in the Capitol building, where he is to speak. And here comes Mr. Brown's first neat trick: The Solomon summons was fake. There's no audience waiting. Just as Langdon realizes he has been lured to Washington under a false pretext, a shriek arises from the Rotunda. Some fiend has deposited Peter Solomon's severed, tattooed hand right above the Capitol Crypt — and right below the dome art that depicts George Washington, founding father and Freemason, as an ascending deity. "That hardly fits with the Christian underpinnings of this country," huffs the tiny, irritating C.I.A. official who serves as this book's Jar Jar Binks, when Langdon starts holding forth about the "Ancient Mysteries" the Capitol hides.

Meanwhile, at the Smithsonian Museum Support Center in Maryland (the book gives street addresses if you don't want to wait for the official Dan Brown bus tours), Dr. Solomon is in her lab. It is located within an immense, highly guarded building that also houses Mars meteorite ALH-84001 and an architeuthis (a k a giant squid). And here it's worth bringing up that Mr. Brown has a sideline as a walking crossword puzzle. His code- and clue-filled book is dense with exotica, from Futhark to Eiomahe to the Kubera Kolam. As for actual symbology, there's a fabulous moment when Mal'akh has Langdon trapped in a box that is rapidly filling with water. He suddenly shows Langdon a 64-symbol-encoded grid. If Langdon doesn't figure out its meaning in less than 60 seconds, he'll stop breathing and something truly terrible will happen: We won't get to hyperventilate through another mind-blowing Langdon story. Mr. Brown's splendid ability to concoct 64-square grids outweighs what might otherwise be authorial shortcomings. Within this book's hermetically sealed universe, characters' motivations don't really have to make sense; they just have to generate the nonstop momentum that makes "The Lost Symbol" impossible to put down. So Mal'akh's story is best not dissected beyond the facts that he is bad, self-tattooed, self-castrated and not Langdon's friend.

Also, the author uses so many italics that even brilliant experts wind up sounding like teenage girls. And Mr. Brown would face an interesting creative challenge if the phrases "What the hell ...?," "Who the hell ... ?" and "Why the hell ... ?" were made unavailable to him. The surprises here are so fast and furious that those phrases get quite the workout.

Then again, Mr. Brown's excitable, hyperbolic tone is one the guilty pleasures of his books. (" 'Actually, Katherine, it's not gibberish.' His eyes brightened again with the thrill of discovery. 'It's ... Latin.' ") It's all in a day's work for Langdon to ponder "a single solitary image that represented the illumination of the

Egyptian sun god, the triumph of alchemical gold, the wisdom of the Philosopher's Stone, the purity of the Rosicrucian Rose, the moment of the Creation, the All, the dominance of the astrological sun" and so much more in that cosmically mystical vein.

"The Lost Symbol" manages to take a twisting, turning route through many such aspects of the occult even as it heads for a final secret that is surprising for a strange reason: It's unsurprising. It also amounts to an affirmation of faith. In the end it is Mr. Brown's sweet optimism, even more than Langdon's sleuthing and explicating, that may amaze his readers most.

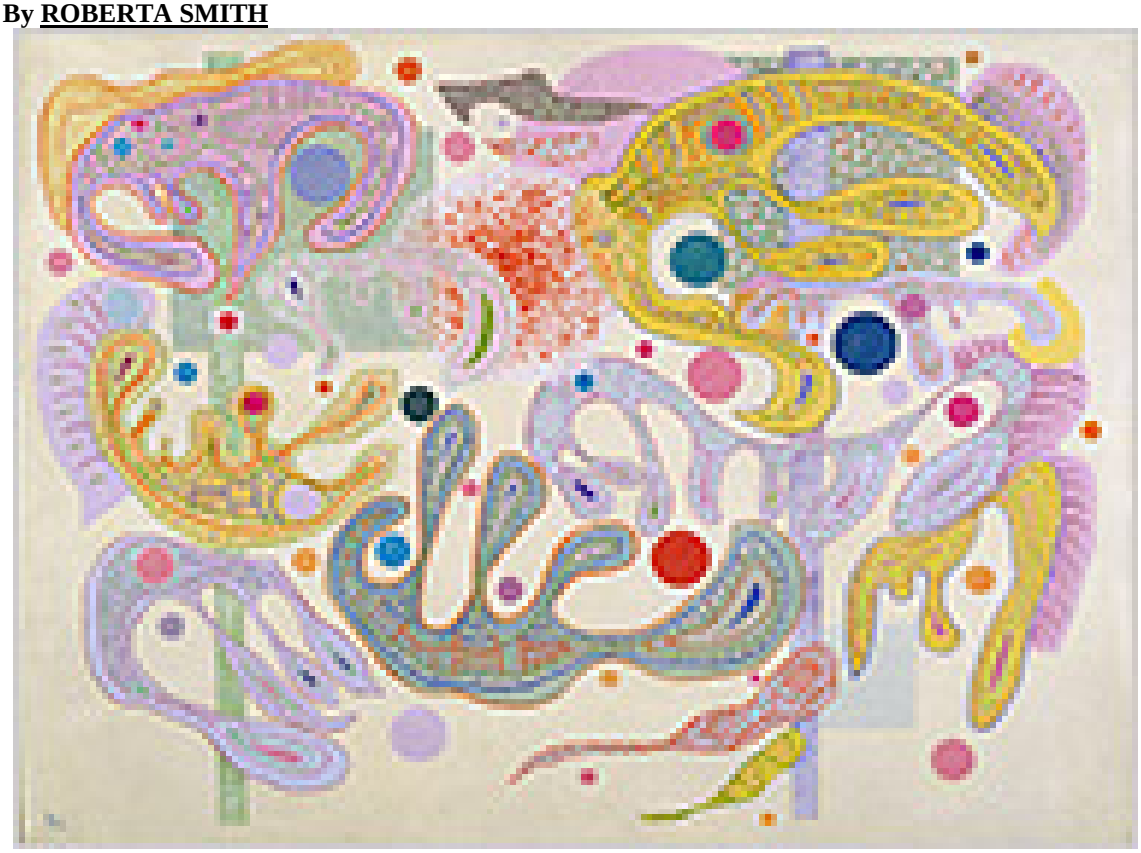
Mr. Brown was writing sensational visual scenarios long before his books became movie material. This time he again enlivens his story with amazing imagery. Some particularly hot spots: the unusually suspense-generating setup for Katherine's laboratory; the innards of the Library of Congress; the huge tank of the architeuthis; and two highly familiar tourist stops, both rendered newly breathtaking by Mr. Brown's clever shifting of perspective. Thanks to him, picture postcards of the capital's most famous monuments will never be the same.

Finally, there's the jacket art for "The Lost Symbol," its background covered with hundreds of symbols that form tiny coded inscriptions. These are so faint that in order to see them you need to pick up an actual copy of the book. You were probably going to do that anyhow.

http://www.nytimes.com/2009/09/14/books/14maslin.html?ref=books

'KANDINSKY'
The Angel in the Architecture

By ROBERTA SMITH



The Guggenheim Museum is not exactly thinking outside the spiral with its sleek Kandinsky retrospective. But maybe that's as it should be.

The Russian avant-gardist Wassily Kandinsky — who dressed like the college professor he had trained to be and sounded like a mystic when he wasn't thinking like a scientist — is the central god in the Guggenheim pantheon and genesis myth. The museum owns more of his work than of any other major Modernist and mounts some form of full-dress Kandinsky show like clockwork every 20 years or so. It's that time again. The Guggenheim's last excursion into Kandinsky occurred in the early 1980s with three context-heavy exhibitions that examined his activities in all mediums, including his Art Nouveau embroidery and works by contemporary artists and designers. This one takes the opposite tack. It distills Kandinsky's momentous career to about 100 paintings, with a large side order of works on paper displayed in an adjacent gallery. The canvases and almost nothing else fill Frank Lloyd Wright's great rotunda from bottom to top, sometimes at the magisterial rate of one painting per bay.
This looks sensational. Organized with the Städtische Galerie im Lenbachhaus in Munich and the Pompidou Center in Paris — sites of the world's other major Kandinsky collections — it contains stupendous loans from all over.

The 1911 "Picture With a Circle" from the Georgian National Museum in Tbilisi has never been in this country. A big, gorgeous blur of resonant blues, greens and purples electrified by a few black lines across the top, it is said to be the artist's first completely abstract painting. But this is only relative: Kandinsky is so pertinent to the present because he tended to ignore the distinctions between abstraction and representation.

In all, this show is the perfect cap to the Guggenheim's yearlong birthday celebration of Wright's building, which opened 50 years ago on Oct. 21.
Lots of museums have foundational artists. The Museum of Modern Art has Picasso and Matisse; the Whitney Museum of American Art, Edward Hopper. But Kandinsky is the angel in the architecture at the Guggenheim; he's part of the bedrock. The circling ramp of Wright's rotunda was surely designed with that Russian's swirling, unanchored abstractions in mind. Kandinsky's precarious, ever-moving compositions suggest that he never met a diagonal he didn't like; Wright obliged with a museum on a perpetual tilt.

Wright might deny the connection, but he was chosen by Hilla Rebay, a German painter and the museum's founding director, and she had Kandinsky on the brain. Solomon R. Guggenheim, her patron, caught the fever, and between 1929 and his death in 1949, he acquired scores of works by the artist. All were given to the Museum of Non-Objective Painting, which he and Rebay founded in 1937. (It was renamed in Guggenheim's honor in 1952.)

The purity of the present show limits Kandinsky's immensity a bit. It simplifies a vision that held music, painting and language as part of a continuum and relegates his activities as theoretician, essayist, poet and (arts) community organizer to the show's informative, discreetly placed wall texts. In both of his best-known books — "Concerning the Spiritual in Art" (1912) and "Point and Line to Plane" (1926) — he displays a remarkable ability to reconcile the redemptive power of art's "inner pulsations," meant to be experienced "with all one's senses" and exacting diagrams of the formal effect of different colors, shapes and lines, each of which he felt had a distinct sound. There are formalist possibilities in these pages that Clement Greenberg never imagined.

The impact of his thought on his contemporaries was tremendous. It is always startling to learn, for example, that Hugo Ball and the Zurich Dadaists revered Kandinsky, included his paintings in their exhibitions and read his poetry at their soirees. Some of these poems are virtual prescriptions for performance art. For example, "Not," in his collection "Sounds" (1912), describes a "jumping man" who "dug a small very round depression" in the ground and "jumped over it without stopping every day from 4 o'clock to 5." More than a few gallery receptionists of the moment have witnessed things like that. Kandinsky was alternately propelled by ambition and history itself. By 1901, barely six years after the combined experiences of a Monet "Haystack" and Wagner's "Lohengrin" jolted him, at 30, to leave Russia for art study in Munich, he had rebelled against the academy and organized like-minded colleagues into the Phalanx. He would go on to become the founding president of the New Artists Association in Munich in 1909. Two years later, when that body chafed at his abstract tendencies, he left to form the Blue Rider group with, among others, the painters Franz Marc, Alexej von Jawlensky and Gabriele Münter, for whom he had left his first wife in 1907.

The outbreak of World War I forced him back to Russia, where he joined the Constructivist experiment, as well as the government bureaucracy. In 1921 he and his new wife, Nina, repaired to Berlin, pushed by physical privation and the rejection of Kandinsky's teaching ideas. By 1922, he was teaching at the Bauhaus and living next door to his great friend Paul Klee. But this idyll ended when the Nazis closed the school in 1933. Then it was on to Paris, the last stop, where he worked, despite increasingly scant art supplies, until his death in 1944.

The Guggenheim's lean, clean presentation makes the show as much a Kandinsky-Wright reunion as a retrospective. After Kandinsky's early chivalric fantasies and landscapes with their vivid stained-glass colors on the rotunda's first level, the compositions explode into centrifugal abstractions and semi-abstractions that echo Wright's plunging space-for-space's-sake rotunda. Nearly each of the exploratory works from 1909 to 1914 — there are more than 40 here — is a hole in the membrane of observable reality that reveals a nonobjective cosmos defined by tangles of line and colored shapes and shadings. Each is a brave new crowded world in free fall, full of more forms, colors and agitation than any single painting needs.

But mainly the show offers an unencumbered view of Kandinsky's painting career and a style that he adjusted with every change of setting, tending toward Constructivism in Moscow, toward Klee at the

Bauhaus and toward a Surrealist-tinged biomorphism — for which he had laid the groundwork 20 years earlier — in Paris. Not surprisingly, he bristled at the suggestion that he had been influenced by Arp and Miró.
Kandinsky's stature is always a bit wobbly in New York, where the Modern's heavy-duty Francophilia has had such a long run. This show allows reassessment of the conventional wisdom that his art went into fairly steep decline after 1921, or even 1914. I think one problem is that Kandinsky did not make cleanly resolved masterpieces. He never painted a perfect picture.
His Munich abstractions, which contain hints of landscapes and of his mounted knights, in particular defy resolution. They try to catch art's transformative powers in the act and are in essence Process-Art narratives.

But the surprise of this show is the strong case it makes for Kandinsky's long-disparaged Paris paintings, where his colors fade to delicate pastels, his brushy surfaces tighten up, and he catalogs biomorphic form to an extent unmatched by any of his colleagues in that city. Unlike the Munich pictures, which for all their wonderfulness are somewhat repetitive, these paintings are different every time out.
The view that these works are finicky, designy period pieces doesn't recede entirely here. But with time, the notion that a great artist's late phase has once more been seriously underestimated could prevail. Kandinsky, the most well-rounded and compleat of Modernist prophets, always had more ideas than he knew what to do with. At the end of his hectic, productive life, he finally began to lay them out one at a time. This marvelous show starts settling the dust.

"Kandinsky" opens on Friday and continues through Jan. 13 at the Guggenheim Museum, 1071 Fifth Avenue, at 89th Street; (212) 423-3500, guggenheim.org.

http://www.nytimes.com/2009/09/18/arts/design/18kandinsky.html?ref=design

GEORGIA O'KEEFFE
In Full Flower, Before the Desert

By HOLLAND COTTER

There are two Georgia O'Keeffes. They're closely related, but one is far more interesting than the other. Not so interesting, except maybe as a marketing phenomenon, is the post-1930s cow-skull painter and striker of frontier-priestess poses. More interesting, and less familiar, is the artist found in "Georgia O'Keeffe: Abstraction," a vivid and surprisingly surprising show of more than 130 paintings and drawings at the Whitney Museum of American Art.

The show's focus is on the first two decades of O'Keeffe's long career. The story starts in 1915, when she was an art teacher in South Carolina and produced her first abstract drawings, which were also among the first fully abstract images by any American artist. Three years later she had her first encounter with the photographer and dealer Alfred Stieglitz, who set her up in New York, initiating a long personal, professional and mutually promotional partnership.

The saga winds down in the 1930s, when O'Keeffe was spending increasing amounts of time alone in New Mexico, working on becoming the mythical figure beloved of popular glossies in her day and museum gift shops now.

That myth gets limited space in the Whitney show. Instead we're presented with a concentration of O'Keeffe's early paintings, most of them abstract. And we're invited to see how bold, graphically punchy and sensuous this work could be, with its big centralized forms, modulated volumes and illusionistic depiction of space. You experience the paintings whole and fast, as you do a strong scent or a sensation of touch, processing your reactions — What am I seeing? What does it mean? Do I like it? — later.

These rounded, shaded images feel as if they can be almost physically grasped, which may have a lot to do with O'Keeffe's abiding popularity. With their naturalistic weight, her abstract forms appeal to some basic appetite for tactility. A similar combination of abstraction and description accounts for the allure of another 20th-century American artist, Edward Hopper, who carved a pictorial world from blocks of light. The mood of his art is very different from that of O'Keeffe's, but their basic method of depiction is the same.

That method is evident right away at the Whitney in a large O'Keeffe drawing called "Early Abstraction" from 1915. Its single form, against a blank ground, is a sweeping upright with a curling fiddlehead top: like an abstract version of Beardsley's Salome, a big, Art Nouveau exclamation point. Drawn in receding layers of shading, it's basically an exercise in linear design, but with an air of mystery and the heft of sculpture.

O'Keeffe would repeat this shape often over the years. (She likened it and a handful of other recurrent images — curved forms pierced by a central crack or slit, for example — to musical motifs.) It appears multiplied in a series of 1918 oil paintings, in which the curling forms have become soft and rainbow colored. In paintings from 10 years later the shape gains naturalistic form as the pistils and stamens of giant flowers.

The flower paintings made O'Keeffe a popular success beginning in the 1920s. But they emerged from her more challenging abstract work, which itself emerged from an electric moment in American culture. O'Keeffe's beginnings as an artist came slightly before that time. She first came to New York from Virginia in 1907, when she was 20, to attend the Art Students League. There she studied with William Merritt Chase and followed his conservative painterly lead for a while. Afterward she took teaching jobs far away from the city, but kept her finger on its pulse long-distance.

In 1912 she learned of the aesthetic theory being espoused by Arthur Wesley Dow at Columbia University, a utopian vision of a consciousness-shaping art based on harmonious abstract design. Soon afterward, she was introduced to the radical thinking of the New York social critic Randolph Bourne, whose proto-feminist writings were in line with O'Keeffe's own views of female equality and independence.

She was working in Amarillo, Tex., in 1913 when the Armory Show hit New York, but on later trips she saw lots of new European work — Picasso, Matisse, Braque — much of it at Stieglitz's gallery. And she gradually formed stimulating friendships with painters like Charles Demuth, Arthur Dove and Marsden Hartley. Dove, an abstraction pioneer, set a particularly encouraging example.

She probably needed one. Outside of narrow avant-garde circles no audience or market for abstract art existed. In the popular press it was at best dismissed as a scam and at worst reviled as un-American. But O'Keeffe's stake in it was not commercial or social or formal. Abstraction was simply the only kind of art, she said, that let her express her deepest feelings.

What were those feelings? She couldn't describe them. "Words and I are not good friends," she wrote to Stieglitz in an early letter. So Stieglitz and other commentators described them for her, asserting that her art was about the essence of womanhood, about the female body, about sexuality.

To underscore the message, Stieglitz made photographs — there are several in the exhibition — of O'Keeffe posing in front of her paintings, echoing their forms with her arms and hands. He also photographed her nude body, often in close-up. The pictures amounted to a public declaration that O'Keeffe and he, a married man, were lovers. They also typecast O'Keeffe as a liberated woman, assuring that her art would be viewed in erotic terms.

Obviously she was a willing collaborator in all of this. She posed for the pictures, helped to process them and applied the cropping and close-up techniques she learned from them to her paintings. She made many of those paintings suggestively sexual. But what was really at stake was power. O'Keeffe wanted the power to include sexuality in her art's expressive range, without necessarily making it the subject. Stieglitz wanted the power to define her art purely in terms of feminine sexuality, and to market it accordingly.

By the mid-1920s O'Keeffe realized the corner she was in and knew she had to get out of it. She also understood that her approach to abstraction was part of the problem, and tried to change it, moving from curves to rectangles. A result was a remarkable group of small vertical pictures seemingly inspired by New York, though her upright forms look less like skyscraper walls than like sheets of folded and creased cloth, their gray surfaces composed from delicately whited-down layers of blues and reds.

Then she cut back on abstraction. One theory has it that she adopted Southwestern images — cow skulls and so on — as a final step in public-image adjustment, using them to effect a complete break with New York art associations. Another suggests that the change was part of a canny effort to align herself with a taste for regionalism that had developed with the Depression.

Whatever her motives, she never fully abandoned abstraction. She returned to it in the 1950s with Barnett Newman-esque paintings of adobe houses, and in the 1960s with aerial views of clouds and desert. But whatever presence these paintings have comes from their large scale; the expressive drive of the early work is missing.

That absence helps explains the drop in tension at the very end of the exhibition, which has been organized by a curatorial team led by Barbara Haskell and Sasha Nicholas of the Whitney. And without that tension there isn't much. The pictures feel flaccid: there's nothing to grasp. An incipient hokiness that mars so much of her post-New York output goes unchecked. In short, the not-interesting O'Keeffe is center stage.

But, as I say, that's just in the concluding gallery. The good news is that the other O'Keeffe, an adventurous, uneven but often audacious artist, rules everywhere else.

"Georgia O'Keeffe: Abstraction" continues at the Whitney Museum of American Art through Jan. 17. It travels to the Phillips Collection, Washington, Feb. 6 to May 9, 2010; and the Georgia O'Keeffe Museum, Santa Fe, N.M., May 28 to Sept. 12.

http://www.nytimes.com/2009/09/18/arts/design/18okeeffe.html?ref=design

MICHAEL SMITH AND MIKE KELLEY
Those Are Grown-Up Laughs for a Big Baby

By KEN JOHNSON

Michael Smith is a big baby. Well, not all the time. But when he gets into his droopy diapers and lacy bonnet, adds sunglasses and a pacifier, and totters around on his stumpy legs as Baby Ikki, he's as riveting to watch as any real toddler, albeit larger, hairier and a bit scary. Mr. Smith, the multitalented performer, video maker and multimedia artist, has been doing this character for about 30 years, and it never gets old.

For his latest escapade Baby Ikki went to Burning Man, the weeklong celebration of all things psychedelic that takes place every summer in the Black Rock Desert of Nevada. A film crew followed him as he wandered around the festival in white Crocs, and the resulting footage is the heartbeat of "A Voyage of Growth and Discovery," a wonderfully entertaining and slyly thought-provoking collaboration between Mr. Smith and Mike Kelley, the Los Angeles artist known for, among other things, sculptures made of old, grubby stuffed animals and children's blankets.

Occupying the SculptureCenter's main space, the installation features a half-dozen large flat screens showing various phases of Baby Ikki's day and night peregrinations, which cumulatively add up to an odyssey. In the gallery is a set of tubular metal structures resembling children's playground climbing equipment, which includes one shaped like a rocket and a geodesic dome skeleton whose floor is covered with stuffed animals. This emphasizes a view of Burning Man as an essentially juvenile gathering. The boyish optimism of Modernist futurism — as in the inventions of Buckminster Fuller — is evoked by these jungle gymlike sculptures.

Looming over all is a colossal sculpture of Baby Ikki made of welded-together junk metal, which parodies the towering wooden sculpture with the emblematic figure that is climactically set on fire every year at Burning Man.

The videos start with Baby Ikki playing in the motor home that brought him to the event. Evidently preoccupied by fire, he clicks on a cigarette lighter, turns on the gas-fired stove top and consumes candy fireballs while horror-movie scenes of a woman threatened by flames plays on a television.

Outside he ambulates among campers dressed in all kinds of fanciful costumes, gesturing with clumsily splayed fingers at people and objects of interest. Occasionally he belts vehicles — done up like animals

for a parade — with the stuffed green creature he carries around in one arm. All the while he maintains an expression of melancholic, slightly quizzical impassivity.
When night comes, he visits some of the elaborate, walk-in environments created by various campers and observes people dancing, twirling flaming batons and otherwise expressing themselves. At one point three minimally dressed women pull him onstage and writhe around him like lap dancers. Finally, all tuckered out, he finds a cushion-covered floor and falls asleep.
Baby Ikki seems to fit right in amid all the zanily attired burners, but he's not one of them. He's a kind of mole, a secret agent with his own agenda. Clearly Mr. Smith and Mr. Kelley designed their project not to celebrate but to mock the Burning Man circus. To substitute a giant baby for its wooden avatar is to suggest that the festival is driven by infantilism.
Contrary to the old hippie fantasy that expanding consciousness through unbridled fun, creativity and hedonism — and of course psychotropic drugs — will transform the world for the better, they imply that Burning Man is naïve and disingenuously complicit with capitalist consumerism. It becomes a symbol of what Herbert Marcuse called "repressive desublimation," which reroutes unruly and rebellious instinctual energies into politically harmless sybaritic indulgence, escapist entertainment and spiritual delusion.
There have been times when anarchic revelry seemed like a good way to resist and overturn socially limiting mores. The antics of the Dadaists in the 1920s and the high jinks of the Merry Pranksters in the '60s were, perhaps, genuinely liberating. But now that Dionysian catharsis has become the promise of beer commercials and spring-break debauchery, behaving "wildly" is no longer so threatening to the status quo.
This does not make the Smith-Kelley project antipsychedelic. A politics of paranoia that finds everywhere the surreptitious, systematic curbing of individual freedoms and democratic initiative has always been part of the counterculture psyche. Yet this sort of suspicious mind-set can be diverted into less troublesome endeavors like "institutional critique," the academically certified type of conceptualism that views art museums as agents of consciousness control and puts its faith in the analytic powers of the properly trained intellect.
The Smith-Kelley project is an unusually imaginative and funny instance of "institutional critique," assuming it is fair to call Burning Man an institution. Admittedly, satirizing the festival and its associated New Age culture is like shooting fish in a barrel. (Borat could have a field day there.) But there are moments in the videos of considerable metaphorical and emotional urgency, as when we see Baby Ikki alone in the distance, almost lost in a dust storm, or when he falls asleep and dreams of women's breasts. In the Fellini-like scene with the three dancers, he's like Odysseus enduring the call of the sirens. It's less the tendentious didacticism than the comic, mythological vision that makes it compelling.
But the tension between ideological critique and carnivalesque rebellion — a schism that has been running through American radicalism for over a century — is something to think about too. A choice between purity of spirit and exuberance of soul.
"A Voyage of Growth and Discovery" is on view through Nov. 30 at the SculptureCenter, 44-19 Purves Street, Long Island City, Queens; (718) 361-1750, sculpture-center.org.

http://www.nytimes.com/2009/09/18/arts/design/18sculpture.html?ref=design

What's the Matter With Cultural Studies?

The popular discipline has lost its bearings

By Michael Bérubé

In the spring, I was asked to participate in a plenary panel at the Cultural Studies Association (U.S.), and the opportunity led me to rethink the history of the field. The session's title was "The University After Cultural Studies." As is my wont on such occasions, I decided to take issue with the idea that the field has had such an impact on American higher education that we can talk about the university *after* cultural studies.

For what kind of impact has cultural studies had on the American university as an institution over the past 20 or 25 years? The field began in Britain in the late 1950s with a Marxist critique of culture by Richard Hoggart and Raymond Williams, as the British New Left broke with the Communist Party's defense of the Soviet invasion of Hungary. Williams's ambitious and provocative book, *Culture and Society* (1958), reviewed the debate over the relationship of culture and society in Britain since the days of Edmund Burke. In the 1960s, Williams and E.P. Thompson redrew the map of British labor history, and in the 1970s, the Birmingham Centre for Contemporary Cultural Studies issued a series of brilliant papers on mass media and popular culture that culminated in the prediction of the rise of Thatcherism—a year before Margaret Thatcher took office. Since its importation to the United States, however, cultural studies has basically turned into a branch of pop-culture criticism.

Policing the Crisis: Mugging, the State, and Law and Order (1978), the Birmingham collection that predicted the British Labour Party's epochal demise, is now more than 30 years old. In that time, has cultural studies transformed the disciplines of the human sciences? Has cultural studies changed the means of transmission of knowledge? Has cultural studies made the American university a more egalitarian or progressive institution? Those seem to me to be useful questions to ask, and one useful way of answering them is to say, sadly, no. Cultural studies hasn't had much of an impact at all.

I'm saying this baldly and polemically for a reason. I know there are worthy programs in cultural studies at some North American universities, like Kansas State and George Mason, where there were once no programs at all. I know that there is more interdisciplinary work than there was 25 years ago; there is even an entire Cultural Studies Association, dating all the way back to 2003. But I want to accentuate the negative in order to point out that over the past 25 years, there has been a great deal of cultural-studies triumphalism that now seems unwarranted and embarrassing.

In the late 1980s and early 1990s, we heard (and I believed) that cultural studies would fan out across the disciplines of the humanities and social sciences, inducing them to become at once more self-critical and more open to public engagement. Some people even suggested, in either hope or fear, that cultural studies would become the name for the humanities and social sciences in toto.

Lest that sound grandiose, I want to insist that there was, at the time, good reason to think that way. The period of theoretical ferment that began in the late 1960s and gained traction in the 1970s seemed to have reached the boiling point. In 1990, my first year as an assistant professor there, the University of Illinois

at Urbana-Champaign held a conference on "Cultural Studies Now and in the Future." The program included historians, media theorists, sociologists, anthropologists, and AIDS activists; and the theoretical terrain—over which cultural studies had held earlier skirmishes with deconstruction, psychoanalysis, feminism, and, of course, in an epochal struggle, with Althusserians and neo-Gramscians—had lately been enriched by the arrival of Foucauldian historicism and queer theory. It really did seem plausible that cultural studies could be the start of something big.

I'm not saying that it has had no impact. Cultural critics like Marc Bousquet, Cary Nelson, Andrew Ross, and Jeffrey Williams have written indispensable accounts of academic labor in America, and each has been inspired, in part, by some of the best work in the cultural-studies tradition, the branch that analyzes the social foundations of intellectual labor. But if you compare the institutional achievements of cultural studies with its initial hopes, I don't see how you can't be disappointed.

In most universities, cultural studies has no home at all, which means (among other things) that graduate students doing work in cultural studies have to hope they'll be hired in some congenial department that has a cultural-studies component. The good news on that front is that you can now find cultural-studies scholars working in anthropology, in critical geography, even in kinesiology. In "museum studies" and cultural ethnography, in the work of Mike Davis and Edward W. Soja on cities, and in analyses of West African soccer clubs or the career of Tiger Woods, cultural studies has cast a wide net. The bad news is that the place where cultural studies has arguably had the greatest impact is in English departments. And though people in English departments habitually forget this, English departments are just a tiny part of the university. Cultural studies may find some sympathetic receptions in some wings of some departments of modern languages, in communications, in education, in history, or anthropology. But it hasn't had much of an impact on sociology, at least not compared with cultural studies in Britain, where cultural studies engaged critically (and often caustically) with sociology from the outset.

I recently gave a talk arguing that the political blogosphere vindicated one of cultural studies' central beliefs—and rebuking the Robert W. McChesney-Noam Chomsky-Edward S. Herman model of mass media (all three of those influential theorists said at the outset of this decade that the Internet could not work as a progressive political force, because it was commercial). That is to say: Cultural studies has taught us—or has tried to teach us—that you don't know the meaning of a mass-cultural artifact until you find out what those masses of people actually do with it. The Internet may be dominated by commercial interests, but the liberal/left blogosphere appeared out of nowhere, largely as the result of the "netroots" work of ordinary men and women with nothing more than laptops, modems, and a desire to offer an alternative to cable news. After my talk, someone asked me, "But isn't that really more a question for sociology?" To which I replied, "Well, the questions of sociology shouldn't be considered alien territory for cultural studies." The situation is even bleaker if you ask about cultural studies' impact on psychology, economics, political science, or international relations, because you might as well be asking about the carbon footprint of unicorns.

At the same time, I know you can't measure the impact of cultural studies simply in institutional terms. It's not a matter of whether there will ever be as many cultural-studies programs as there are women's-studies programs.

So let me proceed to throw some cold water on the intellectual, as distinct from the institutional, history of cultural studies in America. First and foremost, it has been understood, which is to say misunderstood, as coextensive with the study of popular culture. That is very much the fault of cultural-studies scholars: It is what we get for saying (rather insistently, as I recall) that cultural studies has no specific methodology or subject matter.

The result is that cultural studies now means everything and nothing; it has effectively been conflated with "cultural criticism" in general, and associated with a cheery "Pop culture is fun! " approach. Anybody writing about *The Bachelor* or *American Idol* is generally understood to be "doing" cultural studies, especially by his or her colleagues elsewhere in the university. In a recent interview, Stuart Hall, a former director of the Birmingham Centre and still the most influential figure in cultural studies, gave a

weary response to this development, one that speaks for itself: "I really cannot read another cultural-studies analysis of Madonna or *The Sopranos.*"

Finally, cultural studies has had negligible impact on the American academic left in a political sense. (I make this argument at greater length in my forthcoming book, *The Left at War.*) That is because much of the American academic left continues to subscribe to the "manufacturing consent" model, in which people are led to misidentify their real interests by the machinations of the corporate mass media. The point to be made in response is not that corporate mass media don't dupe people; on the contrary, they do it every day. The point, rather, is that work like Hall's on the ideological underpinnings of deregulation and privatization under Thatcher (which he called "authoritarian populism") shows that the situation is much more complicated than that propaganda model. The left's task would actually be easier if all it had to do was expose lies as lies. Instead, you have to do a great deal of groundwork in civil society to try to forge an egalitarian response.

To this day, Hall's other work on race, ethnicity, and diaspora is routinely and reverently cited (and rightly so), even as his work on Thatcherism—and the challenge it poses to the intellectual left—is thoroughly ignored. *The Hard Road to Renewal: Thatcherism and the Crisis of the Left* (Verso, 1988), the collection that contains many of the essays on Thatcherism that Hall first wrote for *Marxism Today,* is out of print and has been for some time; and most major cultural-studies anthologies, even a volume devoted to him, *Stuart Hall: Critical Dialogues in Cultural Studies,* edited by David Morley and Kuan-Hsing Chen (Routledge, 1996), do not include any of the essays from *Hard Road.*

In an especially rich essay, "The Toad in the Garden: Thatcherism Among the Theorists"—in *Marxism and the Interpretation of Culture* (1988), edited by Cary Nelson and Lawrence Grossberg—Hall wrote: "The first thing to ask about an 'organic' ideology that, however unexpectedly, succeeds in organizing substantial sections of the masses and mobilizing them for political action, is not what is *false* about it but what is *true.*" What, in other words, actively makes sense to people whose beliefs you do not share? Hall proposed that leftist intellectuals should not answer that question by assuming that working-class conservatives have succumbed to false consciousness: "It is a highly unstable theory about the world which has to assume that vast numbers of ordinary people, mentally equipped in much the same way as you or I, can simply be thoroughly and systematically duped into misrecognizing entirely where their real interests lie. Even less acceptable is the position that, whereas 'they'—the masses—are the dupes of history, 'we'—the privileged—are somehow without a trace of illusion and can see, transitively, right through into the truth, the essence, of a situation."

Does anybody on the contemporary American left actually operate that way? In the Britain of the 1980s, there were those who were quite foolishly willing to accuse Hall of betraying the left by proposing that it could learn from how Thatcherism constituted a hegemonic project. Today plenty of people on the left continue to believe that working-class conservatives are bamboozled by the corporate media into misidentifying their real material interests. False consciousness, after all, is what's the matter with Kansas.

As the late, great journalist and feminist Ellen Willis wrote in 1999, it's kind of amazing—or kind of depressing—how predictably the left reaches for such an explanation of the world: "When Ronald Reagan was elected in 1980, a wide assortment of liberals and leftists called for unity around a campaign for economic justice. Each time the right wins an egregious victory (as in the Congressional elections of 1994), dozens of lefty commentators rush into print with some version of this proposal as if it were a daring new idea. You would think that if economic majoritarianism were really a winning strategy, sometime in the past 18 years it would have caught on, at least a little. Why has it had no effect whatsoever? Are people stupid, or what?"

The left too often replies, "No, people are not stupid, they're just hornswoggled by Fox News on the right and distracted by college professors who obsess about race, gender, and sexuality on the left." Which is why Willis basically had to make the same critique all over again six years later, when, shortly before her untimely death, she wrote the essay "Escape From Freedom" as a response to the success of Thomas

Frank's *What's the Matter With Kansas?: How Conservatives Won the Heart of America* (Metropolitan Books, 2004).

Indeed, if there was one thing that Hall inveighed against above all others in his debates with his fellow leftists, it was economism, the favorite monocausal explanation of the left intellectual. "I think of Marxism not as a framework for scientific analysis only but also as a way of helping you sleep well at night; it offers the guarantee that, although things don't look simple at the moment, they really are simple in the end," Hall wrote in 1983. "You can't see how the economy determines, but just have faith, it does determine in the last instance! The first clause wakes you up and the second puts you to sleep."

