Infoteca's E-Journal

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The Cybercafe Lives

By VIRGINIA HEFFERNAN

Two years ago, I spent a night in a smoky Bagus Gran Cyber Cafe in Tokyo, which is a kind of no-tell motel for information consumption. It was heady. Semireclined in a dim cubicle before a magnificent spread of consumer electronics and media, I struggled to take advantage of every appointment (game console, DVD player, fast Internet, books, magazines), as I was paying by the hour.

I hoped to replicate the experience of Japanese habitués who told me they find in the media-immersion pods profound relief from the burdens of social and professional life. As one social critic explained, they afford a bliss that comes from role-playing and self-forfeiture, from becoming (in his unforgettable words) “No-face man, no-ID man, no-pride man.” Here’s what happened to me: I played video games, wrote e-mail, watched movies. I puzzled over the low lighting, appreciated the minimal interaction and eventually fell asleep.

The Gran Cyber Cafes in Tokyo are on high floors of buildings in dense, flashing commercial neighborhoods. When trying to imagine a comparable business in the U.S. — an urban space where you pay by the hour for use of superb technology in a communal atmosphere that is nonetheless compartmentalized — it never occurred to me to look in New York’s East Village, where at street level a cafe called Web2Zone has been thriving since Sept. 9, 2001.

So what’s an American media-immersion zone like? From the street, Web2Zone, which is owned by the Korean company Samsung, looks like a standard-issue college-crowd cafe (it’s close to New York University). An outfit called Fusion Wraps keeps a few tables and offers a menu unusual only for featuring bulgogi. From the sidewalk, you can peer through Fusion Wraps to the dark yonder: all told, 10,000 square feet of floor space with rows of workbenches with computers on them.

This is the musty business model of the Internet cafe, allowing patrons to rent time on its computers. Web2Zone was even named “Best Internet Cafe” by The New York Press, though that honor takes on a slightly different hue when you realize that the category has been facing obsolescence for more than a decade. Most recently, the rattiest old cybercafes in Queens have been shut down, following too-frequent

fights among hotheaded video-game patrons. And the once-glamorous @Cafe in Manhattan was already boarded up by 1998! “The notion of a cybercafe — a place for Net surfers to socialize on a tide of gourmet coffee — is at odds with how most people want to use computers, even in their leisure time,” Michel Marriott observed that year in The New York Times. “Those who Web surf, read e-mail, write or program or do just about anything else on a computer often do so in solitude.” Today, with superpowered handhelds, we imagine digital life as something that no longer requires devoted surfaces, mouse pads or uninterrupted stretches of time.

But that’s not true if you’re a gamer. At Web2Zone, more than half of the house is devoted to games — multiplayer, interconnected games, most visibly, whose cinematic images play across the site’s best equipment on computers situated in clusters on round tables.

On any given day, young men — “from around,” a manager told me, implying something about class I couldn’t entirely pinpoint; “not local or N.Y.U.” — can be found sitting close to the front of the house and the natural light. (Regulars apparently choose their machines and stick with them day after day.) The table near the stairs and the cafe — not the more private tables, way back in the murk — seems to fill up first, and the guys sit together, though they could easily spread out. The lofty acoustics of Web2Zone half-swallow the game sound effects, and the ambience is hushed and overcast.

The most popular games at Web2Zone include an oldie called Counter-Strike and, of course, the ne plus ultra M.M.O.R.P.G. (massively multiplayer online role-playing game): World of Warcraft. It’s not clear whether Web2Zone regulars, absorbed in their games, are competing against people in Seoul, in Chicago or at arm’s length.

The staff at Web2Zone gets most excited about the tournaments held there. The tournaments are sponsored by companies like Blizzard Entertainment, which makes World of Warcraft and the rest of the Warcraft series. On a recent weekend, 14 major gamers — young men with managers and expense accounts — were flown in from around the world for a showdown. Typically, gamers pay about $35 for the day to participate, while others pay $5 to watch the games, mostly on monitors downstairs.

Why do the tournament gamers show up in person, when the cafe’s almighty LAN connection (Web2Zone is the largest LAN center on the East Coast) exists entirely so that people don’t have to be face to face to compete? Andrew Ko, who has been a manager at Web2Zone for two years, half-laughed when I asked. “You have to defend your reputation,” he said. Which also means, I guess, descending from the game’s wonderfully Norsey universe of Azeroth to greet your earthling mates.

Web2Zone seems to have nice crowd; the manager tells me they only occasionally tell loud gamers to cool it. Customers regularly tell surveys they don’t need any more privacy than is offered by the workbench layout; they don’t seem to crave the cubicles and capsule rooms with bucket seats that are the pride of such spaces in Japan and Korea. “Half of the people who come here don’t have computers, or they have bad connections,” Ko told me. “The other half, they just like being in a public place. They like having the cafe within reach. Our regulars know each other.”

Participants in social networks and any kind of massive-multiplayer-online existence often feel suspended between total isolation at their screens and howling online crowds. The next incarnation of the cybercafe should take into account that people will pay not only for coffee and online minutes but also for the reassurance that in their cyberjourneys they might find traveling companions whose faces — in line for a Red Bull or a margarita? — they might even see. Finding a way out of isolation and into productive fantasy and social connection, without being eaten up by virtual swarms, may be the video game we’re all playing.

http://www.nytimes.com/2008/11/09/magazine/09wwln-medium-t.html?_r=1&th&emc=th&oref=login

Once Inspired by a War, Now by the Land

By CAROL KINO

Mountainville, N.Y.

ON a gray, unusually muggy October day the artist and architect Maya Lin was showing a visitor around "Wave Field," her new earthwork project at the Storm King Art Center here. The 11-acre installation, which will open to the public next spring, consists of seven rows of undulating hills cradled in a gently sloping valley. Ms. Lin clambered nimbly up and down them, regarding each nook, cranny and blade of grass with something of a proprietary air.

"It's part of a study that started with looking at a simple water wave," she explained en route, "and how does the wave begin or end." Given that she was working with land, not water, she added, "I was almost afraid to start it."

From a neighboring hill came the delighted screams of children at play: Ms. Lin's daughters, India, 11, and Rachel, 9, and one of Rachel's friends.

Seen from afar the piece does suggest an expanse of ocean waves that have been frozen in place, as well as many other things: snowdrifts, a Zen moss garden, perhaps a cluster of the American Indian burial mounds that can be found in the hills of southeastern Ohio, where Ms. Lin grew up.

With its sense of having arisen naturally from the earth, the earthwork also recalls Ms. Lin's Vietnam Veterans Memorial, the design for which catapulted her to stardom and notoriety in 1981, when she was a 21-year-old senior at Yale.

Yet as soon as you walk into the piece, whose earthen swells range in height from 12 to 18 feet, your experience of it changes remarkably. At first, standing at the bottom of a slope, it may look craggy and insurmountable. But in scaling it — which turns out to be relatively easy because of the rough surface —

you become keenly aware of the earth itself, currently a patchy mix of topsoil, short grass, clover, white daisies and yellow-flowered partridge pea, which attracts swarms of monarch butterflies.

“This stuff was just rock-laden soil,” Ms. Lin said, stooping to finger the plants, which were seeded by hand. “It will all end up being field. You don’t want it to turn into a golf course. You basically want whatever is around here naturally to take root. You’re after something that doesn’t look premeditated and too cultivated.”

Then she happened across a large tunnel burrowed into the side of a wave. “Oh my God!” she cried. “A groundhog hole!”

India suddenly scrambled into view, shouting, “Mommy, we counted five of them!”

Ms. Lin laughed and then paused, reflecting, “I think we’ll cover it up?” But within moments she had changed her mind. “I think you have to let it be what it’s going to be,” she said.

In a sense that has been her mantra throughout the project.

Eight years ago, when she was first invited to visit Storm King to start thinking about making a piece, she found herself strangely attracted to an overlooked area known around the art center as the gravel pit. Located on the property’s southwestern edge, about 100 feet beyond Andy Goldsworthy’s “Storm King Wall” (1997-98), it was a reminder of what Storm King looked like in 1960, the year it opened.

Back then much of Storm King’s landscape consisted of acres of gravel that had been mined from the surrounding fields in the 1950s in connection with the construction of the New York State Thruway. Over the years the art center used this rocky material to shape its grounds, creating the seemingly natural hills and valleys that now are dotted with sculptures and site-specific works by artists like David Smith, Isamu Noguchi and Mr. Goldsworthy.

“It’s a man-made landscape, bringing gravel in and reshaping it,” said David R. Collens, the director of Storm King. “That’s the untold story about the art center.” And as soon as Ms. Lin saw the pit, he said, “her eyes lit up, and that was it for her.”

Ms. Lin said: “I’ve tended to create works on the edges and boundaries of places, so the work becomes less of a centerpiece. I’m very interested in exploring works that begin to own the environment.”

By the time she finally proposed the piece to Storm King’s board in 2006, she had already completed two smaller-scale “Wave Field” earthworks, the first at the University of Michigan in Ann Arbor, the second for the courtyard of the Wilkie D. Ferguson Jr. federal courthouse in Miami. “I always knew that I wanted to culminate the series with a field that literally, when you were in it, you became lost inside it,” she said, “so the waves had to become much larger than you.” To her the gravel pit seemed perfect for this concluding piece, which will also be Storm King’s first earthwork.

Because the site was officially a mine, Mr. Collens had to secure permission from the state Environmental Conservation Department to reclaim it as an artwork. The department has strongly supported the project. Because Ms. Lin is “a committed environmentalist,” as she put it, she was intent on using minimal intervention to turn it into an artwork and making the most of what was already there.

That meant gently grading the site and using its largest rocks to create an underlying structure that would provide the piece with natural drainage, a project she accomplished with the aid of the landscape architect Edwina von Gal. The waves and the bowl-like valley in which they rest were largely built from the gravel and earth in the pit itself as well as a berm that had shielded the site from view. Here Ms. Lin relied

heavily on Frank Tantillo, a local landscaper. “You need to find a contractor who’s sympathetic and really supportive,” she said, “because they’re basically sculpting the landscape with a bulldozer.”

By the time the piece opens to the public next spring, it will be shielded from the Thruway by about 270 young trees — a mix of maple, oak, sycamore and other local natives. That’s how many trees Ms. Lin’s studio staff has calculated it will take to offset the fuel and energy consumed in making the piece, including the artist’s own frequent car trips from New York. “I might actually look for more trees that can take hotter weather and make them more predominant,” Ms. Lin said. “I’m a firm believer that global warming is happening.”

And then there are the grasses. Chosen by Darrel Morrison, a landscape restoration expert who consults on all the tall grasses planted at Storm King, they are a native mix that should require little maintenance or watering. By spring tall plants like deertongue and Canada bluegrass will have taken over from the ground cover that now holds the topsoil in place. At that point, Ms. Lin said: “The grass will flow in the wind and feel more like water. Although of course you’re not trying to recreate water. It begins to be its own formal play.”

In a sense Ms. Lin’s entire career has been interplay among what she regards as three separate strands: she is an architect and an artist, and she also designs memorials (she likes to call them anti-monuments) that fall somewhere between the two. She has been pursuing all three directions since she finished the Vietnam memorial in 1982. That project transformed her into something of an instant celebrity, and she was offered a number of architectural commissions as a result. But Ms. Lin, who in person is strikingly friendly and unassuming, does not seem to have let the experience turn her head.

“There’s a part of me that’s oddly shy,” she said. “And I tend to take my time. I didn’t want to produce work that wasn’t quite ready.” So she decided to “maintain course” by earning a master’s degree in architecture at Yale.

While studying the art of building design in graduate school, Ms. Lin found herself spending more and more time in the sculpture studios of the Yale art department, working with her hands. “I was called an architect, and I loved building,” she said, “but at the same time there was this other side of me that was beginning to differentiate itself.”

Soon after graduating, she designed her second monument, the Civil Rights Memorial at the Southern Poverty Law Center in Montgomery, Ala., which was dedicated in 1989. By 1993 she had completed her first major building, for the Museum of African Art in SoHo, which is now defunct.

Since then she has worked consistently in all three areas, often developing ideas for one sort of project while working on another. In 1993 she created her first site-specific sculpture for the Wexner Center for the Arts in Columbus, Ohio. Called “Groundswell,” it consisted of 40 tons of broken tempered glass poured into snowdriftlike piles around the museum’s exterior walls. From this came the idea for her first earthwork, “Wave Field,” in Michigan, which she completed in 1995. That in turn led her back to the studio, where for a time she focused on making sculpture.

Making sculpture as well as drawings and maquettes is at the heart of everything Ms. Lin does, as becomes clear when you enter her studio, a 2,600-square-foot loft in the heart of SoHo. Much of the space is occupied by her assistants, who carry out the mathematical and topographical data collection, analysis and computer modeling that are crucial to her work. But by the doorway there is a small area where, she said, “I literally get to disappear and make the sculptures.”

The room is full of small artworks, most of which suggest the earth in some form or another. There is also a group of colorful asteroidlike objects made from discarded (and nonrecyclable) plastic toys and bottle caps. “It’s really important that I get to make things by hand,” Ms. Lin said. “I think when you’re working

with bulldozers, when everything you're doing is translated through a fairly large-scale machined operation, just to be able to come back here is really crucial to my creativity."

She also makes some work at home, an apartment on the Upper East Side that she shares with her children and her husband, Daniel Wolf, a photography dealer. "I've always made work in my bedroom, basically," she said.

Many of her larger sculptures and installations can be seen in "Systematic Landscapes," an exhibition that opened at the Henry Art Gallery in Seattle in April 2006 and is now at the de Young Museum in San Francisco. It includes three focal installations, all made in 2006. "2 x 4 Landscape" is an earthworklike mound with a pixelated appearance that was built from two-by-fours.

"Water Line," based on remote Bouvet Island in the South Atlantic, is a topographical rendering built with aluminum tubing and suspended from the walls — a kind of three-dimensional drawing — so that visitors can walk beneath it. Then there is "Blue Lake Pass," a model of the Colorado mountain range where Ms. Lin and her family spend summers. Made from particle board, it is cut into cross-sections that visitors can walk among. While making these works, Ms. Lin said, her overall impulse was "to take the aesthetic of 'Wave Field' and bring it indoors."

In the past Ms. Lin has always conceived of her different career strands as separate. "I think it may be the only way I can keep myself balanced," she said. Although she is also working on a commission for the Museum of Chinese in America in Chinatown in Manhattan, she is reluctant to talk about such projects and her artwork in the same breath. "It kind of confuses people," she said.

Yet recently she has been coming around to the idea that the strands may be intertwined. "My greatest fear 15 years ago is that the different parts weren't in dialogue with each other," she said. "But whether it's art, architecture or memorials, I realize now that all my work is intrinsically tied to the natural landscape around us."

http://www.nytimes.com/2008/11/09/arts/design/09kino.html?th&emc=th

Darwin's specimens go on display

Darwin's first sighting of the Galapagos mockingbirds were to prove historic
Randal Keynes, Charles Darwin's great-great-grandson

Two mockingbirds, which are said to have helped Charles Darwin develop his theory on evolution, are to go on public display for the first time.

The specimens, gathered by Darwin from the Galapagos, are said to be the "catalyst" for his transmutation theory - how one species changes into another.

A variety of differences between the specimens led to him questioning the "stability of species".

The birds will go on show at London's Natural History Museum next week.

The mockingbirds will feature in an exhibition dedicated to the pioneering work of the naturalist, which is part of Darwin200, a national programme of events running throughout 2009, celebrating the 200th anniversary of his birth.

"What is fantastic about these two birds is that visitors will be able to see for themselves the crucial differences that Darwin saw," said Jo Cooper, the museum's bird curator.

The mockingbirds were collected during Darwin's five-year voyage on board HMS Beagle, which was captained by Robert FitzRoy.

'Common ancestor'

One of the birds was captured on the island of Floreana, while the other was gathered from another Galapagos island, which is now called San Cristobal.

As a result of an earlier visit, Darwin knew that there was only one species of mockingbird in South America, yet he found a different species on each of the islands in the Pacific Ocean archipelago he visited.

From this, he reasoned that all mockingbirds in the world had descended from a common ancestor, because they shared a number of similarities with each other.

This ultimately led Darwin to the conclusion that all organisms on Earth had common ancestors.

Randal Keynes, Darwin's great-great-grandson, said the specimens played an important part in shaping the ideas that led to Darwin's theory of evolution.

"Darwin's first sighting of the Galapagos mockingbirds were to prove historic," he said.

"He later noted in the The Voyages of the Beagle that the small differences between the two birds on the two islands was a 'most remarkable fact in the distribution of organic beings'."

"Darwin had come to understand that species can change and this ultimately led to our present understanding of life on Earth."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7713340.stm

Published: 2008/11/07 16:18:55 GMT

Green spaces 'reduce health gap'

A bit of greenery near our homes can cut the "health gap" between rich and poor, say researchers from two Scottish universities.

Even small parks in the heart of our cities can protect us from strokes and heart disease, perhaps by cutting stress or boosting exercise.

Their study, in The Lancet, matched data about hundreds of thousands of deaths to green spaces in local areas.

Councils should introduce more greenery to improve wellbeing, they said.

> **This study offers valuable evidence that green space does more than 'pretty up' the neighbourhood**
> Dr Terry Hartig
> Uppsala University, Sweden

Across the country, there are "health inequalities" related to income and social deprivation, which generally reflect differences in lifestyle, diet, and, to some extent, access to medical care.

This means that in general, people living in poorer areas are more likely to be unhealthy, and die earlier.

However, the researchers found that living near parks, woodland or other open spaces helped reduce these inequalities, regardless of social class.

When the records of more than 366,000 people who died between 2001 and 2005 were analysed, it revealed that even tiny green spaces in the areas in which they lived made a big difference to their risk of fatal diseases.

Although the effect was greatest for those living surrounded by the most greenery, with the "health gap" roughly halved compared with those with the fewest green spaces around them, there was still a noticeable difference.

Stress buster

The change was particularly clear in areas such as heart disease and stroke, supporting the idea that the presence of green spaces encourages people to be more active.

However, the researchers, Dr Richard Mitchell from Glasgow University, and Dr Frank Popham, from the University of St Andrews, said that other studies had suggested that contact with green spaces also helped reduce blood pressure and stress levels, perhaps even promoting faster healing after surgery.

They wrote: "The implications of this study are clear - environments that promote good health might be crucial in the fight to reduce health inequalities."

They called for planning authorities to consider making more green spaces available to improve the health and wellbeing of their residents.

In an accompanying article in The Lancet, Dr Terry Hartig, from the Institute for Housing and Urban Research at Uppsala University in Sweden, wrote: "This study offers valuable evidence that green space does more than 'pretty up' the neighbourhood - it appears to have real effects on health inequality, of a kind that politicians and health authorities should take seriously."

David Tibbatts, from GreenSpace, a charity which promotes parks in urban areas, said that they were threatened by "decades of decline" in some areas.

"The study confirms what we have been saying for many years - parks are important for health and everyone should have access to high quality, beautiful and vibrant green spaces. "Unfortunately, despite the benefits green spaces bring to communities, our research has shown a decline in park services that has spread across more than 30 years.

"Despite increase recognition of their role in areas such as improved health, far too many parks teams find their revenue budgets are still under continuous threat."

Professor Barbara Maher from the Lancaster Environment Centre said her research had shown that roadside trees improve health by protecting people from pollution.

"Urban and roadside trees may be an under-used resource both in terms of acting as natural 'pollution monitors' and actively screening people, especially, children and the already ill, from the damaging health effects of particle pollution," she said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7714950.stm

Published: 2008/11/07 11:18:15 GMT

Surgery beneficial in heartburn

By Emma Wilkinson
BBC News health reporter

People with persistent heartburn should be considered for early surgery to prevent a lifetime of popping pills, NHS research suggests.

A year after keyhole surgery, only 14% of patients were still taking medication, compared with 90% of those treated with drugs alone.

The £1m trial of 800 patients suggests surgery should be done more routinely in patients with chronic acid reflux.

Experts said there was a view among GPs that surgery was "too extreme".

Researchers at the University of Aberdeen co-ordinated the trial of laparoscopic fundoplication at 21 hospitals around the UK.

> **For some people, it is a serious problem which could potentially mean a lifetime of tablet taking**
> Professor Roger Jones, King's College London

The results so far suggest the procedure, although expensive at £2000 per patient, is cost-effective because reflux sufferers no longer have to take medication and their quality of life improves.

But they are following the patients for five years to check the benefits are long-term.

The operation involves wrapping a piece of the stomach around the oesophagus to create a new valve to prevent acid backing up from the stomach.

It used to be done by opening up the chest cavity, but with the advent of keyhole surgery is now a lot safer.

Common problem

Reflux is a very common condition with 20% of the population experiencing it at some point in their lives.

Those at the more severe end of the spectrum end up taking tablets for the rest of their lives - potentially for 20 to 30 years in younger patients - and few currently receive surgery.

Study leader, Professor Adrian Grant, said: "It looks pretty promising.

"I think these results will mean that surgeons will be suggesting the operation in those patients who are not quite so bad."

He added: "Like all surgery, fundoplication has some risks, but the more troublesome the symptoms, the greater the potential benefit from the operation."

Professor Roger Jones, head of general practice at King's College London and chair of the Primary Care Gastroenterology Society said surgery was often regarded as "too extreme" for something which is not a serious problem.

"But for some people, it is a serious problem which could potentially mean a lifetime of tablet taking."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7716207.stm

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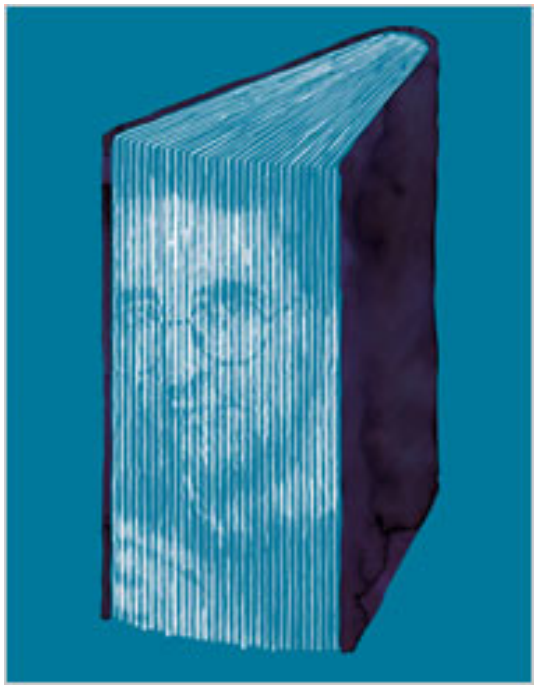
The Departed

By JONATHAN LETHEM



2666

By Roberto Bolaño. Translated by Natasha Wimmer

By 898 pp. Farrar, Straus & Giroux. Cloth and paper, $30

In Philip K. Dick's 1953 short story "The Preserving Machine," an impassioned inventor creates a device for "preserving" the canon of classical music — the sacred and, he fears, impermanent beauties of Schubert, Chopin, Beethoven and so forth — by feeding it into a device that transforms the compositions into living creatures: birds, beetles and animals resembling armadillos and porcupines. Outfitting the classic pieces in this manner, then setting them free, the inventor means to guarantee their persistence beyond the frailties of human commemoration, to give them a set of defenses adequate to their value. Alas, the musical-animals become disagreeable and violent, turn on one another and, when the inventor attempts to reverse-engineer his creations in order to prove that the music has survived, reveal themselves as a barely recognizable cacophony, nothing like the originals. Or has the preserving machine revealed true essences — irregularities, ferocities — disguised within the classical pieces to begin with?