I read that passage today and think: How often do we find ourselves ascribing disparate political events and cultural phenomena solely to neoliberalism—that is, to the evisceration of the social-welfare state and the privatization of social goods? That is not to say that neoliberalism is immaterial; it has dominated the political and economic landscape for 30 years, and its effects on higher education are palpable, baleful, and undeniable—the corporatization of administration and research, the withdrawal of state financing for public universities, the enrichment of the student-loan industry. Indeed, Hall was writing on Thatcherism—and recognizing it correctly for the radical break it represented—just as neoliberal ideology was beginning to discover its powers.

But I want to ask, in a general way, whether cultural-studies theorists are starting from the fact of neoliberalism and then proceeding to the analysis, or whether the analysis simply concludes where it begins, with "It's the neoliberalism, stupid."

There seems to me all the difference in the world between those two approaches: The material base doesn't always determine the most influential ideas and cultural artifacts of the superstructure. As Hall argued, monocausal explanations have the advantage of simplicity. They just don't work very well as accounts of the world.

In 1996, in a scathing, freewheeling, and woefully under-informed critique of the field, Robert McChesney, the media theorist, asked, "Is there any hope for cultural studies?" No, he said emphatically, because cultural studies had gotten distracted by postmodernism and identity politics and had lost sight of the simple truth that the free market is a sham and that people are misled by the mass media. Enough cultural studies already—we had to get back to good old political economy! For, as McChesney doggedly insisted, "it is only through class politics that human liberation can truly be reached." I'm sorry to say that his arguments have carried the day in all too many left precincts of the university, and I'm even sorrier to say that McChesney's claim that cultural studies "signifies half-assed research, self-congratulation, farcical pretension" has been gleefully seconded by much of the mass media and underwritten by some work in cultural studies itself.

But I still have hope that the history of cultural studies might matter to the university—and to the world beyond it. My hopes aren't quite as ambitious as they were 20 years ago. I no longer expect cultural studies to transform the disciplines. But I do think cultural studies can do a better job of complicating the political-economy model in media theory, a better job of complicating our accounts of neoliberalism, and a better job of convincing people inside and outside the university that cultural studies' understanding of hegemony is a form of understanding with great explanatory power—that is to say, a form of understanding that actually works.

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http://chronicle.com/article/Whats-the-Matter-With/48334/

Born Liars, Born Writers?

By Gina Barreca

As I've said before (trust me) lying was the cornerstone, the bedrock, the weaving and shaking but nevertheless enduring foundation upon which the life of my family was built. So I'm not sure I'd want to make an argument against lying, even in creative non-fiction.

I'm teaching a CNF course this semester, and several of the students--they're a smart bunch--have already asked how much of their writing has to be "true."

It's a good question and not one that's limited to the classroom.

After all, why settle for fact? Why not make a story out of ordinary, found incidents, the way some artists make sculptures out of wrecked cars or fabricate fabulous images out of dirt, blood, and rust? Isn't the most charming person the one who makes you believe you alone are the most interesting person on earth? Does it matter that, strictly speaking, you are about as interesting as bubble wrap? Don't we choose--for our leaders, for our celebrities, for our icons--those who are willing to supply us with a vision; don't we believe in the vision itself rather than checking the eyesight of the one providing the vision for us? So what if the actuality turns out to be slightly different from how you found it; so you changed it. So who cares, so long as you made it better?

You have to have a certain amount of inventiveness and imagination, as well as an excellent memory, to be able to lie convincingly. You need to be able to make what is not real appear real. "People have a careless way of talking about a 'born liar,' just as they talk about a 'born poet.' But in both cases they are wrong. Lying and poetry are arts," argued Oscar Wilde. Wilde wasn't one of my ancestors, but obviously he would have felt very much at home. Wilde regards the revelation of the sordid details of our actual lives as terrible because they turn out to be--not heart-rending or shocking or seductive--but supremely vulgar. Listening in on someone's else's intimacies, Wilde implies, wouldn't have you going "Oooooo!" but "Ugh."

But these days lying is more than a family matter: it's a matter of national interest. Having read bits of all too many court and government transcripts (naturally, these often overlap) we can all too easily agree that people telling the absolute truth about every detail of their lives will stun into apathy the most otherwise curious member of the audience.

People sound really stupid and really dull when talking about the unadorned trivia of existence: the typical unadorned discussion of authentic detail is either tacky or remarkably boring.

Let's put it this way: just because something happens to be true doesn't make it significant.

This is not to underestimate the fact that certain lies have important functions in our social order. Lies do lots of things: they keep groups together (when everyone believes the same lie), they protect the innocent (that's why Dragnet changed the names, right?), and they help us survive everyday life.

You don't agree? How about the following defacto truth: all babies are beautiful. It simply does not matter if your colleague's new daughter looks like a cross between Winston Churchill and Rush Limbaugh.

Just declare that she's gorgeous and simply do not define what you mean by gorgeous.

Saying "Goodness, what an intensely objectionable infant" is not the revelation of truth: it is sabotage. It's the sort of remark that's especially unkind if it's true.

White lies, like white magic, make things better, not worse, despite the fact that the practitioners in such cases are--technically-- neither scrupulous nor principled. Lies often help you get along without hurting feelings unnecessarily.

The search for truth can be compared to a cat chasing her tail: frantic in her pursuit, her quarry nevertheless eludes her; despite the fact that all the world can see it's right there, it remains just beyond her reach. It cannot be possessed because, paradoxically, it is already part of her. You want to know; you don't want to know; the reality of the situation is that you already know. Truth is like nuclear waste: it needs to be dealt with carefully. Sometimes it needs to be buried way, way out of town. And sometimes it should never be uncovered at all.

Kamikaze revelations of truth ("Son, it's time for you to know that you were actually a product of America's first cloning experiment"; "Dear, would you be upset if I admitted that, as part of a youthful indiscretion, I once slept with the Denver Broncos?") are rarely helpful in shoring up a relationship or solidifying a position of trust. I believe we should be suspicious those who would foist upon us truths better left unsaid. These are often seriously scary people. Those who tell you the truth "for your own good" or because they are sure "you'll want to know this, even if it makes you unhappy" are not your best friends.

While I traffic in the truth, I nevertheless maintain my inherited ability to fabricate. If I lie to keep peace, or fib to make someone feel better, or reassure myself that the world is not as chaotic and unkind a place as it seems to be, am I the sort of liar who deserved punishment and censure? If I pretend to be courageous when I'm terrified, am I lying or am I being brave? If I fake a happy ending, who's to say the world won't believe me, won't catch up with me and make it so?

The truth is too big, too finely nuanced, too delightfully or desperately made up of different stories, to be owned by any single soul, or viewpoint, or mouthpiece.

I wouldn't kid you.
http://chronicle.com/blogPost/Born-Liars-Born-Writers-/8118/

Tech-Research Round-Up: The Latest in Bikes, Trash, and Contact Lenses

By Ben Terris

College researchers work on some *out-there* technology projects. They may not lead to everday products, but they can help us rethink mundane facts of life. Here are three recent projects that caught our eye, in what is the first of an occasional series:

Eye of the Beholder

If you are jealous of the way the Arnold Schwarzenegger robotic character could see information about the world around him superimposed over whatever he was looking at in *The Terminator*, you might want to pay attention to the work of Babak A. Parviz at the University of Washington.

Mr. Parviz and his team of students have developed a contact lens with a built-in computer display, and it's powered by wireless radio waves. For now, this prototype cannot do anything nearly as complicated as displaying a man's leather-jacket size as he plays pool in a smoky bar, but Mr. Parviz is trying to prove that some such technology is at least possible.The lens's most practical function at this point is that it can monitor concentration of a molecule such as glucose, which could allow people with diabetes to monitor blood-sugar levels. The invention complies with the old adage that eyes can say a lot about a person.

It's Like Riding a Bike

Researchers at Dartmouth College have come up with a way for kids to take the training wheels off their bikes without falling on their faces. The Gyrowheel, a product of the company Gyrobike, is a battery-operated front wheel that uses gyroscopic technology to balance even the most topsy-turvy riders, the company says.

An inner disk spins inside the wheel—which can be installed like any other other wheel—and centers the bike under riders who would otherwise struggle to wobble down the road.

The company says that not only does the product keep riders from skinning their knees on pavement, but it also promotes proper riding technique more than did its technologically unimpressive predecessor, training wheels.

Talkin' Trash

Ever wonder what happens to all your junk after you throw it away? Well, if you live in either New York City or Seattle, you can find out, thanks to a new program created by the Massachusetts Institute of Technology.

The project—called Trash Track—has enlisted volunteers in the bicoastal cities to allow electronic tags to track pieces of their trash as the garbage makes its sojourn about town. With satellite-image visualizations, you can actually see a plastic container of liquid soap's path from Madison Avenue to the Belleville Turnpike in Kearny, N.J.

The idea is not to give the viewer wanderlust, but rather to educate about the patterns, costs, and environmental impact of urban waste removal.

http://chronicle.com/blogPost/Tech-Research-Round-Up-The/8114/

Reading Kafka 'enhances cognitive mechanisms', claims study

Subjects who had just read Kafka's The Country Doctor were better at recognising patterns in grammar test, psychologists found

guardian.co.uk, Thursday 17 September 2009 14.59 BST

Franz Kafka in 1905. Photograph: Hulton Archive/Getty Images

Forget Sudokus and crosswords: if you want to sharpen up your thinking, immerse yourself in Kafka's stories of the surreal.

Research from psychologists at the University of California in Santa Barbara and the University of British Columbia claims to show that exposure to surrealism enhances the cognitive mechanisms which oversee implicit learning functions. The psychologists showed a group of subjects Kafka's story The Country Doctor, a disturbing and surreal tale in which a doctor travels by "unearthly horses" to an ill patient, only to climb into bed naked with him and then escape through the window "naked, exposed to the frost of this most unhappy of ages".

A second group were shown the same story, but rewritten so the plot made more sense. Both groups were then asked to complete an artificial grammar learning task which saw them exposed to hidden patterns in letter strings, and then asked to copy the strings and mark those which followed a similar pattern.

"People who read the nonsensical story checked off more letter strings - clearly they were motivated to find structure," said Travis Proulx, a postdoctoral researcher at UCSB and co-author of the research, which appears in an article published in the September issue of the journal Psychological Science. "But what's more important is that they were actually more accurate than those who read the more normal version of the story. They really did learn the pattern better than the other participants did."

Proulx said that the thinking behind the research was that when we are exposed to something which "fundamentally does not make sense", our brains will respond by "looking for some other kind of

structure" within our environment. A second test got the same results by making people feel alienated about themselves as they considered how their past actions were often contradictory.

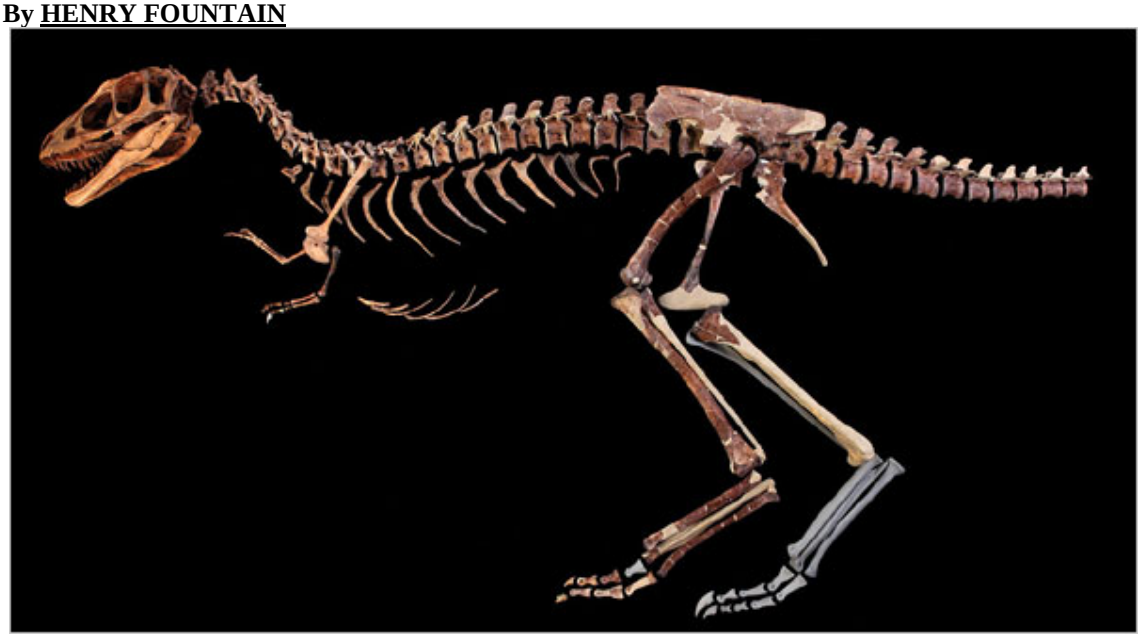
"You get the same pattern of effects whether you're reading Kafka or experiencing a breakdown in your sense of identity," Proulx said. "People feel uncomfortable when their expected associations are violated, and that creates an unconscious desire to make sense of their surroundings. That feeling of discomfort may come from a surreal story, or from contemplating their own contradictory behaviours, but either way, they want to get rid of it. So they're motivated to learn new patterns."

The effect would not work if the person was expecting to experience a feeling of alienation: they have to be surprised by the unexpected events and have no way of making sense of them, leading them instead to trying to make sense of something else. "It's important to note that sitting down with a Kafka story before exam time probably wouldn't boost your performance on a test," said Proulx.

http://www.guardian.co.uk/books/2009/sep/17/kafka-enhances-cognitive-functions-study

Fossil Find Challenges Theories on T. Rex

By HENRY FOUNTAIN

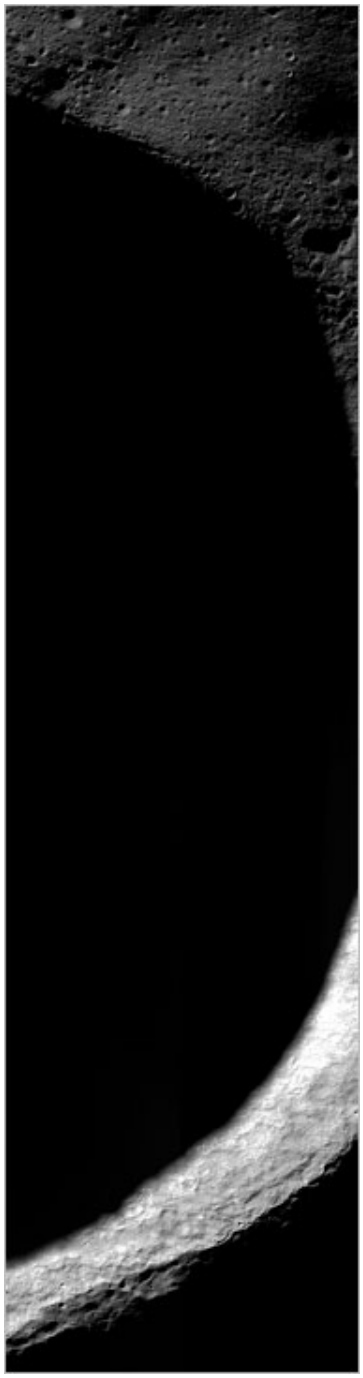


Paleontologists said Thursday that they had discovered what amounted to a miniature prototype of Tyrannosaurus rex, complete with the oversize head, powerful jaws, long legs — and, as every schoolchild knows, puny arms — that were hallmarks of the king of the dinosaurs.But this scaled-down version, which was about nine feet long and weighed only 150 pounds, lived 125 million years ago, about 35 million years before giant Tyrannosaurs roamed the earth. So the discovery calls into question theories about the evolution of T. rex, which was about five times longer and almost 100 times heavier."The thought was these signature Tyrannosaur features evolved as a consequence of large body size," Stephen L. Brusatte of the American Museum of National History, an author of a paper describing the dinosaur published online by the journal Science, said at a news conference. "They needed to modify their entire skeleton so they could function as a predator at such colossal size." his observed pattern," Mr. Brusatte said. The nearly complete fossil was found in northeastern China and bought by a collector, Henry J. Kriegstein, who alerted Paul C. Sereno, a paleontologist at the University of Chicago and lead author of the paper. The fossil, which was illicitly excavated, will be returned to a museum in China.

Dr. Sereno said the fossil was that of a young adult, about 5 or 6 years old and near the end of its growth period. Besides the oversized head, jaws and legs, it had long shinbones and long, compressed feet that helped it run fast after smaller dinosaurs and other prey. "We see this all, to our great surprise, in an animal that is basically the body weight of a human," Dr. Sereno said.Raptorex, like T. rex, would have killed animals with its teeth and jaws. The forelimbs would not have been the primary means for attacking prey. In fact, Dr. Sereno said, the forelimbs would have gotten smaller as the head got larger. "This is an agile, fast-running animal," he said. "By adding a lot of weight at the top, something has to give way. What gave way was the forelimb."Thomas R. Holtz Jr., a paleontologist at the University of Maryland who was not involved in the work, said the discovery helped "clear up the origin of the characteristic features of the Tyrannosaurs."Dr. Holtz, who cautioned that the findings needed to be independently confirmed, noted that there had been a gap in the family tree between earlier, more primitive Tyrannosaurs that had relatively short legs and long arms and the later giants with opposite features. "This clarifies the sequence," he said.

http://www.nytimes.com/2009/09/18/science/18dinosaur.html?ref=science

Lunar Craters May Be Chilliest Spots in Solar System



By KENNETH CHANG

The shadowy craters near the south pole of the Moon may be the coldest places in the solar system, colder than even Pluto, NASA scientists reported Thursday as they unveiled some of the first findings from the Lunar Reconnaissance Orbiter spacecraft.

"We're looking at the Moon with new eyes," said Richard Vondrak, the mission's project scientist.

The orbiter, launched in June, officially began its one-year mission to map the Moon's surface this week. But during three months of turning on, testing and calibration of its seven instruments, it had already begun returning data. Notably, its camera captured pictures of the Apollo landing sites, including some of the tracks that the astronauts left on the surface.In the newly released data, thermal measurements showed that daytime temperatures over much of the surface reached 220 degrees Fahrenheit — hotter than boiling water — before plummeting to frigidness at night.

But the bottoms of the craters, which lie in permanent darkness, never warm above minus 400. Those ultracold temperatures have trapped and held deposits of ice for several billion years. The ice could prove a valuable resource to future explorers, not only as drinking water but also, when the water molecules are broken apart, hydrogen and oxygen.

If it exists, the ice could also hold a detailed historical record of past comet impacts on the Moon, which would provide new hints of the early conditions in the solar system.A second instrument detected slow-moving neutrons, which indicate the presence of hydrogen in the polar regions. The hydrogen is most likely in the form of water, and that data support the findings of the Lunar Prospector spacecraft a decade ago.

In a twist, the reconnaissance orbiter found hydrogen not only in some craters but also in some areas outside of the craters. Also, some of the craters did not appear to have hydrogen.

That means the water — or some other hydrogen-containing molecule like methane — lies beneath the surface. "It would be very durable there," Dr. Vondrak said. "What we don't know is the abundance and how deep it is buried."

Getting to the material at the bottom of the craters could be difficult. An instrument that maps the topography by bouncing a laser beam off the surface has found the sides of the craters to be steep and rough terrain.

The primary mission of the Lunar Reconnaissance Orbiter, gathering data on the Moon from an altitude of 31 miles to prepare for the return on astronauts, will continue for a year. After that, it will continue to operate to gather information for scientists.

http://www.nytimes.com/2009/09/18/science/space/18moon.html?_r=1&ref=science

Health Ills Abound as Farm Runoff Fouls Wells

By CHARLES DUHIGG

MORRISON, Wis. — All it took was an early thaw for the drinking water here to become unsafe.

There are 41,000 dairy cows in Brown County, which includes Morrison, and they produce more than 260 million gallons of manure each year, much of which is spread on nearby grain fields. Other farmers receive fees to cover their land with slaughterhouse waste and treated sewage.

In measured amounts, that waste acts as fertilizer. But if the amounts are excessive, bacteria and chemicals can flow into the ground and contaminate residents' tap water.

In Morrison, more than 100 wells were polluted by agricultural runoff within a few months, according to local officials. As parasites and bacteria seeped into drinking water, residents suffered from chronic diarrhea, stomach illnesses and severe ear infections.

"Sometimes it smells like a barn coming out of the faucet," said Lisa Barnard, who lives a few towns over, and just 15 miles from the city of Green Bay.

Tests of her water showed it contained E. coli, coliform bacteria and other contaminants found in manure. Last year, her 5-year-old son developed ear infections that eventually required an operation. Her doctor told her they were most likely caused by bathing in polluted water, she said.

Yet runoff from all but the largest farms is essentially unregulated by many of the federal laws intended to prevent pollution and protect drinking water sources. The Clean Water Act of 1972 largely regulates only chemicals or contaminants that move through pipes or ditches, which means it does not typically apply to waste that is sprayed on a field and seeps into groundwater.

As a result, many of the agricultural pollutants that contaminate drinking water sources are often subject only to state or county regulations. And those laws have failed to protect some residents living nearby.

To address this problem, the federal Environmental Protection Agency has created special rules for the biggest farms, like those with at least 700 cows.

But thousands of large animal feedlots that should be regulated by those rules are effectively ignored because farmers never file paperwork, E.P.A. officials say.

And regulations passed during the administration of President George W. Bush allow many of those farms to self-certify that they will not pollute, and thereby largely escape regulation.

In a statement, the E.P.A. wrote that officials were working closely with the Agriculture Department and other federal agencies to reduce pollution and bring large farms into compliance.

Agricultural runoff is the single largest source of water pollution in the nation's rivers and streams, according to the E.P.A. An estimated 19.5 million Americans fall ill each year from waterborne parasites, viruses or bacteria, including those stemming from human and animal waste, according to a study published last year in the scientific journal Reviews of Environmental Contamination and Toxicology.

The problem is not limited to Wisconsin. In California, up to 15 percent of wells in agricultural areas exceed a federal contaminant threshold, according to studies. Major waterways like the Chesapeake Bay have been seriously damaged by agricultural pollution, according to government reports.
In Arkansas and Maryland, residents have accused chicken farm owners of polluting drinking water. In 2005, Oklahoma's attorney general sued 13 poultry companies, claiming they had damaged one of the state's most important watersheds.
It is often difficult to definitively link a specific instance of disease to one particular cause, like water pollution. Even when tests show that drinking water is polluted, it can be hard to pinpoint the source of the contamination.
Despite such caveats, regulators in Brown County say they believe that manure has contaminated tap water, making residents ill.
"One cow produces as much waste as 18 people," said Bill Hafs, a county official who has lobbied the state Legislature for stricter waste rules.
"There just isn't enough land to absorb that much manure, but we don't have laws to force people to stop," he added.
In Brown County, part of one of the nation's largest milk-producing regions, agriculture brings in $3 billion a year. But the dairies collectively also create as much as a million gallons of waste each day.
Many cows are fed a high-protein diet, which creates a more liquid manure that is easier to spray on fields.
In 2006, an unusually early thaw in Brown County melted frozen fields, including some that were covered in manure. Within days, according to a county study, more than 100 wells were contaminated with coliform bacteria, E. coli, or nitrates — byproducts of manure or other fertilizers.
"Land application requirements in place at that time were not sufficiently designed or monitored to prevent the pollution of wells," one official wrote.
Some residents did not realize that their water was contaminated until their neighbors fell ill, which prompted them to test their own water.
"We were terrified," said Aleisha Petri, whose water was polluted for months, until her husband dumped enough bleach in the well to kill the contaminants. Neighbors spent thousands of dollars digging new wells.
At a town hall meeting, angry homeowners yelled at dairy owners, some of whom are perceived as among the most wealthy and powerful people in town.
One resident said that he had seen cow organs dumped on a neighboring field, and his dog had dug up animal carcasses and bones.
"More than 30 percent of the wells in one town alone violated basic health standards," said Mr. Hafs, the Brown County regulator responsible for land and water conservation, in an interview. "It's obvious we've got a problem."
But dairy owners said it was unfair to blame them for the county's water problems. They noted that state regulators, in their reports, were unable to definitively establish the source of the 2006 contamination.
One of those farmers, Dan Natzke, owns Wayside Dairy, one of the largest farms around here. Just a few decades ago, it had just 60 cows. Today, its 1,400 animals live in enormous barns and are milked by suction pumps.
In June, Mr. Natzke explained to visiting kindergarteners that his cows produced 1.5 million gallons of manure a month. The dairy owns 1,000 acres and rents another 1,800 acres to dispose of that waste and grow crops to feed the cows.
"Where does the poop go?" one boy asked. "And what happens to the cow when it gets old?"
"The waste helps grow food," Mr. Natzke replied. "And that's what the cow becomes, too."
His farm abides by dozens of state laws, Mr. Natzke said.
"All of our waste management is reviewed by our agronomist and by the state's regulators," he added. "We follow all the rules."
But records show that his farm was fined $56,000 last October for spreading excessive waste. Mr. Natzke declined to comment.
Many environmental advocates argue that agricultural pollution will be reduced only through stronger federal laws. Lisa P. Jackson, the E.P.A. administrator, has recently ordered an increase in enforcement of the Clean Water Act. Tom Vilsack, the agriculture secretary, has said that clean water is a priority, and President Obama promised in campaign speeches to regulate water pollution from livestock.

But Congress has not created many new rules on the topic and, as a result, officials say their powers remain limited.
Part of the problem, according to data collected from the E.P.A. and every state, is that environmental agencies are already overtaxed. And it is unclear how to design effective laws, say regulators, including Ms. Jackson, who was confirmed to head the E.P.A. in January.
To fix the problem of agricultural runoff, "I don't think there's a solution in my head yet that I could say, right now, write this piece of legislation, this will get it done," Ms. Jackson said in an interview.
She added that "the challenge now is for E.P.A. and Congress to develop solutions that represent the next step in protecting our nation's waters and people's health."
A potential solution, regulators say, is to find new uses for manure. In Wisconsin, Gov. Jim Doyle has financed projects to use farm waste to generate electricity.
But environmentalists and some lawmakers say real change will occur only when Congress passes laws giving the E.P.A. broad powers to regulate farms. Tougher statutes should permit drastic steps — like shutting down farms or blocking expansion — when watersheds become threatened, they argue.
However, a powerful farm lobby has blocked previous environmental efforts on Capital Hill. Even when state legislatures have acted, they have often encountered unexpected difficulties.
After Brown County's wells became polluted, for instance, Wisconsin created new rules prohibiting farmers in many areas from spraying manure during winter, and creating additional requirements for large dairies.
But agriculture is among the state's most powerful industries. After intense lobbying, the farmers' association won a provision requiring the state often to finance up to 70 percent of the cost of following the new regulations. Unless regulators pay, some farmers do not have to comply.
In a statement, Adam Collins, a spokesman for the Wisconsin Department of Natural Resources, said farmers can only apply waste to fields "according to a nutrient management plan, which, among other things, requires that manure runoff be minimized."
When there is evidence that a farm has "contaminated a water source, we can and do take enforcement action," he wrote.
"Wisconsin has a long history of continuously working to improve water quality and a strong reputation nationally for our clean water efforts," he added. "Approximately 800,000 private drinking water wells serve rural Wisconsin residents. The vast majority of wells provide safe drinking water."
But anger in some towns remains. At the elementary school a few miles from Mr. Natzke's dairy, there are signs above drinking fountains warning that the water may be dangerous for infants.
"I go to church with the Natzkes," said Joel Reetz, who spent $16,000 digging a deeper well after he learned his water was polluted. "Our kid goes to school with their kids. It puts us in a terrible position, because everyone knows each other.
"But what's happening to this town isn't right," he said.

http://www.nytimes.com/2009/09/18/us/18dairy.html?ref=science

Many Faces, and Phases, of Steel in Cars

By HENRY FOUNTAIN

For all the talk of reinvention in the auto industry, of car companies using high-tech materials to make lighter and stronger vehicles that are safer and more fuel-efficient, the mainstay of the mass-produced automobile is the same as it has always been: steel. The modern car still contains more of it than anything else, about 60 percent by weight.

But automotive steel has changed quite a bit since the first Model T rolled off the assembly line. Metallurgists and manufacturers have learned to manipulate steel's microstructure through precise control of processing to create sheet steels of increasing strength. Prompted by crash-worthiness requirements and the need to make cars lighter to improve gas mileage, automakers are replacing conventional steels with advanced high-strength ones.

Where once a single grade of steel might have sufficed, the typical "body in white," as automakers call a car's basic skeleton, might now be a patchwork of a dozen or more steels of different types and strengths, tailored through computer modeling to handle the stress and strain of normal driving — and of severe crashes.

"The day of the mild steel part at the Ford Motor Company is dead," said Ford's chief safety engineer, Steve Kozak. "The majority of steels we're using now are high strength or ultra high strength."

The advanced steels go by names like D.P. (for dual phase) and TRIP (for transformation-induced plasticity). The strongest ones are used in parts like door beams, where the aim is to stop a foreign object (like another car's bumper) from entering the passenger compartment, and windshield pillars, where the goal is to prevent the roof from flattening like a pancake in a rollover.

In the front and rear of the vehicle, where there is more room to absorb the energy of a collision, steels that deform more easily, and get stronger as they do, might be used. Even body panels, which are usually made from milder steel, are bake hardenable, getting stronger as they are heated during paint curing to resist denting better.

North American carmakers draw a lot of criticism for overall design and reliability of their cars, but they generally receive high marks for their use of advanced steels. "I'd say North America doesn't have to take a back seat to anyone," said Richard A. Schultz of Ducker Worldwide, a consulting firm that tracks materials use by automakers.

The steel industry, Mr. Schultz said, has worked to develop new products, to keep steel in cars and to fend off the increased use of aluminum and other materials. They have been developing higher-strength products for decades, beginning with high-strength low-alloy, or H.S.L.A., steels. But most were costly to produce and difficult to make into parts. "They were looked at as more for aerospace applications," Mr. Schultz said.

Only in recent years have researchers and manufacturers figured out how to make economical high-strength steels that are pliant enough to be stamped and formed and that can be welded or otherwise joined to other parts in the complex auto assembly process, where time is money.
"At the end of the day we have to manufacture everything that's there," said James G. Schroth, lab group manager in the Materials and Processes Lab of General Motors' Research and Development Center. "The real changes in technology have been the higher-strength materials we can still make into parts."
Using higher-strength steel, a part can be downgauged — made from thinner stock — to help improve fuel economy. But some parts, notably exterior panels, are already so thin — less than a millimeter, or one twenty-fifth of an inch, in many cases — that stiffness becomes an issue. "You reach a thickness where you can't go even thinner," Mr. Schroth said.
Like other steels, high-strength varieties begin as molten iron produced from ore and coke in a blast furnace. "Despite literally hundreds of years of development of the process, it's still the best and most economical way of making high-purity iron," said Blake K. Zuidema, director of automotive product applications for the steelmaker ArcelorMittal.
The molten iron, usually with scrap added, is made into steel in a basic oxygen furnace, in which oxygen is blown into the melt ("basic" in the name refers to the alkaline materials used to line the furnace). The gas oxidizes the iron and removes some impurities and most of the carbon. (High-carbon steel is very hard but difficult to work.)
For most automotive purposes, the steel is cast into a slab. At this point, Dr. Zuidema said, "you have a product that is not too much different than conventional steels," except for the addition of small amounts of other metals — alloys.
Some of the strength of steel is gained through alloying, said David K. Matlock, a metallurgist at the Colorado School of Mines and director of the Advanced Steel Processing and Products Research Center, which is supported by auto and steel companies.
Small amounts of metals like niobium or vanadium help keep the steel hard during hot rolling, where the slab is squeezed into a long sheet about two to four millimeters thick. But depending on the metal and how much of it is used, alloying can be costly. "For automotive steels, you want them to be inexpensive," Dr. Matlock said. "The alloying that goes into them has to be low."
The next step in transforming the steel relies not on adding metals, but on using temperature to change the arrangement of the atoms in steel. Like most metals, steel has a crystalline structure, with iron and other atoms arranged in orderly fashion. But steel is not a single continuous crystal, like, say, the silicon that is used for semiconductor production. Rather, it consists of crystallites, or grains, that can vary in size and orientation.
To change the crystal structure, manufacturers use techniques like cold rolling, annealing and quenching. The steel sheet is rolled again, at room temperature, and heated to a high temperature for a specific time before being rapidly cooled, or quenched, by water. The process is fast, continuous and precisely controlled.
"Very fast cooling gives us the ability to get unique structures with far less alloying," Dr. Zuidema said.
The process results in phase transformations, or changes in the steel's crystalline structure. When the sheet is heated above about 1,300 degrees Fahrenheit, some of the basic cube-shaped crystals, known as ferrite, transform to another cube-shaped phase, austenite. The rapid cooling then converts the austenite to a third phase, martensite, which has an elongated shape and traps more carbon atoms. "Martensite is a very refined structure," Dr. Matlock said, and adds strength.
The result is a steel with dual phases of ferrite and martensite, and by precisely controlling temperature and timing, the amounts of the two can be varied to produce steels of differing strengths and formability characteristics. Steelmakers can, in effect, dial up the strength and ductility desired. "You get the final structure you want," Dr. Matlock said, "and create the final properties you need for the specific design."
The so-called martensitic transformation can be thought of as a slight repositioning of the atoms that reshapes the crystal. The change is so rapid that it travels through the steel at about the speed of sound. Such transformations are not limited to steels, or even metals; the protein crystals in the tail sheath of some viruses, for example, undergo a martensitic transformation, changing their structure rapidly before the tail invades a bacterium.
In some high-strength steels, all of the ferrite ends up being converted to martensite; in others, some austenite remains. High-martensite steels, including those with small amounts of boron added, are difficult to form, so parts are usually made by hot stamping, in which the steel is heated first, stamped and then cooled to allow phase transformation and hardening. Steels with retained austenite are easier to form

and get harder during the forming process, or even when crumpling in a crash, as the deformations convert the austenite to martensite.

For the car manufacturer, there is a complex calculus involving strength, weight requirements and costs that go into choosing what steel goes where. A part made of stronger steel may save some weight, but it may require more work to produce the necessary tools and dies. “Tool development costs a lot of money,” said Mr. Schultz, of Ducker Worldwide. Other steels could require different welding methods, so it might not be practical or cost-effective to introduce them into an assembly line.

What is certain, though, is that cars are going to have to continue becoming lighter and stronger. New federal regulations, for example, call for the roof to be able to withstand three times the vehicle’s weight in a rollover, twice the previous standard. And Mr. Schultz has calculated that to meet fuel economy goals for 2020, carmakers will have to keep replacing mild steels, and even some early-generation high-strength grades, with higher-strength steels (and in some cases with aluminum, plastics and other materials).

For steelmakers, that means continuing development of more advanced products that are stronger and yet remain formable. “It’s a systematic engineering process,” said Dr. Zuidema, of ArcelorMittal. “We have a fairly comprehensive knowledge of how each of the potential phases in the iron-carbon system affects the mechanical properties.” So if they know what properties are desired, they can determine the structure needed, and thus the combination of alloying and processing to achieve that structure.

For the steel companies, even incremental improvements will help the car companies meet crash and fuel standards — and help the steelmakers keep other materials manufacturers at bay.