Dick's parable evokes the absurd yearning embedded in our reverence toward art, and the tragicomic paradoxes "masterpieces" embody in the human realm that brings them forth and gives them their only value. If we fear ourselves unworthy of the sublimities glimpsed at the summit of art, what relevance does such exalted stuff have to our grubby lives? Conversely, if on investigation such works, and their makers, are revealed as ordinary, subject to the same provisions and defects as the rest of what we've plopped onto the planet — all these cities, nations, languages, histories — then why get worked up in the first place? Perfect or, more likely, imperfect, we may suspect art of being useless in either case.

Literature is more susceptible to these doubts than music or the visual arts, which can at least play at abstract beauty. Novels and stories, even poems, are helplessly built from the imperfect stuff: language, history, squalid human incident and dream. When so many accept as their inevitable subject the long odds the universe gives the aspirations of our species, degraded as it finds itself by the brutalities of animal

instinct and time's remorseless toll, books may seem to disqualify themselves from grace: how could such losers cobble together anything particularly sublime?

The Chilean exile poet Roberto Bolaño, born in 1953, lived in Mexico, France and Spain before his death in 2003, at 50, from liver disease traceable to heroin use years before. In a burst of invention now legendary in contemporary Spanish-language literature, and rapidly becoming so internationally, Bolaño in the last decade of his life, writing with the urgency of poverty and his failing health, constructed a remarkable body of stories and novels out of precisely such doubts: that literature, which he revered the way a penitent loves (and yet rails against) an elusive God, could meaningfully articulate the low truths he knew as rebel, exile, addict; that life, in all its gruesome splendor, could ever locate the literature it so desperately craves in order to feel itself known. Is a lifetime spent loving poems in a fallen world only a poor joke? Bolaño sprints into the teeth of his conundrum, violating one of the foremost writing-school injunctions, against writer-as-protagonist (in fact, Bolaño seems to make sport of violating nearly all of the foremost writing-school rules, against dream sequences, against mirrors as symbols, against barely disguised nods to his acquaintances, and so on). Again and again he peoples his singular fictions with novelists and poets, both aspiring and famous, both accomplished and hopeless, both politically oblivious and committedly extremist, whether right or left. By a marvelous sleight of hand writers are omnipresent in Bolaño's world, striding the stage as romantic heroes and feared as imperious villains, even aesthetic assassins — yet they're also persistently marginal, slipping between the cracks of time and geography, forever reclusive, vanished, erased. Bolaño's urgency infuses literature with life's whole freight: the ache of a writing-workshop aspirant may embody sexual longing, or dreams of political freedom from oppression, even the utopian fantasy of the eradication of violence, while a master-novelist's doubts in his works' chances in the game of posterity can stand for all human remorse at the burdens of personal life, or at knowledge of the burdens of history.

In the literary culture of the United States, Bolaño has become a talismanic figure seemingly overnight. The "overnight" is the result of the compressed sequence of the translation and publication of his books in English, capped by the galvanic appearance, last year, of "The Savage Detectives," an eccentrically encompassing novel, both typical of Bolaño's work and explosively larger, which cast the short stories and novellas that had preceded it into English in a sensational new light. By bringing scents of a Latin American culture more fitful, pop-savvy and suspicious of earthy machismo than that which it succeeds, Bolaño has been taken as a kind of reset button on our deplorably sporadic appetite for international writing, standing in relation to the generation of García Márquez, Vargas Llosa and Fuentes as, say, David Foster Wallace does to Mailer, Updike and Roth. As with Wallace's "Infinite Jest," in "The Savage Detectives" Bolaño delivered a genuine epic inoculated against grandiosity by humane irony, vernacular wit and a hint of punk-rock self-effacement. Any suspicion that literary culture had rushed to sentimentalize an exotic figure of quasi martyrdom was overwhelmed by the intimacy and humor of a voice that earned its breadth line by line, defying traditional fictional form with a torrential insouciance.

Well, hold on to your hats.

"2666" is the permanently mysterious title of a Bolaño manuscript rescued from his desk after his passing, the primary effort of the last five years of his life. The book was published posthumously in Spanish in 2004 to tremendous acclaim, after what appears to have been a bit of dithering over Bolaño's final intentions — a small result of which is that its English translation (by Natasha Wimmer, the indefatigable translator of "The Savage Detectives") has been bracketed by two faintly defensive statements justifying the book's present form. They needn't have bothered. "2666" is as consummate a performance as any 900-page novel dare hope to be: Bolaño won the race to the finish line in writing what he plainly intended, in his self-interrogating way, as a master statement. Indeed, he produced not only a supreme capstone to his own vaulting ambition, but a landmark in what's possible for the novel as a form in our increasingly, and terrifyingly, post-national world. "The Savage Detectives" looks positively hermetic beside it.

"2666" consists of five sections, each with autonomous life and form; in fact, Bolaño evidently flirted with the notion of separate publication for the five parts. Indeed, two or three of these might be the equal of his masterpieces at novella length, "By Night in Chile" and "Distant Star." In a comparison Bolaño openly solicits (the novel contains a series of unnecessary but totally charming defenses of its own formal strategies and magnitude) these five long sequences interlock to form an astonishing whole, in the same manner that fruits, vegetables, meats, flowers or books interlock in the unforgettable paintings of Giuseppe Arcimboldo to form a human face.

As in Arcimboldo's paintings, the individual elements of "2666" are easily cataloged, while the composite result, though unmistakable, remains ominously implicit, conveying a power unattainable by more direct strategies. Parts 1 and 5, the bookends — "The Part About the Critics" and "The Part About Archimboldi" — will be the most familiar to readers of Bolaño's other work. The "critics" are a group of four European academics, pedantically rapturous on the topic of their favorite writer, the mysterious German novelist Benno von Archimboldi. The four are glimpsed at a series of continental German literature conferences; Bolaño never tires of noting how a passion for literature walks a razor's edge between catastrophic irrelevance and sublime calling. As the four become sexually and emotionally entangled, the puzzle of their devotion to a writer who declines their interest — declines, in fact, ever to appear — inches like a great Lovecraftian shadow over their lives.

Following dubious clues, three of the four chase a rumor of Archimboldi's present whereabouts to Mexico, to Santa Teresa, a squalid and sprawling border city, globalization's no man's land, in the Sonoran Desert. The section's disconcertingly abrupt ending will also be familiar to readers of the novellas: the academics never locate the German novelist and, failing even to understand why the great German would exile himself to such a despondent place, find themselves standing at the edge of a metaphysical abyss. What lies below? Other voices will be needed to carry us forward. We meet, in Part 2, Amalfitano, another trans-Atlantic academic wrecked on the shoals of the Mexican border city, an emigrant college professor raising a beautiful daughter whose mother has abandoned them. He is beginning, seemingly, to lose his mind. Bolaño's genius is for weaving a blunt recitation of life's facts — his novels at times evoke biographies, case studies, police or government files — with digressive outbursts of lyricism as piercing as the disjunctions of writers like Denis Johnson, David Goodis or, yes, Philip K. Dick, as well as the filmmaker David Lynch. Here, Amalfitano considers a letter from his absconded wife: "In it Lola told him that she had a job cleaning big office buildings. It was a night job that started at 10 and ended at 4 or 5 or 6 in the morning. . . . For a second he thought it was all a lie, that Lola was working as an administrative assistant or secretary in some big company. Then he saw it clearly. He saw the vacuum cleaner parked between two rows of desks, saw the floor waxer like a cross between a mastiff and a pig sitting next to a plant, he saw an enormous window through which the lights of Paris blinked, he saw Lola in the cleaning company's smock, a worn blue smock, sitting writing the letter and maybe taking slow drags on a cigarette, he saw Lola's fingers, Lola's wrists, Lola's blank eyes, he saw another Lola reflected in the quicksilver of the window, floating weightless in the skies of Paris, like a trick photograph that isn't a trick, floating, floating pensively in the skies of Paris, weary, sending messages from the coldest, iciest realm of passion." Bolaño has been, because of his bookishness, compared to Jorge Luis Borges. But from the evidence of a prose always immediate, spare, rapturous and drifting, always cosmopolitan and enchanted, the Bolaño boom should be taken as immediate cause for a revival of the neglected master Julio Cortázar. (Cortázar's name appears in "2666," but then it may seem that every human name appears there and that Bolaño's book is reading your mind as you read it.)

By the end of Amalfitano's section a reader remains, like the critics in the earlier section, in possession of a paucity of real clues as to this novel's underlying "story," but suffused with dreadful implication. Amalfitano's daughter seems to be drifting into danger, and if we've been paying attention we'll have become concerned about intimations of a series of rape-murders in the Santa Teresa slums and foothills. What's more (if we've been reading flap copy or reviews) we'll have noted that "Santa Teresa" is a thin disguise over the real town of Ciudad Juárez, the site of a dismayingly underreported sequence of unsolved crimes against women, with a death toll that crept into the hundreds in the '90s. In the manner of James Ellroy, but with a greater check on both prurience and bathos, Bolaño has sunk the capital of his great book into a bottomless chasm of verifiable tragedy and injustice.

In the third section — "The Part About Fate" — this real-world material comes into view in the course of a marvelously spare and pensive portrait of a black North American journalist, diverted to Santa Teresa to cover what turns out to be a pathetically lopsided boxing match between a black American boxer and a Mexican opponent. Before arriving in Mexico, though, the journalist visits Detroit to interview an ex-Black Panther turned motivational speaker named Barry Seaman, who delivers, for 10 pages, the greatest ranting monologue this side of Don DeLillo's Lenny Bruce routines in "Underworld." Here's a bit of it: "He talked about the stars you see at night, say when you're driving from Des Moines to Lincoln on Route 80 and the car breaks down, the way they do, maybe it's the oil or the radiator, maybe it's a flat tire, and you get out and get the jack and the spare tire out of the trunk and change the tire, maybe half an hour, at most, and when you're done you look up and see the sky full of stars. The Milky Way. He talked about star athletes. That's a different kind of star, he said, and he compared them to movie stars, though as he said, the life of an athlete is generally much shorter. A star athlete might last 15 years at best, whereas a movie star could go on for 40 or 50 years if he or she started young. Meanwhile, any star you could see from the side of Route 80 . . . might have been dead for millions of years, and the traveler who gazed up at it would never know. It might be a live star or it might be a dead star. Sometimes, depending on your point of view, he said, it doesn't matter, since the stars you see at night exist in the realm of semblance. They are semblances, the same way dreams are semblances."

At last, and with the blunt power of a documentary compilation, comes Part 4, "The Part About the Crimes." Bolaño's massive structure may now be understood as a form of mercy: "2666" has been conceived as a resounding chamber, a receptacle adequate to the gravity — the weight and the force — of the human grief it will attempt to commemorate. (Perhaps 2666 is the year human memory will need to attain in order to bear the knowledge in "2666.") If the word "unflinching" didn't exist I'd invent it to describe these nearly 300 pages, yet Bolaño never completely abandons those reserves of lyricism and irony that make the sequence as transporting as it is grueling. The nearest comparison may be to Haruki Murakami's shattering fugue on Japanese military atrocities in Mongolia, which sounds the moral depths in "The Wind-Up Bird Chronicle." Bolaño's method, like Murakami's, encapsulates and disgorges dream and fantasy, at no cost to the penetration of his realism. BY the time we return to matters of literature, and meet Archimboldi, a German World War II veteran and a characteristically culpable 20th-century witness whose ambivalent watchfulness shades the Sonoran crimes, we've been shifted into a world so far beyond the imagining of the first section's "critics" that we're unsure whether to pity or envy them. Though Archimboldi's literary career is conjured with Bolaño's customary gestural fulsomeness, "2666" never presents so much as a scrap of the fictional master's fiction. Instead the titles of Archimboldi's books recur as a kind of pulse of implication, until the conjectured power of an unknown literature has insisted itself upon us like a disease, one that might just draw us down with the savagery of a murderer operating in a moonless desert.

A novel like "2666" is its own preserving machine, delivering itself into our hearts, sentence by questing, unassuming sentence; it also becomes a preserving machine for the lives its words fall upon like a forgiving rain, fictional characters and the secret selves hidden behind and enshrined within them: hapless academic critics and a hapless Mexican boxer, the unavenged bodies deposited in shallow graves. By writing across the grain of his doubts about what literature can do, how much it can discover or dare pronounce the names of our world's disasters, Bolaño has proven it can do anything, and for an instant, at least, given a name to the unnamable.

Now throw your hats in the air.

Jonathan Lethem is the author of "The Fortress of Solitude." His new novel will be published in 2009.

http://www.nytimes.com/2008/11/09/books/review/Lethem-t.html?8bu&emc=bua1

The Caged Bird Speaks

By ELIZABETH ROYTE

ALEX & ME

How a Scientist and a Parrot Discovered a Hidden World of Animal Intelligence — And Formed a Deep Bond in the Process

By Irene M. Pepperberg

Illustrated. 232 pp. Collins/HarperCollins Publishers. $23.95

"Alex & Me," Irene Pepperberg's memoir of her 30-year scientific collaboration with an African gray parrot, was written for the legions of Alex's fans, the (probably) millions whose lives he and she touched with their groundbreaking work on nonhuman communication. Alex — for anyone who missed the commemorations last year in The Economist, Nature, The New York Times and on the radio and TV — could label more than a hundred objects and understood the concept of categories, as well as bigger-smaller, same-different and absence. (The Guardian called Alex "smarter than the average U.S. president.") To anyone who's dreamed of talking with the animals, Dr. Doolittle style, Alex was a revelation.

For a technical analysis of his feats, you'll want to read Pepperberg's book "The Alex Studies," published in 2000. The present book, in contrast, is largely celebratory — light on science, heavy on cute animal stories and heartwarming in its depiction of what was either a fruitful professional collaboration or a weirdly dependent friendship, or both. Still, it isn't all billing and cooing: a strain of "I'll show them" runs through the text. Accusations against the scientific establishment, which at first denied Pepperberg funding, publication, prestigious appointments and professional respect, propel the narrative.

Pepperberg's basic biography ought to be rousing (nerdy girl abandons career in chemistry to pursue animal intelligence; is rejected by establishment; achieves international acclaim). But she tells her own story with far less emotion than she does Alex's. There's much that Pepperberg is unwilling to reveal — about her cold and controlling parents, her failed marriage and her relationships with colleagues. That's the author's prerogative, but it leaves a reader wondering how she ended up in her 50s, alone and jobless, reduced to eating 14 tofu meals a week (to save money, not the earth). Her approach to herself is neither scientific nor humanistic: the woman remains an enigma.

Alex, on the other hand, is a delight — a one-pound, three-dimensional force of nature. Mischievous and cocky, he also gets bored and frustrated. (And who wouldn't, when asked to repeat tasks 60 times to ensure statistical significance?) He shouts out correct answers when his colleagues (other birds) fail to produce them. If Pepperberg inadvertently greets another bird first in the morning, Alex sulks all day and refuses to cooperate. He demands food, toys, showers, a transfer to his gym.

This ornery reviewer tried to resist Alex's charms on principle (the principle that says any author who keeps telling us how remarkable her subject is cannot possibly be right). But his achievements got the better of me. During one training session, Alex repeatedly asked for a nut, a request that Pepperberg refused (work comes first). Finally, Alex looked at her and said, slowly, "Want a nut. Nnn . . . uh . . . tuh."

"I was stunned," Pepperberg writes. "It was as if he were saying, 'Hey, stupid, do I have to spell it out for you?' " Alex had leaped from phonemes to sound out a complete word — a major leap in cognitive processing. Perching near a harried accountant, Alex asks over and over if she wants a nut, wants corn, wants water. Frustrated by the noes, he asks, "Well, what do you want?" Mimicry? Maybe. Still, it made me laugh.

After performing major surgery on Alex, a doctor hands him, wrapped in a towel, to an overwrought Pepperberg. Alex "opened an eye, blinked, and said in a tremulous voice, 'Wanna go back.' " It's a phrase Alex routinely used to mean "I'm done with this, take me back to my cage." The scene is both wrenching — Alex had been near death — and creepy, evoking the talking bundle in "Eraserhead."

Pepperberg frames her story with Alex's death: the sudden shock of it, and the emotional abyss into which she fell. Ever the scientist, she wonders why she felt so strongly. The answer she comes up with is both simple — her friend was dead — and complex. At long last, and buoyed by the outpouring of support from people around the world, she could express the emotions she'd kept in check for 30 years, the better to convince the scientific establishment that she was a serious researcher generating valid and groundbreaking data (some had called her claims about animal minds "vacuous"). When Alex died, that weight lifted.

BUT in revealing how Alex lived, and the day-to-day workings of her lab, Pepperberg may soon find herself open to fresh criticism. Her book raises an important question: why, if Alex has the cognitive skills of a young child, and even seems to grasp such concepts as love, would anyone confine him to a cage in a lab? Why run him through the drills, or scold him for getting answers "wrong"? ("You turkey," he'd say, mimicking his trainers, or "Say better!") During a stint at M.I.T.'s Media Lab, Pepperberg worked on a device, designed for gray parrot owners, that projects terrifying images of predators when their pets' vocalizations "exceeded the desired level." She doesn't comment on the morality of either confining a highly intelligent creatureor scaring it into submission. She deals with the question of animal rights in just one sentence: while acknowledging it would be cruel to adopt a gray and leave it alone all day, "that doesn't mean grays or other animals have wide-ranging political rights."

Alex was a celebrity, and this book will surely please his legions of fans. Meanwhile, supporters of Pepperberg, who continues her research with other grays, will remind critics that we'd have no inkling of parrot intelligence without Alex's sacrifice.

Elizabeth Royte, a frequent contributor to the Book Review, is the author of "Garbage Land: On the Secret Trail of Trash" and "Bottlemania: How Water Went on Sale and Why We Bought It."

http://www.nytimes.com/2008/11/09/books/review/Royte-t.html?8bu&emc=bua2

Intimacy and Solitude

By PETER STEVENSON

UNPACKING THE BOXES

A Memoir of a Life in Poetry

By Donald Hall

195 pp. Houghton Mifflin Company. $24

"In childhood nothing happened." So Donald Hall writes in his enchanting memoir, and what's admirable about that sentence is not just the pleasure in coming across such a cheeky volley in the opening pages of an account of a life in our post-Freudian age, but the choice Hall made not to insert a comma between "childhood" and "nothing." A comma — "In childhood, nothing happened" — would have insisted on a dramatic pause that the reader would be expected to applaud politely, nodding at the poet's foreshadowing that clearly something did happen and it must have been simply stupendous, and here we go. But Hall means what he says, repeating the phrase "Nothing happened" twice, like a chorus or incantation, on the following page.

What he's getting at, of course, is that "nothing" is a perfectly appropriate way to describe how the unfolding of life — particularly a child's life — can feel. He is hinting at that uncanny sensation one can have as a child when something vividly alive and unfathomable, which defies description, is very much

"happening." (The parent asks the child what she did today. "Oh, nothing.") The fact that Hall can evoke the fused aliveness and alienation of such "nothing happenings" is one reason for his success as a poet.

Donald Hall was born into a New England realm of darkness and privilege. The family business was the Brock-Hall Dairy in Hamden, Conn. His father, Hall wrote in one poem, "hated his job at the Dairy, working for his father, and came home weeping"; he would rush from the room so his son would not see him cry. His mother, who hid her "debauched suburban habits" — drinking, smoking, playing cards, dancing, wearing makeup — from her strict New Hampshire parents her entire life, entered Hall's consciousness as a soothing presence, lying on his bed and singing in his ear so that "I fell asleep at night on love's island." But later, when he was around 7, she "withdrew into illness," dropping to 68 pounds from 160 because of what Hall suspects was anorexia and depression. In "Unpacking the Boxes," he notes that "much of my poetry has been elegiac, even morbid, beginning with laments over New Hampshire farms and extending to the death of my wife," and he cites the early loss of his mother's attention.

About the death of his wife, the poet Jane Kenyon, in 1995, Hall has written grippingly in a memoir, "The Best Day the Worst Day," and a volume of poems, "Without." The books established him as a reluctant bard of prednisone, Cytoxan and bone marrow, as he told the tale of how a 23-year marriage and idyllic life in his family's ancestral New Hampshire farmhouse, Eagle Pond Farm — where mornings meant writing poetry in separate rooms, afternoons a romp in bed and then reading aloud Keats, Wordsworth, the Bible and Henry James — came to a thundering end with her death from leukemia at the age of 47. It is a mark of the honesty of Hall's work — the generous refusal to look away — that in his new book, he tells us he bought condoms two weeks after she died. "Lust is grief / that has turned over in bed / to look the other way," he wrote in his poem "Ardor."

Could anyone who eagerly read "Madame Bovary" and "Anna Karenina" at 12 not end up a writer? Growing up on the crest of World War II in Connecticut, Hall was warned off masturbation by his father, but found relief in Flaubert and Tolstoy: "My understanding of what took place in locked carriages was imperfect, but I knew that it was something wicked and worth dying for." He took on Keats and Shelley. "Every afternoon, I shut the door of my bedroom to write: Poetry was secret, dangerous, wicked and delicious." At a Boy Scout meeting during his freshman year of high school, he had a startling encounter with a "sophisticated" 16-year-old scout. "I bragged that I had written a poem in study hall that day. 'Do you write poems?' he said. 'Yes. Do you?' He hesitated a moment, out of drama, not shyness. 'It is my profession.' I had never heard anyone speak so thrilling a sentence."