“You’re fighting for ounces here,” Mr. Schultz said. “You’re turning over every rock. I’ve told my steel friends, fasten your seatbelts.”

http://www.nytimes.com/2009/09/15/science/15steel.html?ref=science

Liège-Guillemins train station: a ticket to tomorrow

It is majestic, daring – and a destination in itself. This glorious new station in Belgium is the future of train travel

Jonathan Glancey

guardian.co.uk, Wednesday 16 September 2009

The future of train travel ... Belgium's renovated railway station, Liége-Guillemins. Photograph: John Thys/AFP/Getty

That was quick. The journey from London St Pancras to Liège-Guillemins in Belgium takes just over three hours, with a change at Brussels from the Eurostar to another high-speed train. It's so quick, in fact, you almost feel you're travelling in time. This isn't just because cars appear to be going backwards as your train shoots alongside motorways; it's also down to the look of the stations at either end of the journey.St Pancras, a largely happy marriage of Victorian gothic fairytale opulence and cool contemporary design, is glorious. But the new station at Liége-Guillemins is a revelation, as grand as anything the Victorians built and yet futuristic, too – in the sense that it seems dreamlike and visionary. This gleaming station, commissioned by the Belgian state railway, is easily one of the world's finest. Its ethereal, transparent, filigree architecture suggests openness, a dissolving of boundaries, infinite horizons, speed, grace and ease: everything, in other words, that train travel should be. Its seemingly delicate yet immensely strong structure is evidently the work of engineers with an appreciation of spiders' webs, not to mention the Forth Bridge and the Eiffel Tower. The way its canopies seem to ski down from the heights is masterly, suggesting designers in love with the idea of trains, stations and their rhythmical to and fro.The big difference between St Pancras (the work of architect George Gilbert Scott and engineer William Barlow) and Liège-Guillemins is that the Belgian station is the idea of one man, Santiago Calatrava, who happens to be both engineer and architect (as well as a sculptor and painter). While I have always loved St Pancras, with its thrilling blend of romantic architecture and adventurous engineering, I have been suspicious, and critical, of Calatrava ever since he received the Liège-Guillemins commission in 1996.Calatrava, born in Valencia in 1951, made his name with a particularly fine railway station, Zürich Stadelhofen, completed in 1990; this curves above the city's streets. Soon after, he engineered a sequence of charismatic road bridges in Seville and Merida that looked like giant lyres. Then, a little later, came his

TGV station at Lyon-Satolas airport, in the guise of a giant steel and concrete bird taking flight. It seemed the Swiss-trained virtuoso could do no wrong.Commissions for cultural buildings around the world flooded in, and Calatrava's work began to go wild, sensational and a little bonkers. With its exaggerated, beak-like curves, the Tenerife Opera House, opened in 2003, struck a histrionic chord; the vast City of Arts and Sciences in Valencia, completed this year, is absurd and exhausting, both visually and to walk through. Too flamboyant, too demanding, its huge structures were inspired by dinosaur skeletons; the result is a collection of cultural buildings that seem wholly out of scale with the elegant, low-rise Spanish city.I had begun to see Calatrava's work as the architectural equivalent of pretentious prog rock: too many instruments, too many solos, too many notes. And then my train drew into Liège-Guillemins and I forgave him a lot. It is a masterpiece of logistics, urban planning, design, construction, detailing – and chutzpah. Time (and the faces of passengers) will tell if it works as well as it looks, yet the promise is great: on first aquaintance, this building, which will be inaugurated tomorrow, is as convincing as it is thrilling.

Bad news for air travel

The plan and design seem simple. Five long platforms are sheltered, in their middle stretches, by a lofty, transparent bird's cage of a roof. Made of 39 steel arches, it is 200 metres long, 35 metres high, and open (whenever practical) to the elements. There is no single grand facade: this symmetrical building offers equal value to all viewpoints. As Calatrava told Belgian railway staff: "We completely reinvented the facade. Or, better, we said, 'There is no longer a facade.'" Instead, there are only large openings announced by the ravishing metallic canopies that overhang them.Glass brickwork between the tracks and platforms illuminates a huge, grotto-like undercroft. This beautiful sequence of interweaving underground spaces links the platforms, as the hulking shadows of trains slide by overhead. Below, and equally well realised if not quite so shapely or magical, is an 800-space car park. The flow from car to platform to train is seamless – as it is from the buses pulling into the adjacent terminal. Calatrava's station has been designed to fit into Liège's revived Guillemins district, with housing, shops, offices, hotels, new streets and town squares promised – recession willing. A former steel town, Liège is now reinventing itself as a centre of hi-tech industry: everything from armaments and aerospace, to companies specialising in digital and bio-technologies, as well as beer and chocolate, of course.

While Calatrava's City of Arts and Sciences feels overblown, his Belgian railway station, 13 years in the making, is spot on – proof, perhaps, that a demanding brief for a building with a very specific, highly practical purpose is good for architect and engineer alike (or architect-engineer). This is, quite simply, a beautiful building. To stand under that great white steel shell is to feel the architecture soaring with all the majesty and daring of a gothic cathedral, bound up with notions of speed, of hurtling towards the future. The station looks good from the hills and church towers flanking Guillemins, too: it rolls like a silver wave through the town, yet the effect seems natural and unstrained, not wilfully sensational. Calatrava has said the vaulted shape of the roof was intended to mimic the graceful rise and fall of the Cointe hills. I'm not sure if it quite does that, but the sinuous design is certainly captivating.As the station, which cost ¤300m (£267m), gets into its stride, this will be a fine place to meet people, as well as to catch trains. It's easy to imagine idling time away here as the sky, seen through that canopy, changes colour, as the lights come on and the trains pull out into the night. In the coming months, there may be direct trains from London, which brings Frankfurt one step nearer. Thalys trains – aircraft on rails, basically, which cruise along at 186mph – have already made flights from Paris to Brussels redundant: Air France no longer flies this route, unable to compete with the 82-minute city-centre-to-city-centre journey time, and books its passengers on Thalys trains instead.Britain aside, this is the age of the high-speed train in Europe – and Calatrava has provided one of the era's finest monuments, a station that is a destination in itself. It is worth taking the trip from St Pancras to Liège–Guillemins just to experience this building, which makes our own mess of a railway seem all the more maddening. Calatrava has created a new architecture for rail travel, one that is all about speed, service – and sensation.

http://www.guardian.co.uk/artanddesign/2009/sep/16/liege-guillemins-train-station

Pause in Arctic's melting trend

By Richard Black
Environment correspondent, BBC News website

This summer's melt of Arctic sea ice has not been as profound as in the last two years, scientists said as the ice began its annual Autumn recovery.

At its smallest extent this summer, on 12 September, the ice covered 5.10 million sq km (1.97 million sq miles).

This was larger than the minima seen in the last two years, and leaves 2007's record low of 4.1 million sq km (1.6 million sq miles) intact.

But scientists note the long-term trend is still downwards.

They note that at this year's minimum, the ice covered 24% less ocean than for the 1979-2000 average.

The analysis is compiled from satellite readings at the US National Snow and Ice Data Center (NSIDC) in Boulder, Colorado.

Colder front

Among the reasons for the less drastic melt are that Arctic temperatures have been cooler this year than last, researchers said, and that winds have helped disperse sea ice across the region.

NSIDC scientist Walt Meier said the reasons for the somewhat cooler temperatures this year were not entirely clear yet.

"We had cloudier conditions and low pressure zones in late summer that probably helped keep temperatures down," he told BBC News.

"It's something we need to look at in more detail.

"But it certainly wasn't as warm as 2007, which was in the order of 2-3C warmer than the average in a lot of places."

The question now, he said, was whether 2007 turns out to be a "high-melt blip", or whether 2009 turns out to be a "low-melt blip" - which will not become evident until next summer at the earliest.

What continues to have scientists worried is that a significant proportion of the cover consists of young, thin ice formed in a single winter.

This is much more prone to melting than the older, thicker ice that dominated in years gone by.

"If we get another warm year, anything like 2007, then the ice is really going to go," said Dr Meier.

"And the chances are that at some point in the next few years we are going to get a warm one."

White heat

In recent decades, the Arctic region has been warming about twice as fast as the average for the Earth's surface.

Recently, scientists specialising in reconstructing past temperatures released data showing that the current decade is the warmest in the Arctic for at least 2,000 years.

Melting ice is a "positive feedback" mechanism driving temperature rise faster. Whereas white ice reflects sunlight back into space, dark water absorbs it, leading to faster warming.

The NSIDC team cautions that this is a preliminary analysis and that further melt is possible, though unlikely, this year.

Next month they will publish a full analysis including more details of how temperatures, currents and winds affected the sea ice this summer.

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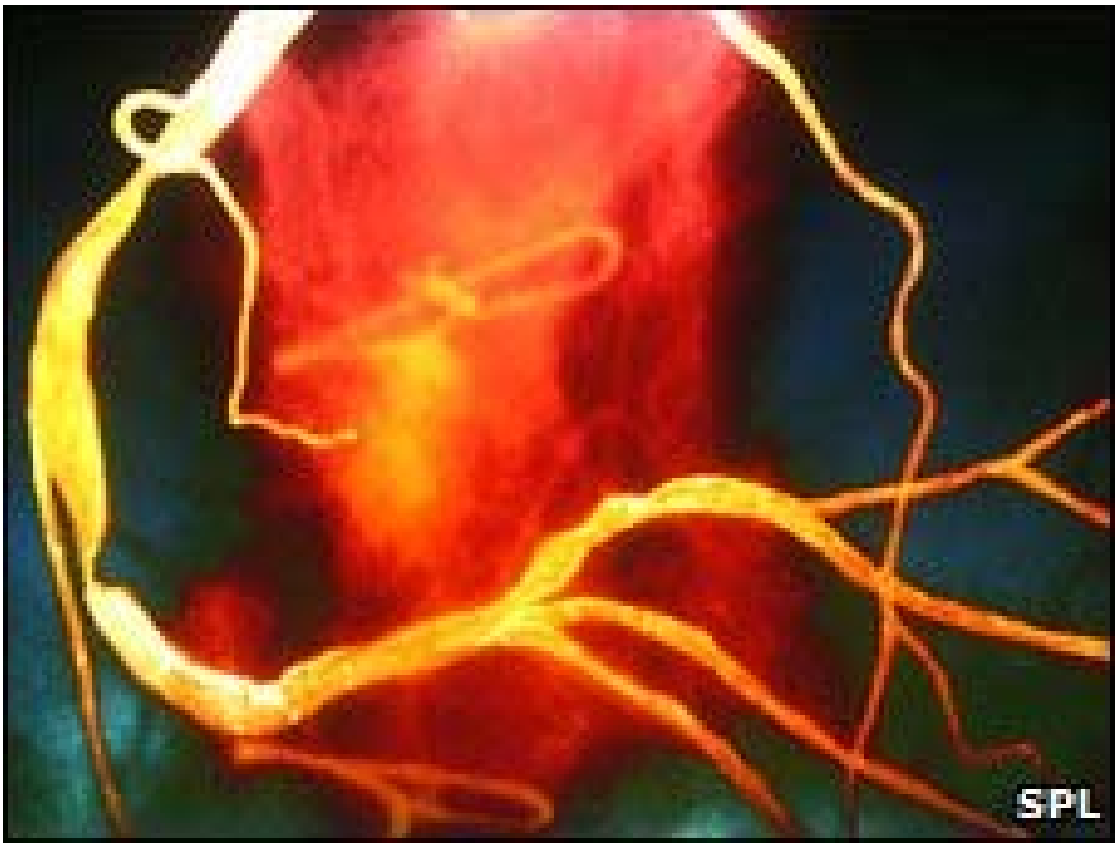
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8261953.stm

Published: 2009/09/17 21:07:49 GMT

Unhealthy men 'may lose 10 years'

Middle-aged male smokers with high blood pressure and raised cholesterol levels face dying about 10 years before healthier counterparts, a study warns.



The UK study looked at more than 19,000 civil servants aged 40-69 and traced what happened to them 38 years later.

The Oxford study, in the British Medical Journal, said men with these three risk factors could expect a 10-year shorter life from 50 years of age.

The British Heart Foundation said over 40s should have a heart health check.

The study was set up in 1967-70 at the peak of the vascular disease epidemic in the UK.

Participants had their height, weight, blood pressure, lung function, cholesterol and blood glucose levels measured and completed a questionnaire about their previous medical history, smoking habits, employment grade and marital status.

Current smokers made up 42% of the men, 39% had high blood pressure and 51% had high cholesterol.

They were followed up nearly 40 years later in 2005 by which time 13,501 had died.

Risk factors

RISK FACTORS FACTS

26% men & 25% women in England aged 35-49 smoke
23% men & 22% women in England aged 50-59 smoke
34% men & 26% women in England aged 45-54 have high blood pressure
74% men & 78% women in England aged 45-54 have high cholesterol
Source: BHF

The researchers from the University of Oxford focused on smoking, high blood pressure and cholesterol because they are the main cardiovascular risk factors.

But when they broadened it out to look at all risk factors including obesity, diabetes and employment grade, they found a 15-year life expectancy difference between the 5% with the highest number of risk factors and the 5% who had the lowest number of risk factors.

The proportion of deaths attributed to vascular disease in old age has declined from about 60% in 1950 to less than 40% in 2005 for both men and women.

Dr Robert Clarke, of the Clinical Trial Service Unit at the University, led the study.

HAVE YOUR SAY Nobody can guarantee that if you live the life of a saint and the diet of a rabbit that you will live longer Gremlin-UK, Manchester, UK

He said: "We've shown that men at age 50 who smoke, have high blood pressure and high cholesterol levels can expect to survive to 74 years of age, while those who have none of these risk factors can expect to live until 83.

"It is precisely this kind of very prolonged follow-up study that is necessary to get these results - that modest differences in heart risk factors can accurately predict significant differences in life expectancy.

"The results give people another way of looking at heart disease risk factors that can be understood more readily.

"If you stop smoking or take measures to deal with high blood pressure or body weight, it will translate into increased life expectancy. "

Healthy life

Professor Peter Weissberg, medical director at the BHF, said: "This important study puts a figure on the life-limiting effects of smoking, high blood pressure and high cholesterol.

"It provides a stark illustration of how these risk factors in middle-age can reduce life expectancy.

"The good news is that all of us can make changes to help us live a healthy life for longer, even after 50.

"We know that stopping smoking and reducing blood pressure and cholesterol, by lifestyle changes and/or tablets, can prevent the onset of heart disease - and these findings suggest it could make a decade of difference to our lives.

"Although the study only involved men, there is no reason why the same should not apply to women.

"So, I urge all men and women over 40 to have a health check - that all GPs can provide - which will include finding out their blood pressure and cholesterol levels, and starting to address any areas of concern."

Jane Landon, deputy chief executive of the National Heart Forum, said: "Public health strategies to discourage smoking and promote healthy eating and active lifestyles from childhood are vital to prevent the accumulation in middle age of these avoidable risk factors."

Professor Alan Maryon-Davis, president of the UK Faculty of Public Health, said: "These findings also help to explain why people who are less well off are more likely to die younger.

"Poorer people tend to smoke more, eat less healthy diets and suffer more psychosocial stress - all adding to their risk of heart disease. These are the people who need help most."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8260561.stm

Published: 2009/09/17 23:00:32 GMT

'Safe' lead levels harm children

Young children's exposure to lead in the environment is harming their intellectual and emotional development, according to UK researchers.

The researchers say the toxic effects of lead on the central nervous system are obvious even below the current so-called safe level of lead in the blood.

They are recommending the threshold should be halved.

A spokesman for the Health Protection Agency said levels of exposure should be kept to the minimum.

Lead has been removed from paint and petrol by law in the UK, but it is still widespread in the environment.

The study from the University of Bristol Centre for Child and Adolescent Health set out to see if there was any effect on the behaviour and intellectual development of children who had ingested just below the so-called safe level of 10 microgrammes per decilitre (or tenth of a litre) of blood.

The study is published in the journal, Archives of Diseases in Childhood.

Lead levels

SOURCES OF LEAD
- Lead-based paint
- Household dust
- Lead water pipes
- Soil around the home
- Paint on children's toys

Children's bead necklaces
Christmas lights
Lead smelters/industries

The Bristol researchers took blood samples from 582 children at the age of 30 months.

They found 27% of the children had lead levels above five microgrammes per decilitre.

They followed the children's progress at regular intervals and then assessed their academic performance and behavioural patterns when they were seven to eight years old.

After taking account of factors likely to influence the results, they found that blood lead levels at 30 months showed significant associations with educational achievement, antisocial behaviour and hyperactivity scores five years later.

With lead levels up to five microgrammes per decilitre, there was no obvious effect.

But lead levels between five and 10 microgrammes per decilitre were associated with significantly poorer scores for reading (49% lower) and writing (51% lower).

A doubling in lead blood levels to 10 microgrammes per decilitre was associated with a drop of a third of a grade in their Scholastic Assessment Tests (SATs).

And above 10 microgrammes per decilitre children were almost three times as likely to display antisocial behaviour patterns and be hyperactive than the children with the lower levels of lead in their blood.

Adverse effects

The effects of lead toxicity in children were first described in 1892 in Brisbane, Australia.

" **The Agency's advice is that exposures to lead should be kept to the minimum that is reasonably practical** "
Health Protection Agency spokesman

Since then acceptable levels of lead in the blood have fallen sharply.

In 1991, the US Centres for Disease Control and Prevention, revised their level of concern for blood levels down to ten microgrammes per declitre.

The World Health Organisation estimates that globally half of the urban children under the age of five have blood levels exceeding this limit.

Professor Alan Emond, who led this study, said a third of the children in his study had levels only half of this but were still exhibiting adverse effects.

He said: "Lead in the body is one of many factors that impacts on education, but this is a reminder that environmental factors are important and paediatricians must test more children with behavioural problems for lead."

"We did our blood survey when the children were about two and a half years old.

"We think this is quite close to the peak age for lead ingestion when the children are putting everything in their mouths as they explore their environment.

"This is a normal phase that we grow out of, but for children who have developmental problems, like autism, it may go on for a longer time so they may be particularly vulnerable. "

A Health Protection Agency spokesman said: "The Agency's advice is that exposures to lead should be kept to the minimum that is reasonably practical.

"This has been the policy in the UK and of health agencies throughout the world for many years.

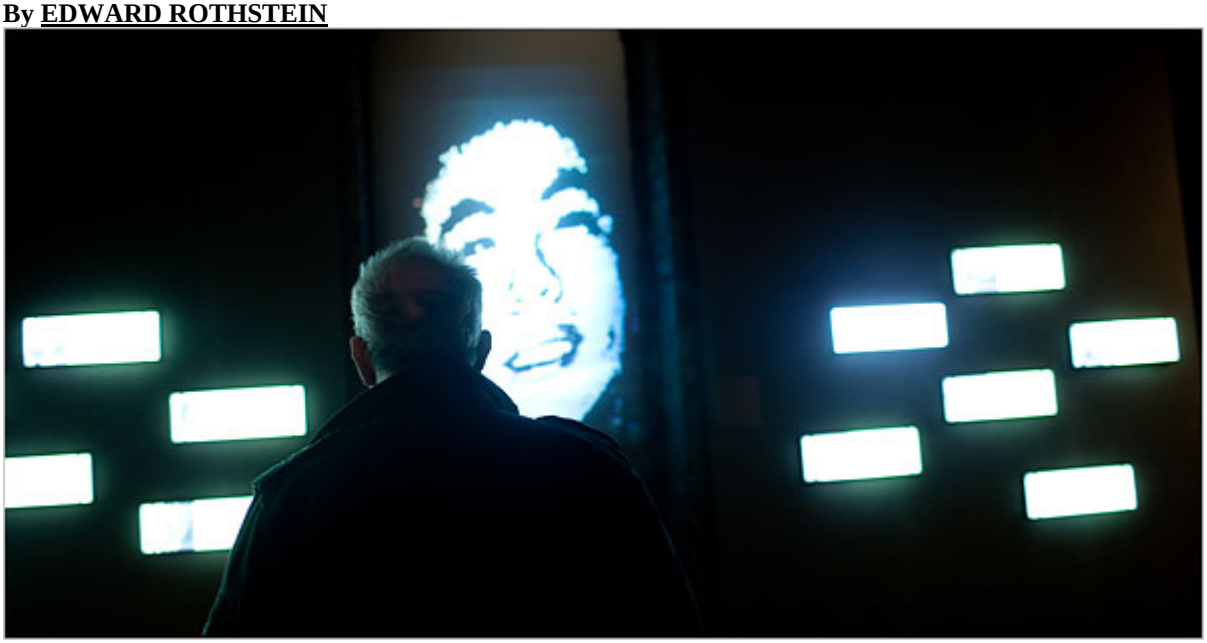
"Measurements have shown that levels of lead in children and adults have decreased markedly over the last two decades or more, primarily because of these policies."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8259639.stm

Published: 2009/09/16 23:01:40 GMT

Reopened Museum Tells Chinese-American Stories

By EDWARD ROTHSTEIN



"Iron Chink" proclaims the raised words on a cast-iron sign, once mounted on a fish-processing machine. In the early 1900s in Seattle the machine had been invented to replace Chinese laborers, who presumably were constructed of weaker mettle.

Now, of course, its casual slur inspires some shock. It is a companion piece to another object, a cap-gun toy from the 1880s, when the "Chinese Question" (as objections to Chinese immigration was called) turned violent: pull the trigger, and a suited gentleman kicks a braided Chinese man in the rear, setting off the miniature explosion.

As you walk through the Museum of Chinese in America, which is reopening in Chinatown on Tuesday in a warm and inviting new space designed by Maya Lin, you can't see these objects and not be aware of the kinds of challenges these immigrants once faced. Such artifacts also reflect the expanded ambitions of the museum itself: it began as a community institution almost 30 years ago, dedicated to preserving and commemorating the history of Chinatown, but with this $8.1 million transformation it now has a 14,000-square-foot space and national ambitions.

Its goal is to explore the experience of Chinese immigration and the evolution of Chinese communities in the United States, to account for a people's struggles and triumphs and honor their artistic achievements. One of its galleries is now showing works of four Chinese-American artists.

With these ambitions the institution is joining an ever-lengthening roster of American museums of identity. All of them — whether they deal with Latino-Americans, Jewish-Americans, Nordic-Americans, Asian-Americans, Arab-Americans or African-Americans — are celebrations of hyphenated existence. And the strange thing is how similar the arcs of their stories are: they recount how after a long period of suffering, prejudice and hatred, a group has carved a distinctive place in the history of the United States, its once scorned identity now a source of strength. Many of these museums also serve as anchors for the community and as educational centers, recounting political morality tales and honoring a shared history. That is certainly the case here as well.

Ms. Lin designed the institution's main exhibition space to surround a bare-bricked, sky-lighted central area between the two connected buildings that constitute the museum. The central atrium, with a staircase leading down to a floor of offices and classrooms, invokes both a traditional Chinese courtyard and a

rough-edged shared urban habitat that recalls yards or alleys over which neighbors shared stories, sometimes leaning out of windows.

The main gallery rooms even have windows looking out over the bricked space, only here each window also functions as a screen on which videos and photographs are projected as autobiographical histories are recounted. The galleries (with exhibition design by Matter Architectural Practice and mgmt. design) are intimate and make it seem as if you were passing through the rooms of a modest home. They lead chronologically from the 19th-century history of China's encounters with the West to lives of contemporary Chinese-Americans told on a wall of video screens.

This core exhibition, "With a Single Step: Stories in the Making of America," was created by the historian John Kuo Wei Tchen, a co-founder of the museum, along with Cynthia Ai-fen Lee. It depends less on artifacts like the cap gun or the display of irons used by once-familiar Chinese laundry establishments than on the arc of the narrative.

One side of some galleries tells of struggle and hardship, showing images of the riots that led to the 1882 Chinese Exclusion Act, for example, in which unskilled Chinese immigrants were barred. Also on display are the crib sheets an aspiring immigrant once studied to convince officials at Angel Island (the San Francisco counterpart to Ellis Island) that he was more than a "paper son" whose false documents affirmed a connection to someone already in America.

The most fascinating galleries are compressed displays of how the image of Chinese-Americans was shaped into stereotypes in early 20th-century culture, ranging from Fu Manchu's villainy to chop suey's homogenized exoticism. The position of Chinese-Americans became still more complicated when China was an ally during World War II, a Communist enemy in the 1950s and a warily watched trading partner and political rival in the 1980s and '90s.

The other side of the main galleries contains illuminated panels with brief biographies of individuals who transcended all these obstacles. There is Dr. Faith Sai So Leong (born 1880), for example, who became the first female Chinese dentist in America; Du Lee (born 1879), who organized the Chinese American Citizens Alliance in 1915 "to combat anti-Chinese sentiments"; and Yan Phou Lee (born 1861), who became the first Chinese student elected to Phi Beta Kappa and gave the commencement address when he graduated from Yale in 1887. And, of course, more contemporary Chinese-Americans are here as well, including Secretary of Energy Steven Chu, the architect I. M. Pei and the cellist Yo-Yo Ma.
But despite the museum's considerable achievement it also harbors a tension that reveals some of the problems with the identity archetype. Like some other identity museums celebrating ethnic groups and communities, this one can too easily slip into the "we," making it seem as if it were an internal account rather than a public statement. Each gallery includes a poem by Mr. Tchen and a narrative highlighting identity issues.

"Years of floods and droughts push our sons and fathers to leave ancient homes," we are told of the 19th-century emigrations. "We find work and opportunity, but we also find many enslaved and dispossessed," we read. "Writers like Jack London call us 'heathens' and say we can never become real Americans," another display says.

And as a kind of haunting theme there is the question: "So are 'we' to be included in their sacred 'We the People'? Or not?"

This approach tends to accent the hardened formula of the identity narrative (and overshadows the museum's ability to explore more fully the nature of Chinese culture and immigration). Typically, in this account, triumph is reserved for the very end, with the 1960s as a turning point: the civil-rights movement is hailed for weakening the hold of prejudice and loosening the fetters of xenophobia. It is as if identity itself becomes the source of salvation. It may have begun as the instigation for oppression but it ends as a force for liberation. One gallery here contains posters and publications from that era that emphasizes these themes.

There is no question that the ’60s political movements had an effect on the status of all minorities; the identity narrative itself was shaped in that era. But aspects of this exhibition, particularly autobiographical statements that can be read, listened to or watched, reveal that model’s limits.

While the actual texts of some of these accounts are constructed from historical information by contemporary Chinese-American writers, including David Henry Hwang, Maxine Hong Kingston, Gish Jen and Ha Jin, the nuances they introduce are important. A 19th-century laborer, Ah Quin, speaks of working in Alaska as a cook for miners, sending home $30 every few months. Another 19th-century figure, Wong Chin Foo, makes it clear just how old certain political movements are: “When the Chinese Exclusion Act was renewed in 1892 with even more restrictions on the Chinese here, I helped form ‘The Chinese Equal Rights League.’ Through our efforts, we managed to persuade some congressmen to consider our proposals to grant us the rights guaranteed by the U.S. Constitution.”

And later in the exhibition there are brief written accounts by more recent immigrants, like Sam Wong, whose wandering first took him to Vietnam and Cambodia before “the U.S. welcomed me.”
In these voices, and others, we can hear the mixture of prospects and obstacles that Chinese immigrants encountered. This must have been true even in the worst of times: Chinese laborers sought to come here even after it was clear that nothing like paradise was in store. Many must have recognized degrees of restriction and opportunity and risked their lives to minimize one and maximize the other.

This is an aspect of the history that was once emphasized in older stories of American immigration, demonstrating how opportunities trumped hardships and possibility triumphed over prejudice. There is no point in returning to that model’s glossy idealism, which too easily elided over injustices and failings. But the first-person stories here suggest that the dominant identity model has its own form of exaggeration, heightening trauma and minimizing promise. The hope is that over time this will be amended (and not just in this museum) with a fuller understanding of both sides of a hyphenated identity.
The Museum of Chinese in America opens to the public Tuesday at 1:30 p.m.; 215 Centre Street, near Grand Street, Chinatown; (212) 619-4785 or mocanyc.org.

http://www.nytimes.com/2009/09/22/arts/design/22museum.html?ref=design

It's Only Natural, This Thing for Books

By RANDY KENNEDY

THE Hispanic Society of America, the lonely gem of a museum in the Washington Heights section of Manhattan, is usually visited — when visited at all — for the collection of world-class Goya, El Greco and Velázquez paintings amassed there by its founder, the railroad heir and scholar Archer Milton Huntington.

But the society also boasts one of the world's best libraries of material relating to Spain, Portugal and the Americas, a collection accessed through an unassuming side door, which opens onto a small reading room presided over by portraits of great thinkers like the philosopher José Ortega y Gasset and scattered with heavy oak table placards commanding "Silence."

The collection itself — letters, novels, books of hours, maps, sailing charts, marriage contracts (including one from 1476 for Ferdinand and Isabella's eldest daughter), land grants, catechisms, scientific treatises and other documents dating back as far as the 12th century — fills the cavernous floor below, in a procession of dimly lighted shelves that can be peered at through small windows, giving the space the feeling of an aquarium or the nocturnal rooms of a zoo.

When the French artist Dominique Gonzalez-Foerster visited these basement stacks for the first time two years ago, the impression that came over her immediately, partly because the collection seemed at the same time so monumental and so cloistered, was "this Citizen Kane, Xanadu feeling," she said in a recent telephone interview from Paris, where she lives and works part of the year. Sitting in the stacks amid the smell of dusty paper and buckram, she began to envision a kind of parallel library, as if the society's could somehow dream itself a new existence.

And with help over the last few months from a team of painters and the society's librarians, it now has, in a way. On Wednesday "chronotopes & dioramas," an exhibition by Ms. Gonzalez-Foerster that is part of the Dia Art Foundation's unlikely temporary partnership with the Hispanic Society, opens in a space next to the society that could almost be an annex to its library.

The work presents a meticulously fashioned fantasy of a library in which shelves have become obsolete, and books, like examples of living creatures, are displayed in illusionistic dioramas that evoke those of the American Museum of Natural History. In this kind of library the Dewey decimal system has been replaced by a subjective method of categorization about as straightforward as Symbolist poetry. Franz Kafka, J. G. Ballard, Adolfo Bioy Casares and Gertrude Stein find themselves grouped together in the depths of the North Atlantic, as writers whom Ms. Gonzalez-Foerster sees as links between Europe and the Americas. Jorge Luis Borges and Roberto Bolaño share company in the desert. And Paul Bowles, Elizabeth Bishop and the Brazilian poet Oswald de Andrade are classified under the tropical, their books

displayed in a rain-forest diorama in which the ruins of a Modernist house can be seen peeking out of the undergrowth.

Ms. Gonzalez-Foerster, 44, rose to prominence in France in the 1990s but has only recently begun to become widely known in the United States; this is her first solo museum exhibition in New York. Though she was born in Strasbourg and educated in Grenoble, she has long been fascinated with South American culture, particularly the tropical-modernist mélange of Brazil, where she spends half of each year. She has also been one of the most literary-minded members of a group of artists — including Pierre Huyghe, Liam Gillick, Douglas Gordon and Philippe Parreno — who emerged at roughly the same time in Europe and often appear in the same sentence as practitioners of a post-Conceptual brand of art that de-emphasizes creating objects over creating atmospheres for experiences.

In her work, books have long been important conceptually and as a kind of raw material, "almost like bricks" as she describes them, though bricks that seem almost sentient in the postmodern way of text liberated from its author. In a monumental installation inside the Tate Modern's Turbine Hall in London last year that envisioned the soaring space as a fallout shelter from incessant rain in the year 2058, rows of bare bunk-bed frames were littered with the science-fiction novels that served as the inspiration for the piece. In a continuing work called "Tapis de Lecture," or "Reading Rug," she puts comfortable carpets in exhibition spaces and places on them stacks of the books that have formed her personal bibliography, a version of a self-portrait that people are invited to leaf through.

"With a library," she said, "you slowly build a biography for yourself."

Her own library in Paris — where she lives with her daughter and her husband, the choreographer Jérôme Bel, half of the year — grew so unwieldy that it had to be moved out of her house and into a studio nearby, in the 19th Arrondissement in the northeastern part of the city.

Six months ago a leak in a space above hers flooded the studio. And just the day before the telephone interview, a fire in a neighboring studio forced firefighters to knock through a wall of hers to fight it. ("When I didn't know yesterday whether they had been burned," she said of her books, "I was really in a state.")

In both cases her collection survived almost completely intact, but she said the resulting destruction reminded her of the famous photograph from World War II that shows a library with its roof blown off during the Blitz but the volumes on the shelves surreally intact amid the rubble.

The water invasion came as she was already thinking about the Hispanic Society installation, she said, and it inspired her to undertake some vaguely masochistic experiments in which she submerged books in water. "I've been surprised that they survive longer than you would think," she said, laughing, in her singsongy, heavily accented English.

But then, after her first visit to the American Museum of Natural History during a New York trip, she began to think more broadly about creating book-filled dioramas that would encompass the spectrum of earthly terrain: one of the ocean, one of the tropics (as a place in limbo between water and land, a visual and conceptual theme that runs through much of her work) and one of the desert, the land devoid of water. "It's a way of trying to organize a very visual library," she explained, "to treat books almost like living beings."

Several weeks ago a team of diorama painters set to work in the space next to the Hispanic Society's main building under the direction of Joianne Bittle Knight, who has helped create several dioramas in recent years for special exhibitions at the Museum of Natural History.

One sweltering late August afternoon (the Hispanic Society has no air-conditioning) Ms. Knight and two fellow painters were stationed, one per diorama, listening to the sounds of the Buena Vista Social Club as they consulted a scatter of source material provided by Ms. Gonzalez-Foerster to try to evoke, as realistically as possible, landscapes existing largely in her imagination. Books from the society's collection and from Ms. Gonzalez-Foerster's own and those bought specifically for the project would later be stacked, suspended and otherwise inserted like taxidermied creatures.

Perched inside the dun-colored desert scene arranging sage from West Texas, Ms. Knight said that while the suspension-of-disbelief techniques she used to create the scenes were time-tested ones honed at the Museum of Natural History, it was the first time she had ever employed them with Ray Bradbury or the contemporary painter Peter Doig cited as references.

"We don't really get to think of those kinds of things at the history museum; it's very controlled, with every detail explained," Ms. Knight said. "This was cool. It was a liberating way to work."

Dia's curator at large, Lynne Cooke, who organized the exhibition, said that she became aware of Ms. Gonzalez-Foerster's work about a decade ago and was struck by a darkened room the artist had created at

a Berlin Biennial that subtly evoked a bedroom from a Rainer Werner Fassbinder film. “There was so much appropriation out there at the time that was so literal or flatfooted, and this was not at all,” she said.
Knowing about Ms. Gonzalez-Foerster’s bibliophilia and her time spent living in Brazil, she took her almost immediately to see the society’s library and its curator of manuscripts and rare books, John O’Neill. “The library is incredibly important and constantly consulted,” Ms. Cooke said. “It was my guess or my assumption that she would gravitate toward it for the piece, but I didn’t really know how.”
Mr. O’Neill — whom Ms. Gonzalez-Foerster refers to in conversation as “that great Irish guy” — helped her rummage through the library for books, though Modernist and postmodernist Spanish-language literature is not a strong focus of its collection. He did find a few volumes on her list, though, including ones by Borges and Casares, which he retrieved recently from a shelf to show a visitor during a tour of the library with the society’s director, Mitchell A. Codding.
“We pulled out hundreds of books, and she came down to just these five,” Mr. O’Neill said, describing a great winnowing scene in which upstairs tables were spread with volumes.
“It looked like a secondhand bookstore up there,” he recalled. “She pushed them around a bit, I guess to see how the books interacted, but I don’t know. I can’t exactly say what she was after.”
Daniel Birnbaum, the artistic director of this year’s Venice Biennale who included a film by Ms. Gonzalez-Foerster in the exhibition, once wrote that what she was primarily after, at least in his view, was to create “an atmosphere that draws out the melancholy inherent in objects in the world,” objects that have lost their meaning through over-definition. It is a mission she has carried out through means — video, sparsely furnished rooms, spare sculpture gardens, sound environments, even a Paris Métro installation — that, like the books in her diorama, seem to want to resist conventional categorization.
“In Gonzalez-Foerster’s work,” Mr. Birnbaum concluded, “genre no longer seems relevant.”
But toward the end of the interview Ms. Gonzalez-Foerster suggested that at least one way to think about her work is as that of a writer. And the Hispanic Society exhibition is simply her attempt to write her idea of a library into existence by her own means, the way Borges did with words. “I always wanted to be a writer, but writing is very difficult for me,” she said. “Slowly I accepted the idea of a kind of expanded literature, you might say. And so to me this as exciting as writing something.”
Dominique Gonzalez-Foerster "chronotopes & dioramas" is on view Sept. 23-April 18, 2010 at Dia at the Hispanic Society. For more information visit www.diaart.org or call 212 989 5566.

http://www.nytimes.com/2009/09/20/arts/design/20kenn.html?ref=design

The Revolution Will Be Illustrated

By STEVEN HELLER

Early-20th-century artists and designers greatly admired Russian revolutionary posters and typography, and the art movements that sprang from the October Revolution: Constructivism, Suprematism and Productivism. These fostered new forms of painting, sculpture, architecture, advertising and graphic design. Much of this art was not, however, art for art's sake, but rather a means to propagate the ideology of the state. When it began, the Russian avant-garde was a radical departure from accepted aesthetics and signified a victory over cultural conservatism. But alas, the celebration was relatively short-lived. Lenin was not a big fan. So innovative artists and designers were essentially tolerated until they were replaced in the 1930s by Stalin's turgid Socialist Realism.