In high school, Hall writes, in an attempt "to establish myself as fascinating, or at least weird . . . I spoke a particular sentence from time to time, without providing a reason for delivering the information. I would announce, 'Dead people don't like olives,' and 10 minutes later say again, 'Dead people don't like olives.' " Perhaps not surprisingly, he was packed off to Phillips Exeter Academy — "a compound of 700 suburban Republican boys taught by elderly conservatives" — where he published poems in the literary magazine and cultivated a lifelong taste for solitude. At 16, he attended the Bread Loaf Writers' Conference: "My first night, I saw Robert Frost, the flesh of a poet." He also lost his virginity there, to a 24-year-old blonde whose husband was an officer overseas. Exeter led to Harvard, where he sat alongside John Ashbery, Robert Bly and Kenneth Koch on the editorial board of The Advocate. He woke at 6 a.m. to write poetry, prowled the Grolier Poetry Book Shop, introduced the requisite bad girl — "pretty, sexy and melodramatic: a pale, unsmiling face with black hair and red-red lipstick" — to his parents and won the annual poetry prize his senior year.

Imagine his surprise when, arriving at Oxford after graduation on a Henry fellowship, he finds it to be a "party school," where "poetry was an attitude, not an art," and where "rudeness was a mating call. If you responded to rudeness with rudeness, you might begin a friendship." Hall, tall and beefy, unpacked his American bluster, which frightened and charmed the British: "One Oxford poet confessed to me that I had been scary because I talked American and wore tennis shoes." He guzzled sherry, became literary editor of Isis magazine and presided over the Poetry Society, entertaining Cecil Day-Lewis, Dylan Thomas,

Geoffrey Hill and Thom Gunn. He got drunk with George Plimpton and became poetry editor of The Paris Review. Academia kept calling: back in the States he was elected to the Society of Fellows at Harvard, a plum that allowed Hall to spend three years writing poetry, meet T. S. Eliot and have dinner with Vladimir Nabokov. His first book of poems, “Exiles and Marriages,” came out in December 1955; his father died the same month.

No matter how glamorous his associations, Hall still had to cobble together the usual sources of income for a poet: doing varied freelance work, editing anthologies, some years teaching. In the late 1950s he joined other poets in satisfying the country’s sudden hunger for poetry readings, as “the skies turned thick with poets traveling to say their lines.” His first marriage, which produced two children, crumbled, leaving his daily life “troubled, unsettled, full of rash undertaking.” In 1969 he met Jane Kenyon, then a young poetry student; they married three years later and soon moved to Eagle Pond, where well-received verses and essays about rural life continued to pour out of Hall as he grew a beard and paunch appropriate to America’s image of a rascally farmer-poet. They lived, Hall wrote in one poem, as “twin solitudes” that “corresponded,” while Kenyon battled depression and found a passionate audience for her poetry.

The 15-month nightmare of Kenyon’s illness and death is lightly touched on in this book. Hall picks up the story in the aftermath, when he falls prey to an unfamiliar bipolar phase: manic promiscuity; lightning-bolt love affairs; black, murderous depression. A poem from the time begins, “When you fall in love, / you jockey your horse / into the flaming barn.” We learn that he’s since settled down with “a woman who lives an hour away, who can come to me once or twice a week.”

At 80, Hall now lives in “the thin air of antiquity’s planet.” He recently endured a stroke that led to an early-morning endarterectomy to clear a carotid artery. “It was a morning like a green field,” he writes, “and I felt good — attended to by shepherds who spoke softly to each other and to me.”

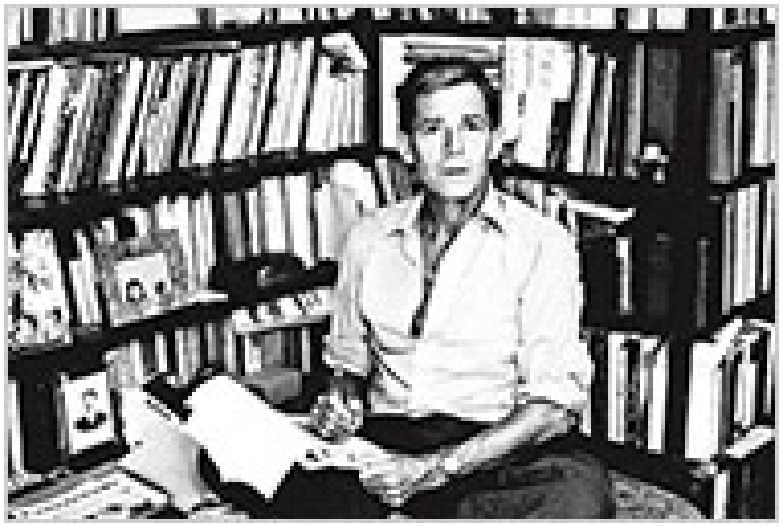
Peter Stevenson is the executive editor of The New York Observer.

http://www.nytimes.com/2008/11/09/books/review/Stevenson-t.html?8bu&emc=bua2#

Changing Light

By AUGUST KLEINZAHLER

SELECTED POEMS



By James Merrill. Edited by J. D. McClatchy and Stephen Yenser

298 pp. Alfred A. Knopf. Paper, $16

The poetry of James Merrill is a good deal closer to a Haydn piano trio or Boccherini quintet than it is to Walt Whitman's "barbaric yawp." Like the 18th-century Galante style in music, Merrill's work has a high, almost lacquered finish and prizes the qualities of refinement, intricacy of design and formal containment. It is music for the court, for the knowledgeable and cultivated listener. At his best — in a handful of poems where he's most restrained and the emotional core of the work, however camouflaged or subdued, is most intense — Merrill has few peers, and none among contemporary poets working in meter and rhyme.

Born in 1926, the son of Charles Merrill, known as "Good-Time Charlie," co-founder of the Merrill Lynch brokerage house, James Merrill was raised in Southampton, Long Island, and Manhattan amid extraordinary privilege and wealth. The Manhattan address, 18 West 11th Street, which provided the title of one of Merrill's thornier poems, later became famous after a bomb being assembled by the Weathermen went off there accidentally in March 1970.

Merrill's reputation as a poet, which was enormous in the 1960s and '70s, has receded over time. New Criticism, the prevailing literary theory during much of that era, placed special value on the kind of poetry Merrill wrote, in particular his formal dexterity, his use of irony, his complex surfaces and the demands his work made on the reader. The poetry, though in no way confessional in the manner of Berryman or Lowell, is for the most part autobiographical. But even at the poems' most intimate, the poet or narrator's voice is at a remove or anonymous.

As controlled a poet as Merrill is, and as much as he is in thrall to a certain kind of poetic decorum, he is, in his way, a poet of excess — as was Whitman, for that matter, or Wallace Stevens, a favorite. (Merrill begins his poem "Yánnina," "Somnambulists along the promenade …") Merrill wrote a 600-page poem, excerpted here, entitled "The Changing Light at Sandover," based on his and his longtime partner's adventures with the Ouija board, with which they summoned from the dead, among others, W. H. Auden, Plato and a peacock named Mirabell. A hopeless voluptuary when it comes to language, Merrill is addicted to wordplay, cleverness with form, ingenious rhymes. His work has affinities with the French fin-de-siècle Decadent writers and their hyper-refined style, their tangled, involved sentences, their fascination with the exotic and their elaborate digressions. One can languish amid the poet's digressions. Merrill's gifts with language often become his vice. His poetry, when read in quantity, even in this expertly edited selection by J. D. McClatchy and Stephen Yenser, can at times seem like a repast of macaroons and tawny port. He is best read a poem or two at a time.

The operative word with Merrill's work is recherché in its English usage, meaning exquisite, refined, lavishly elegant, exotic, obscure. No writer was more important to Merrill than Marcel Proust, to whom Merrill pays homage in one of his finest poems, "For Proust," in the 1962 collection "Water Street." That volume also contains "An Urban Convalescence" and "Swimming by Night," both poems of memory and both gems, especially "An Urban Convalescence." McClatchy and Yenser write in their introduction: "Merrill believed, with Marcel Proust, that the only true paradise is a lost paradise. Love is not fully itself until it is lost, until it becomes memory, then becomes art."

Merrill's poetry will not be to everyone's taste. He never intended it to be. He insists too often on being clever; he can go on too long and wreck what begins and continues for quite a few stanzas as a splendid poem written in ballad meter, "The Summer People," or he can choke a poem with detail, as he does in "Yánnina." Many readers will find the poetry mannered. It is, by design. The poet is an aesthete, a dandy in the Baudelairean sense, unabashedly so. One critic has referred to Merrill's style as "New Critical Baroque." Rococo would probably be more apt. Where a straight line would do, Merrill cannot resist using filigree. But if one were to bypass his work, one would be missing some of the finest poems written in English in the middle of last century, poems like "Mornings in a New House," "Lost in Translation" or "The Kimono," a poem that shows Merrill at his most restrained:

> When I returned from lovers' lane
> My hair was white as snow.
> Joy, incomprehension, pain
> I'd seen like seasons come and go.
> How I got home again
> Frozen half dead, perhaps you know.
>
> You hide a smile and quote a text:
> Desires ungratified
> Persist from one life to the next.
> Hearths we strip ourselves beside
> Long, long ago were x'd
> On blueprints of "consuming pride."
>
> Times out of mind, the bubble-gleam
> To our charred level drew
> April back. A sudden beam . . .
> — Keep talking while I change into
> The pattern of a stream
> Bordered with rushes white on blue.

Apart from Proust and Stevens, among Merrill's other exemplars are the Alexandrian poet Constantine Cavafy, who, as with Proust, Merrill celebrates in an hommage. He shared the older poet's fascination with Hellenic culture and homosexual love. Henry James is another. Merrill enjoys creating the sorts of atmospheres found more often in novels than in poetry, and a number of his poems are narratives in miniature, tiny blank verse novels of manners. Yeats, who pays a visit via the Ouija board in "The Changing Light at Sandover," is another, especially in Merrill's early work. And Merrill's friend Elizabeth Bishop, yet another, and to whom Merrill wrote two poems, both fine: "The Victor Dog" and "Overdue Pilgrimage to Nova Scotia," the first an exercise in virtuosity and wit, the second a moving elegy of sorts, filled with admiration and affection.

August Kleinzahler's most recent book is "Sleeping It Off in Rapid City: Poems, New and Selected."

http://www.nytimes.com/2008/11/09/books/review/Kleinzahler-t.html?8bu&emc=bua2

Art of the Steal

By HUGH EAKIN

LOOT

The Battle Over the Stolen Treasures of the Ancient World

By Sharon Waxman

Illustrated. 414 pp. Times Books/ Henry Holt & Company. $30

Loot is an ugly word. Derived from Hindi and Sanskrit, it emerged in British India, where it no doubt proved useful in describing some of the more sordid transactions of empire. In the 20th century, it was applied to Jewish art collections systematically plundered by Hitler and, later, to electronics pilfered from shop windows during the 1992 Los Angeles riots. Most recently — and perhaps most provocatively — it has been wielded against well-to-do American museums whose pristine specimens of ancient civilizations have with shocking frequency turned out to be contraband.

It is this latest application of the term that interests Sharon Waxman in “Loot,” a broad survey of what she calls “the battle over the stolen treasures of the ancient world.” Over the past few years, numerous museums have been confronted with claims that antiquities they have been acquiring were plundered by tomb robbers. Now the countries from which these objects came want them back. And as Waxman observes, they are resorting to increasingly rough tactics — “lawsuits and criminal prosecution, public embarrassment and bare-knuckled threats.” Top-drawer dealers in ancient art have been sentenced to jail, while a prominent American curator has been indicted in Rome. And cowed by sensational accounts of dirty dealings (the Italian trial, now in its third year, features almost pornographic Polaroids of soon-to-be museum objects caked in fresh mud), four leading institutions — the Metropolitan Museum of Art, the J. Paul Getty Museum, the Boston Museum of Fine Arts and the Princeton University Art Museum — have decided to fork over dozens of antiquities to Italy.

How did museums become looters? To Waxman, a former culture reporter for The Washington Post and The New York Times, the problem is part of a larger battle about history, in which “once-colonized

nations" are seeking to reclaim the "tangible symbols" of national identity from the "great cultural shrines of the West." To explore this conflict, she sets out on a Grand Tour of two American and two European museums, and of several Mediterranean countries from whose monuments and tombs their collections have been formed.

In Cairo she is moonstruck by Zahi Hawass, Egypt's flamboyant antiquities czar, who issues off-color threats to museums that refuse to give back trophies like the Rosetta stone. ("I thought I should dance with them first, before I kiss them," Hawass says of the British Museum, in one of his milder statements.) At the Louvre, Waxman wonders why there is no information about how all those Pharaonic monuments got there. In Turkey, she visits a tiny provincial museum that has managed to lose track of a Lydian treasure reclaimed (with great effort) from the Met. In Athens, she tours the New Acropolis Museum, wishfully designed to house the Elgin marbles, while in Britain she locates an elderly descendant of Lord Elgin who, not surprisingly, is disinclined to see them returned. At the Getty, she is distracted by old "tales of sex among the curators and researchers," arguing, dubiously, that they provide a general "backdrop of personal drama and tensions" that helps explain the problems over stolen antiquities.

Along the way, Waxman rehearses some of the more ruthless European campaigns of archaeological dismemberment in the 18th and 19th centuries, and she is surely right to lament the failure of the Louvre and the British Museum to inform the public about the darker episodes in their pasts. Unfortunately, the recent troubles have little to do with that era, and her argument falters when her itinerary brings her to Rome. After all — as she concedes in passing — Italy was a colonizer not a colony, and the American museums that have been its primary target are not, for the most part, burdened by imperial misdeeds. Here, the essential background is the emergence of an almost completely unregulated international antiquities market after World War II, and of a growing web of cultural property laws and enforcement mechanisms (including America's own courts and customs officials) that are now being used to shut that market down.

With so much ground to cover, Waxman doesn't have much time to investigate this complicated legal history, and her account of the Rome trial of the former Getty curator Marion True, in particular, betrays a faulty grasp of the facts. Waxman makes able use of earlier press accounts (including my own), and she is correct to conclude that while the evidence is disturbing, the idea of a conspiracy centered around True raises many questions. But she seems to think, among other misunderstandings, that Maurizio Fiorilli, a lawyer for the Culture Ministry who is her main Italian source, is "the authority who decided whether prosecution was warranted," when in fact the case is prosecuted by the judiciary, not the ministry.

Citing an unnamed Getty source, Waxman writes that the museum is paying for True's defense as part of an elaborate "nondisclosure" deal that prevents True from implicating her former employers. But according to lawyers for both sides, the legal fees are governed by a standard agreement that does not restrict True's ability to testify. They point out that if there were such a nondisclosure requirement, which they deny, it would amount to illegal suppression of evidence. And the museum's decision to return a rare statue of Aphrodite was not, as Waxman claims, a result of evidence presented by the Italian government, but of separate information turned up by the museum's own investigators.

The larger problem is Waxman's portrayal of the antiquities crisis as mainly a "tug of war" over coveted museum pieces. In fact, the more important battle concerns unprotected archaeological sites, and it is far less a matter of repatriating objects than of figuring out how to stop latter-day looters from destroying our collective past. That vital challenge remains unsolved.

Hugh Eakin has written about museums and the antiquities trade for The New York Review of Books, The New Yorker and The Times.

http://www.nytimes.com/2008/11/09/books/review/Eakin-t.html?8bu&emc=bua2

Troubled Water

By MIRANDA SEYMOUR

THAMES

The Biography

By Peter Ackroyd

Illustrated. 481 pp. Nan A. Talese/Doubleday. $40

From his first novel, “The Great Fire of London,” to this new book’s ambitious harbinger, “London: The Biography,” the city as theater (with a major role played by the mute, dark, untamable river) has fueled Peter Ackroyd’s writing. His biographies of Sir Thomas More, William Blake, Charles Dickens and T. S. Eliot were richly enhanced by their London settings, in particular the brooding presence of the Thames. His novel “The House of Doctor Dee” evoked an Elizabethan manor overlooking the river, and in another novel, “Hawksmoor,” the orderly world of London’s great Baroque churches was shattered by glimpses of the charnel houses, Celtic sites and Roman temples that lie buried beneath their watery crypts.

Ackroyd’s vision of the city has always been dark. It comes as no surprise, then, to discover that the most successful parts of this monster survey of a smallish river (just 215 miles long) teeter between the morbid (ancient offerings of severed heads, many with missing mandibles; horrific drownings; advice on where the desperate may best jump off a bridge) and lyrical evocations of the underworld. Here, as in “London,” Ackroyd writes well about the eerie nature of the man-made tunnels that burrow beneath the Thames.

The portion of the river to which Ackroyd is most drawn, and upon which he is a master, flows between Hampton Court (the most westerly of the great Tudor palaces built along the river for the pleasure of bishops and kings) and the 30-mile stretch of the estuary, whose dreary marshlands are evoked in some of Dickens’s greatest scenes. These were the malarial flats over which the convict Magwitch fled from one of the notorious prison ships to encounter young Pip. Thirteen tiny tombstones for young children in Cooling churchyard (Dickens’s acknowledged source, on the Hoo peninsula) indicate why, to this day, these shores remain so desolate.

Joseph Conrad and, more surprisingly, Bram Stoker, also drew inspiration from this most haunted area of the Thames. (Jonathan Harker found a marshland hideaway at Purfleet for the vampiric count.) It is here, toward the end of a pilgrimage of nearly 400 pages, that Ackroyd at last enters his element. The concluding chapters of "Thames" are extraordinary, perhaps the finest he has written in a prolific career. The estuary, so he tells us, was the landscape of nightmare to the Anglo-Saxon poets: strange names like Whalebone Marshes, the Black Deep and the Hundred of Hoo evoke this ancient world. "It is not a human place," Ackroyd writes. "Even at the beginning of the 21st century, walking alone by the shores of the estuary, it is possible to feel great fear — fear of the solitude, fear of being abandoned, fear of what is alien represented by the river itself. It may be a fear of the primeval Thames." The reader feels no doubt that Ackroyd's knowledge of this area is real. The terror — and delight — that he conveys seems entirely authentic.

While at his most engaging in the barren wastelands once described as "the last place God made — and never finished," Ackroyd draws on his formidable knowledge of London's history to describe his Janus-faced river's opposite nature: the Thames's rise to power, creating one of the largest and busiest ports in the world. By 1828, walls longer than those that had originally encircled the entire city bordered the London docks; back then, the tobacco warehouse at Wapping boasted a covered area larger than any, so it was claimed, since the building of the Pyramids. As of 1930, Dockland offered employment to 100,000 people, but in 1981, in part because of the need for suitable anchorage for large container ships, the last of the majestic city docks closed down.

Noting these events, Ackroyd is neither nostalgic nor pessimistic. He welcomes the transition from imperial Dockland to the planned regeneration of the eastern end of London's great river in a new Thames Gateway Development. He does not — who could? — lament the departure of an old, fog-haunted waterway that stank, at the heyday of the British Empire, of an unwholesome combination of sewage and chemicals; a river in which no fish swam and corpses became covered with an ineradicable slime. It pleases Ackroyd that Isambard Brunel's small red bricks are still, 170 years later, holding up the great railway bridge that first spanned the river at Maidenhead, but he cracks no cheap jokes about the more recent — and blunder-ridden — history of the spindly Millennium Bridge and its punk-haired sister, the Millennium Dome. All varieties of progress, in Ackroyd's view, are welcome, each a new stage in the river's sinuous evolution.

"Thames" exhibits a sometimes infuriating author at both his best and his worst. The worst shows up in Ackroyd's occasional recourse to meaningless guff to bulk out the text ("Those who dream by the river may dream of the future as well as of the past"; "We come from, and return to, the water") and in an unblushing dependence upon material provided by two (gratefully acknowledged) researchers. Their presence, in passages like this, isn't too hard to spot: "There are 106 pedestrian bridges on the Thames: 76 on the nontidal river, ranging in height from 7› feet (2.2 meters) to 32 feet (9.7 meters), and 30 on the tidal Thames. On the tidal river there are also 9 rail bridges and 19 road bridges (most of which also accommodate pedestrians)." Here and elsewhere, the experience of reading "Thames" jars, as if fact-loving Mr. Gradgrind had broken in upon a class devoted to the splendidly unfettered rantings of Robert Graves's "White Goddess."

It's advisable, then, not to treat "Thames" as an academic resource. (As with "London," no footnotes are provided.) Excuse yourself from reading the passages that merit a book of their own, possibly entitled "Wisdom of the River." Feel free to skip the lists of churches named for Mary and the inventories of the myriad deities in charge of other rivers. Few — after all — would take the risk of a deep plunge into the Thames itself; so it proves with Ackroyd's history. A brisk dip will do you less harm — and bring you far more pleasure — than full immersion.

Miranda Seymour is the author of biographies of Mary Shelley and Robert Graves. Her most recent book is a memoir, "Thrumpton Hall."

http://www.nytimes.com/2008/11/09/books/review/Seymour-t.html?8bu&emc=bua2

Uncommon Ground

By ALAN WOLFE

SWEET LAND OF LIBERTY

The Forgotten Struggle for Civil Rights in the North

By Thomas J. Sugrue

Illustrated. 688 pp. Random House. $35

Mention the civil rights movement and Birmingham, Selma and Memphis spring to mind. Rarely do we recall Boston, Pittsburgh and Cleveland. But there was a civil rights movement in the North, Thomas J. Sugrue reminds us in “Sweet Land of Liberty,” and it is impossible to understand race relations today without pondering what we can learn from it.

Sugrue’s long and exhaustively researched book brings that movement back to life. No one should underestimate just how thoroughly racist attitudes and practices shaped the lives of residents of Detroit, Chicago and Philadelphia in the decades after World War II. Justifying the exclusion of African-Americans from his affordable new suburban housing developments, William Levitt said that he “could not take a chance on admitting Negroes and then not being able to sell his houses.” Yet housing was only one of many issues reinforcing an unofficial but powerful color line in the North. Accounts of police brutality, restricted public beaches, segregated schools and racist hiring practices fill page after page of this book. At the same time Sugrue, a historian at the University of Pennsylvania, recounts the struggles of those, many long forgotten, who devoted themselves to promoting racial equality.