Thus, the fertile period after the October Revolution wound up deteriorating into a creative wasteland. "The stories of some of the men and women who saw their early revolutionary struggles transformed into almost unspeakable tragedy are recorded here, alongside hundreds of examples of indelible images created by the designers, artists and photographers who shaped the iconography of the first workers' state," David King writes in his introduction to RED STAR OVER RUSSIA: A Visual History of the Soviet Union From the Revolution to the Death of Stalin (Abrams, $50). And if the first 200 pages of this 350-page volume are any indication, the graphics used to promote the workers' paradise deserve admiration. But the rest of this extraordinarily illustrated book provides witness to the corrosive effects of ham-handed propaganda, and to the role of state-sanctioned imagery in demeaning and subjugating the arts. "Red Star Over Russia" is a mammoth collection of rare Soviet applied art and photographs, edited and designed by King, a British graphic designer and design historian who in the 1980s reintroduced Constructivist mannerisms into the contemporary design vocabulary, spawning a stylistic revival that continues in various forms to this day (e.g., Shepard Fairey's recent advertising campaign for Saks Fifth Avenue). For three decades he has scrutinized and revealed the hidden treasures of this officially out-of-favor art. He has further renewed the appreciation of pioneers through books on Alexander Rodchenko, Vladimir Mayakovsky and other significant avant-gardists. His "Blood and Laughter: Caricatures From the 1905 Revolution" uncovered a little-known cache of satirical journals produced during the first (failed) attempt to overthrow the czar. His mesmerizing book "The Commissar Vanishes: The Falsification of Photographs and Art in Stalin's Russia" includes a host of "before and after" official photographs, manipulated to remove Stalin's purged opponents. King is a voracious collector of all things Soviet, and some of his collection is on view in its own gallery at the Tate Modern in London.
This new book is organized not into individual chapters, but into pages and spreads devoted to a range of themes addressed in graphic and photographic materials, including "Political Abstraction," "Urban Proletariat" and "Workers of the World, Unite." Prominent artists like El Lissitzky and Gustav Klutsis are featured — Klutsis on a spread called "The Evolution of a Klutsis Poster," showing a photomontage with

Lenin striding forward against the background of the Dniepr Dam, promoting the New Economic Policy. King reveals how that heroic image was reused in different iterations. His organizing principle, while not historically orthodox, results in a cinematic panorama of the Soviet Union from these critical early years through the devastation of World War II; one of the last photos in the book is of Khrushchev in Moscow in 1959, alongside two sequin-laden stars of "Holiday on Ice."

The clichéd heroic/romantic graphics from the Stalin years take a back seat to the earlier avant-garde work, but the photographs of leaders, workers and soldiers King has amassed from the Stalin period, some quite candid, say a lot about the rise and fall of the Communist revolution. The most startling — even beautiful — image in the entire book is of Stalin lying in state at the House of Trade Unions in Moscow, where his show trials had been carried out in the '30s. He rests peacefully in full party regalia — his face lighted dramatically from below — on bright red sheets, surrounded by a tropical garden of red and white flowers and green leaves. What a relief it must have been for so many to see him in such a tableau.

Alphonse Mucha's quintessential Art Nouveau stylings have probably never been compared to Socialist Realism, but there are superficial connections worth mentioning. While Mucha's work was more related to czarist-era decorative design (which was influenced by French Art Nouveau), many of his most famous graphic pieces romanticized, heroized and idealized male and female forms, in a manner similar to Socialist art. His well-known poster for Job cigarette papers, which was revived during the '60s as a hippie emblem, and his various posters for Sarah Bernhardt's performances in Paris were propaganda of a commercial kind.

Most people know Mucha — who was born in Moravia and studied in Brno before moving to Vienna, Munich and then Paris, where he worked with the Théâtre de la Renaissance — for his Bernhardt posters. "The name Mucha and poster art are inseparable," according to a catalog entitled ALPHONSE MUCHA (Prestel, $65), which was edited by Agnes Husslein-Arco, Jean Louis Gaillemin, Michel Hilaire and Christiane Lange and designed by Peter Baldinger. Mucha (1860-1939) is so renowned that seeing his name on a book cover, above the requisite floriated woman, is déjà vu all over again. But this extensive volume is not a common poster monograph. Posters, in fact, were only one part of an oeuvre that included furniture, jewelry, stained glass and murals. Mucha is also known for the naturalistic ornamental patterns created for the book "Documents Décoratifs" (1902), and his street-scene and portrait photography, though minor, is pleasantly surprising. Another facet of Mucha that bears notice is "The Slav Epic," a cycle of paintings he began in 1910 and exhibited in 1928. "Mucha was moved by the historical events of his time," the editors write. "His melancholy finds expression in the devastated battlefields in his paintings." Although the work is somewhat exaggerated and sentimental, there is a profound Goyaesque sense of misery in some of these paintings. Indeed, they are so totally out of character with the rest of his work that it calls for a reconsideration — forcing us to evaluate Mucha outside the decorative realm, where he has long been the master. There is a funny similarity between the covers of "Alphonse Mucha" and Daniel Zimmer and David J. Hornung's REYNOLD BROWN: A Life in Pictures (Illustrated Press, $39.95). Each illustration shows a female stereotype of its time, Mucha's from 1898-99 and Brown's from 1958. Born a few generations apart (Brown lived from 1917 to 1991), they exemplified the commercial art of their eras: both made posters for theatrical events; both painted actresses and idealized women. Mucha painted Bernhardt, a giant of the stage, and Brown painted Allison Hayes in "Attack of the 50 Foot Woman," a tall tale on film.

I always wondered who painted that "50 Foot Woman" poster, a perfect example of B-movie promotion. Brown signed his work (which not every film poster artist did), but I never really connected the signature with the artist who also captured the essence of so many other films, including "Tarantula!" about a "crawling terror 100 feet high"; "The Incredible Shrinking Man"; "Attack of the Puppet People"; "Al Capone," starring Rod Steiger; "Flipper," the story of a "fabulous dolphin"; and "Cat on a Hot Tin Roof," to name but a few of the dozens of famous and forgotten movies that Brown's art promoted.

The days when realist/romantic illustrators like Brown ruled the advertising and pulp roosts are over. Illustrators have become more cerebral, emotive or decoratively stylized. Details of the kind Brown drew so precisely are no longer virtues but expendable irrelevancies. Still, this book — depicting a life through hundreds of amazing pictures, although the later, personal work is disappointingly cold and formulaic — reminds me of how much as a kid I wanted to create distant worlds (planets, battlefields, etc.) with paint and brush, just as Brown did. Without his facility, I could never do it.

Before he began designing movie posters, Reynold Brown illustrated covers for Popular Science, Outdoor Life and Auto in a pulp-realistic style. There was a time between the turn of the 20th century and the '50s

when most magazine covers were illustrated in this manner. Many of these can be found in CULT MAGAZINES, A to Z: A Compendium of Culturally Obsessive and Curiously Expressive Publications (Nonstop Press, paper, $34.95), edited by Earl Kemp and Luis Ortiz. This awkwardly formatted book (it bends when you hold it) contains a wealth of arcane information about many of the oddball magazines that once graced newsstands, including an abundance of crime pulps — like Breezy Stories, Black Nylons, Strange, and True Mystic Confessions — as well as horror and girlie magazines.

But what is a cult magazine? In his introduction, Ortiz is vague: “The only thing they all seem to have in common is that they serve a need.” In fact, cult magazines usually serve a specific clientele outside the mainstream (my favorite, though not included in this book, is The Razor’s Edge, a zine for women who shave their heads). In addition to the pulps included here, we get music mags, like Crawdaddy and Creem; humor and comics mags, like Raw and Cracked; and even one I art-directed when I was 19, the best-forgotten Mobster Times, a satirical magazine from the early ’70s based on the concept that (political) crime does pay. The design of this book may not be very appealing, but if you are a voracious cult-magazine aficionado the information and illustrations are well worth it. I was elated many years ago to learn that Superman was Jewish. Of course, we all know Superman isn’t exactly Jewish — he came from the planet Krypton, after all — but Joe Shuster and Jerry Siegel, the two teenage boys from Cleveland who created the Man of Steel, were. I figure that at least gives him the same lineage as Irving Berlin’s “White Christmas.” But I’m getting off point. I was happy to hear about Superman, but I’m ecstatic to learn from Craig Yoe’s SECRET IDENTITY: The Fetish Art of Superman’s Co-Creator Joe Shuster (Abrams ComicArts, $24.95) that after trying unsuccessfully to regain the Superman copyright in the late ’40s, Shuster went on to produce erotic cartoons. One does not have to look too closely to see that some of the male characters in his “Nights of Horror” porn series resemble Clark Kent (or is it Superman?). As exploitative postwar pulp porno goes, this is pretty well done. The drawing is impeccable; it’s kinky and funny at the same time.

This book came about after the author found a “Nights of Horror” booklet in a used-book seller’s stall. Yoe notes that just as Shuster created a fictional character with a secret identity, Shuster himself had “a secret identity who created porn.” He had undersold his Superman idea and become “the poster child for starving artists.” Shuster had to turn to pornography to get a paycheck, but this was not without payback. During the ’50s there was a government crackdown, and most of the small print run of “Nights of Horror” was destroyed. Shuster had lost yet another source of meager income. But then, just before the release of the first Superman movie, DC Comics, caving to fan and media pressure, agreed to pay Shuster and Siegel a modest salary, give them health insurance and “return . . . their credits to the comic books.”

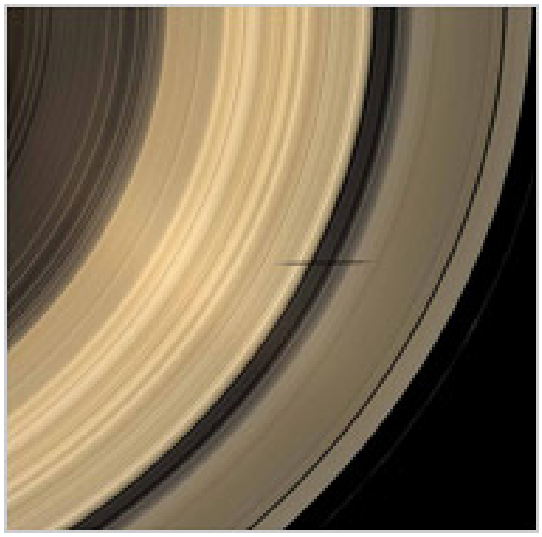
Anaïs Nin, as we know, wrote her share of pornography, too. So on his mural at the Waverly Inn in Greenwich Village, the caricaturist Edward Sorel drew her with large waiflike eyes and naked breasts. Edna St. Vincent Millay and Edmund Wilson, Dylan Thomas, Norman Mailer, Bob Dylan, Mabel Dodge and John Reed are also in various states of undress, but everyone else is fully clothed in Sorel’s surprising little book, THE MURAL AT THE WAVERLY INN: A Portrait of Greenwich Village Bohemians (Pantheon, $15.95), which was designed by Walter Bernard.

Ye Waverly Inn and Garden first opened after World War I and became a legendary haunt for West Villagers, including painters, poets and playwrights, bohemians, beatniks and Bolshies. A few years ago it was purchased by a partnership that included Graydon Carter, the editor of Vanity Fair, who hired Sorel to create a signature mural featuring Village luminaries. This charming little book is a biography of the mural, which is reproduced in miniature in its entirety as a multiple-panel gatefold at the back. The book includes short essays by Dorothy Gallagher about each caricature, from Duchamp to Warhol, Jane Jacobs to Emma Goldman, Jack Kerouac to Thelonious Monk. The only “scuffle,” Carter says in his brief introduction, was over the inclusion of a Communist cartoonist, Art Young. “My objection had less to do with politics than with identification: I had never heard of Art Young.” Nonetheless, he gave in to Sorel’s explanation: “He was the most famous interwar cartoonist living in New York!”

http://www.nytimes.com/2009/09/20/books/review/Heller-t.html?ref=design

CAROLYN PORCO
An Odyssey From the Bronx to Saturn's Rings

By DENNIS OVERBYE



It is twilight time on Saturn.

Shadows lengthened to stretch thousands of miles across the planet's famous rings this summer as they slowly tilted edge-on to the Sun, which they do every 15 years, casting into sharp relief every bump and wiggle and warp in the buttery and wafer-thin bands that are the solar system's most popular scenic attraction.

From her metaphorical perch on the bridge of the Cassini spacecraft, which has been orbiting Saturn for five years, Carolyn Porco, who heads the camera team, is ecstatic about the view. "It's another one of those things that make you pinch yourself and say, 'Boy am I lucky to be around now,' " Dr. Porco said. "For the first time in 400 years, we're seeing Saturn's rings in three dimensions."

On Monday, Dr. Porco and the Cassini team released a grand view of the rings in all their shadowed glory, including clumps, spikes, undulations and waves two and a half miles high on the edge of one ring. "We always knew it would be good; instead, it's been extraordinary," Dr. Porco said of the cascade of results that have placed her in a spotlight to which she has become increasingly accustomed. "I feel I'm on a great human adventure," she said.

The work may be carried out by robots, Dr. Porco said, "but we are all explorers."

"It's thrilling," she added, "and I want everyone to know how thrilling it is."

Dr. Porco, 56, a senior researcher at the Space Science Institute in Boulder, Colo., may be the leader of the camera team on the $3.4 billion Cassini mission, an adjunct professor at the University of Colorado and one of Wired magazine's 15 people who should be advising the president. But she is also a proud child of the 1960s who has never let go of the exuberance of that era when President John F. Kennedy "said that the sky isn't even the limit," as she puts it, and "things were unleashed."

Her entries on the Cassini imaging Web site echo the spirit of the character Capt. James T. Kirk on "Star Trek":

Captain's Log
March 23, 2009

We are almost there. Saturn and we, its companions, have journeyed together now for nearly five years, in a circumnavigation of the outer solar system.

Stanley Kubrick's film "2001: A Space Odyssey" is still her favorite movie. and she still loves the Beatles. On a visit to England in 2001, she and her imaging colleagues recreated the album cover picture of the Beatles crossing Abbey Road, with Dr. Porco leading, dressed in white like John Lennon.

Dr. Porco was born and raised in a Bronx family with four brothers she partly credits for her subsequent success in astronomy. "I'm used to fighting and arguing with males," she said.

Her father, an Italian immigrant, drove a bread truck, and her mother kept house. Dr. Porco attended Cardinal Spellman High School, the same school that Justice Sonia Sotomayor of the Supreme Court attended.

She was a studious child and a spiritual seeker — "13 going on 80" — who lived a lot in her head. Later, as a student at the State University of New York at Stony Brook, she said she spent two years as a chanting Buddhist and even went on a two-week pilgrimage to Japan, where she was the majorette in a Buddhist marching band, wearing hot pants. "Now, THOSE were the days," she wrote in an e-mail message.

By then, Dr. Porco was pursuing the future she had glimpsed at age 13 when she saw Saturn through a neighbor's rooftop telescope. As a graduate student at the California Institute of Technology, she floundered at first but then got a job helping to analyze data from the two Voyager spacecrafts, which toured the outer planets from Jupiter to Neptune from 1978 to 1989.

It was there, said Peter Goldreich, her thesis advisor, that she demonstrated a knack for picking out important things. Among them was a discovery that mysterious dark spokes in Saturn's ring system were connected to the planet's magnetic field. She did her thesis on aspects of the rings and how they were shaped by the gravity of tiny moonlets.

Dr. Porco also did a lot of dancing, and played a guitar and sang in the Titan Equatorial Band, a pickup group of scientists and science writers named after a feature on Saturn's largest moon, and later for a group in Tucson called the Estrogens. "Three women and one very brave guy," she said.

By the time Voyager passed Neptune in 1989, Dr. Porco was a research associate at the University of Arizona and leading a small team trying to make sense of the thin rings around Neptune.

"She was one of the young rock stars of Voyager," said David Grinspoon, of the Southwest Research Institute in Boulder, who was a graduate student at Arizona at the time.

But it had not been an easy climb in the overwhelmingly male and competitive environment of space science. Dr. Porco once described scientists as "schoolyard toughs." She recalled pumping herself up to be an "alpha male" before meetings of her ring team.

Even as a graduate student, Dr. Goldreich recalled, Dr. Porco "was making a deliberate effort to become tough, and she succeeded."

Dr. Porco found an ally and friend in Carl Sagan, the Cornell astronomer, author and a charter member of the Voyager team, who defended her once when her Voyager colleagues teased her about not being married.

Dr. Porco was subsequently hired as a consultant for the movie "Contact," based on Sagan's novel about a feisty astronomer, Ellie Arroway, who discovers a signal from extraterrestrials.

Although plans fell through for Dr. Porco to meet Jodie Foster, the actress who played Arroway, she did attend a workshop on the script, where she took strong exception to an idea that the character would sleep with her adviser. "She's a let-it-ripper, isn't she?" recalled the movie's producer, Lynda Obst. "She let it rip."

Voyager, Dr. Porco said, was the time of her life. "It had all the elements of Homeric legend," she said. "It was a long 12-year odyssey, punctuated by brief episodes of great discovery and conquest. And then it was back in the boat, oars in the water, until years later we reached our next port of call. It was a defining experience for many of us, and certainly for me."

The chance to channel Dr. Porco's inner Captain Kirk continued with the $3.4 billion Cassini mission, which was launched on a roundabout course toward Saturn in 1997 and arrived in 2004. Being on the imaging team is like standing on the bridge of the spaceship, she said. "We have the windows," she said. "That's what we're responsible for."

Dr. Porco was chosen over more senior astronomers to head the Cassini camera team in 1990, one of 12 team leaders for the spacecraft. The job swallowed her life, she said, and required her hard-won toughness. "Our experiment has been spectacularly successful," she said, "and that would never have happened if I let people roll over me."

But Dr. Porco said it had all been worthwhile. "Between my participation in Voyager and my role in Cassini," she said, "when comes the time, I will die a happy and gratified woman."

One of the most thrilling Cassini moments was in 2004 when the Huygens probe detached from Cassini and landed on Saturn's largest moon, Titan, a strange, frigid world where rocks are made of ice, and rivers and oceans are formed of what Dr. Porco has described as "paint thinner."

Last month, astronomers announced that they had detected methane storms on Titan, a cloudy moon that has an atmosphere denser than that of Earth.

They also discovered plumes erupting from the south pole of another Saturn moon, Enceladus, suggesting the presence of underground water and prompting talk about a future mission to cruise through the plumes. “Should we ever discover that life has arisen twice,” Dr. Porco said, “that would be a game-changer.”
The Titan landing, Dr. Porco said in a talk in 2007 should have been celebrated with parades in every major city.
That talk led to another movie adventure. J. J. Abrams, the producer of the television series “Lost,” was listening and asked Dr. Porco to consult on his “Star Trek” movie. On a visit to the set, she suggested that a scene in which the Starship Enterprise materialized inside clouds be set on Titan. The scene, made it on to the cover of Cinefex, a magazine about special effects in films.
In an interview, Mr. Abrams said: “She helped us feel connected to what Gene Roddenberry had been trying to do. This is our future,” referring the creator of “Star Trek.”
Cassini endures, and Dr. Porco is a member of the team for the New Horizons spacecraft, which is scheduled to arrive at Pluto in 2015. But she said she hoped to spend more of her time popularizing science and hopes to write a book about Cassini.
“To my mind,” Dr. Porco said, “most people go through life recoiling from its best parts. They miss the enrichment that just a basic knowledge of the physical world can bring to the most ordinary experiences. It’s like there’s a pulsating, hidden world, governed by ancient laws and principles, underlying everything around us — from the movements of electrical charges to the motions of the planets — and most people are completely unaware of it.
“To me, that’s a shame.”

http://www.nytimes.com/2009/09/22/science/space/22prof.html?ref=science

To Explain Longevity Gap, Look Past Health System
By JOHN TIERNEY

If you're not rich and you get sick, in which industrialized country are you likely to get the best treatment?

The conventional answer to this question has been: anywhere but the United States. With its many uninsured citizens and its relatively low life expectancy, the United States has been relegated to the bottom of international health scorecards.

But a prominent researcher, Samuel H. Preston, has taken a closer look at the growing body of international data, and he finds no evidence that America's health care system is to blame for the longevity gap between it and other industrialized countries. In fact, he concludes, the American system in many ways provides superior treatment even when uninsured Americans are included in the analysis.

"The U.S. actually does a pretty good job of identifying and treating the major diseases," says Dr. Preston, a demographer at the University of Pennsylvania who is among the leading experts on mortality rates from disease. "The international comparisons don't show we're in dire straits."

No one denies that the American system has problems, including its extraordinarily high costs and unnecessary treatments. But Dr. Preston and other researchers say that the costs aren't solely due to inefficiency. Americans pay more for health care partly because they get more thorough treatment for some diseases, and partly because they get sick more often than people in Europe and other industrialized countries.

An American's life expectancy at birth is about 78 years, which is lower than in most other affluent countries. Life expectancy is about 80 in the United Kingdom, 81 in Canada and France, and 83 in Japan, according to the World Health Organization.

This longevity gap, Dr. Preston says, is primarily due to the relatively high rates of sickness and death among middle-aged Americans, chiefly from heart disease and cancer. Many of those deaths have been attributed to the health care system, an especially convenient target for those who favor a European alternative.

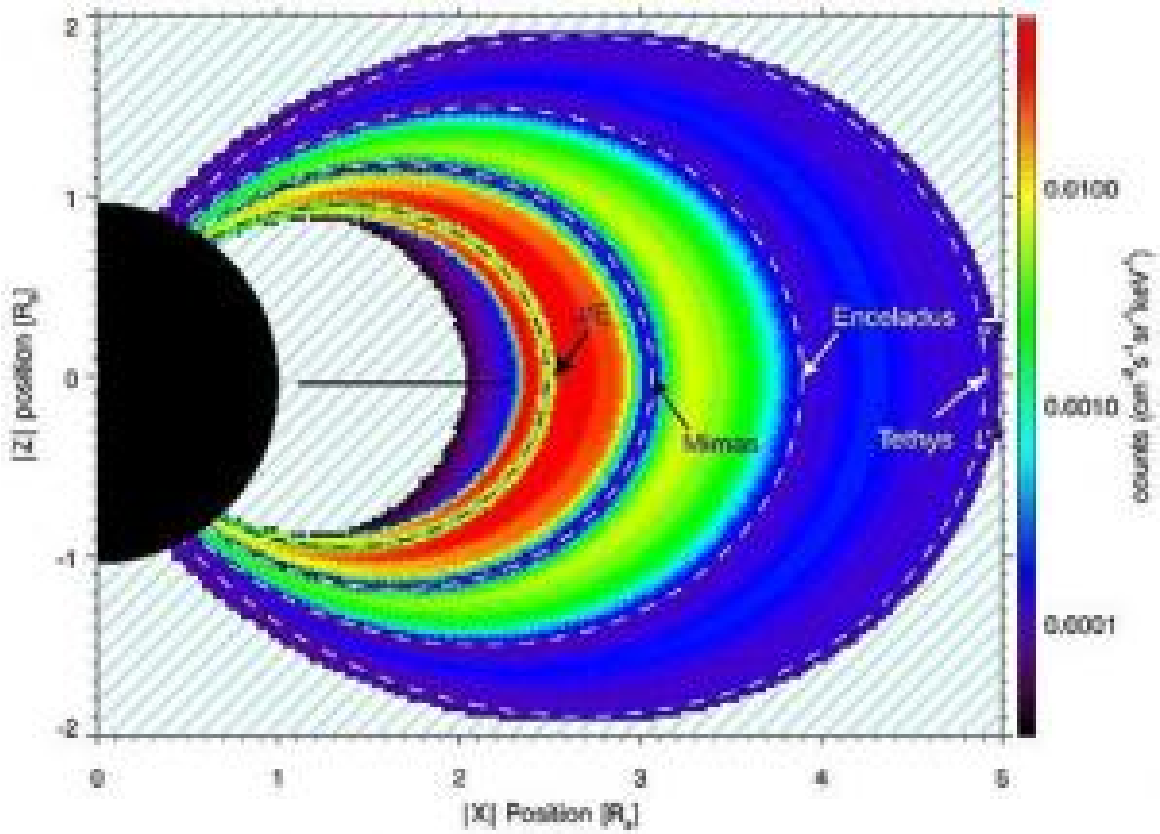
But there are many more differences between Europe and the United States than just the health care system. Americans are more ethnically diverse. They eat different food. They are fatter. Perhaps most important, they used to be exceptionally heavy smokers. For four decades, until the mid-1980s, per-capita cigarette consumption was higher in the United States (particularly among women) than anywhere else in the developed world. Dr. Preston and other researchers have calculated that if deaths due to smoking were excluded, the United States would rise to the top half of the longevity rankings for developed countries.

As it is, the longevity gap starts at birth and persists through middle age, but then it eventually disappears. If you reach 80 in the United States, your life expectancy is longer than in most other developed countries. The United States is apparently doing something right for its aging population, but what?

One frequent answer has been Medicare. Its universal coverage for people over 65 has often been credited with shrinking the longevity gap between the United States and other developed countries.
But when Dr. Preston and a Penn colleague, Jessica Y. Ho, looked at mortality rates in 1965, before Medicare went into effect, they found an even more pronounced version of today's pattern: middle-aged people died much more often in the United States than in other developed countries, but the longevity gap shrunk with age even faster than today. In that pre-Medicare era, an American who reached 75 could expect to live longer than most people elsewhere.
Besides smoking, there could be lots of other reasons that Americans are especially unhealthy in middle age. But Dr. Preston says he saw no evidence for the much-quoted estimates that poor health care is responsible for more preventable deaths in the United States than in other developed countries. (Go to nytimes.com/tierneylab for details.)
For all its faults, the American system compares well by some important measures with other developed countries, as Dr. Preston and Ms. Ho enumerate. Americans are more likely to be screened for cancer, and once cancer is detected, they are more likely to survive for five years.
It's been argued that the survival rate for cancer appears longer in America merely because the disease is detected earlier, but Dr. Preston says that earlier detection can be an advantage in itself, and that Americans might also receive better treatment. He and Ms. Ho conclude that the mortality rates from breast cancer and prostate cancer have been declining significantly faster in the United States than in other industrialized countries.
Americans also do relatively well in surviving heart attacks and strokes, and some studies have found that hypertension is treated more successfully in the United States.
Compared with Europeans, Americans are more likely to receive medication if they have heart disease, high cholesterol, lung disease or osteoporosis. But even if the American system does provide more treatment for more sick people, couldn't it do something to reduce its workload?
When I brought up Dr. Preston's work to Ellen Nolte and C. Martin McKee, two prominent European critics of the American system, they suggested that he was taking too limited a view of health care. They said the system should take responsibility for preventing disease, not just treating it.
Dr. Preston acknowledges that the United States might do more to keep young and middle-aged people from getting sick, but he says it's not clear that other countries' systems are more effective.
"The U.S. has had one spectacular achievement in preventive medicine," he says. "It has had the largest drop in cigarette consumption per adult of any developed country since 1985." If Americans keep shunning cigarettes, the longevity gap could shrink no matter happens with the health care system.

http://www.nytimes.com/2009/09/22/science/22tier.html?ref=science

New Transient Radiation Belt Discovered Around Saturn



Radiation belt map of the ions with energies between 25-60 MeV, in Saturn's magnetosphere, based on several years of Cassini MIMI/LEMMS data. The structure of this radiation belt is almost perfectly stable for more than 5 years of Cassini observations, despite the intense variability of the radiation belts, outside the location of Tethys. (Credit: Image courtesy of Europlanet Media Centre)

ScienceDaily (Sep. 21, 2009) — Scientists using the Cassini spacecraft's Magnetospheric Imaging instrument (MIMI) have detected a new, temporary radiation belt at Saturn, located around the orbit of its moon Dione at about 377,000 km from the center of the planet.

The discovery will be presented at the European Planetary Science Congress in Potsdam by Dr Elias Roussos on Monday 14 September.

Radiation belts, like Earth's Van Allen belts, have been discovered at Jupiter, Saturn, Uranus and Neptune. However, to date, it has only been possible to observe the variability of their intensity at Earth and Jupiter. Now that Cassini has been orbiting Saturn for more than five years, it has been possible to assess for the first time changes in Saturn's radiation belts.

An international team of astronomers made the discovery analysing data from the MIMI's LEMMS sensor, which measures the energy and angular distribution of charged particles in the magnetic bubble that surrounds Saturn.

"The most dramatic changes have been observed as sudden increases in the intensity of high energy charged particles in the inner part of Saturn's magnetosphere, in the vicinity of the moons Dione and Tethys," said Dr. Roussos. "These intensifications, which could create temporary satellite atmospheres around these moons, occurred three times in 2005 as a response to an equal number of solar storms that

hit Saturn's magnetosphere and formed a new, temporary component to Saturn's radiation belts," he added.

The new belt, which has been named "the Dione belt," was only detected by MIMI/LEMMS for a few weeks after each of its three appearances. The team believe that newly formed charged particles in the Dione belt were gradually absorbed by Dione itself and another nearby moon, named Tethys, which lies slightly closer to Saturn at an orbit of 295,000 km.

Unlike the Van Allen belts around the Earth, Saturn's radiation belts inside the orbit of Tethys are very stable, showing negligible response to solar storm occurrences and no variability over the five years that they have been monitored by Cassini.

Interestingly, it was found that the transient Dione belt was only detected outside the orbit of Tethys. It appeared to be clearly separated from the inner belts by a permanent radiation gap all along the orbit of Tethys.

"Our observations suggest that Tethys acts as a barrier against inward transport of energetic particles and is shielding the planet's inner radiation belts from solar wind influences. That makes the inner, ionic radiation belts of Saturn the most isolated magnetospheric structure in our solar system," said Dr Roussos.

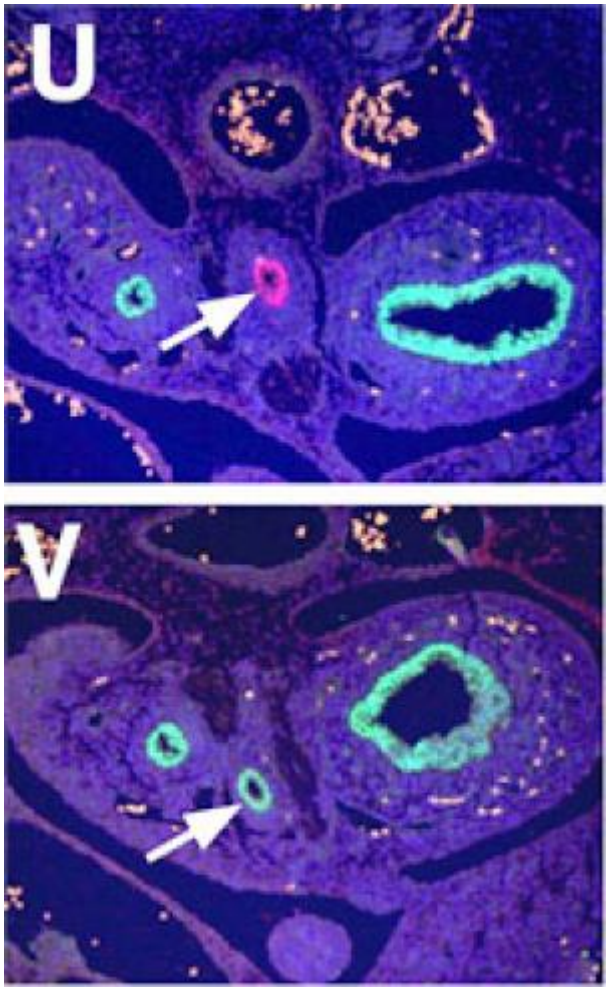
The radiation belts within Tethys's orbit probably arise from the interaction of the planet's main rings and atmosphere and galactic cosmic ray particles that, unlike the solar wind, have the very high energies needed to penetrate the innermost Saturnian magnetosphere. This means that the inner radiation belts will only vary if the cosmic ray intensities at the distance of Saturn change significantly.

However, as Dr. Roussos emphasised, "Outside the orbit of Tethys, the variability of Saturn's radiation belt might be enhanced in the coming years as we start approaching the solar maximum. If solar storms occur frequently in the new solar cycle, the Dione belt might become a permanent, although highly variable, component of Saturn's magnetosphere, which could affect significantly Saturn's global magnetospheric dynamics."

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090914111821.htm

How To Make A Lung



 # Normal and separate expression of Nkx2.1 (green) in lung endoderm and p63 (red) in esophagus endoderm (arrow) (Panel U). Activation of Wnt/beta-catenin results in reprogramming of esophagus endoderm to Nkx2.1 positive lung endoderm (panel V, arrow). (Credit: Edward Morrisey, PhD, University of Pennsylvania School of Medicine; Developmental Cell)

ScienceDaily (Sep. 21, 2009) — A tissue-repair-and-regeneration pathway in the human body, including wound healing, is essential for the early lung to develop properly. Genetically engineered mice fail to develop lungs when two molecules in this pathway, Wnt2 and Wnt2b, are knocked out. The findings are described this week in *Developmental Cell*.

“We wanted to know the answer to a seemingly simple question: What is required to generate the lung in mammals?” asked senior author Edward Morrisey, PhD, Associate Professor of Medicine and Cell and Developmental Biology at the University of Pennsylvania School of Medicine.

“Wnt molecules are important for lung growth and we think that some of the molecules in the Wnt pathway are needed to specify lung progenitor cells and if not enough cells are ‘told’ to make a lung, an animal develops a faulty, smaller organ or even no lung,” says Morrisey, who is also the Scientific Director of the Penn Institute for Regenerative Medicine.

Several molecular signals are important for proper lung development but not much is known about the early signals that turn on the genes needed to specify the lung at the right place and time in the embryo. Clinically, understanding how a lung develops is important in treating or preventing a host of lung and

pulmonary diseases in children. “Premature babies in particular often develop respiratory problems which can lead to health issues not only during infancy but also later in life” says Morrisey.

He also points out that pulmonary and cardiac development is intricately connected: “One thing that is coming out of these studies is that the lung and heart form together which is an important point to remember as pathways affecting one organ system can affect the other.” In fact, one of the Wnt knockout mice the team developed also has profound cardiovascular defects, he notes.