Sugrue tells so many stories that it is impossible to summarize them all. I found myself particularly taken with his treatment of one theorist and one activist. The theorist is Henry Lee Moon, a journalist and political strategist who worked for the C.I.O. and the N.A.A.C.P. Moon sought a way for black Americans to exercise influence in national politics, and he found it in the concept of “balance of power,” the title he gave to his 1948 book. Understanding that African-Americans were losing their allegiance to the party of Lincoln, Moon was able to persuade a number of Democratic Party politicians, up to and including Harry Truman, that black votes could swing close elections their way, eventually undermining the grip that Southern segregationists held on the party. In the 2008 election Democratic segregationists

are gone, but Moon's analysis remains; for Democrats, winning the black vote is still the key to winning the electoral vote. That all this was anticipated 60 years ago is quite amazing.

The activist brought to life so well is Roxanne Jones. A resident of one of Philadelphia's poorest neighborhoods, Jones, like many of her neighbors, was unable to afford a car, and spent hours each day on buses and trolleys getting to work. Surrounded by people barely able to get by, she devoted her life to organizing protests against the humiliations and inefficiencies of Pennsylvania's welfare system. Eventually she became the first black woman elected to the State Senate, where she advocated legislation designed to improve the lives of the inner-city poor. Her funeral in 1996 drew politicians from both political parties. Today there is a post office named after her in North Philadelphia.

Sugrue highlights Moon and Jones for a reason; both implicitly questioned the ideas that dominated the civil rights movement in the South. Inspired by Gunnar Myrdal's "American Dilemma," and led primarily by preachers, the Southern movement had been moral in tone: blacks should strive to lift themselves up, and whites should aim to live up to American ideals of freedom and equality.

Such an approach, Sugrue argues, was inappropriate for the North. For one thing, Northern whites were persuaded that so long as they avoided explicitly segregationist laws, their consciences were clean. For another, racial progress in the North was so slow that more dramatic steps were required than nonviolent protest or high-minded sermons. Sugrue says that only through actions threatening the privileges of whites — boycotts, demonstrations, community control of schools — could blacks narrow the disparities.

Although moved by Sugrue's history, I was unpersuaded by his advocacy. He spends a disproportionate amount of time writing about Marxist extremists and crackpot demagogues, devoting a dozen pages, for example, to the Revolutionary Action Movement, a violence-spouting Maoist sect. Yet he manages only two paragraphs for the Ocean Hill-Brownsville controversy in Brooklyn, which did so much to fracture the alliance between blacks and Jews. Sugrue's book all too often focuses on the positions that black organizations took with respect to global issues rather than on the domestic conditions that produced urban poverty and segregated schools.

In addition, Sugrue pays insufficient attention to the price the Northern civil rights movement paid for its refusal to take morality seriously. Once blacks used the language of empowerment and self-determination, whites were free to do so as well: those Boston Irish-American parents resisting busing appealed to the same themes of community autonomy and rejection of outsiders that black activists did in demanding control of their schools. Lacking a moral compass, more than a handful of Northern civil rights workers became hustlers if not downright criminals. Most important of all, by insisting that everything was a struggle for power, Northern activists all too often treated whites as enemies to be fought rather than allies to be cultivated. Justified or not, black power produced a white backlash. To advance in American society, any minority needs allies. The strategies Sugrue so admires were incapable of producing them.

Sugrue devotes his epilogue to the lessons learned from his history. Rightly noting that much progress has been achieved, he concludes that none of it was "solely or primarily the result of a shift in white attitudes." Causality in this matter is impossible to establish, but I think Sugrue is wrong. White attitudes toward blacks have changed strikingly during the past six decades, and for the better; the mere fact of Barack Obama testifies to that. Imagine how much more might have changed if the Northern civil rights movement had borrowed more of the moral appeal to conscience that inspired civil rights in the South.

Alan Wolfe's "Future of Liberalism" will be published next year.

http://www.nytimes.com/2008/11/09/books/review/Wolfe-t.html?8bu&emc=bua2

Hearts Full of Sorrow

By BEN RATLIFF

DELTA BLUES

The Life and Times of the Mississippi Masters Who Revolutionized American Music

By Ted Gioia. Illustrated by Neil Harpe

449 pp. W. W. Norton & Company. $27.95.

It has been 70 years since Robert Johnson's death and 25 since Muddy Waters's. It has been 16 years since the founding of the House of Blues nightclub chain and eight years since the burning of Junior's Place, in Chulahoma, Miss., one of the last of the great Delta juke joints. We are in the post-history of the blues, and at this point we might as well set some requirements, guards against benign nonsense, for new books on all blues, but especially Delta blues.

Here are some: One, no overwriting and no clichés. Two, a thorough awareness of the notion that blues fetishism, by collectors, producers and writers, has been equally damaging and helpful. Three, the newest discographical and biographical information, as much as possible. (In some cases, it's all we have to rely on — a man or a woman was in such a room at such a time.) Four, no pious implications that the blues always represents righteousness, truth and tradition. These were performers; grant them their artifice. (Also, as little positive use of the word "simple" as possible. Same for negative use. Neutral use is O.K.) Five, a sure fix on the best musicians as both extraordinary artists and ordinary subjects of history.

After that, do what you want.

On the second page of the preface to "Delta Blues," his new survey, Ted Gioia explains his middle-aged transition to a deeper level of interest in the blues. "My attraction to traditional blues," he writes, "was no doubt fueled by my growing dissatisfaction with the overpowering commercialization and commoditization I encountered elsewhere in the music world. Traditional blues' stubborn allegiance to its

own guiding lights, its resistance to corporate interference, its blissful ignorance of music videos and trendy radio formats, its affirmation of its own inexpressibly rich heritage. . . ."

No!

But a few pages later, the book starts to be tremendously useful. Gioia, the author of three books on jazz and two books on music as social function ("Work Songs" and "Healing Songs"), keeps jumping between several different levels. He describes the Delta blues as a critic, writing from hard listening. He traces its history through real-life issues — migration, labor, audiences, record sales, nightclubs — pausing every so often to delineate how different the story of this music is, in which someone who was unknown in his own time, like Johnson, can be the king of it.

And he attempts to triangulate a kind of leveled-out truth about the blues, weighing dozens of accounts from both the artists and their associates. In this book you become as familiar with researchers, historians, producers and biographers like Alan Lomax, Stephen Calt, Mack McCormick, H. C. Speir and Gayle Wardlow as you do with Son House, Tommy Johnson, Muddy Waters and Howlin' Wolf.

As Robert Palmer did in "Deep Blues" (1981) — a slimmer, more mysterious, more urgent book — Gioia fills an early chapter with the findings of Charles Peabody, the Harvard archaeologist who explored Coahoma County, Miss., in 1901, and with the memoirs of W. C. Handy, the composer of "St. Louis Blues." Handy's nickname was "Father of the Blues"; he was also one of its first fantasists, writing about "the beauty of primitive music" after his initial encounters with blues musicians in Mississippi, early in the 20th century, and describing it as "the weirdest music I had ever heard."

Unlike Palmer, Gioia doesn't spend much time connecting the blues to West African performance patterns and rituals. He favors, instead, its evolution from black antebellum work songs. And in general, as he moves along, he uses work to drive the narrative: how economic opportunities affected musicians, what money and motivation the blues might have offered them, and how their own work ethics and aesthetics squared with those of their audiences.

So the chapter on Bukka White and Son House centers on the Parchman prison farm, where both singers served time and where White met the folklorist John Lomax. "Prisons are not supposed to play a role in the history of music," Gioia warns; but in the history of the Delta blues, "everything is the opposite of what one expects." The Muddy Waters chapter is really about the blues' moving north: Waters followed the work force, leaving the Delta around the same time as the first public displays of the cotton-picking machine. The section on Mississippi John Hurt is really about the mechanics of the blues revival of the early '60s, an enlightened orgy of "rediscovery"; it ties Hurt to the awkward second acts in the careers of Bukka White, Son House and Skip James, and to the waning of the blues as a living tradition.

The chapter on John Lee Hooker — and here Gioia really hits his stride — deals with Hooker's endless variations on a one-chord groove, but also with the profligacy of his recording career. He could make dozens of records in a single year, some under different names, sometimes lending himself to producers who had no idea what to do with him. There's an embedded narrative here about the way certain blues musicians — not just Hooker, but Son House and others — might have taken too much pride in the quantity of their work, and not enough in the quality, as an emotional defense against exploitation. But there's another, too, about the opportunism of both Hooker and his employers. Gioia follows Hooker to the end of his long life with a clear fascination for even some of his lesser achievements, through his '70s recordings with Canned Heat and his Grammy-winning final days.

Robert Johnson naturally gets a whole chapter, but faced with a lack of hard biographical facts, Gioia writes an essay about uncertainty and conjecture in blues historiography. What most people have heard about Johnson is the myth that he sold his soul to the Devil at a crossroads; Gioia responds with a nine-page mini-history on the blues and religion, and on the blues and credulousness. (He doesn't believe the crossroads story, of course, but he argues for its significance; this is his rejoinder to Elijah Wald's book

"Escaping the Delta: Robert Johnson and the Invention of the Blues.") He also recounts the history of the scholars who have tried, and are still trying, to dig up the details of Johnson's life.

Gioia does overwrite at times — not in the moments when he knows something, but when he feels he can't know. "We may never be able to fully explain Robert Johnson's dark night of the soul," he ponders, "but even less should we try to explain it away, or refuse to admit its hypnotic power." (Maybe we should make alternative fuels with it.) Yet tucked into this complex chapter — as with all the others — are small analyses of the music, and by contrast they are well handled: neither too wet with wonder nor too dry with data.

Much of this material has been covered in other books, though without so much synthesis and circumspection. "Delta Blues" is not as contentious as Wald's revisionist "Escaping the Delta" or Marybeth Hamilton's "In Search of the Blues," two books that have caused some soul-searching among music critics. (Gioia does take a few guarded stands: in his scene-setting emphasis on the black American work song over the West African griot song, and in his defense of Alan Lomax against recent blues scholars who claimed that Lomax had obscured the contributions of the black researchers he collaborated with in the 1940s.)

Instead, Gioia uses original research, interviews with reliable sources and his own calm, argument-closing incantations to draw a line through a century of the Delta blues — a history that is probably more over than he cares to admit in his book's final pages. He has balanced the story of the music with that of its reception, and where the truth of either one is inaccessible, he says so. He's in favor of the blues retaining some mystery, but only highly informed mystery.

Ben Ratliff is a music critic for The Times and the author of "The Jazz Ear: Conversations Over Music," which is being published this month.

http://www.nytimes.com/2008/11/09/books/review/Ratliff-t.html?8bu&emc=bua2

An Officer and a Bulldog

By ROBERT KAGAN

WARLORD

A Life of Winston Churchill at War, 1874-1945

By Carlo D'Este

Illustrated. 845 pp. Harper/ HarperCollins Publishers. $39.95

Winston Churchill's life spanned the last decades of the British Empire, and to read Carlo D'Este's enjoyable new biography is to recall the sequence of disasters that befell Britain between the final days of the Victorian era and its brush with extinction in World War II. American pundits these days speculate rather glibly about national decline and imagine that, if it comes, it is something that can be safely and intelligently managed. But genuine geopolitical decline is a serious and often deadly business. Churchill spent the better part of his life fending off increasingly dire threats to Britain's place in the world, and then to its very existence as an independent nation. A biography of Churchill is in some ways a biography of the British people, with all their remarkable successes, devastating failures, occasional silliness, arrogance and insouciance, and finally their incredible bravery.