In the developing embryo, the lung, pancreas, liver, thyroid, and stomach all come from the foregut region, which starts out looking like a long tube. “These organs bud from this undifferentiated tube and go on to develop into specific tissue types,” explains Morrisey. “The lung is one of the last to bud off the foregut during development.”

The team focused on the Wnt pathway to see where and when Wnt molecules were expressed along the foregut tube, even before the lung starts to become a recognizable organ. “The lung is a relative late arriver,” says Morrisey. “The liver, pancreas, and other organs begin developing days earlier.” They found that the Wnt proteins Wnt2 and Wnt2b are expressed in the cells surrounding the foregut, right where the lung will eventually form. When they are knocked out, the animals completely lacked lungs.

Morrisey surmised that Wnt2 and Wnt2b were required to specify the early progenitors for the lung in the foregut. “We found that the Nkx2.1 gene, which is expressed in both lung and thyroid progenitor cells in the foregut, were absent only in the region where the lung was supposed to form and not in the thyroid progenitor cells.”

They confirmed this fine tuning of lung development by knocking out an additional gene in the Wnt pathway called beta-catenin in the early foregut, and these mice also did not develop lungs, but all the other foregut-associated organs developed properly. “This says that these two Wnt molecules are essential for specifying the lung but not other foregut-derived organs” explains Morrisey.

The Morrisey lab also showed that activation of the Wnt pathway resulted in formation of lung progenitors in both the esophagus and stomach where they are normally excluded. “The ability of Wnt to program esophagus and stomach endoderm to a lung fate points to the critical role this pathway plays in lung development and suggests the possible use of Wnt in generating lung epithelium from non-lung sources.”

First author Ashley Goss is a graduate student in the Morrisey lab and co-author Terry P. Yamaguchi, National Cancer Institute, made one of the knockout mice. This work was funded by the National Heart, Lung, and Blood Institute, the American Heart Association and the National Cancer Institute.

Adapted from materials provided by University of Pennsylvania School of Medicine.

http://www.sciencedaily.com/releases/2009/08/090817190648.htm

Students Navigating The Hudson River With Hydrogen Fuel Cells

The 22-foot New Clermont, powered solely by hydrogen fuel cells, will launch from Pier 84 in Manhattan on September 21 and sail up the Hudson River to arrive in Troy, N.Y. on the evening of September 25. The project was conceived and is led by students at Rensselaer Polytechnic Institute. (Credit: Rensselaer)

ScienceDaily (Sep. 21, 2009) — A group of ambitious Rensselaer students will soon sail up the Hudson River, propelled by pollution-free hydrogen fuel cells and a clear vision for a cleaner, greener future.

Their boat, the 22-foot New Clermont, is fit with a pair of 2.2-kilowatt fuel cell units. With a crew of three, the ship will launch from Pier 84 in Manhattan on September 21 and cruise at a cool 6 mph to arrive in Troy on the evening of September 25. The group is planning to make several stops along the way, showing off their one-of-a-kind boat, speaking with other green-minded individuals, and talking about the many environmental and potential economic benefits of building out the nation's hydrogen economy.

"At its core, the New Clermont Project is about awareness. It's a fun way to teach people about hydrogen energy," said doctoral student William Gathright, who founded the group in early 2009. "We're high-tech environmentalists. We want to share our vision of a time when people can take a pleasure cruise on their boat, or drive to the store, without leaving a trail of pollution and toxins behind them. We hope to inspire and challenge them to think of ways of making that vision a reality."

Gathright, a doctoral student in the Department of Materials Science and Engineering and a National Science Foundation IGERT Fellow who is also pursuing a master's degree in management from Rensselaer's Lally School of Management & Technology, has assembled a volunteer team of undergraduate and graduate students from a wide spectrum of academic disciplines. New Clermont team members are not receiving any course credit for the project.

The first few months of the project entailed recruiting a team with skills and expertise in materials science and engineering, electrical and systems engineering, management, and communications. Their only physical asset, at first, was the boat itself – a forgotten, neglected vessel that Gathright promptly renamed the New Clermont. The 40-year-old sailboat is a Bristol 22, sometimes called a Bristol Caravel, and measures 22 feet from aft to bow.

Along with major repairs, maintenance, and scrubbing away two decades worth of grime, Gathright and cohorts used their engineering know-how to prep the New Clermont to hold and support a pair of fuel cell units. The units, which are GenDrive class 3 systems on loan to the students from Latham, N.Y.-based fuel cell developer Plug Power, each weigh about 500 pounds and stand three feet wide by three feet tall. The team used a crane to lift the units into the New Clermont and sit them on specially engineered, homemade mounts.

"This project, from beginning to end, has certainly been an exercise in creative problem solving," Gathright said. "But you know what? We're Rensselaer students. Innovating and problem solving is what we do best."

The New Clermont's fuel cell units run on compressed hydrogen gas. A special membrane within the fuel cell systems separates the hydrogen into electrons and protons. The protons pass through the membrane and the electrons travel around a circuit, which creates electricity. After passing through the membrane, the protons and electrons are exposed to oxygen from the ambient air, which results in the creation of water and a small amount of heat. The electrochemical process is entirely pollution-free. The fuel cells power a pair of motors mounted on the stern of the New Clermont. Team members modified the store-bought engines to accept input from the fuel cell units.

Along with boosting the visibility and public awareness of hydrogen, fuel cells, and green energy, the New Clermont Project is also a celebration of American ingenuity and the rich technological history of New York state and the Hudson River. The project and boat are named after and will closely mirror the route of the world's first commercial steamboat, the Clermont, which renowned captain Robert Fulton sailed from New York to Albany in the first years of the 19th century – almost exactly 200 years ago.

The New Clermont Project also coincides with the 400-year anniversary of Henry Hudson's historic trek up what would eventually become the Hudson River.

"Just as Robert Fulton wanted to prove to the world that steam was a viable, economical means to power boats and unleash the economic potential of our waterways, we want to open people's eyes to the viability of hydrogen and fuel cells as a way to power boats, and one day maybe even our cars, trucks, and homes," said Lally School MBA student Leah Rollhaus, who helps lead the New Clermont Project.

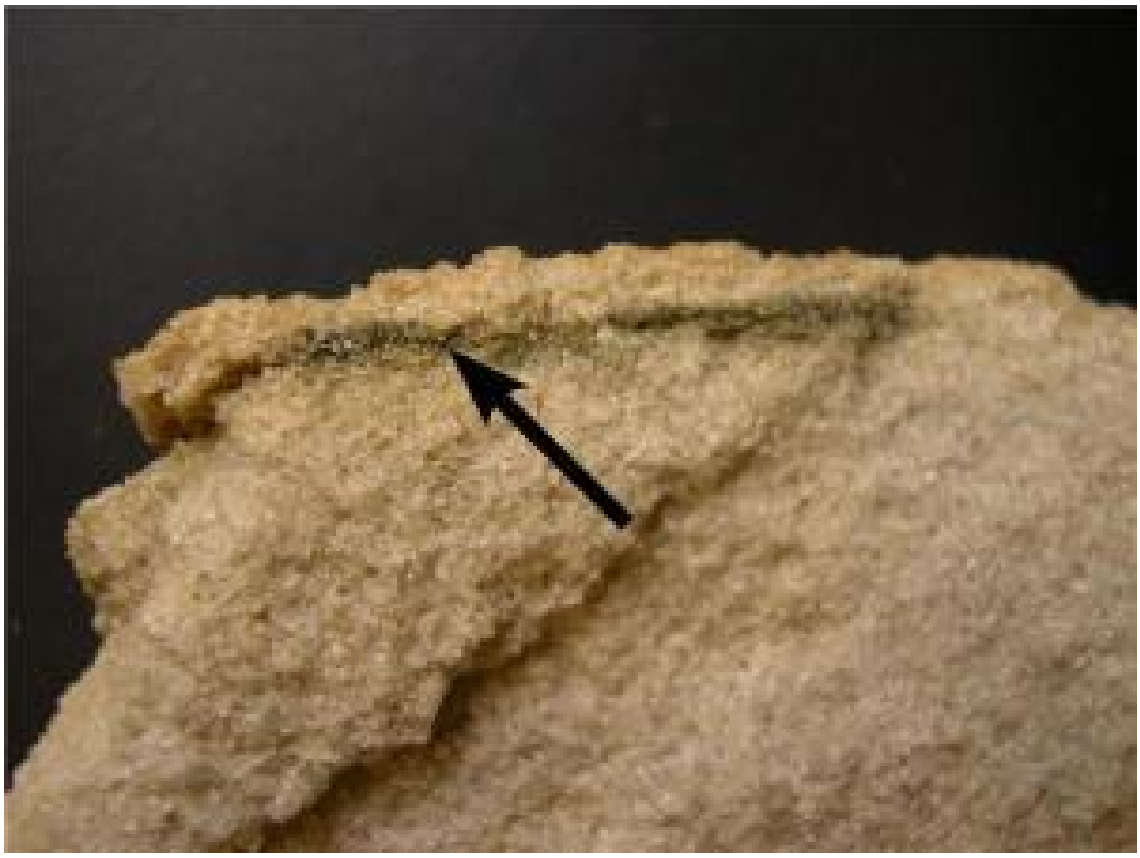
The New Clermont Project had a busy summer, from participating in the annual Clearwater Festival to networking with the Capital Region and New York business communities to rally support and build a buzz around the September voyage. Along the way, the New Clermont Project also became a member group of the Rensselaer Student Sustainability Task Force, and joined ranks with the Institute's Severino Center for Technological Entrepreneurship. The New Clermont will end its voyage at the docks of Rensselaer's home town of Troy, N.Y., during the monthly Troy Night Out celebration.

"It's been an outstanding experience, and I can't wait to set sail, meet all sorts of interesting new people during our five-day voyage, and hopefully impress upon everyone that – with a little effort – we can all take ownership of the future and do our part to make this Earth a cleaner and greener place."

Adapted from materials provided by Rensselaer Polytechnic Institute.

http://www.sciencedaily.com/releases/2009/09/090918110646.htm

New Drake Equation To Quantify Habitability?



An image showing microbes living in sandstone in Antarctica. (Credit: C Cockell)

ScienceDaily (Sep. 21, 2009) — Researchers from the Open University are laying the groundwork for a new equation that could mathematically quantify a habitat's potential for hosting life, in a similar way to how the Drake equation estimates the number of intelligent extraterrestrial civilizations in the Milky Way.

Dr Axel Hagermann will be proposing a method to find this 'habitability index' at the European Planetary Science Congress in Potsdam, Germany on Thursday 17 September.

"At present, there is no easy way of directly comparing the suitability of different environments as a habitat for life. The classical definition of a habitable environment is one that has the presence of a solvent, for example water, availability of the raw materials for life, clement conditions and some kind of energy source, so we tend to define a place as 'habitable' if it falls into the area where these criteria overlap on a Venn diagram. This is fine for specific instances, but it gives us no quantifiable way of comparing exactly how habitable one environment is in comparison with another, which I think is very important," said Dr Hagermann, who originates from Recklinghausen in Germany.

Dr Hagermann and colleague Prof Charles Cockell have the ambitious aim of developing a single, normalised indicator of habitability, mathematically describing all the variables of each of the four habitability criteria. Initially, they are focusing on describing all the qualities of an energy source that may help or hinder the development of life.

"Electromagnetic radiation may seem simple to quantify in terms of wavelengths and joules, but there are many things to consider in terms of habitability. For instance, while visible and infrared wavelengths are important for life and processes such as photosynthesis, ultraviolet and X-rays are harmful. If you can

imagine a planet with a thin atmosphere that lets through some of this harmful radiation, there must be a certain depth in the soil where the 'bad' radiation has been absorbed but the 'good' radiation can penetrate. We are looking to be able to define this optimal habitable region in a way that we can say that it is 'as habitable' or 'less habitable' than a desert in Morocco, for example," said Dr Hagermann.

The pair will be presenting their initial study and asking for feedback from colleagues at the European Planetary Science Congress.

"There may be good reasons why such a habitability index is not going to work and, with so many variables to consider, it is not going to be an easy task to develop. However, this kind of index has the potential to be an invaluable tool as we begin to understand more about the conditions needed for life to evolve and we find more locations in our Solar System and beyond that might be habitable," said Dr Hagermann.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090916223915.htm

Plant Essential Oil Eyed As Mosquito, Ant Repellent

ARS scientists and their collaborators in a company called Agro Research, Inc., are working to identify the active ingredients of a mosquito- and ant-repelling essential oil that comes from a native American Samoan plant. (Credit: Photo courtesy of Jessica Lawrence, NC State Entomology Dept., Bugwood.org.)

ScienceDaily (Sep. 21, 2009) — Agricultural Research Service (ARS) scientists have teamed up with researchers from a company in American Samoa to investigate the chemical makeup of a mosquito- and ant-repellent essential oil from a native Samoan plant.

The ARS scientists and researchers at Agro Research, Inc., in Pago Pago, American Samoa, discovered that the oil from a local plant repelled mosquitoes and pest ants in preliminary studies, which were conducted under a material transfer agreement. The isolation and identification of the active component (or components) will be done as part of a recently established one-year cooperative research and development agreement.

The plant is one of the 540 native species of flowering plants in American Samoa, a U.S. island territory in the South Pacific.

ARS chemists Robert Vander Meer and Ulrich Bernier at the agency's Center for Medical, Agricultural and Veterinary Entomology in Gainesville, Fla., are working with Agro Research, Inc.'s Pemerika Tauiliili to identify the active ingredients in the plant essential oil.

Two mosquito species—Aedes aegypti and Anopheles albimanus—were used to evaluate the essential oil's repellency. A. aegypti transmits viruses that cause yellow fever, dengue and chikungunya. A. albimanus transmits malaria parasites and is not as susceptible to repellents as many other mosquito species.

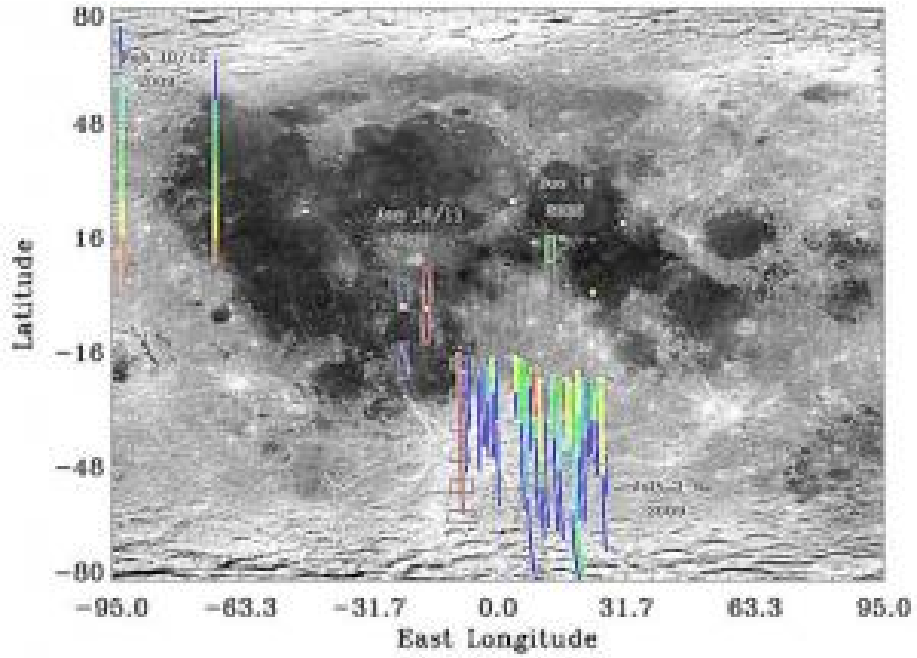
The essential oil was also tested on the red imported fire ant, Solenopsis invicta. Significant repellency was observed with concentrations diluted more than 100-fold, and the active components are likely a small fraction of the total oil.While American Samoa is malaria-free, mosquitoes pose significant problems for the Samoan population due to transmission of dengue virus.

Exploration for new active ingredients among botanical extracts has value because it can lead to the discovery of new synthetic analogs with unique and useful properties.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2009/08/090830100003.htm

Chandrayaan-1 X-ray Spectrometer Success To Provide New Understanding Of Lunar Surface



An image showing areas of the lunar surface imaged by C1XS. (Credit: Image courtesy of Europlanet Media Centre)

ScienceDaily (Sep. 21, 2009) — Over its ten months of operation, the Chandrayaan-1 X-ray Spectrometer (C1XS) has gathered data for a total of 30 solar flares, giving the most accurate measurements to date of magnesium, aluminium, silicon, calcium and iron in the lunar surface. Results will be presented at the European Planetary Science Congress in Potsdam, Germany, by the instrument's Principal Investigator, Professor Manuel Grande on Friday 18 September.Although contact was lost with Chandrayaan-1 last month, the enhanced performance of the C1XS instrument, which exceeded its design specification, means that the science team will be able to determine the geochemistry of new areas of the lunar surface, adding some vital pieces to the jigsaw of the mineralogy of the lunar surface.

The miniature C1XS instrument investigated the lunar surface using an effect whereby X-ray illumination from the Sun causes rocks to fluoresce, emitting light at a different wavelength. This re-emitted light contains spectral peaks that are characteristic of elements contained in the rock, revealing its composition. Solar flares act like a flash bulb, giving added illumination and allowing C1XS to 'see' more elements.During normal conditions, C1XS could detect magnesium, aluminium and silicon and collected data on the levels of these elements enabling detailed mapping of areas of the lunar surface during its operational period. During the 30 solar flares, C1XS detected calcium and iron (and sometimes titanium, sodium and potassium) in key areas in the southern hemisphere and on the far side of the Moon. The spectral resolution of 50 km was much better than previous missions."The C1XS team will be analysing the data collected during the Chandrayaan-1 mission over the next few months and the results will help us further our knowledge of the Moon and planetary formation. In addition, the design of the instrument has been proved very successful in that it withstood passage through the Earth's radiation belts and went on to produce these wonderful high-resolution spectra. We were able to separate clear peaks for each of the target elements, allowing us not only to identify where they are present but give an accurate estimate for how much is there. The technology developed for C1XS opens up some exciting opportunities for future missions," said Professor Grande.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090918102105.htm

Rare Meteorite Found Using New Camera Network In Australian Desert

This is Bunburra Rockhole, the meteorite, at the discovery site. (Credit: Imperial College London)

ScienceDaily (Sep. 20, 2009) — Researchers have discovered an unusual kind of meteorite in the Western Australian desert and have uncovered where in the Solar System it came from, in a very rare finding published in the journal *Science*.

Meteorites are the only surviving physical record of the formation of our Solar System and by analysing them researchers can glean valuable information about the conditions that existed when the early Solar System was being formed. However, information about where individual meteorites originated, and how they were moving around the Solar System prior to falling to Earth, is available for only a dozen of around 1100 documented meteorite falls over the past two hundred years.

Dr Phil Bland, the lead author of today's study from the Department of Earth Science and Engineering at Imperial College London, said: "We are incredibly excited about our new finding. Meteorites are the most analysed rocks on Earth but it's really rare for us to be able to tell where they came from. Trying to interpret what happened in the early Solar System without knowing where meteorites are from is like trying to interpret the geology of Britain from random rocks dumped in your back yard."

The new meteorite, which is about the size of cricket ball, is the first to be retrieved since researchers from Imperial College London, Ondrejov Observatory in the Czech Republic, and the Western Australian Museum, set up a trial network of cameras in the Nullarbor Desert in Western Australia in 2006.

The researchers aim to use these cameras to find new meteorites, and work out where in the Solar System they came from, by tracking the fireballs that they form in the sky. The new meteorite was found on the first day of searching using the new network, by the first search expedition, within 100m of the predicted site of the fall. This is the first time a meteorite fall has been predicted using only the data from dedicated instruments.

The meteorite appears to have been following an unusual orbit, or path around the Sun, prior to falling to Earth in July 2007, according to the researchers' calculations. The team believes that it started out as part of an asteroid in the innermost main asteroid belt between Mars and Jupiter. It then gradually evolved into an orbit around the Sun that was very similar to Earth's. The other meteorites that researchers have data for follow orbits that take them back, deep into the main asteroid belt.

The new meteorite is also unusual because it is composed of a rare type of basaltic igneous rock. The researchers say that its composition, together with the data about where the meteorite comes from, fits

with a recent theory about how the building blocks for the terrestrial planets were formed. This theory suggests that the igneous parent asteroids for meteorites like today's formed deep in the inner Solar System, before being scattered out into the main asteroid belt. Asteroids are widely believed to be the building blocks for planets like the Earth so today's finding provides another clue about the origins of the Solar System.

The researchers are hopeful that their new desert network could yield many more findings, following the success of their first meteorite search.

Dr Bland added: "We're not the first team to set up a network of cameras to track fireballs, but other teams have encountered problems because meteorites are small rocks and they're hard to find in vegetated areas. Our solution was quite simple - build a fireball network in a place where it's easy to find them. The Nullarbour Desert is ideal because there's very little vegetation and dark rocks show up really easily on the light desert plain.

"It was amazing to find a meteorite that we could track back to its origin in the asteroid belt on our first expedition using our small trial network. We're cautiously optimistic that this find could be the first of many and if that happens, each find may give us more clues about how the Solar System began," said Dr Bland.

The researchers' network of cameras takes a single time-lapse picture every night to record any fireballs in the sky. When a meteorite falls, researchers can then use complex calculations to uncover what orbit the meteorite was following and where the meteorite is likely to have landed, so that they can retrieve it.

Adapted from materials provided by Imperial College London.

http://www.sciencedaily.com/releases/2009/09/090917144123.htm

Uncertain Future Predicted For Forests

The shores of Lake Superior. The composition of some of our nation's forests may be quite different 200 to 400 years from today according to a recent study. (Credit: iStockphoto/Arpad Benedek)

ScienceDaily (Sep. 20, 2009) — The composition of some of our nation's forests may be quite different 200 to 400 years from today according to a recent study at the University of Illinois. The study found that temperature and photosynthetic active radiation were the two most important variables in predicting what forest landscapes may look like in the future. The uncertainties became very high after the year 2200.

Approximately 100,000 acres of forested area west of Lake Superior which make up the Boundary Waters Canoe Area was used for the study. Using computer models PnET-II and LANDIS-II, the researchers were able to simulate 209 possible scenarios, including 13 tree species and 27 possible climate profiles to predict how the landscape will look over time.

"The tools that we developed and we're using for the research project can be applied to any discipline dealing with risk and uncertainty in decision making," said U of I researcher George Gertner.

"We were dealing with the uncertainties in global change predictions using the projections established by the United Nations Intergovernmental Panel of Climate Change. These projections were based on different CO_2 reduction scenarios and global circulation models. "

The study found that the most important source of uncertainty in the forest composition prediction is from the uncertainty in temperature predictions. The second most important source is photosynthetic active radiation, the third is carbon dioxide, and the fourth is precipitation.

"The Boundary Waters Area is significant because it's a transitional area between boreal forests – like those in Canada, Russia, Sweden, and Norway – and temporal forests," Gertner said. "So, if there are changes in the climate you'll see the changes – if it gets warmer, the temporal forests will move north. Because of its proximity to Lake Superior, rainfall is not so critical there. It's very moist. So, if you were to do a similar sort of study, say, in Illinois, temperature may not cause so much uncertainty; rainfall might."

The research was done by a team consisting of George Gertner, a statistician and quantitative ecologist; Chonggang Xu, his Ph.D. student; and Robert Scheller, a landscape ecologist at the Conservation Biology Institute in Corvallis, Oregon. They drew from the disciplines of statistics and ecology to interpret the data collected to predict the future of the forest landscape.

"You have to have an understanding of the biology, physiology, as well as statistics as it relates to uncertainty. If you don't, then the results might not mean anything. You have to be able to interpret everything and make sure it all makes sense. "

Gertner explained that in traditional uncertainty analysis, the variables are considered to be independent of one another.

"But in reality, they are all interrelated. We try to account for the actual correlation of these inputs – these relationships. And that's where the methodology is new, because of that."

The relationships of the variables are more complicated than just raising the temperature and lowering the amount of rainfall. "One scenario might be if we establish a policy to reduce CO 2 greenhouse gas emissions by a certain level," Gertner said.

"If we have agencies around the world who adopt these policies to make these reductions, over time the scenarios predict what will happen, but with uncertainty."

The question is what to do about it? How to adapt? How to manage the forest for global change?

"The bottom line is that we have to have very robust systems that can handle this variability. It can't be rigid. If we have robust systems, whatever happens, it can handle it. Sustainability comes into play in the robustness. You try to manage those areas by having more diversity, not monocultures."

Gertner said that management can be easier with agricultural systems. "Over short intervals you can adapt very quickly. You can make big changes very quickly, but with a forest, the lifespan is 100, 200 years, so once you do something it's longer term. We need to be making policies now that will affect our forests hundreds of years from now."

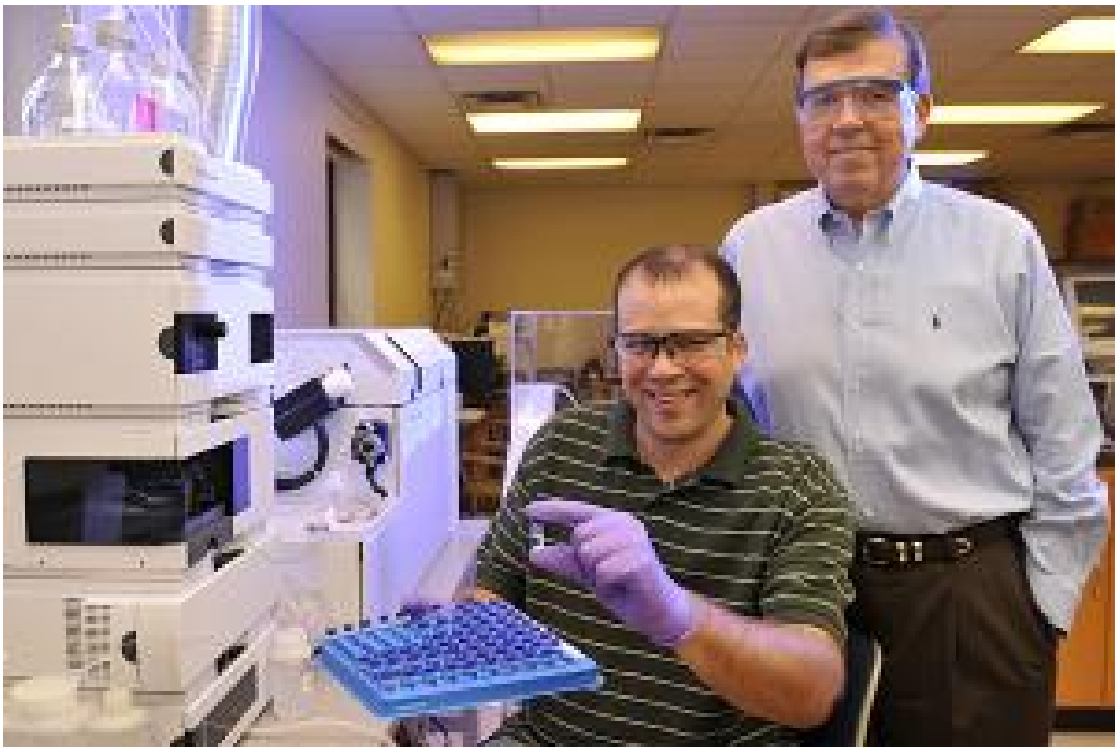
Uncertainties in the response of a forest landscape to global climatic change is published in Global Change Biology 2009.

Funding was provided by U.S. Department of Agriculture McIntire-Stennis funds and U.S. Army Corps of Engineers Construction Engineering Research Laboratory funds.

Adapted from materials provided by University of Illinois at Urbana-Champaign, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090915140932.htm

New X-ray Technique Illuminates Reactivity Of Environmental Contaminants



Matthew Ginder-Vogel, left, and Donald Sparks, S. Hallock du Pont Chair of Plant and Soil Sciences and director of the Delaware Environmental Institute at University of Delaware. (Credit: Image courtesy of University of Delaware)

ScienceDaily (Sep. 20, 2009) — A chemical reaction can occur in the blink of an eye.

Thanks to a new analytical method employed by researchers at the University of Delaware, scientists can now pinpoint, at the millisecond level, what happens as harmful environmental contaminants such as arsenic begin to react with soil and water under various conditions.

Quantifying the initial rates of such reactions is essential for modeling how contaminants are transported in the environment and predicting risks.

The research method, which uses an analytical technique known as quick-scanning X-ray absorption spectroscopy (Q-XAS), was developed by a research team led by Donald Sparks, S. Hallock du Pont Chair of Plant and Soil Sciences and director of the Delaware Environmental Institute at UD. The work is reported in the Sept. 10 Early Edition of the *Proceedings of the National Academy of Sciences* and will be in the Sept. 22 print issue.

Postdoctoral researcher Matthew Ginder-Vogel is the first author of the study, which also involved Ph.D. student Gautier Landrot and Jason Fischel, an undergraduate student at Juniata College who has interned in Sparks's lab during the past three summers.

The research method was developed using beamline X18B at the National Synchrotron Light Source at Brookhaven National Laboratory in Upton, N.Y. The facility is operated by the U.S. Department of Energy.

“This method is a significant advance in elucidating mechanisms of important geochemical processes, and is the first application, at millisecond time scales, to determine in real-time, the molecular scale

reactions at the mineral/water interface. It has tremendous applications to many important environmental processes including sorption, redox, and precipitation," Sparks said.

"My group and I have been conducting kinetics studies on soils and soil minerals for 30 years," Sparks added. "Since the beginning I have been hopeful that someday we could follow extremely rapid reaction processes and simultaneously collect mechanistic information."

X-ray spectroscopy was invented years ago to illuminate structures and materials at the atomic level. The technique has been commonly used by physicists, chemists, materials scientists, and engineers, but only recently by environmental scientists.

"In studying soil kinetics, we want to know how fast a contaminant begins to stick to a mineral," Ginder-Vogel says. "In general, these reactions are very rapid -- 90 percent of the reaction is over in the first 10 seconds. Now we can measure the first few seconds of these reactions that couldn't be measured before. We can now look at things as they happen versus attempting to freeze time after the fact," he notes.

For their study, the UD researchers made millisecond measurements of the oxidation rate of arsenic by hydrous manganese oxide, which is a mineral that absorbs heavy metals and nutrients.Contamination of drinking water supplies by arsenic is a serious health concern in the United States and abroad. The poisonous element occurs naturally in rocks and minerals and is also used in a wide range of products, from wood preservatives and insecticides, to poultry feed.The toxicity and availability of arsenic to living organisms depends on its oxidation state -- in other words, the number of electrons lost or gained by an atom when it reacts with minerals and microbes. For example, arsenite [As(III)] is more mobile and toxic than its oxidized counterpart, arsenate [As(V)].

"Our technique is important for looking at groundwater flowing through minerals," Ginder-Vogel notes. "We look at it as a very early tool that can be incorporated into predictive modeling for the environment."A native of Minnesota, Ginder-Vogel started out as a chemist in college, but says he wanted to do something more applied. As he was completing his doctorate at Stanford University under Prof. Scott Fendorf, a UD alumnus who studied under Sparks, Ginder-Vogel saw the advertisement for a postdoctoral position in Sparks's lab and jumped at the opportunity.

"The University of Delaware has the reputation as one of the best research institutions in the country for soil science, and Don Sparks is a leader in the field," Ginder-Vogel notes.Ginder-Vogel says one of the coolest things about the current research is its interdisciplinary nature."What's novel about soil chemistry is that we can take bits of pieces from different fields -- civil and environmental engineering, materials science, chemistry, and biochemistry -- and apply it in unique ways," he says. "It's fun to contribute to a new research method in our field."

The research was funded by the U.S. Department of Agriculture (USDA) and by two grants from the National Science Foundation, including one from the NSF-Delaware Experimental Program to Stimulate Competitive Research (EPSCoR). The U.S. Department of Energy supported the research team's use of the National Synchrotron Light Source.

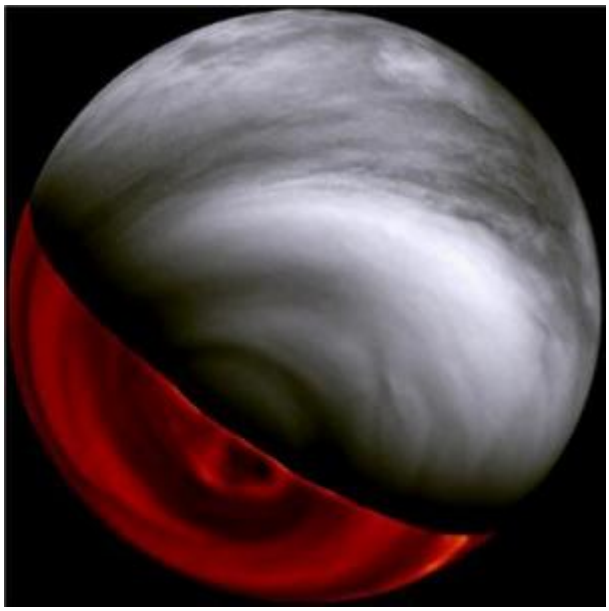
Journal reference:

1. Matthew Ginder-Vogel, Gautier Landrot, Jason S. Fischel, and Donald L. Sparks. **Quantification of rapid environmental redox processes with quick-scanning x-ray absorption spectroscopy (Q-XAS)**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0908186106

Adapted from materials provided by University of Delaware.

http://www.sciencedaily.com/releases/2009/09/090915174504.htm

Venus Express Adds Evidence For Atmospheric Water Loss On Earth's Twin



Global view of Venus in a combination of ultraviolet VMC and infrared VIRTIS images. (Credit: ESA/VIRTIS & VMC Teams)

ScienceDaily (Sep. 20, 2009) — Observations by the European Space Agency's Venus Express mission have provided strong new evidence that the solar wind has stripped away significant quantities of water from Earth's twin planet. The data also shed new light on the transfer of trace gases in the Venusian atmosphere and wind patterns.

The results will be presented at the European Planetary Science Congress in Potsdam, Germany, on Wednesday 16 September.

The SPICAV and VIRTIS instruments carried by the spacecraft have been used to measure concentrations of water vapour in the Venusian atmosphere at altitudes ranging from the lowest 10 km up to 110 km, high above the cloud tops. Studies led by scientists from Belgium and Russia have found that the ratio of heavy water, which contains the isotope deuterium instead of hydrogen, to normal water is nearly twice as high above the clouds compared to its value in the lower atmosphere.

"Water vapour is a very rare species in the Venusian atmosphere: if it were in liquid form now, it would cover the surface of Venus with just a few centimetres of water. However, we believe Venus once had large volumes of water that have since escaped into space or stripped away by the solar wind. These results from Venus Express demonstrate that the heavier water containing deuterium has not been able to escape Venus's gravity as easily as normal H_2O. This enrichment of heavy water provides strong evidence that water loss is occurring in the upper atmosphere and that Venus was probably more humid and Earth-like in the distant past," said Dr Emmanuel Marcq of the LATMOS laboratory in France.

A team led by Dr Marcq has also used SPICAV to study the variation of sulphur dioxide with latitude and found that there is a gradual decrease of concentrations of the gas towards the poles.

"This fits well with our knowledge of global circulation," said Dr Marcq. "Incoming energy from the Sun is redistributed so that the atmosphere rises near the equator and subsequently falls towards the poles. We also see a decrease in the amounts of sulphur dioxide in the upper atmosphere, where it is destroyed by ultraviolet radiation. Globally, our measurements confirm the downward trend in sulphur dioxide

concentrations since the first measurements were made in the 1970s, which indicates that there may be active volcanism on Venus, although it has never been directly observed yet."

The VIRTIS and VMC team has also been able to measure the velocity of the wind at different altitudes in Venus atmosphere by analysing observations in different wavelengths. The cloud tops at an altitude of 70 kilometres reflect visible and ultraviolet light on day side. The lower atmosphere can be viewed on the night side in infrared wavelengths, in which radiation escapes from the lower atmosphere and the surface through narrow spectral intervals called "transparency windows".

Observations of the lower cloud layer over a two year period show that the wind is nearly constant in time with no seasonal effects or variations linked to the position of the Sun in the Venusian sky. A study, led by Dr Ricardo Hueso at the Universidad País Vasco, has found that variations in the intensity of the wind happen from time to time, especially in subpolar regions close to 65ºS latitude.

"The variations seem to be linked to the polar vortex which may affect latitudes beyond its overall location, however we don't yet have an explanation as to how this occurs," said Dr Hueso.

Previous studies have shown that East-West wind speeds are very high, reaching 400km/h in the upper clouds at equatorial latitudes and 230 km/h in the lower cloud at tropical latitudes. However, the new analysis also shows that there is almost no wind in meridional (North-South) directions between tropical and subpolar latitudes in the lower cloud, which is in contrast to wind speeds of around 35 km/h in the upper clouds flowing from tropics to the pole transporting heat. Intriguingly, particular structures in the lower cloud layer may still travel North and South in this region with significant velocities of up to 40 km/h.

"Most of the cloud structures in the lower cloud do not travel in the meridional direction but sometimes some of them travel Northwards and others Southwards. The average of all these turbulent and chaotic motions is very close to zero but rarely some structures can travel at these high speeds of 40 km/h to the North or the South. When we have been able to analyse further these turbulent motions in the lower cloud, we might discover important hints to the origin of the atmospheric super-rotation and finally solve the big mystery of why the winds on Venus flow faster than the planet's rotation," said Dr Hueso.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090916092536.htm

Impact Of Renewable Energy On Our Oceans Must Be Investigated, Say Scientists

Dolphin. Scientists are calling for urgent research to understand the impact of renewable energy developments on marine life. (Credit: Dr Matthew Witt, University of Exeter.)

ScienceDaily (Sep. 20, 2009) — Scientists from the Universities of Exeter and Plymouth are calling for urgent research to understand the impact of renewable energy developments on marine life. The study, now published in the *Journal of Applied Ecology*, highlights potential environmental benefits and threats resulting from marine renewable energy, such as off-shore wind farms and wave and tidal energy conversion devices.

The research highlights the capacity for marine renewable energy devices to boost local biodiversity and benefit the wider marine environment. Man-made structures on the sea bed attract many marine organisms and sometimes become 'artifical reefs', for example, supporting a wide variety of fish. The study also points out that such devices could have negative environmental impacts, resulting from habitat loss, collision risks, noise and electromagnetic fields.

The study highlights the gaps in our understanding of the effects of marine renewable energy devices on the health of our oceans. The team calls for more research to improve our understanding of these threats and opportunities. The researchers also stress the importance of considering the impact on marine life when selecting locations for the installation of marine energy devices.

Corresponding author Dr Brendan Godley of the University of Exeter said: "Marine renewable energy is hugely exciting and it is vital that we explore the potential for it to provide a clean and sustainable energy source. However, to date research into the impact of marine renewable energy on sea life has been very limited. . Our study highlights the urgent need for more research into the impacts of marine renewable energy on marine life. This will involve biologists, engineers and policy-makers working together to ensure we really understand the risks and opportunities for marine life."

Professor Martin Attrill, Director of the University of Plymouth Marine Institute said: "Our paper highlights the need to take a fresh look at the effect marine renewable energy generation has on the environment if we are to deliver a higher proportion of energy from renewable sources and start to combat climate change. We need to have the industry working directly with conservation bodies to plan

the next phase of development. We suggest further research could demonstrate the potential of security zones around, for example, wave farms to act as Marine Protected Areas. Therefore, if all stakeholders can work together in a coordinated way we can possibly address two key issues - combating climate change and creating a network of MPAs. We need the research on environmental impact to help move the whole field forward."

This study was carried out by PRIMaRE (the Peninsula Research Institute for Marine Renewable Energy), a joint £15 million institute for research into harnessing the energy from the sea bringing together the technology and marine expertise of the Universities of Exeter and Plymouth.

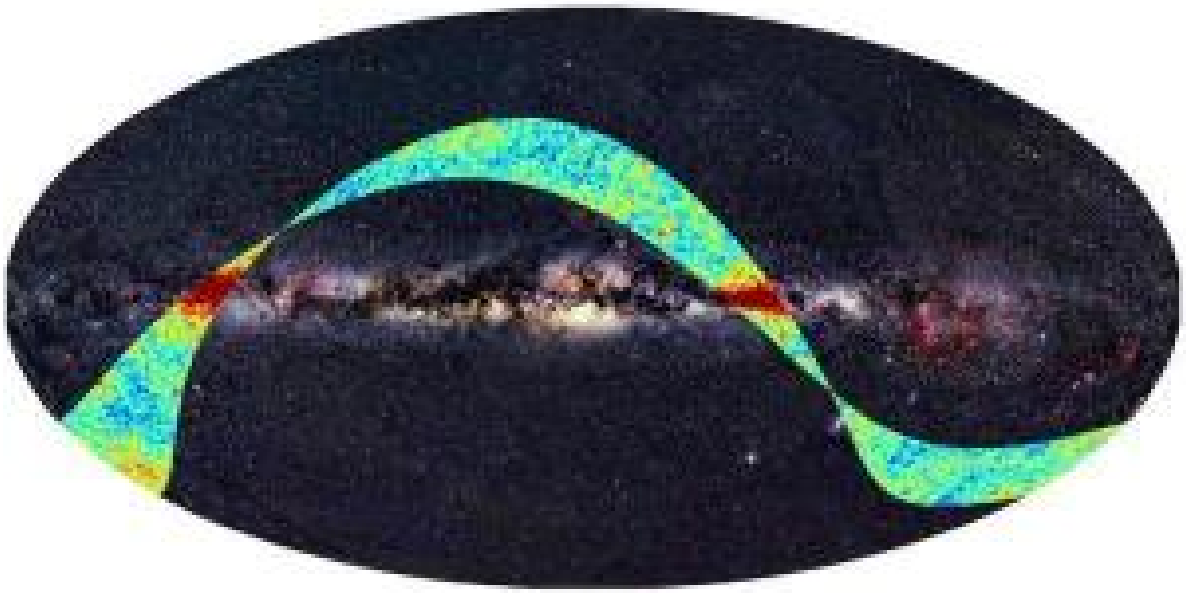
Journal reference:

1. Inger et al. **Marine renewable energy: potential benefits to biodiversity? An urgent call for research**. *Journal of Applied Ecology*, 2009; DOI: 10.1111/j.1365-2664.2009.01697.x

Adapted from materials provided by University of Exeter.

http://www.sciencedaily.com/releases/2009/09/090917111511.htm

Planck Snaps Its First Images Of Ancient Cosmic Light



A map of the sky at optical wavelengths shows a prominent horizontal band which is the light shining from our own Milky Way. The superimposed strip shows the area of the sky mapped by Planck during the First Light Survey. (Credit: ESA, LFI & HFI Consortia. Background optical image: Axel Mellinger)

ScienceDaily (Sep. 20, 2009) — Preliminary results from ESA's Planck mission to study the early Universe indicate that the data quality is excellent. This bodes well for the full sky survey that has just begun.

Planck started surveying the sky regularly from its vantage point at the second Lagrange point of the Sun-Earth system, L2, on 13 August. The instruments were fine-tuned for optimum performance in the period preceding this date.

ESA's Planck microwave observatory is the first European mission designed to study the Cosmic Microwave Background – the relic radiation from the Big Bang.

Following launch on 14 May, checkouts of the satellite's subsystems were started in parallel with the cool-down of its instruments' detectors. The detectors are looking for variations in the temperature of the Cosmic Microwave Background that are about a million times smaller than one degree – this is comparable to measuring from Earth the body heat of a rabbit sitting on the Moon. To achieve this, Planck's detectors must be cooled to extremely low temperatures, some of them being very close to absolute zero (–273.15°C, or zero Kelvin, 0K).

With check-outs of the subsystems finished, instrument commissioning, optimisation, and initial calibration was completed by the second week of August.

The 'first light' survey, which began on 13 August, was a two-week period during which Planck surveyed the sky continuously. It was carried out to verify the stability of the instruments and the ability to calibrate them over long periods to the exquisite accuracy needed.

This survey was completed on 27 August, yielding maps of a strip of the sky, one for each of Planck's nine frequencies. Each map is a ring, about 15° wide, stretching across the full sky. Preliminary analysis indicates that the quality of the data is excellent.

Routine operations started as soon as the first light survey was completed, and surveying will now continue for at least 15 months without a break. In approximately 6 months, the first all-sky map will be assembled.

Within its allotted operational life of 15 months, Planck will gather data for two complete sky maps. To fully exploit the high sensitivity of Planck, the data will require delicate adjustments and careful analysis. It promises to return a treasure trove that will keep both cosmologists and astrophysicists busy for decades to come.

Adapted from materials provided by European Space Agency.

http://www.sciencedaily.com/releases/2009/09/090917111503.htm

Majority Of Unintended Incidents In The Emergency Room Are Caused By Human Error, Study Finds

ScienceDaily (Sep. 20, 2009) — Sixty percent of the causes of unintended incidents in the emergency department that could have compromised patient safety are related to human failures, according to a study published in the open access journal *BMC Emergency Medicine*.

Hospitals and emergency departments are challenging settings with regard to patient safety -- a considerable number of patients suffer from unintended harm caused by healthcare management. Little is known about the causes of unintended events and, thus, these results from Marleen Smits and colleagues from Netherlands Institute for Health Services Research and EMGO Institute for Health and Care Research, may help to target research and interventions to increase patient safety.

The Dutch team studied emergency departments at 10 hospitals in the Netherlands for 8-14 weeks, during which staff were asked to report unintended events, defined as all unintended incidents that could have harmed or did harm a patient.

A total of 522 unintended events were reported, of which more than half of the events had consequences for the patient. A quarter of the reported events related to cooperation between the emergency department and other hospital departments. The team found that most root causes were human (60%), followed by organizational (25%) and technical (11%). Nearly half of the causes were attributable to departments outside the emergency department, such as the laboratory.

Event reports are internationally relevant for healthcare providers and policy makers in the area of emergency medicine. Smits said, "Patient safety in the emergency setting should be improved, especially the collaboration with other hospital departments".

All general hospitals in the Netherlands participate in the safety program "Prevent harm, work safely". They are setting up safety management systems that include incident reporting systems. Moreover, hospitals follow action plans on 10 themes with a high potential for reduction of unintended harm, for example, early detection of a decline in a patient's vital signs, medication verification and prevention of substitutions of patients.

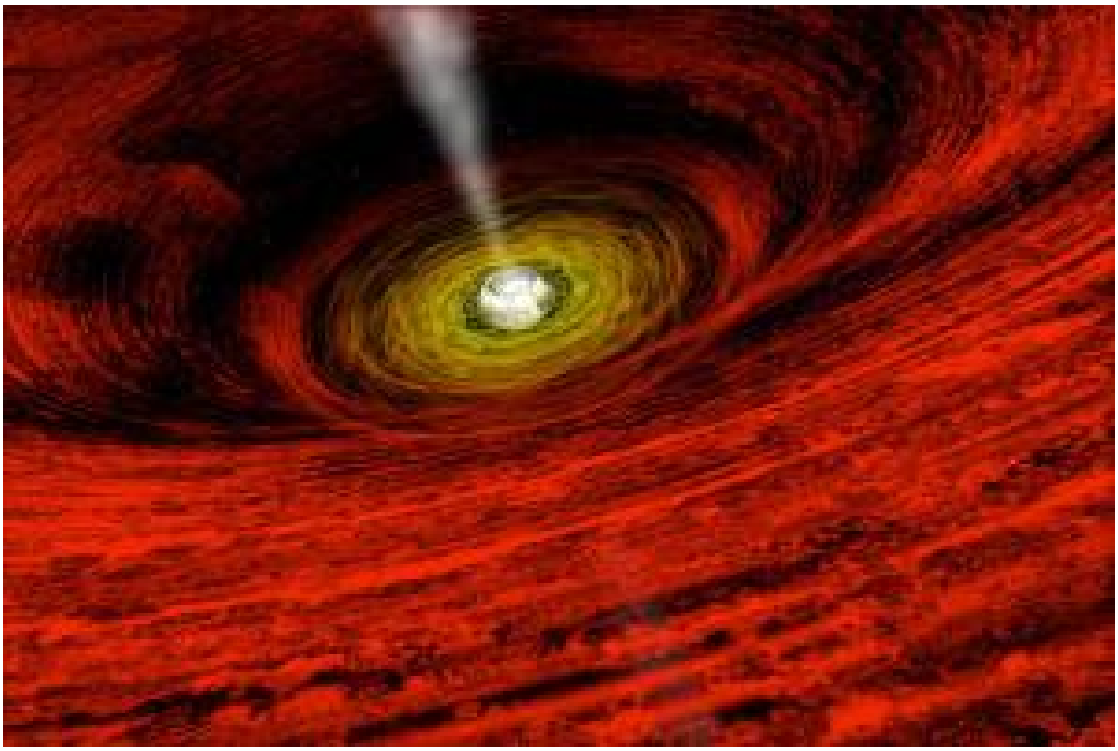
Journal reference:

1. Marleen Smits, Peter P Groenewegen, Danielle RM Timmermans, Gerrit van der Wal and Cordula Wagner. **The nature and causes of unintended events reported at ten emergency departments**. *BMC Emergency Medicine*, 2009; (in press) [link]

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

http://www.sciencedaily.com/releases/2009/09/090917191603.htm

Invading Black Holes Explain Cosmic Flashes



Artist's concept: In the center of a swirling whirlpool of hot gas is likely a beast that has never been seen directly: a black hole. (Credit: A. Hobart, CXC)

ScienceDaily (Sep. 19, 2009) — Black holes are invading stars, providing a radical explanation to bright flashes in the universe that are one of the biggest mysteries in astronomy today.

The flashes, known as gamma ray bursts, are beams of high energy radiation – similar to the radiation emitted by explosions of nuclear weapons – produced by jets of plasma from massive dying stars.

The orthodox model for this cosmic jet engine involves plasma being heated by neutrinos in a disk of matter that forms around a black hole, which is created when a star collapses.

But mathematicians at the University of Leeds have come up with a different explanation: the jets come directly from black holes, which can dive into nearby massive stars and devour them.

Their theory is based on recent observations by the Swift satellite which indicates that the central jet engine operates for up to 10,000 seconds - much longer than the neutrino model can explain.

Mathematicians believe that this is evidence for an electromagnetic origin of the jets, i.e. that the jets come directly from a rotating black hole, and that it is the magnetic stresses caused by the rotation that focus and accelerate the jet's flow.

For the mechanism to operate the collapsing star has to be rotating extremely rapidly. This increases the duration of the star's collapse as the gravity is opposed by strong centrifugal forces.

One particularly peculiar way of creating the right conditions involves not a collapsing star but a star invaded by its black hole companion in a binary system. The black hole acts like a parasite, diving into

the normal star, spinning it with gravitational forces on its way to the star's centre, and finally eating it from the inside.

"The neutrino model cannot explain very long gamma ray bursts and the Swift observations, as the rate at which the black hole swallows the star becomes rather low quite quickly, rendering the neutrino mechanism inefficient, but the magnetic mechanism can," says Professor Komissarov from the School of Mathematics at the University of Leeds.

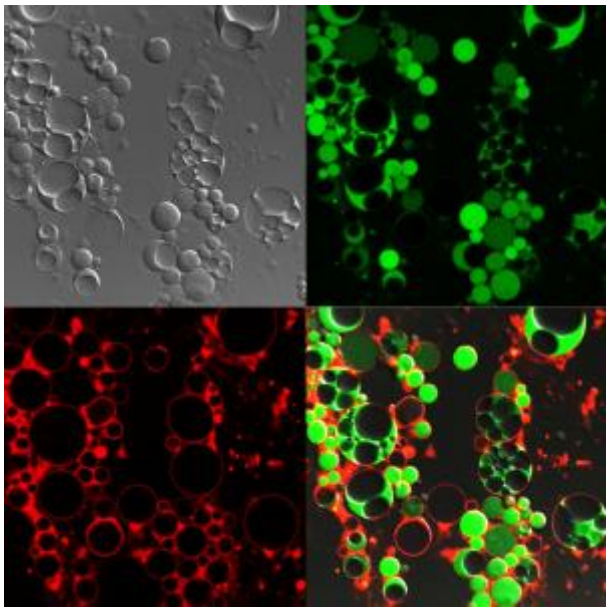
"Our knowledge of the amount of the matter that collects around the black hole and the rotation speed of the star allow us to calculate how long these long flashes will be – and the results correlate very well with observations from satellites," he adds.

The research is published in the *Monthly Notices of the Royal Astronomical Society* and funded by the Science and Technology Facilities Council in the UK.

Adapted from materials provided by University of Leeds.

http://www.sciencedaily.com/releases/2009/09/090918100015.htm

Listeria L-forms: Discovery Of An Unusual Form Of Bacterial Life



ETH Zurich researchers used state-of-the-art imaging methods to observe the cell-wall deficient Listeria L-forms.

ScienceDaily (Sep. 19, 2009) — ETH Zurich researchers have discovered a new life form of *Listeria monocytogenes*, an opportunistic pathogen responsible for serious food poisoning. These bacteria can reproduce and proliferate as so-called L-forms. The methods to detect these bacteria should now be adapted.

For over 100 years, it was known that bacteria may lose their cell wall and can still survive. However, it was believed that this phenomenon was merely an artefact and that bacteria without cell walls do not remain viable. Recent research of a group headed by ETH Zurich Professor Martin J. Loessner, which has just been published in *Molecular Microbiology*, shows that bacteria without a cell wall can be a stable form of bacterial life. Astonishingly, not only can Listeria survive without a cell wall, they are even able to reproduce and proliferate.

From cheese to the brain

Listeria (*Listeria monocytogenes)* are pathogens causing dangerous and often fatal cases of food-borne infections, and are frequently found in milk products such as vacherin soft cheese. The bacteria invade the human body through the epithelial cells of the intestine and spread from cell to cell., which renders them invisible to the immune system. Listeria can cross both the blood-brain barrier and the placenta barrier. Having reached the brain, they cause severe inflammation of the brain, which can be fatal. Listeria can also endanger fetuses and pregnant women.

Membrane instead of a cell wall

Listeria cells normally appear as small rods. If they shed their cell wall, e.g. through contact with certain antibiotics such as penicillin, they become spherical and enlarge greatly. These cell wall deficient cells are surrounded by a single membrane only. As an intermediate stage between this L-form and the rod-shaped parental cells, there is an intermediate stage from which the bacteria can rebuild their cell wall. However, once Listeria has reached the complete L-form status, there may be no way back.

The change from the normal form to the L-form is accompanied by many changes in cell metabolism and gene activity. Almost 280 of the genes of normal and L-form Listeria showed differing activity. While genes responsible for stress regulation were activated in the L-forms, genes for metabolism and energy balance were strongly repressed. The researchers interpret this as the bacterial response and active adaptation to its new lifestyle. Loessner says "L-form Listeria really have a very stressful life."

"Culturing" the L-forms of bacteria is not easy. They need to be "bred" in a liquid medium and do not normally form colonies, so plating on a petri dish is not possible. Although L-form Listeria cells are capable of reproducing themselves, this can take time: formation of a visible colony within tubes containing a soft medium takes at least six days, compared to 16 to 20 hours for normal cells.

A new mechanism of division

The researchers were amazed by their observations on how mother cells produce L-form daughter cells. First, new vesicles form inside the large L-form cells. When these are large enough, the mother cell bursts and releases the daughter cells. At this point, these have the full genetic make-up of the mother cell, but it is still unclear how the genetic material is transferred. Interestingly, their metabolism does not start up until they have been released from the mother cell.

L-forms can grow in milk

The researchers had a reason for investigating this strange form of bacterial life: a large epidemic of Listeria with many fatalities in the US about 20 years ago. Although it is clear that this was the result of the consumption of contaminated milk, and the pathogens could be detected both on the farm from which the milk originated and in the patients who had consumed the milk, Laboratories were unable to find Listeria in the milk itself. One possible explanation is that the bacteria had been present in the milk in their reversible L-form and had thus been undetectable. Loessner says, "This is because the L-form can reproduce in milk just as well as under laboratory conditions."

L-form Listeria can also outwit the immune system. Although macrophages, i.e. phagocytes, ingest the spherules, they seem unable to kill them in a timely fashion. While normal Listeria cells are killed after about 30 minutes, the L-forms can survive for much longer inside a macrophage. The ETH Zurich professor feels that "the immune system may have a problem if macrophages cannot recognise the L-forms as a pathogen."

Pathologists sometimes reported small bubble-shaped objects in brain sections from animals that had died of listeriosis, but it has hitherto been impossible to classify these properly. Loessner hypothesizes that these could also have involved L-form Listeria.

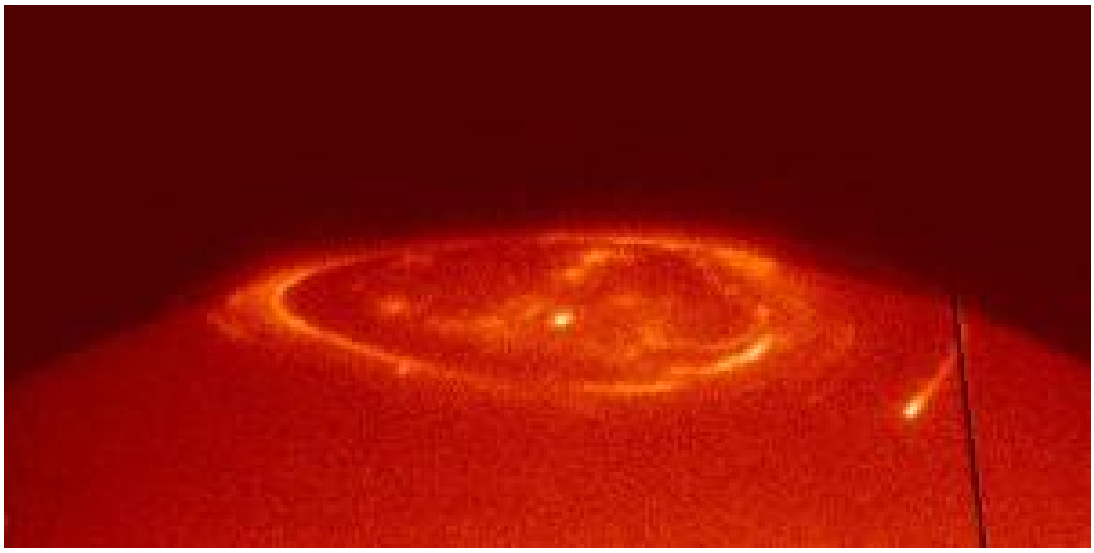
Journal reference:

1. Dell'Era S, Buchrieser C, Couvé E, Schnell B, Briers Y, Schuppler M, Loessner MJ. **Listeria monocytogenes L-forms respond to cell wall deficiency by modifying gene expression and the mode of division**. *Molecular Microbiology*, 73:306-322; Online: Jun 23 2009 DOI: 10.1111/j.1365-2958.2009.06774.x

Adapted from materials provided by ETH Zurich.

http://www.sciencedaily.com/releases/2009/09/090912145843.htm

Ganymede Makes Big Impression On Jupiter's Auroral Lightshows



Last frame of movie showing the northern auroral region of Jupiter. Actual duration of sequence ~30 minutes. The bulk of the aurora rotates with the planet. (Credit: Grodent/HST Team)

ScienceDaily (Sep. 19, 2009) — Studies of features in Jupiter's spectacular and rapidly changing aurorae have given new insights into the complex electromagnetic interactions between the giant planet and two of its innermost moons.

As Ganymede and Io orbit Jupiter, they interact with regions of plasma and generate electromagnetic waves that are projected along Jupiter's magnetic field lines towards Jupiter's poles where they cause auroral bright spots. Scientists from the University of Liège in Belgium have used thousands of images taken by the Hubble Space Telescope in ultraviolet wavelengths to monitor these auroral features in unprecedented detail.

"Each of these auroral structures is telling an ongoing story about vast transfers of energy taking place far away from the planet. By analysing the exact locations of these features and how their shape and brightness changes as Io and Ganymede move in their orbit around Jupiter, we have created the most detailed picture to date of how Jupiter and these moons are electromagnetically interconnected," said Dr Denis Grodent, who will be presenting results at the European Planetary Science Congress in Potsdam, Germany, on Thursday 17 September.

Uniquely amongst Jupiter's moons, Ganymede has a strong enough magnetic field to carve a protective magnetic bubble within Jupiter's powerful magnetosphere. Analysis of the Hubble images by Grodent and his colleagues has allowed them to measure accurately the size of the Ganymede auroral footprint for the first time. They have found that it is too big to be a simple projection of Ganymede's cross-section. However, using a three-dimensional computer model to map the footprint back along the field lines, the team has found that it corresponds well with the diameter of Ganymede's mini-magnetosphere.

In addition, the sequences of Hubble images revealed unexpected brightness variations of Ganymede's auroral footprint at three different timescales: 100 seconds, 10 to 40 minutes, and 5 hours.

"Each of these timescales appears to refer to a specific aspect of the Ganymede-Jupiter interaction and allows us to identify possible actors of this interaction. The 5 hour variation appears to be linked to the rotational period of Jupiter's magnetic field and the movement of Ganymede through the tilted plasma sheet that surrounds the planet. The 10-40 minute variations could be due to sudden changes in energy due to plasma being injected into the system and the 100 second pulses may be linked to bursts of

magnetic energy being suddenly released when Jupiter and Ganymede's magnetic field lines connect. However, we are not sure at this stage," said Dr Grodent.

The team has also mapped the positions of all possible locations of the auroral footprint of Jupiter's volcanically active moon, Io, with unprecedented accuracy. Io's footprint consists of a series of spots and a long tail that swirls out about 30 000 km in the direction of the planet's rotation. The angle of observation in some of the Hubble images has allowed the team to measure the altitude of the tail for the first time with accuracy.

"We found that the tail is at an altitude of approximately 900 km above Jupiter's cloud tops. Interestingly, although the brightness of the tail decreases as it gets further away from the main spot, the altitude remains relatively constant. We also saw spectral absorption indicating that methane is present, which is unexpected at such a high altitude," said Dr Bertrand Bonfond.

Io's footprint arises as a result of the moon's motion through a doughnut-shaped torus of charged particles, which accumulates along Io's orbit from material ejected by its volcanoes. In this flow of particles Io acts as a boulder in a stream, generating powerful waves that propagate towards Jupiter's poles. These waves have the special property to project electrons in both directions along the magnetic field lines and when these electrons finally hit Jupiter's atmosphere they create aurora in the form of luminous spots. In addition, Io drags on the plasma, briefly slowing it down, and when the plasma is reaccelerated to normal speed it generates electric currents that form the tail.

The team's analysis shows that the charged particles that generate Io's auroral features have a wide range of energies, meaning that some electrons penetrate deep into the atmosphere while others lose most of their energy in the upper atmosphere.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090916223913.htm

Ego City: Cities Are Organized Like Human Brains

Cities are organized like brains, and the evolution of cities mirrors the evolution of human and animal brains, according to a new study by researchers at Rensselaer Polytechnic Institute. (Credit: Rensselaer/Mark Changizi)

ScienceDaily (Sep. 19, 2009) — Cities are organized like brains, and the evolution of cities mirrors the evolution of human and animal brains, according to a new study by researchers at Rensselaer Polytechnic Institute.

Just as advanced mammalian brains require a robust neural network to achieve richer and more complex thought, large cities require advanced highways and transportation systems to allow larger and more productive populations. The new study unearthed a striking similarity in how larger brains and cities deal with the difficult problem of maintaining sufficient interconnectedness.

“Natural selection has passively guided the evolution of mammalian brains throughout time, just as politicians and entrepreneurs have indirectly shaped the organization of cities large and small,” said Mark Changizi, a neurobiology expert and assistant professor in the Department of Cognitive Science at Rensselaer, who led the study. “It seems both of these invisible hands have arrived at a similar conclusion: brains and cities, as they grow larger, have to be similarly densely interconnected to function optimally.”

As brains grow more complex from one species to the next, they change in structure and organization in order to achieve the right level of interconnectedness. One couldn’t simply grow a double-sized dog brain, for example, and expect it to have the same capabilities as a human brain. This is because, among other things, a human brain doesn’t merely have more “dog neurons,” but, instead, has neurons with a greater number of synapses than that of a dog – something crucial in helping to keep the human brain well connected.

As with brains, interconnectedness is also a critical component of the overall function of cities, Changizi said. One couldn’t put together three copies of Seattle (surface area of 83.9 sq. miles) and expect the result to have the same interconnectedness and efficiency as Chicago (surface area of 227.1 sq. miles). There would be too many highways with too few exits and lanes that are too narrow.

In exploring this topic, Changizi discovered evidence linking the size of a city or a brain to the number and size of its supporting infrastructure. He investigated and documented how the infrastructures scale up as the surface area of brains and cities increase.

As cities and the neocortex grow in surface area, the number of connectors – highways in cities and pyramidal neurons in brains – increases more slowly, as surface area to the 3/4 power, Changizi found. This means the number of connectors increases in both brains and cities as S3/4, where S = surface area. Similarly, as cities and brains grow, the total number of highway exits and synapses — which share a similar function as terminal points along highways and neurons — increases with an exponent of about 9/8. The number of exits per highway and synapses per neuron were also closely aligned, with an exponent of approximately 3/8.

These and other findings are detailed in the paper "Common Scaling Laws for City Highway Systems and the Mammalian Neocortex," published this week in the journal Complexity. The complete paper may be viewed online at the Complexity Web site.

"When scaling up in size and function, both cities and brains seem to follow similar empirical laws," Changizi said. "They have to efficiently maintain a fixed level of connectedness, independent of the physical size of the brain or city, in order to work properly."

Marc Destefano, clinical assistant professor in the Department of Cognitive Science at Rensselaer, co-authored the paper.

Adapted from materials provided by Rensselaer Polytechnic Institute.

http://www.sciencedaily.com/releases/2009/09/090903163945.htm

Audio labels to help blind people

By Geoff Adams-Spink
Age & disability correspondent, BBC News

A device that allows blind people to attach and read audio labels on everyday objects has gone on show.

The PenFriend uses minute barcodes which - when scanned by a digital pen - trigger MP3 files recorded on the unit.

It has been developed by a UK firm together with the Royal National Institute of Blind People (RNIB).

It costs less than £60, and can be used to label foods and medication as well as clothing, personal documentation and film and music collections.

"At the moment we are just scratching the surface: we are starting development of address books, organisers, diaries and calendars," explained Alison Long of the RNIB.

'Software secret'

The PenFriend is the result of collaboration between the charity and London-based company, Mantra Lingua.

It uses optical identification technology (OID) to print microdots on to adhesive labels which are then read by the scanner in the tip of the PenFriend.

This in turn triggers an MP3 file, usually of the user's own voice, giving a spoken description of the item that is labelled.

It can hold up to 70 hours of audio recordings and can also be used as a standard MP3 player.

This means that people are not limited to just a few seconds to describe the object being labelled.

Information such as a food item's sell-by date, its ingredients and even cooking instructions can be included.

In the case of medication, the purchase date and dosing instructions can be added.

Mantra Lingua originally used a talking pen device with its children's books and approached the RNIB to see whether it would be useful for vision-impaired children.

Coincidentally, the charity had been looking for a low-cost labelling product.

"We saw the potential in the talking pen and commissioned them [Mantra Lingua] to develop and manufacture the PenFriend," explained Ms Long.

She says that the secret of the device is in the software that reads the microdot barcodes.

Audio labelling is not a new idea, but previous versions tended to use more expensive Radio Frequency Identification (RFID) tags to label products.

"This is exciting because it's giving people independence at an affordable price and without being technical," said Ms Long.

"We've already had a lot of positive feedback - so many letters from people who have said it has changed their lives."

It was on show at the RNIB Techshare exhibition in London's Docklands.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/8263262.stm

Published: 2009/09/21 12:35:22 GMT

Over-55s 'less aware on cancer'

People aged over 55 are less aware than younger adults of how to reduce their risk of cancer, a UK survey suggests.

A survey of 2,000 people found those in that age group were less likely to know that poor diet, being overweight and drinking alcohol all increase risk.

The World Cancer Research Fund said it is estimated healthier lifestyles could prevent a third of common cancers.

Cancer Research UK said the survey results were worrying given the disease is primarily one of old age.

The YouGov survey of almost 2,000 people found that 56% of the over-55s were aware a poor diet increases the risk of cancer, compared with 60% of younger adults.

" **No matter how old you are, you can make lifestyle changes that can reduce your cancer risk** "
Lisa Cooney World Cancer Research Fund

Some 54% of the older age group knew that being overweight is another risk factor, compared with 59% of the under-55s.

A lower proportion of the over-55s than younger adults pointed to being physically active and limiting alcohol intake as ways to reduce cancer risk.

However, the survey did show that awareness overall of cancer risks had increased in the past couple of years.

'Convincing evidence'

The World Cancer Research Fund, which commissioned the survey, said there was convincing scientific evidence that all the lifestyle factors featured in the survey were associated with the risk of cancer.

Lisa Cooney, WCRF head of education, said: "The scientific evidence that we can reduce our cancer risk by making healthy lifestyle choices is overwhelming, so it is a real concern that so many older people are not aware of this.

"This is because if people do not know what increases and reduces risk then they are not in a position to make informed choices about their lifestyle.

"We need to get the message across that it is never too late to start thinking about cancer prevention."

She added there was still a long way to go in raising public awareness of the health issues to the levels seen with smoking.

Jessica Harris, health information officer at Cancer Research UK, said: "Living a healthy life can have a real impact on cancer risk, so we want everyone to know about the positive steps they can take to reduce their risk of cancer.

"It's worrying to see that awareness of these risks is lower among older people, especially since three-quarters of cancers are in people aged 60 or over."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8260494.stm

Published: 2009/09/20 23:44:12 GMT

Dementia burden 'underestimated'

The future global burden of Alzheimer's and other types of dementia has been underestimated, say UK experts.

A report from King's College London suggests more than 115 million people across the globe will suffer from dementia by 2050.

This prediction is 10% more than previous figures published in 2005, driven mainly by new figures from South Asia and Latin America.

The Alzheimer's Society said the data showed the "scale of the challenge".

The rise in dementia fuelled by increasing life expectancies in countries around the world is causing widespread concerns.

" **The current investment in research, treatment and care is actually quite disproportionate to the overall impact of the disease on people with dementia, the carers, on health and social care systems, and on society** "
Professor Martin Prince King's College London

The strain of caring for people with dementia is not just a social issue, but an economic one, placing a growing burden on the working population and health systems.

The King's College London research, part of the 2009 World Alzheimer's Report, published by Alzheimer's Disease International, estimates that there will be 35 million people worldwide with dementia by next year.

That number is set to almost double every 20 years, to 65.7 million in 2030 and 115.4 million in 2050.

Ageing world

Advances in healthcare and nutrition will have the biggest impact in poorer countries and, as a result, the number of older people is set to increase rapidly.

Currently, it is calculated that just over half of all people with dementia live in poor- or middle-income countries, but this is expected to rise to more than two-thirds by 2050.

In addition, the research suggests that the proportion of older people who have dementia is higher than previously thought in some parts of the world, adding to the estimated numbers.

Professor Martin Prince, from King's College, said that the numbers involved were "staggering".

He said: "The current investment in research, treatment and care is actually quite disproportionate to the overall impact of the disease on people with dementia, the carers, on health and social care systems, and on society."

Alzheimer's Disease International said that more countries should follow the lead of Australia, France, Korea and the UK in developing action plans to tackle the impact of the disease.

The Alzheimer's Disease Society said that the UK could still do more, with one million people set to develop the illness in the next decade.

A spokesman said: "This shows the scale of the challenge. This worldwide problem needs a response from every nation and the UK government must play a key part."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8263856.stm

Published: 2009/09/20 23:44:31 GMT

Icy stares and dirty minds: Hitch-hiking emotions

- 15 September 2009 by **Jim Giles**

Magazine issue 2725.

Remember this scene from *Trainspotting*? Watching it makes you more prone to harsh moral judgements (Image: Miramax / Everett / Rex)

WILL these hands ne'er be clean?" asks Lady Macbeth, as she obsessively tries to wash away the guilt she feels for her role in the murder of King Duncan. Her feelings of self-disgust, we are led to believe, have manifested themselves as a sensation of physical dirtiness.

It is not only in the language of playwrights such as Shakespeare that complex emotions like guilt, grief or loneliness are compared to physical sensations. These metaphors crop up in everyday phrases, too, in many languages. In English, for example, we talk of being "left out in the cold" when we feel socially excluded, a sentiment echoed in the Japanese saying "one kind word can warm three winter months".

At face value, these connections seem purely symbolic. In real life, loneliness doesn't really send us shivering, and guilt doesn't really make us feel dirty. Or do they? Recent research has found that these physical sensations can often accompany our emotions. It works the other way too - by provoking a feeling of disgust, a scene from the film *Trainspotting* shaped the way subjects in an experiment made moral judgements.

Many now believe that this reflects the way complex emotions arose in our evolutionary past. As our brain evolved to process more and more complex emotions, the theory goes, there was no need for new neural machinery: our emotions simply piggybacked onto the circuits that handle basic sensory perceptions. Here are some of the most striking experiments linking physical sensations with emotions and behaviour.

Cold shoulders and warm receptions

DURING the autumn of 2006, a series of volunteers arrived at Yale University's psychology building. Each was greeted in the lobby by a researcher, who accompanied them up to the fourth floor. In the elevator, the researcher casually asked the volunteer to hold the drink she was carrying while she noted down their name. The subjects did not know it, but the experiment began the moment they took the cup.

Once in the lab, the 40 or so volunteers read a description of a fictitious person and then answered questions about the character. Those who had held an iced coffee, rather than a hot one, rated the

imaginary figure as less warm and friendly, even though each volunteer had read the same description. Answers to other questions about the figure, such as whether the character appeared honest, were unaffected by the type of drink (*Science*, vol 322, p 606).

The experiment, run by Lawrence Williams of the University of Colorado at Boulder and John Bargh of Yale, is not the only study to link physical and psychological warmth. Just thinking about being socially excluded, for example, can make the room feel around 3 °C cooler (*Psychological Science*, vol 19, p 838). This may explain some aspects of how we socialise. For example, it is more common to offer a hot drink rather than a cold one when we welcome someone into our home. "Certain behaviours people engage in during interpersonal relationships reflect an understanding of the link between physical and psychological warmth," says Williams.

The insular cortex, which lies deep within one of the folds that line the surface of the brain, is probably at the root of these results. Brain imaging shows that this area is active when people are experiencing both physical and psychological warmth. The connection is probably present at birth and strengthened during early life, when babies learn to associate the physical warmth of their parents with nourishment and protection, says Williams.

Cleanliness and godliness

"TRULY Allah loveth those who turn unto Him, and loveth those who have a care for cleanness," says the Koran. Islam is not alone in linking hygiene to moral purity. Christians cleanse the body and soul through baptism, and cleanliness is likewise important to Hindus.

This connection, which is entrenched in the orbitofrontal cortex of the brain, can have a profound and unexpected influence on our behaviour. In one recent study, Simone Schnall at the University of Plymouth, UK, and colleagues showed half their volunteers a neutral film and the other half the toilet scene from the film *Trainspotting*. (The uninitiated need only use their imagination here: the clip features what is described as the "worst toilet in Scotland".) Those who viewed the *Trainspotting* clip subsequently made more severe judgements about unethical acts such as cannibalism than volunteers who had viewed the neutral scene. Exposing subjects to a fart smell and placing them in a filthy room had a similar effect (*Personality and Social Psychology Bulletin*, vol 34, p 1096).

And as Lady Macbeth's obsessive hand-washing suggests, a feeling of guilt can leave us reaching for a bar of soap. Chen-Bo Zhong of the University of Toronto in Canada and Katie Liljenquist, now at Brigham Young University in Provo, Utah, asked volunteers to read a first-person account of either an ethical act or an act of sabotage. They then had to rate the desirability of various household objects, including soap, toothpaste, CD cases and chocolate bars. Those who had read the sabotage story showed a greater preference for the cleaning products (*Science*, vol 313, p 1451) than those who had not.

A simplistic conclusion from these experiments would be that a cleaner environment makes us more tolerant of the misdemeanours of others. Yet the act of physical cleansing does not necessarily encourage us to act more morally ourselves, as religious ceremonies might have us believe. In another part of their study, Zhong's team asked volunteers to recall an unethical deed from their past. Under the guise of a health and safety precaution, he then gave half the subjects antiseptic wipes to clean their hands. The participants were then asked if they would take part in another experiment, this time to help out a desperate graduate student. Only 40 per cent of the subjects who had cleaned their hands volunteered, compared with almost three-quarters of those who hadn't.

Other experiments have shown that feelings of moral disgust can spur people to help others. By allowing people to wash away these feelings, say Zhong and Liljenquist, we may be giving licence to ungenerous behaviour.

The sting of rejection

CAST your mind back to your schooldays. Do you remember how it hurt when you were left out of a game? Or how you felt when you weren't invited to a party? The pain of exclusion may seem tangible, but can it ever resemble the sensation of a physical wound?

To probe the neural link between physical and emotional pain, Naomi Eisenberger at the University of California, Los Angeles, and colleagues asked volunteers to play a virtual ball game. Each volunteer believed that their teammates were in other labs, but in fact these "people" were generated by the software, which was also programmed to gradually exclude the human player. All the while an fMRI scanner recorded the subject's neural activity.

The scans revealed that the feelings of social exclusion increased activity in the dorsal anterior cingulate cortex (dACC), an area of the brain also involved in the feelings of distress that accompany physical pain. The dACC also lit up when people thought about the death of a loved one (*Science*, vol 323, p 890).

This might explain why some people in deep emotional pain turn to drugs like alcohol or heroin, which numb physical pain. Yet according to an unpublished study by Nathan DeWall at the University of Kentucky in Lexington, less potent drugs could also do the trick, without side effects.

DeWall asked around 60 college students to take either paracetamol (acetaminophen) or a placebo in the morning and evening for three weeks. The students also answered daily questions about their emotional state. DeWall found that those who took the painkiller reported fewer hurt feelings.

In another experiment, DeWall gave paracetamol or a placebo to volunteers playing the virtual ball game. The result was as expected: the painkiller reduced activity in the dACC that was associated with the emotionally painful feelings of exclusion. He now wants to test the drug on people with clinical symptoms of depression or anxiety. "Anxious people are constantly concerned about negative evaluation," he says. "Perhaps Tylenol [paracetamol] can help them." It remains a long shot, and not something to be recommended right now, but if the results pan out it will be an interesting avenue to explore for the future.

Jim Giles is a writer based in San Francisco

http://www.newscientist.com/article/mg20327252.200-icy-stares-and-dirty-minds-hitchhiking-emotions.html

Wired's Guide to Hoaxes: How to Give — and Take — a Joke

Essay: Scott Brown, The Official Prankonomy: Steven Leckart

Here's what you've been told: "There's a sucker born every minute." "Take or be taken." "Believe none of what you hear and half of what you see." These aphorisms are so ingrained in American life, they're practically commandments. And for good reason: We are a credulous people. For proof, open your spam folder and count the chain emails from 1998 that are still coming in, dutifully forwarded by friends and relatives. Or consider that new Facebook pal whose name seemed familiar enough when you hit Confirm. We are, today, the same easy marks who ran screaming from Orson Welles' made-up Martians and flocked to see the Cardiff Giant. So we're defensive. A hoax, we are taught, is an invasive, aggressive stratagem—a nefarious short-circuiting of our natural social instincts, a hack of Trust itself, a deterministic, zero-sum shell game with a clear winner (the prankster) and loser (the gull).

Well, here's what we're telling you: Bullshit.

Take *and* be taken. There's a *skeptic* born every minute. *Every man a mountebank, every man a mark!* These are your new commandments, O children of Barnum, Borat, and Blair Witch. The source of hoodwinkery has shifted from the all-powerful (ad agencies, governments, MTV) to the tweeting masses—and lo, charlatanism is democratized. There is no more Big Lie, only Big Lulz, and getting gamed is no shame. It's the seal on the social contract, a mark of our participation in this new covenant of cozening.

Raised on a diet of rickrolls, Goatse, and other forms of cultural roughage, we no longer take pranks so personally, and we know that "too far" and "too soon" are a lot farther and sooner than they used to be. We also know it's fun. For the Hoax Populi, it's a kind of language—a friendly punch in the arm, not a stab in the back. And we need that social lubricant to keep us (a) safely aware of ourselves and (b) united as a fractious but functional whole.

Still, it's sometimes hard to distinguish a prank from a scam, a sham from a fraud, a Nigerian prince from Prince Albert in a can. That's why wired is pleased to present this handy Prankonomy, a celebration of the japes and ruses of our shifty age.

The Crank Call
Marks: Cantankerous yet inquisitive barkeeps, customer service reps, political candidates.

Noted Practitioners: Jerry Lewis, Bum Bar Bastards, Bart Simpson, the Jerky Boys, Crank Yankers, shock jocks.

Sample Scripts: Bart calls Moe's Tavern and asks for Oliver Clothesoff; a Canadian DJ uses an exagè9rè9 French accent to convince Sarah Palin she's speaking with a porn-loving, seal-hunting President Sarkozy.

Occupational Hazards: Caller ID, giggle fits, telecommunications law.

The Rickroll
Ah, the heartbreaking tumble down the Rick Astley rabbit hole. This click-and-switch meme sends innocent Web users not to the promised link but to a YouTube video of the well-coiffed crooner from the 1980s. Why? Because an anonymous 4chan yuckster (riffing on an obscure "Duck Roll" meme) thought it was funny. Contrary to Astley's now infamous chorus, however, most of us have given this up.

Fake Email Chain Letter
Get-rich spam existed before 1997, but Iowa State comp-sci major Brian Mack thought it lacked panache. From his campus computer lab, he fired off a message explaining that Microsoft was beta-testing an email-tracing program. The hook: Bill Gates would pay you $1,000 if the email reached 1,000 people. Within a month, the missive was drowning servers, and permutations were beginning to evolve (including one featuring Walt Disney Jr.). Every two or three years, the e-prank flares up again, usually thanks to someone's mom.

Fauxtoshop
Gone are the days of painstakingly doctored UFO images. A simple head swap now turns Sarah Palin into a gun-toting babe (good one!), while a basic copy/paste job adds an extra missile to an Iranian launch (not so much!).

Zoological Mysteries
A Georgia hunter claims to have shot, killed, and photographed a 12-foot-long, 1,000-pound wild boar. Elite mainstream media dub the pig Hogzilla and dismiss the story as hogwash. National Geographic investigates and finds the swine, albeit only 800 pounds' worth. But this tall tale taken too far is still remembered as a hoax, thus imposing an even more onerous burden of proof on Sasquatch spotters and Nessie hunters.

The Fast-Food Urban Legend
Want to play on the public fear of fast-food contamination for fun and profit? Here's your recipe.

1 order of Wendy's chili
1 human finger
(Suitable substitutions include cockroach eggs at Taco Bell, deep-fried rats at KFC, or giant loogies at Burger King.)

Remove digit from purse and submerge in chili. Scream. Call police. Note: Use of own finger increases chances of getting caught.
Cost of human finger: $100.
Cost to Wendy's franchise: Millions in lost revenue.

Fake Amateurs
It takes real pros to create homegrown content. Here's how they did it at the Lonelygirl15 School of Filmmaking. 1. Find burgeoning media venue with huge audience (then, YouTube; now, Twitter). 2. Locate attractive young actress desperate for work. 3. Be brief (less than two minutes per video, 250 words per post, or five tweets per day). 4. Commit to the long con (it took 34 episodes to unravel Lonelygirl15). 5. Reveal hoax—and collect VC money. 6. Get production deal ... for another Web series.

Fake Experts
Posing as reps for the National Petroleum Council, a pair of Yes Men—members of a loose collective of culture jammers who target megacorporations—suggest a solution for the global energy crisis: Convert dead humans into oil, Soylent Green-style. ExxonMobil is people! Other false prophets include Stephen Colbert, John Hodgman, and pundit Martin Eisenstadt.

Hidden Camera
Noted Practitioners: Allen Funt, Dick Clark, Ashton Kutcher, the FBI.

Typical Victims: Naive tourists in Times Square, hapless celebrities, Love Boat cast members.

All-Time Best Example: Kutcher's Punk'd crew nearly moves Justin Timberlake to tears after convincing the singer that his LA mansion has been repossessed.

All-Time Worst Examples: ESPN's Erin Andrews' hotel peep show, Jon (minus Kate Plus 8), Taxicab Confessions.

Malware
For networks of underfed, overskilled foreign hackers, there's always a way to break through software safeguards and destroy thousands of people's hard drives. (See: Code Red, ILOVEYOU, Storm botnet.) Trouble is, there's not always a way to break out of jail after NastyEstonian778 turns out to be a CIA agent.

Nonpareil Nerd Pranks
At brainy colleges, practical jokes are not only expected, they're encouraged. Classic whoppers include dressing up MIT's Great Dome as R2-D2, bricking in doors at Oxford, having a girlfriend in Canada.

Performance Hoax
NYC-based collective Improv Everywhere has hosted spontaneous dance parties, no-pants subway rides, and synchronized swimming in a city fountain. They also created the Best Gig Ever, packing a club with fake fans for an obscure out-of-town band. See also: public pillow fights, zombie marches, Lady Gaga's career.

Media Hoax
Then: Broadcast of War of the Worlds causes mass panic that aliens are invading the planet.

Now: Sale of The Onion to China is noted dryly by All Things Considered.

Extreme Candid Camera
Perpetrators turn the lens away from unsuspecting victims and back on the audience, pushing the concept of the prank into a postmodern interrogation of the American soul. Also: fart jokes.

See: Sacha Baron Cohen, Tom Green.

Typical Victims: Southern frat boys, news anchors, Paula Abdul.

Possible Outcomes: Lawsuits, fisticuffs, PhD dissertations.

Extreme Impersonation
Noted Practitioners: Christopher "Rockefeller" Rocancourt; Christian Gerhartsreiter, aka Clark Rockefeller

Typical Victims: Wealthy blue bloods.

Sample Scams: Rocancourt used bogus identities to defraud investors of more than $1 million before he was caught in 2001, earning him four years in prison. Gerhartsreiter's adopted surname fooled his upper-crust neighbors—until he was convicted earlier this year of kidnapping his daughter.

Occupational Hazards: Prison time, awkward family reunions.

http://www.wired.com/culture/culturereviews/magazine/17-09/mf_hoax

'Next generation' wi-fi approved

The next-generation of wi-fi technology has finally been approved for use, despite being on sale in laptops and other equipment for several years.

The 802.11n technology, as it is known, was ratified by the IEEE, a body that oversees all wi-fi standards.

It was conceived seven years ago and offers speeds at least six times faster than current approved technology.

Electronics firms have sold PCs and routers using the standard for many years, labelled "802.11n draft".

But without the IEEE's approval, there were no guarantees that future networking equipment would be compatible with the devices.

The IEEE's rubber stamp has changed that.

All existing draft 802.11n wi-fi products will work with the final standard, according to the Wi-Fi Alliance, a group that tests wireless products to ensure compliance.

"This was an extraordinarily wide-ranging technical challenge," said Bruce Kraemer of the IEEE.

"When we started in 2002, many of the technologies addressed in 802.11n were university research topics and had not been implemented."

Under ideal conditions, 802.11n technology can offer speeds of 300 megabits per second (Mbps) and above, many times higher than the previous 802.11g, which operates at speeds of up to 54 Mbps.

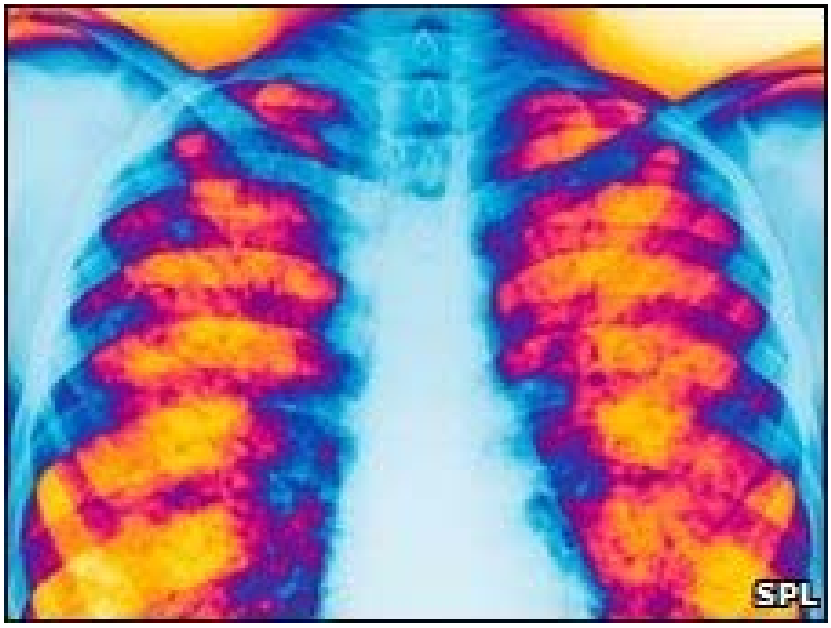
It is also able to transfer data over distances of 90m (300ft) indoors, double that of previous technologies.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/8254085.stm

Published: 2009/09/14 09:44:31 GMT

Gene find 'may curb lung mucus'

A genetic breakthrough raises hope of easing suffering for people with chronic lung disease - and maybe those just fighting a common cold.



The biological reason why the lungs of people with conditions such as asthma and cystic fibrosis often clog up with thick mucus has been unclear.

But Cincinnati Children's Hospital researchers have identified the main genetic switch behind the build-up.

The Journal of Clinical Investigation study raises hopes of new treatments.

Lead researcher Dr Jeffrey Whitsett said a way to combat excessive mucus production would potentially be a significant step forward, as there was currently no effective treatment to remove build-up once it had taken place.

WHAT IS MUCUS?

A sugar-coated collection of large proteins that, in healthy conditions, help the body defend itself by collecting and then clearing out contaminants

It was thought that after airways were attacked by an allergic response or inflammation mucus cells, known as goblet cells, divided and proliferated at a very fast rate - a process known as hyperplasia.

But instead the Cincinnati team discovered that a type of lung cell, called Clara cells, instead morph into goblet cells - a process called metaplasia.

They also showed that the process was reversible - goblet cells can change back to Clara cells if the initial problem is dealt with.

In work on mice, the researchers also identified a gene called SPDEF as key to the process of mucus production.

Allergic reaction

They used a protein from egg whites to induce an allergic reaction in inflammation in the animals' lungs, and showed that SPDEF activity soared in the affected tissues, leading to hyper-production of mucus.

However, when the gene was switched off inflammation and excessive mucus production did not occur.

And mice lacking SPDEF were unable to increase mucus production or develop goblet cells.

Further analysis showed that SPDEF plays a complex role switching other genes involved in inflammation and mucus production on and off.

The researchers hope it will be possible to develop treatments that influence activity of the gene, but warn tests in humans are still several years away.

Dr Keith Prowse, spokesperson for the British Lung Foundation, said: "Excess mucus production blights the lives of millions of patients with chronic lung conditions such as cystic fibrosis and chronic obstructive pulmonary disease.

"At present there are only a few treatments available and they are often not very effective.

"The finding that SPDEF which controls mucus production could lead to new and effective treatments which would benefit the millions of people with chronic lung disease in the UK."

Dr David Halpin is a spokesman for the British Thoracic Society and a consultant respiratory physician at the Royal Devon and Exeter Hospital.

He said: "Sputum production is a symptom of respiratory disease which is poorly treated by current medicine.

"Any advance in the understanding of the mechanisms responsible for this is likely to be a benefit to patients."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8254020.stm

Published: 2009/09/14 23:07:10 GMT

Genes blamed for early first sex

The fact that children raised in homes without a dad have sex earlier is down to their genes, say US researchers.

The study tested for genetic influences as well as factors such as poverty, educational opportunities and religion.

The more genes the children shared, the more similar their ages of first intercourse regardless of whether they had an absent father or not.

A spokesman for the charity, Brook, said children needed early education to help them make informed choices.

Competing theories

The study published in the journal, Child Development, says several theories have been advanced about the environmental factors which influence this association between absent fathers and early sex.

One suggests that because these children observe unstable or stressed parental relationships, they learn that resources are scarce, and people untrustworthy.

This leads them to mature in such a way that they are geared towards mating rather than parenting.

" **While there is clearly no such thing as a 'father absence gene', there are genetic contributions to traits in both mums and dads that increase the likelihood of earlier sexual behaviour in their children** "
Jane Mendle, University of Oregon

Another states that because adolescents reared in single-parent households may have parents engaging in sexual behaviour with partners to whom they are not married, the children may be more likely to view non-marital sex as the norm.

And a third theory states that a single-parent family structure may encourage adolescent sexuality by reduced parental control.

In other words two parents can much more closely monitor their offspring's activities and social networks, reducing the opportunities for sex.

But this study shows these factors are not as important as genes in determining early sexual behaviour.

Results

The researchers at the University of Oregon compared the average age of first intercourse among children whose fathers were always absent, partially absent or always present throughout childhood.

They looked at more than 1,000 cousins aged 14 and older from the American National Longitudinal Survey of Youth.

For the children whose fathers were always absent, 63.2% reported having had sex.

This compared to 52.5% of children whose fathers were sometimes absent.

And only 21% of children whose fathers were always present.

The average age of first intercourse for children whose fathers were always absent was 15.28, compared to partially fathered children at 15.36 and 16.11 for children whose fathers were present for all of their childhood.

It compared children who were related in different ways to each other, and who differed in whether they had lived with their fathers.

The more genes the children shared, the more similar their ages of first intercourse, regardless of whether or not the children had an absent father.

Genetic risk factor

Jane Mendle, professor of psychology at the University of Oregon, who led the study said: "The association between father's absence and children's sexuality is best explained by genetic influences, rather than by environmental theories alone.

"While there is clearly no such thing as a 'father absence gene', there are genetic contributions to traits in both mums and dads that increase the likelihood of earlier sexual behaviour in their children.

" **All young people need access to confidential sexual health services as well as high quality education about sex and relationships from a young age** "
Simon Blake, Brook Advisory Centre

"These include impulsivity, substance use and abuse, argumentativeness and sensation seeking."

But Professor Mendle said her study did not have the power to discriminate conclusively between genetic and environmental factors and further research with a larger number of children would be necessary.

Simon Blake, from the sexual health charity, Brook Advisory Centre, took issue with the idea that genes were the overriding factor in early sex.

He said: "We know from research that factors associated with young people having first intercourse at a younger age are: lower educational achievements; friends and the media being the main source of information about sex education; socio-economic status; early sexual experience and the earlier age at which girls start their periods.

"All young people need access to confidential sexual health services as well as high quality education about sex and relationships from a young age.

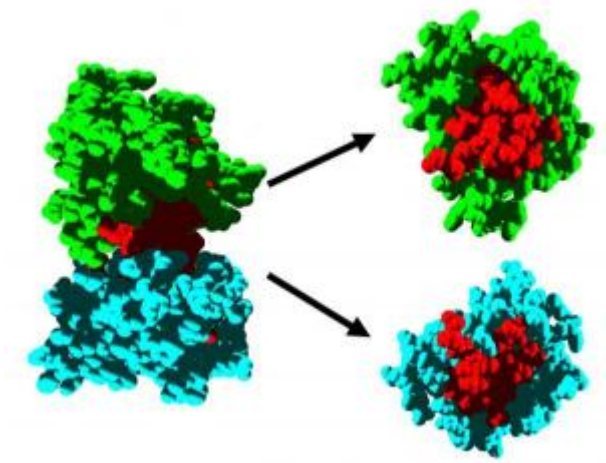
"This gives them the skills and information to make informed choices, and the self-esteem and aspirations for themselves for the future.

"Targeted outreach work is also an effective way of reaching those more vulnerable groups."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8251483.stm

Published: 2009/09/14 23:04:56 GMT

Mechanism Related To Onset Of Various Genetic Diseases Revealed



One of the globular protein pairs studied by UAB researchers. The danger region of both proteins (interaction region), in red, remains obscured and inoffensive as long as the two proteins are united. Genetic mutation causes them to separate, leaving the aggregation-prone region uncovered and favouring the formation of toxic aggregates. (Credit: Image courtesy of Universitat Autonoma de Barcelona)

ScienceDaily (Sep. 20, 2009) — Researchers at the Department of Biochemistry and Molecular Biology of Universitat Autònoma de Barcelona (UAB) have revealed the process by which proteins with a tendency to cause conformational diseases such as amyotrophic lateral sclerosis, familial amyloidotic polyneuropathy, familial amyloidotic cardiomyopathy, etc. finally end up causing them.

Researchers have carried out an analysis of their 3D structure and studied why these proteins finally become toxic although they are correctly folded, an indicator that they are functioning correctly. The answer can be found in the separation of the proteins, which under normal conditions are found in groups of two or more, caused by a genetic mutation in their composition. Researchers believe this discovery, published recently in the journal *PLoS Computational Biology*, could also be the cause of other diseases of unknown origins.

Every day cells produce thousands of new proteins which renew themselves every second and which, by obeying the orders prescribed in our genetic code, work towards the proper functioning of our body. However, these proteins occasionally suffer genetic mutations which can cause changes in their composition, thus preventing them from carrying out their functions and the activities they are assigned. In many cases this gives way to the formation of toxic macromolecular aggregates - amyloid fibrils - which block our body's protein quality control system and finally provoke cell death.

Protein aggregation and the misfolding of proteins can be linked to the origin of many conformational diseases which can be either genetic or spontaneous. The proteins involved can either have an unstructured or lineal unfolded form such as in Alzheimer's and Parkinson's disease or Type II Diabetes, or can be globular, showing a folded 3D-structure. The former have been widely characterised by scientists and the process by which they unfold is known. The process leaves regions uncovered which are in the risk of becoming aggregated and these eventually form toxic assemblies. Globular proteins are known to be linked to hepatic, cardiac, renal and neurological disorders. However scientists do not know exactly how they manage to aggregate despite the fact that they are correctly folded within the body.

Through computational analysis, researchers Salvador Ventura and Virgínia Castillo, from the UAB Department of Biochemistry and Molecular Biology, have discovered that, in non-disease conditions, globular proteins related to conformational diseases are found associated in pairs to other proteins or in complex subunits, in a way that one protein covers the aggregation-prone region of the other and thus

prevents the onset of this process. Therefore these regions remain obscured in the interior of the structure and are inoffensive to the organism as long as the two proteins are joined together. Researchers have found that genetic mutations produced in the interaction sites of the protein pair prevents their association, leaving aggregation-prone regions uncovered and favouring the formation of toxic aggregates. According to researchers, this would explain why out of two people with the same globular proteins and the same risk regions, only the one who suffers a genetic mutation would finally develop a disease.

The conclusions obtained have led researchers to contemplate the possibility that dissociation is a general mechanism, which not only affects globular proteins with a clearly defined structure, but also others which have not yet been characterised and which could be the cause of diseases of unknown origin.

As possible strategies to prevent the dissociation of proteins, the authors propose introducing genetic mutations into the proteins to strengthen their association and developing specific molecules to block the risk regions of already dissociated proteins.

The results of the study carried out by UAB researchers coincides with those obtained by researchers at Cambridge University, who also published similar data in the journal Proceedings of the National Academic of Sciences.

In the future UAB researchers are planning to expand their computational analysis to cover the whole set of human proteins with a defined 3D-structure. With this objective they seek to discover the proteins responsible for different genetic diseases of unknown origins and offer a series of new therapeutic targets for these disorders.

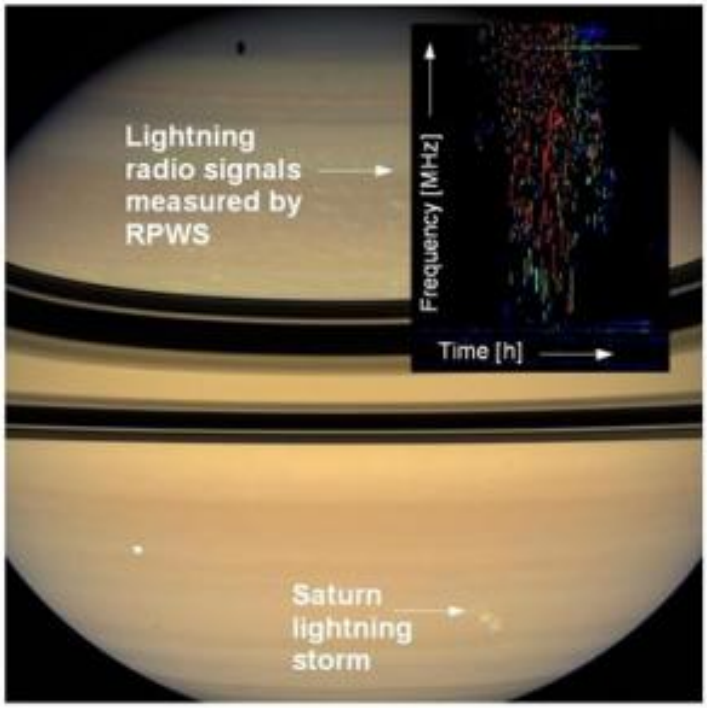
Journal reference:

1. Castillo V, Ventura S. **Amyloidogenic Regions and Interaction Surfaces Overlap in Globular Proteins Related to Conformational Diseases**. *PLoS Computational Biology*, 2009; 5 (8): e1000476 DOI: 10.1371/journal.pcbi.1000476

Adapted from materials provided by Universitat Autonoma de Barcelona, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090917111615.htm

Longest Lightning Storm On Saturn Breaks Solar System Record



Annotated image of Saturn lightning. (Credit: RPWS Team/NASA/JPL/Space Science Institute)

ScienceDaily (Sep. 17, 2009) — A powerful lightning storm in Saturn's atmosphere that began in mid-January 2009 has become the Solar System's longest continuously observed thunderstorm. It broke the record duration of 7.5 months set by another thunderstorm observed on Saturn by NASA's Cassini spacecraft between November 2007 and July 2008.The observations of the thunderstorm will be presented by Dr Georg Fischer of the Austrian Academy of Sciences at the European Planetary Science Congress in Potsdam, Germany, on Tuesday 15 September.

The current thunderstorm on Saturn is the ninth that has been measured since Cassini swung into orbit around Saturn in July 2004. Lightning discharges in Saturn's atmosphere emit very powerful radio waves, which are measured by the antennas and receivers of the Cassini Radio and Plasma Wave Science (RPWS) instrument. The radio waves are about 10 000 times stronger than their terrestrial counterparts and originate from huge thunderstorms in Saturn's atmosphere with diameters around 3000 km.Dr Fischer said: "These lightning storms are not only astonishing for their power and longevity, the radio waves that they emit are also useful for studying Saturn's ionosphere, the charged layer that surrounds the planet a few thousand kilometres above the cloud tops. The radio waves have to cross the ionosphere to get to Cassini and thereby act as a natural tool to probe the structure of the layer and the levels of ionisation in different regions."The observations of Saturn lightning using the Cassini RPWS instrument are being carried out by an international team of scientists from Austria, the US and France. Results have confirmed previous studies of the Voyager spacecraft indicating that levels of ionisation are approximately 100 times higher on the day-side than the night side of Saturn's ionosphere.Lightning storms on Saturn usually occur in a region that nicknamed "Storm Alley" by scientists, which lies 35 degrees south of Saturn's equator. Dr Fischer commented: "The reason why we see lightning in this peculiar location is not completely clear. It could be that this latitude is one of the few places in Saturn's atmosphere that allow large-scale vertical convection of water clouds, which is necessary for thunderstorms to develop. However, it may be a seasonal effect. Voyager observed lightning storms near the equator, so now that Saturn has passed its equinox on 11 August, we may see the storms move back to equatorial latitudes."Saturn's role as the source of lightning was given added confirmation during Cassini's last close flyby of Titan on August 25. During the half hour that Cassini's view of Saturn was obscured by Titan, no lightning was observed. "Although we know from Cassini images where Saturn lightning comes from, this unique event was another nice proof for their origin," said Dr Fischer.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090914202157.htm

Researchers To Probe Whether Lyme Disease Will Follow Spread Of Ticks Across U.S.

A penny illustrates the size of the deer tick. (Credit: Photo by Graham Hickling, University of Tennessee)

ScienceDaily (Sep. 17, 2009) — Potentially debilitating Lyme disease doesn't afflict people everywhere that the ticks harboring it are found. At least not yet. A five-university consortium led by a Michigan State University researcher wants to find out why.

"These ticks are on the move. As ticks expand into new areas, more people will likely become infected," said MSU fisheries and wildlife assistant professor Jean Tsao, who will lead the four-year, $2.5 million study.

"We have a really intriguing scientific puzzle to solve – many factors change as we move from north to south, and we need to be smart with our study design to unravel these," she said. "Our study also has practical goals – we aim to provide the health community and the public in the various states with some reassurance, or warning, about what their future will hold for spread of Lyme disease. Understanding the reasons why Lyme disease is such a problem in some areas will help us manage the disease better, and lower the risk to human health."

In 30 years, the tiny blacklegged tick has cut a huge swath through 10 northern states by carrying a bacterial infection now annually afflicting more than 20,000 North Americans. Curiously, the same parasite commonly known as the deer tick also is found in southern states, where Lyme disease is comparatively rare.

"Researchers do not know how climate, vertebrate biodiversity, tick genetics or other factors affect the maintenance of the pathogen and its relative abundance in an area," Tsao said. "So as the ticks spread, will tick populations in new areas be infected like northern populations or mainly clean of infection like southern populations?"

The disease has a range of symptoms including rash, fatigue, joint aches and shooting pain, and now is widespread in Minnesota and Wisconsin and along the northeastern seaboard. And although ticks also are found in the forests of the Upper Peninsula and eastern Lake Michigan shoreline, the disease has yet to make serious inroads in Michigan beyond Menominee County in the southwestern U.P.

That might not be the case for long, Tsao said, as infected ticks ride deer, mice, birds and other hosts into new areas. Her colleague Edward Walker's lab discovered recently established populations of Lyme

disease ticks in southwestern Michigan in the early 2000s, she noted, and during the last six years MSU doctoral student Sarah Hamer has tracked the invasion up the shore of Lake Michigan.

Tsao and colleagues are looking into potential new explanations for the uneven incidence of Lyme disease. The researchers plan to study how various ecological factors affect the Lyme disease cycle by simultaneously applying standardized survey methods at 12 sites spanning Massachusetts to Georgia and Minnesota to Mississippi.

Participating with MSU in the National Science Foundation-funded study are researchers from the University of Montreal, the University of Rhode Island, Hofstra University, the University of Tennessee and Georgia Southern University.

Adapted from materials provided by Michigan State University.

http://www.sciencedaily.com/releases/2009/09/090916173334.htm

Melting Of The Greenland Ice Sheet Mapped

The ice is approximately 3 km thick in central Greenland and by analyzing every single annual layer in the kilometers-long ice cores researchers can get detailed information about the climate of the past. (Credit: Centre for Ice and Climate, Niels Bohr Institute, University of Copenhagen)

ScienceDaily (Sep. 17, 2009) — Will all of the ice on Greenland melt and flow out into the sea, bringing about a colossal rise in ocean levels on Earth, as the global temperature rises? The key concern is how stable the ice cap actually is, and new Danish research from the Niels Bohr Institute at the University of Copenhagen can now show the evolution of the ice sheet 11,700 years back in time – all the way back to the start of our current warm period.

The results are published in the journal *Nature*.

Numerous drillings have been made through both Greenland's ice sheet and small ice caps near the coast. By analysing every single annual layer in the kilometres long ice cores researchers can get detailed information about the climate of the past. But now the Danish researcher Bo Vinther and colleagues from the Centre for Ice and Climate at the Niels Bohr Institute, University of Copenhagen, in collaboration with researchers from Canada, France and Russia, have found an entirely new way of interpreting the information from the ice core drillings.

"Ice cores from different drillings show different climate histories. This could be because they were drilled at very different places on and near Greenland, but it could also be due to changes in the elevation of the ice sheet, because the elevation itself causes different temperatures" explains Bo Vinther about the theory.

Today the ice sheet is more than three kilometres thick at its highest point and thinning out towards the coast. Four of the drillings analysed are from the central ice sheet, while two of the drillings are from small ice caps outside of the ice sheet itself, at Renland on the east coast and Agassiz which lies just off of the northwest coast of Greenland in Canada.

Small ice caps show the standard

The small ice caps are stable and have not changed in elevation, and even though they lie very far apart from each other on either side of the central ice sheet, they show the same climate history. This means that one can use the small ice caps climate history as a standard reference for the others.

Bo Vinther explains, that the four drillings through the ice sheet would have had the same climate history if there had not been changes in elevation throughout the course of time. It is known that for every 100 meter increase in elevation, there is a 0.6 per mille decrease in the level of the oxygen isotope Oxygen-18, which indicates the temperature in the air. So if there is a difference of 1.2 per mille, the elevation has changed by 200 meters.

By comparing the Oxygen-18 content in all of the annual layers from the four drillings through the ice sheet with the Oxygen-18 content of the same annual layers in the small ice caps, Bo Vinther has calculated the elevation course through 11,700 years.

Temperature sensitive ice sheet

Just after the ice age the elevation of the ice sheet rose slightly. This is because when the climate transitions from ice age to warm age, there is a rapid increase in precipitation. But at the same time, the areas lying near the coast begin to decrease in size, because the ice is melting at the edge. When the ice melts at the edge, it slowly causes the entire ice sheet to 'collapse' and become lower.

The calculations show that in the course of about 3,000 years the elevation changed and became up to 600 meters lower in the coastal areas. But in the middle it was a slow process, where the elevation decreased around 150 meters in the course of around 6,000 years. It then stabilised.

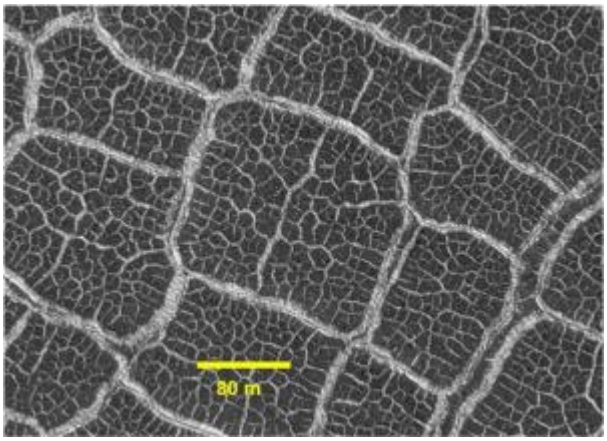
The elevations that were found with the help of the Oxygen-18 measurements from the ice cores are checked with other methods, for example, by measuring the air content, which is also dependent upon the elevation.

The new results show the evolution of elevation of the ice sheet throughout 11,700 years and they show that the ice sheet is very sensitive to the temperature. The results can be used to make new calculations for models predicting future consequences of climate changes.

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

http://www.sciencedaily.com/releases/2009/09/090916133508.htm

Patterns In Mars Crater Floors Give Picture Of Drying Lakes



Detailed image of large-scale crater floor polygons, caused by desiccation process, with smaller polygons caused by thermal contraction inside. The central polygon is 160 metres in diameter, smaller ones range 10 to 15 metres in width and the cracks are 5-10 metres across. (Credit: NASA/JPL)

ScienceDaily (Sep. 16, 2009) — Networks of giant polygonal troughs etched across crater basins on Mars have been identified as desiccation cracks caused by evaporating lakes, providing further evidence of a warmer, wetter martian past.

The findings were presented at the European Planetary Science Congress by PhD student Mr M Ramy El Maarry of the Max Planck Institute for Solar System Research.

The polygons are formed when long cracks in the surface of the martian soil intersect. El Marry investigated networks of cracks inside 266 impact basins across the surface of Mars and observed polygons reaching up to 250 metres in diameter. Polygonal troughs have been imaged by several recent missions but, until now, they have been attributed to thermal contractions in the martian permafrost. El Maarry created an analytical model to determine the depth and spacing of cracks caused by stresses building up through cooling in the martian soil. He found that polygons caused by thermal contraction could have a maximum diameter of only about 65 metres, much smaller than the troughs he was seeing in the craters."I got excited when I saw that the crater floor polygons seemed to be too large to be caused by thermal processes. I also saw that they resembled the desiccation cracks that we see on Earth in dried up lakes. These are the same type of patterns you see when mud dries out in your back yard, but the stresses that build up when liquids evaporate can cause deep cracks and polygons on the scale I was seeing in the craters," said El Maarry.

El Maarry identified the crater floor polygons using images taken by the MOC camera on Mars Global Surveyor and the HiRISE and Context cameras on Mars Reconnaissance Orbiter. The polygons in El Maarry's survey had an average diameter of between 70 and 140 metres, with the width of the actual cracks ranging between 1 and 10 metres.Evidence suggests that between 4.6 and 3.8 billion years ago, Mars was covered in significant amounts of water. Rain and river water would have collected inside impact crater basins, creating lakes that may have existed for several thousand years before drying out. However, El Maarry believes that, in the northern hemisphere, some of the crater floor polygons could have been formed much more recently.

"When a meteorite impacts with the martian surface, the heat can melt ice trapped beneath the martian crust and create what we call a hydrothermal system. Liquid water can fill the crater to form a lake, covered in a thick layer of ice. Even under current climatic conditions, this may take many thousands of years to disappear, finally resulting in the desiccation patterns," said El Maarry.

Adapted from materials provided by Europlanet Media Centre, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090916092653.htm

With A Flash Of Light, A Neuron's Function Is Revealed

A larval zebrafish flicks its tail in a swimming motion after it is exposed to ultraviolet light. Using light-activated proteins, scientists for the first time zeroed in on the poorly understood neuron that controls this response. (Credit: Isacoff lab)

ScienceDaily (Sep. 16, 2009) — There's a new way to explore biology's secrets. With a flash of light, scientists from the U.S. Department of Energy's Lawrence Berkeley National Laboratory and the University of California, Berkeley zeroed in on the type of neural cell that controls swimming in larval zebrafish.

Using innovative light-activated proteins and gene expression techniques, the scientists zapped several zebrafish with a pulse of light, and initiated a swimming action in a subset of fish that was traced back to the neuron that drives the side-to-side motion of their tail fins.

The technique behind this needle-in-haystack search for the neural roots of a specific behavior could become a powerful way to learn how biological systems work. The light-activated protein could also become a handy tool in the field of synthetic biology, in which scientists seek to identify a useful network of proteins in one microbe and import it into another microbe — a method could be used to optimize the development of biofuels and disease-fighting therapies, to name a few applications. Their work is published in the Sept. 17 issue of the journal *Nature.*

"This is a very unique way of arriving at an individual cell: by starting with the behavior it controls," says Ehud Isacoff, a biophysicist who holds joint appointments with Berkeley Lab's Physical Biosciences and Materials Sciences Divisions and UC Berkeley's Department of Molecular and Cell Biology. The research is an ongoing collaboration between Claire Wyart, a scientist in Isacoff's UC Berkeley lab, Filippo Del Bene of Herwig Baier's UC San Francisco lab, and Dirk Trauner of the University of Munich.

Currently, scientists often determine a neuron's function via correlation. If a group of neurons activates every time an animal performs a certain behavior, then chances are those neurons control that behavior. The same goes if the neurons are disrupted: if the behavior stops, then the affected neurons likely control it.

"But we want to move beyond correlation and actually test causality," says Isacoff. "We want to play a behavior back to the nervous system and determine the individual neurons that are directly responsible. And this has been very difficult to do until now."

The key to the scientists' success is an artificial, light-activated protein they developed a few years ago. The protein can be genetically engineered to express in a neuron or other type of cell and function as an optical switch. Zap the protein with one color of light, and it switches on and activates its host neuron. Zap it with another color of light, and it turns off and the neuron becomes dormant.

To test the light-activated protein, Isacoff and colleagues used it to search for the cell that drives the neural circuit that mediates swimming in larval zebrafish.

First, they randomly expressed the protein in the genome of hundreds of larval zebrafish. Some light-activated switches popped up in muscle cells, some in bone cells, and some in the central nervous system.

Next, they chose only those fish in which the light-activated protein was expressed in neural cells in the spinal cord, some of which are known to control locomotion.

They then zapped these fish with light. Like dutiful servants, a handful of fish spontaneously flicked their tails side to side in a swimming motion. Further analysis led the scientists to the neural source of this behavior: all of the swimmers had the optical switch expressed in a cell called the Kolmer-Agduhr neuron, whose existence has been known for more than 75 years, but whose function had remained a mystery.

"Our technique allows us to identify previously unknown parts of neural circuits that control a behavior," says Isacoff. "And this approach can be broadly used. What we have done with locomotion can be done with any behavior and in many biological systems. "

The research was funded in part by Berkeley Lab's Directed Research and Development Program and the National Institutes of Health Nanomedicine Development Center for the Optical Control of Biological Function.

Adapted from materials provided by DOE/Lawrence Berkeley National Laboratory.

http://www.sciencedaily.com/releases/2009/09/090916153140.htm

Acne Really Is A Nightmare For Some Teens

A new study investigates the links between acne, diet and mental health issues in both males and females. (Credit: iStockphoto/Suzanne Tucker)

ScienceDaily (Sep. 16, 2009) — Zits, pimples, bumps and blemishes are a young person's worst nightmare. Collectively they are known as acne, a very common skin condition that affects millions of adolescents. Now a Norwegian study published in the open access journal *BMC Public Health* has investigated the links between acne, diet and mental health issues in both males and females.

University of Oslo researcher Jon Anders Halvorsen together with co-authors from Lhasa (Tibet) and Boston (US) studied 3775 adolescents to explore the possible causes of acne. The 18- and 19-year olds were given questionnaires to monitor their diets, lifestyle variables, and mental conditions. Participants reported on their own acne. Lastly, researchers acquired the socio-demographic status of the young people from Statistics Norway.The study identified crude associations between acne and high intake of chocolate and chips and low intake of vegetables. In girls, there was a significant link between acne and diet low in raw and fresh vegetables. This may indicate that a low-glycemic index could have a protective role in the development of acne.

Dr. Halvorsen said: "Our study shows a possible link between diet and acne. However, when we introduced symptoms of depression and anxiety in our statistical model, the role of diet became less clear. On the other hand the association between acne and mental health problems was still strong when diet was introduced. This underscores mental health problems as an important aspect of young people's acne".He concluded, "It is too early to give evidence based diet advice to teenagers with acne. Further studies are needed. Luckily, acne is rarely associated with serious morbidity. However, it does cause problems for a high number of young people. I hope that this study will encourage doctors to help adolescents to treat their acne and researchers to find preventive factors. Young people deserve better!"

Journal reference:

1. Jon A Halvorsen, Florence Dalgard, Magne Thoresen, Espen Bjertness and Lars Lien. **Is the association between acne and mental distress influenced by diet? Results from a cross-sectional population study among 3775 late adolescents in Oslo, Norway**. *BMC Public Health*, 2009; (in press) [link]

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

http://www.sciencedaily.com/releases/2009/09/090915192230.htm

Brain's Response To Seeing Food May Be Linked To Weight Loss Maintenance

Salad and tomatoes. After a four-hour fast, to ensure participants would be hungry, they were shown pictures of food items, including low-calorie foods (such as whole grain cereals, salads, fresh vegetables and fruit); high-calorie foods (including cheeseburgers, hot dogs, French fries, ice cream, cake and cookies), and nonfood objects with similar visual complexity, texture and color (e.g., rocks, shrubs, bricks, trees and flowers). (Credit: iStockphoto/Elena Elisseeva)

ScienceDaily (Sep. 16, 2009) — A difference in brain activity patterns may explain why some people are able to maintain a significant weight loss while others regain the weight, according to a new study by researchers with The Miriam Hospital.

The investigators report that when individuals who have kept the weight off for several years were shown pictures of food, they were more likely to engage the areas of the brain associated with behavioral control and visual attention, compared to obese and normal weight participants.

Findings from this brain imaging study, published by the *American Journal of Clinical Nutrition*, suggest that successful weight loss maintainers may learn to respond differently to food cues.

"Our findings shed some light on the biological factors that may contribute to weight loss maintenance. They also provide an intriguing complement to previous behavioral studies that suggest people who have maintained a long-term weight loss monitor their food intake closely and exhibit restraint in their food choices," said lead author Jeanne McCaffery, PhD, of The Miriam Hospital's Weight Control and Diabetes Research Center.

Long-term weight loss maintenance continues to be a major problem in obesity treatment. Participants in behavioral weight loss programs lose an average of 8 to 10 percent of their weight during the first six months of treatment and will maintain approximately two-thirds of their weight loss after one year. However, despite intensive efforts, weight regain appears to continue for the next several years, with most patients returning to their baseline weight after five years.

Researchers used functional magnetic resource imaging (fMRI), a non-invasive technique that localizes regions of the brain activated during cognition and experience, to study the brain activity of three groups: 18 individuals of normal weight, 16 obese individuals (defined as a body mass index of at least 30), and 17 participants who have lost at least 30 lbs and have successfully maintained that weight loss for a minimum of three years.

After a four-hour fast, to ensure participants would be hungry, they were shown pictures of food items, including low-calorie foods (such as whole grain cereals, salads, fresh vegetables and fruit); high-calorie foods (including cheeseburgers, hot dogs, French fries, ice cream, cake and cookies), and nonfood objects with similar visual complexity, texture and color (e.g., rocks, shrubs, bricks, trees and flowers). The MRI scan documented brain responses to each image.

Those in the successful weight loss maintenance group responded differently to these pictures compared to the other groups. Specifically, researchers observed strong signals in the left superior frontal region and right middle temporal region of the brain – a pattern consistent with greater inhibitory control in response to food images and greater visual attention to food cues.

"It is possible that these brain responses may lead to preventive or corrective behaviors – particularly greater regulation of eating – that promote long-term weight control," said McCaffery, who is also an assistant professor of psychiatry and human behavior (research) at The Warren Alpert Medical School of Brown University. "However, future research is needed to determine whether these responses are inherent within an individual or if they can be changed."

The study was funded by a grant from the National Institutes of Health. Co-authors include Rena Wing and Ron Cohen, both from The Miriam Hospital and Alpert Medical School; Andreana P. Haley from the University of Texas at Austin; Lawrence H. Sweet from Butler Hospital and Alpert Medical School; Suzanne Phelan from California Polytechnic State University; Hollie A. Raynor from the University of Tennessee at Knoxville; and Angelo Del Parigi from Pfizer, Inc.

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

http://www.sciencedaily.com/releases/2009/09/090915113542.htm

Changes In Earth's Ozone Layer Predicted To Increase UV Radiation In Tropics And Antarctica

Physicists have discovered that changes in the Earth's ozone layer due to climate change will increase the amount of ultraviolet radiation hitting the tropics and Antarctica. (Credit: iStockphoto/Inga Ivanova)

ScienceDaily (Sep. 16, 2009) — Physicists at the University of Toronto have discovered that changes in the Earth's ozone layer due to climate change will reduce the amount of ultraviolet (UV) radiation in northern high latitude regions such as Siberia, Scandinavia and northern Canada. Other regions of the Earth, such as the tropics and Antarctica, will instead face increasing levels of UV radiation.

"Climate change is an established fact, but scientists are only just beginning to understand its regional manifestations," says Michaela Hegglin, a postdoctoral fellow in the Department of Physics, and the lead author of the study published in *Nature Geoscience* on September 6.

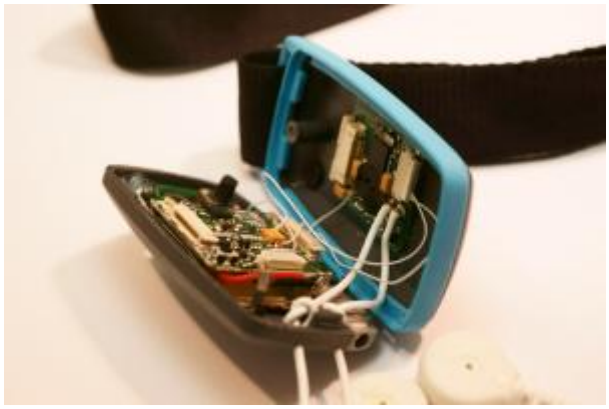
Using a sophisticated computer model, Hegglin and U of T physicist Theodore Shepherd determined that 21st-century climate change will alter atmospheric circulation, increasing the flux of ozone from the upper to the lower atmosphere and shifting the distribution of ozone within the upper atmosphere. The result will be a change in the amount of UV radiation reaching the Earth's surface which varies dramatically between regions: e.g. up to a 20 per cent increase in UV radiation over southern high latitudes during spring and summer, and a nine per cent decrease in UV radiation over northern high latitudes, by the end of the century.

While the effects of increased UV have been widely studied because of the problem of ozone depletion, decreased UV could have adverse effects too, e.g. on vitamin D production for people in regions with limited sunlight such as the northern high latitudes."Both human and ecosystem health are affected by air quality and by UV radiation," says Shepherd. "While there has been much research on the impact of climate change on air quality, our work shows that this research needs to include the effect of changes in stratospheric ozone. And while there has been much research on the impact of ozone depletion on UV radiation and its impacts on human and ecosystem health, the notion that climate change could also affect UV radiation has not previously been considered. This adds to the list of potential impacts of climate change, and is especially important for Canada as northern high latitudes are particularly affected."The research was funded by the Canadian Foundation for Climate and Atmospheric Sciences through the C-SPARC project. The C-SPARC project is a national collaboration between Environment Canada and several Canadian universities.

Adapted from materials provided by University of Toronto.

http://www.sciencedaily.com/releases/2009/09/090915113534.htm

Necklace For Long-term And Robust Cardiac Monitoring In Daily Life



Detail of IMEC's ECG necklace developed at Holst Centre. (Credit: Image courtesy of Interuniversity Microelectronics Centre (IMEC))

ScienceDaily (Sep. 16, 2009) — IMEC and its research affiliate Holst Centre today present a prototype of an electrocardiogram or ECG necklace at the IEEE Engineering in Medicine & Biology Conference (EMBC) in Minneapolis, Minnesota (USA). The technology enables long-term monitoring of cardiac performance and allows patients to remain ambulatory and continue their routine daily activities while under observation. The embedded beat detection algorithm copes with the artefacts inherent to ambulatory monitoring systems.

The ECG necklace is easy to use and characterized by a low power consumption ensuring 7 days autonomy. It contains IMEC's proprietary ultra-low power analog readout ASIC (application-specific integrated circuit), and relies on a low power commercial radio/microprocessor platform. A wavelet-based heart beat detection algorithm is embedded in the processor that ensures the accurate computation of the instantaneous heart rate, even under high level of noise. A second ultra-low power microcontroller unit controls the wireless transmission of the ECG data to a computer within a range of 10m. An optional memory module enables data logging for applications in which the receiving computer is not in the neighborhood.

Ambulatory cardiac monitoring systems today suffer from inaccurate measurements due to artefacts which are inherent to ambulatory situations. IMEC's embedded beat detection algorithm has been optimized for robust heart beat detection. It copes with baseline wander, EMG (electromyogram) and motion artefacts, and high and variable electrode impedance. Heart beat is detected with 1 sample resolution. The algorithm achieves best-in-class performances, with 99.8% sensitivity and 99.77% positive predictivity on both the MIT-BIH database and a proprietary database of ambulatory ECG recordings. A satisfactory performance is achieved until 0dB SNR (signal to noise ratio).

With the Human++ program, IMEC and Holst Centre aim to leverage their expertise in nanoelectronics and nanotechnology to develop solutions for a more efficient and better healthcare. IMEC's generic technology for wireless ECG systems, such as the new ECG necklace prototype, can be used for permanent screening of people at risk of cardiovascular disorders, heart beat and beat analysis information for fit & healthy people and therapy compliance and follow-up for people under cardiovascular treatment. Industry can get access to the technology by joining the Human++ program as research partner or by licensing agreements for further product development.

Adapted from materials provided by Interuniversity Microelectronics Centre (IMEC).

http://www.sciencedaily.com/releases/2009/09/090902122336.htm

Super Bedsheet Solves Delivery-room Problems

Astrid Skreosen (left) used to work in the maternity ward in Skien Hospital. Now she is developing medical aids for her former work-place. The photo shows her together with colleague Elin Tollefsen.

ScienceDaily (Sep. 16, 2009) — Astrid Skreosen has worked for many years as an auxiliary nurse in the maternity ward in Skien Hospital. She became fed up with the little mats which were supposed to lie under women who were giving birth, and were intended to soak up waste products and fluids.

“Restless women in labour and unstable mats made problems for everyone. None of these underlays fitted the delivery beds, and we were wading in foetal fluids and blood. I was just as irritated by people who said that we shouldn’t complain, but just make the best of things,” says Skreosen, who decided to do something about the problem herself.

She began to look into the possibility of producing a specially modified super-absorbent bed sheet, and after stumbling around in the dark for a while with inventors’ consultants and patent offices, she rang SINTEF.

Skreosen was put in touch with Per Stenstad in SINTEF Materials and Chemistry. After a few meetings an agreement to cooperate was signed. By Christmas 2007 the plans were so advanced that she could apply for funding and set up a company: ASAP Norway.

Triple-layer, millimetre-thick sheet

“The principle of an absorbent polymer material is well known”, says Stenstad. “It functions rather like a nappy. In this case, the challenge was that the sheet must be only a millimetre thick, without letting dampness pass through it. The set of sheets also had to consist of two parts in order to be suitable for the labour bed.”

SINTEF scientists have already developed two prototypes and a number of other textiles that have been tested; Ullevål Hospital in Oslo is interested. The products are made up of three layers: the bottom layer acts as a humidity barrier while the mid-layer is a superabsorbent polymer, topped by a gauze-like layer in contact with the skin; this is intended to allow fluids to pass rapidly through it.

“We carried out a survey of damp-absorbent polymers in use today; for example in nappies. Most of these are based on polyacrylic acid, and we have used a powder that is based on this powder. We have managed

to produce prototypes that are only 0.1 mm thick by fixing a thin layer of absorbent powder directly to the base layer," says Stenstad.

For the base layer itself, the scientists found a suitable bioplastic from BioBag. It is soft, flexible and environmentally friendly, and the project group is already in contact with the manufacturer, who is positive about signing an agreement to produce the material.

SINTEF health researchers have been responsible for concept development and prototype development.

"It was important to end up with a bed sheet that utilises simple and functional technology, that would also ensure maximum absorption of damp," says one of them, Tore Christian Storholmen.

Savings

Astrid Skreosen has applied for a patent, and is now looking for a company to produce her sheets.

"This bed sheet can be used in maternity wards and in field hospitals anywhere in the world. Another option would be to use it in operating theatres and ambulances," she says.

The aim is to enable hospitals to save time and money by using the new sheet. Clearing up and laundering after a delivery is a major, time-consuming job, and lack of time for such tasks can lead to infections. Replacing the mats with a sheet of this type will also mean less waste."

Adapted from materials provided by SINTEF, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090914111414.htm

Skeleton Found At Roman Site In Britain Mystifies Archaeologists

A skeleton, found at one of the most important, but least understood, Roman sites in Britain is puzzling experts from The University of Nottingham. (Credit: Image courtesy of University of Nottingham)

ScienceDaily (Sep. 16, 2009) — A skeleton, found at one of the most important, but least understood, Roman sites in Britain is puzzling experts from The University of Nottingham.

Dr Will Bowden from the Department of Archaeology, who is leading excavations at the buried town of Venta Icenorum at Caistor St Edmund in Norfolk, said the burial was highly unusual: "This is an abnormal burial. The body, which is probably male, was placed in a shallow pit on its side, as opposed to being laid out properly. This is not the care Romans normally accorded to their dead. It could be that the person was murdered or executed although this is still a matter of speculation."

The skeleton has been removed for further investigation. Dr Bowden said: "It is an exciting find and once we have cleaned the bones they will undergo a full examination and a range of scientific tests to try and find out how this individual died."

The Caistor excavations, sponsored by the Foyle Foundation, May Gurney, the Roman Research Trust and South Norfolk Council, have also found evidence of Iron Age as well as early prehistoric occupation some 10,000 years BC. Dr Bowden said: "These excavations have added an enormous amount to what we knew before. There are flints so sharp you could still shave with them – they are so fresh they have barely moved in all that time."

Excavations were first carried out at Caistor St Edmund in 1929 after aerial photographs picked out the site in the parched fields following an exceptionally dry summer.

Dr Bowden's work began two years ago. Using the latest technology the team revealed the plan of the buried town at an extraordinary level of detail never been seen before.

The high-resolution geophysical survey used a Caesium Vapour magnetometer to map buried remains across the entire walled area of the Roman town. Dr Bowden worked with Dr David Bescoby and Dr Neil Chroston of the University of East Anglia on the new survey, sponsored by the British Academy. Around 30 local volunteer members of the Caistor Roman Town Project also assisted.

The survey produced the clearest plan of the town yet - confirming the street plan (shown by previous aerial photographs), the town's water supply system (detecting the iron collars connecting wooden water pipes), and the series of public buildings including the baths, temples and forum, known from earlier excavations.

Caistor lies in the territory of the Iceni, the tribe of Boudica who famously rebelled against Roman rule in AD 60/61. The survey revealed numerous circular features that apparently predate the Roman town.

These are probably of prehistoric date, and suggest that Caistor was the site of a large settlement before the Roman town was built. This had always been suspected because of numerous chance finds of late Iron Age coins and metalwork, but until the survey was carried out there had never been any evidence of buildings.

This summer archaeologists returned to start excavating the site. Dr Bowden said: "To have the opportunity to excavate here is the chance of a lifetime."

Adapted from materials provided by University of Nottingham.

http://www.sciencedaily.com/releases/2009/09/090915140924.htm

How Much Does It Hurt?

Northwestern's David Cella is leading a vast effort at better measuring pain, fatigue and outcomes. It may change the way researchers run clinical trials.

- By: Ryan Blitstein | September 17, 2009 | 06:40 AM (PDT) |

The Patient-Reported Outcomes Measurement Information System, may change the way researchers run clinical trials.Bora Ucak

Sometimes, it's simple to measure the effects of medical treatment: A patient recovers from the flu or she doesn't. Cancer cells disappear or they return.

Yet many conversations between doctor and patient yield less-than-scientific answers — intangible descriptions, such as the amount of pain a person is in or how much a drug amplifies his drowsiness. Because researchers employ incongruous tools to measure the unmeasurable, a group of clinical studies devoted to a disease might seem like they were written in different languages.

To address this problem, David Cella wants to create the Rosetta Stone of medical symptoms. The chair of the department of medical social sciences at Northwestern University's medical school is leading PROMIS, a government-funded program aimed at standardizing the way patients talk to doctors about their bodies and minds. It has the ambitious goal of re-engineering the way clinical research is performed in the United States.

The PROMIS initiative began after officials at the National Institutes of Health, like many health experts, saw the limits of using varied methodologies to gauge the same symptoms, as it's difficult to compare the results of studies that employ different assessment tests.

"They've grown frustrated or weary of seeing fatigue measured in hundreds of different ways or pain measured in hundreds of different ways," Cella says.

In some cases, test results also fail to capture changes that clinicians observe among their patients. This is partly because some measures are too basic to yield detailed information. The standard way to measure pain, for instance, is just to ask a patient their level of pain on a scale from zero to 10, with little regard for whether they're able to perform everyday tasks.

"Only recently have we begun to recognize that it's important not only to document pain, but functional status," says Aaron Gilson, a director of the pain and policy studies group at the University of Wisconsin School of Medicine and Public Health.

In 2004, NIH started funding the Patient-Reported Outcomes Measurement Information System (PROMIS), a cooperative group of scientists at six research sites, with Cella in charge of a statistical coordinating center at Northwestern. They're mapping out ways to assess a range of well-being areas, from anger to social support.

To create the right vocabulary, they've had to fundamentally rethink the way medicine measures symptoms, assembling 7,000 questions from literature reviews and expert recommendations, and then tossing out overlapping concepts. They winnowed the final list down to a few hundred queries that provide the maximum amount of valid information in the smallest amount of time. (You can try a sample test by clicking on "CAT demo" here.)

They field-tested the battery among thousands of adults against the observations of clinicians, patient self-reports in traditional measures and objective outcomes like CT scans and survival. That helped determine where questions fit along the continuum of intensity for each perception. For example, the question, "How often were you too tired to take a bath or shower?" better gauges extreme fatigue levels than, "How often did you have enough energy to exercise strenuously?"

The group then created an adaptive software test that chooses each subsequent question based on a test-taker's prior responses. The final score, Cella believes, is an accurate, standardized measure of the way a person experiences a symptom — allowing researchers to compare him or her with other patients.

After two years of managing a web-based PROMIS system, this month Cella's team is releasing a standalone version of the software for research teams and hospitals to maintain in-house. Because it addresses users' privacy and technical concerns over the online system, he expects this overhauled version will soon double the number of hospitals and research teams using PROMIS to more than 2,000.

In the next few months, the project is opening up data from its first wave of questionnaires — about 20,000 patients' worth — so outside researchers can analyze it. They're also expanding testing protocols in a variety of domains, including arthritis and congestive heart failure, as well as new physical areas such as sleep/wake and cognitive functions.

To be sure, no system based on patient responses can accurately, objectively measure a feeling as abstract as human pain. Yet tech-heavy neurological research, which aims to do just that, remains years away from allowing scientists to understand specific brain states based solely on a computer image. For now, PROMIS seems to be the best way to quantify fuzzy emotions and sensations into a common scientific language.

Cella stresses that PROMIS isn't meant to replace all other tests, particularly not those targeted toward specific treatments or side effect. If it succeeds, though, it could become the lingua franca for interpreting everything from the effects of new drugs to the efficacy of addiction research.

http://www.miller-mccune.com/health/how-much-does-it-hurt-1432?utm_source=Newsletter75&utm_medium=email&utm_content=0915&utm_campaign=newsletters

Naked mole rats may help cure cancer

- 22 September 2009
- Magazine issue 2726.

THEY might be bald and ugly, but naked mole rats never get cancer. If their trick can be copied it could help humans resist cancer too.

It's almost impossible to culture naked mole rat cells in the lab, which made Andrei Seluanov and Vera Gorbunova from Rochester University, New York, wonder if this might be linked to their ability to resist cancer.

They found that a dilute solution of naked mole rat skin cells did start to proliferate, but stopped once the cells reached a certain, relatively low density. Such "contact inhibition" is also used by human cells to inhibit growth, but cancer bypasses this mechanism so cells keep growing.

The researchers also found that contact inhibition in naked mole rats is controlled by two genes, *p16* and *p27*, while in humans it is primarily controlled by *p27*. "Naked mole rats have an additional barrier in the way of tumour progression," says Seluanov, who presented the results at the Strategies for Engineered Negligible Senescence meeting in Cambridge, UK, last week.

If this check could be stimulated in humans, it could halt the growth of cancerous tumours.

http://www.newscientist.com/article/mg20327267.300-naked-mole-rats-may-help-cure-cancer.html

Years of caste system belie Indians' shared ancestry

- 24 September 2009
- Magazine issue 2727.
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  THE Rigveda, a collection of Sanskrit hymns written around 3500 years ago, doesn't contain much genetics. It does, however, have the first mention of India's caste system, and now a genetics study reveals that inbreeding going back thousands of years has led to marked genetic differences between castes. It also shows that India's many distinct peoples spring from just two ancient populations.

Nick Patterson of the Broad Institute in Cambridge, Massachusetts, and colleagues examined fragments of DNA from 25 groups across India. They included castes and hunter-gatherer tribes, or "scheduled populations". Each of these groups was genetically distinct, but the profiling indicated that all Indians spring from one of two populations: Ancestral North Indians (ANI), who are genetically close to Europeans, and Ancestral South Indians, who are distinct from both east Asians and ANI (*Nature*, DOI: 10.1038/nature08365).

"If you're trying to understand disease and distribution between south and north India, there could be environmental or lifestyle issues," says Patterson, "but genetics could also offer a perfectly possible explanation."

The analysis showed that castes are descended from a small pool of ancestors and that an initial lack of genetic variability has been reinforced by marriages within the group. The current caste system has resulted in limited gene flow for thousands of years, says Patterson.

http://www.newscientist.com/article/mg20327274.500-years-of-caste-system-belie-indians-shared-ancestry.html

Lack of sleep linked to Alzheimer's

- 19:00 24 September 2009 by **Jessica Hamzelou**

A lack of sleep could help toxic plaques develop in the brain, accelerating the progression of Alzheimer's disease.

David Holtzman looked at how sleep affected the levels of beta-amyloid protein in mice and humans. This protein causes plaques to build up in the brain, which some think cause Alzheimer's disease by killing cells.

Holtzman's group found that beta-amyloid levels were higher in mouse brains when the mice were awake than when they were sleeping.

Lack of sleep also had an effect on plaque levels: when the mice were sleep-deprived – forced to stay awake for 20 hours of the day – they developed more plaques in their brains.

Sleep therapy

Holtzman also tried sending the mice to sleep with a drug that is being trialled for insomnia, called Almorexant. This reduced the amount of plaque-forming protein.

He suggests that sleeping for longer could limit the formation of plaques, and perhaps block it altogether.

The group also measured levels of beta-amyloid in the cerebrospinal fluid of 10 healthy men, both at night and during the day. Levels were lower at night, suggesting that sleep might also help keep levels of the plaque protein low in humans.

Holtzman reckons that when we're awake, our brains are more active, and that this may cause us to produce more beta-amyloid protein.

Pills aren't the answer

Neuroscientist Damian Crowther of the University of Cambridge says that people with Alzheimer's are known to suffer sleep abnormalities, but that whether these are a cause or a symptom of the disease is unknown.

He says the new results are interesting, but cautions against encouraging people with Alzheimer's to take sleeping pills in the hope that sleep will mitigate the disease. Instead, he suggests exercise to induce sleep might be a good idea if later studies confirm a link between sleep and Alzheimer's progression.

"It is interesting that there may be a link between sleep and the build-up of the protein associated with the development of Alzheimer's disease," says Clive Ballard, director of research at the Alzheimer's Society in London. "However, there are many other biological factors that may have an impact on the protein's production, so further research in this area would be needed."

Recently, for example, several drugs that clear plaques failed to relieve the symptoms of Alzheimer's. And earlier this month, two studies suggested that disruptions of the immune system, the way cells metabolise fat and wear and tear on the circulatory system may be as much to blame for Alzheimer's as plaques.

Journal reference: *Science*, DOI: 10.1126/science.1180962