Bravery was a constant throughout Churchill's long, eventful life. D'Este notes that "long before he became a statesman," he "was first a soldier." The young Churchill, with his miserable childhood and miserable personality, chose military service as a way to make his name and prove himself worthy — especially to his cold and distant father. As a young man, he fought in India and was almost killed. In 1898 he fought under Kitchener at Omdurman and barely escaped death again. Then he fought in the

Boer War, where he was captured and escaped. In World War I he served as first lord of the Admiralty, but after the failure of his plan to force open the Dardanelles, which led to the death of thousands of British and Allied soldiers at Gallipoli, he had himself assigned to fight alongside such men in the bloody trenches of Flanders.

All of this was decades before he became prime minister and saved Britain, and perhaps the world, from the rule of Hitler and the Nazis. In that role, D'Este argues, Churchill was not merely a politician conducting a war in the manner of Woodrow Wilson, Lloyd George or Franklin Roosevelt. He was a soldier, a "warlord," a warrior-statesman in the mold of Frederick the Great, Napoleon, Oliver Cromwell or his great ancestor the Duke of Marlborough.

This is the main theme of "Warlord," and it is perhaps a bit overstated. D'Este is a military historian, the author of fine biographies of Dwight Eisenhower and George Patton, so it is not surprising that he sees Churchill as soldier first and political leader second. But Churchill's greatness as a national leader was as a politician and statesman, which was what he always aspired to be.

He loved danger, and he was daring sometimes to the point of absurdity. But whenever the young Churchill threw himself into peril he calculated, even as the bullets flew and the swords cut the air, how the latest bit of derring-do would bring his name to attention back in England. And indeed, by 1900 his fame as a soldier, along with his best-selling books, catapulted him into Parliament. That year Mark Twain introduced him in New York as the "hero of five wars, author of six books and future prime minister of England." Churchill was 26 years old.

At that time, Churchill did not even believe a great military career was possible any longer. Like many of his contemporaries at the turn of the century, he thought large-scale war between great powers was obsolete. As D'Este describes his thinking, "surely civilization had progressed beyond that point in a new century, when nations were more and more dependent upon one another for commerce and common sense had made such nightmares ludicrous."

Optimism vanished as Churchill watched Germany's naval buildup and Kaiser Wilhelm II's determination to make Germany a great world power. Churchill later wrote: "I thought of the peril of Britain, peace-loving, unthinking, little prepared, of her power and virtue, and of her mission of good sense and fair play. I thought of mighty Germany towering up in the splendor of her Imperial State and delving down in her profound, cold, patient, ruthless calculations."

It was not as a soldier or a warlord that he watched threats emerge, but as a democratic leader passionately devoted to Britain and to its principles and liberal traditions. In political exile following World War I, he warned of the rise of dictatorships in Germany, Italy, Japan, Spain and the Soviet Union, so much so that his critics, who did not want to think anymore about great confrontations, called him a warmonger. When he denounced the agreement reached at Munich in 1938, he warned that there could "never be friendship between the British democracy and the Nazi power."

Despite his military experiences, Churchill's greatness lay not in his military skills or acumen. He was the author of several botched military operations, from Gallipoli in the First World War to the failed pre-emptive invasion of Norway in the Second. British generals constantly grumbled about the meddling politician and amateur — complaints no one would have heard from the armies of Napoleon, Frederick or Marlborough.

Rather it was Churchill's ability to see clearly and unblinkingly what most others, including most military men of his time, could not or did not want to see. He understood, for instance, that there could be no secure peace with Hitler after the invasion of Poland, even as many around him hoped Britain could yet stay out of a Continental war. After the fall of France, "realists" like Lord Halifax urged a peace deal on the grounds that Britain could never succeed alone and that there was "nothing particularly heroic in going down fighting if it could somehow be avoided." But Churchill understood that Hitler could never

permit an independent Britain, which would always threaten Germany's control of the Continent, and would use peace only to gather strength for a final assault.

Churchill also understood, better than his own generals and admirals, the vital importance of taking the offensive. As he told his generals in 1940, "the completely defensive habit of mind, which has ruined the French, must not be allowed to ruin all our initiative." This aggressive approach produced the failures of Gallipoli and Norway, but Churchill believed it was better to try and to fail than not to try at all. Like Lincoln, he saw the importance of bolstering public morale, and he understood how deadly it was to talk of peace deals when the nation was losing. "We shall go on and we shall fight it out," he declared. "And if at last the long story is to end, it were better it should end, not through surrender, but only when we are rolling senseless on the ground." No one doubted him when he promised to die with pistol in hand fighting the Nazis in the streets of London.

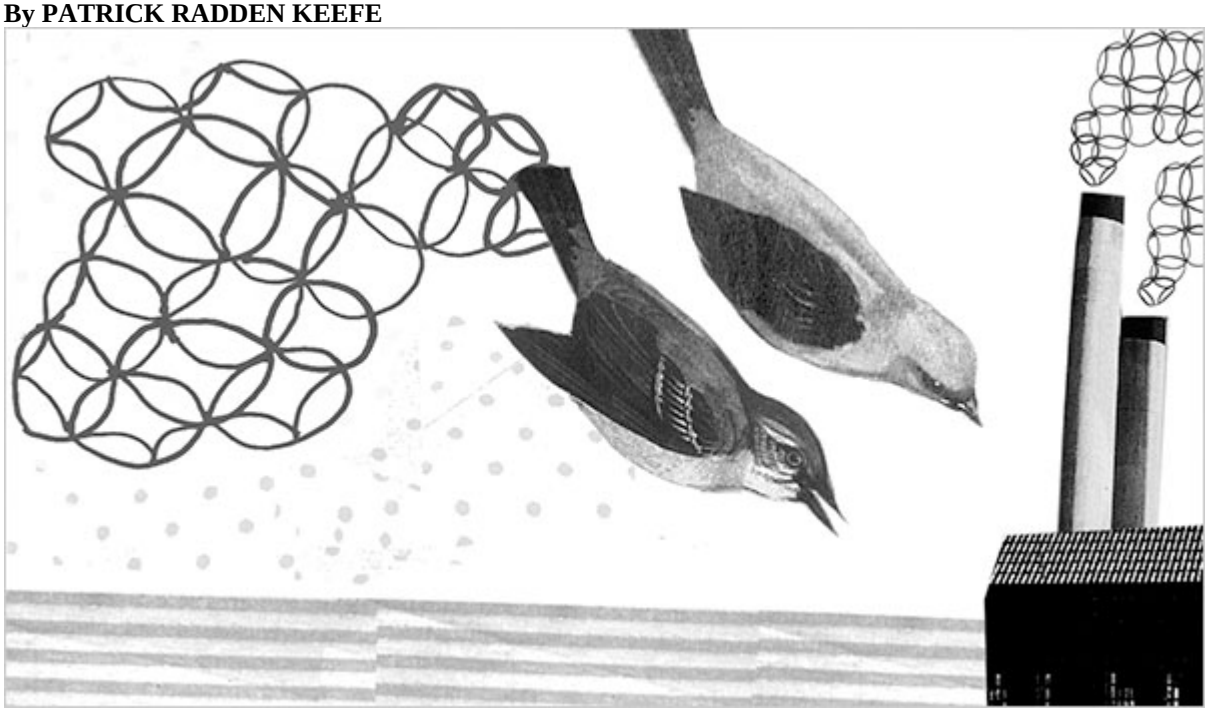
These were the qualities that made Britons choose him over other men, and to follow him in a desperate struggle against the greatest odds. Margot Asquith, describing why people looked to him for leadership, observed that it was not his mind or judgment they respected. "It is, of course, his courage and color — his amazing mixture of industry and enterprise. . . . He never shirks, hedges or protects himself. . . . He takes huge risks. He is at his very best just now; when others are shriveled with grief — apprehensive . . . and self-conscious morally, Winston is intrepid, valorous, passionately keen and sympathetic." He may have longed "to be in the trenches" and was "a born soldier," but it was not as a soldier that the world needed him.

Robert Kagan is a senior associate at the Carnegie Endowment for International Peace and the author of "The Return of History and the End of Dreams."

http://www.nytimes.com/2008/11/09/books/review/Kagan-t.html?8bu&emc=bua2

Holding Up the Sky

By PATRICK RADDEN KEEFE



FACTORY GIRLS

From Village to City in a Changing China

By Leslie T. Chang

420 pp. Spiegel & Grau. $26

Toward the end of “Factory Girls,” her engrossing account of the lives of young migrant workers in southern China, Leslie Chang describes receiving a gift. Min, a young woman who works at a handbag plant, presents Chang with an authentic Coach purse plucked fresh from the assembly line. It emerges that Min’s dormitory-style bedroom is stuffed with high-end leatherwear. When the author proposes giving one of the handbags to the mother of Min’s boyfriend, Min scoffs. “His mother lives on a farm,” she says. “What’s she going to do with a handbag?”

The emergence of China’s titanic manufacturing base has been chronicled in numerous books and articles in recent years, but Chang has elected to focus not on the broader market forces at play but on the individuals, most of them women, who leave their villages and seek their fortunes on the front lines of this economy.

Since the 1970s, China has witnessed the largest migration in human history, Chang observes, “three times the number of people who emigrated to America from Europe over a century.” There are 130 million migrant workers in China today. A few decades ago, a rural peasant could expect to live and die on the same plot of land his family had farmed for generations. But the country’s explosive economic growth has allowed the young and adventurous to trade the stifling predictability of village life for the excitement, opportunity and risk of the factory boomtown.

A former China correspondent for The Wall Street Journal, Chang focuses on one boomtown in particular, Dongguan, a frenetic jumble of megafactories in Guangdong Province. The city produces garments of every description and 30 percent of the world's computer disk drives. One-third of all the shoes on the planet are produced in the province, and Chang spends time in a factory that manufactures Nike, Reebok and other brands. It has 70,000 employees, most of them women, and boasts its own movie theater, hospital and fire department.

Dongguan is "a perverse expression of China at its most extreme," Chang suggests; it is polluted, chaotic and corrupt, but jostling also with a generation of strivers who are unashamed of their ambition and astonishingly indifferent to risk. New arrivals from the countryside can double or triple their income in a couple of weeks by taking a computer class or learning a little English. Switching jobs becomes a form of self-reinvention, and starting a new business is as easy as purchasing a new business card.

To Chang, the factory girls seem to live in "a perpetual present." They have forsaken the Confucian bedrock of traditional Chinese culture for an improvised existence in which history and filial loyalty have been replaced by rapid upward mobility, dogged individualism and an obsessive pursuit of a more prosperous future. After revealing that her driver's license was purchased on the black market, one woman seems to voice the general ethos of the town when she says to Chang, of her abilities behind the wheel, "I know how to drive forward."

With new job opportunities forever appearing and huge personnel turnover in any given factory, friendships are difficult to make and to maintain, and Chang details the loneliness and isolation of the migrant workers. Dongguan's laborers assemble cellphones, but they purchase them as well, and with their speed-dial archives of acquaintances, the phones become a sort of lifeline, the only way to keep track of the breakneck comings and goings of friends. If a worker's cellphone is stolen, as they often are, friends, boyfriends and mentors may be lost to her forever. "The easiest thing in the world," Chang remarks more than once, "was to lose touch with someone." People living their lives "on fast-forward" in this manner would seem to resist any kind of comprehensive portraiture by a reporter. But Chang perseveres, hanging around the factories, purchasing cellphones for some of the women she meets so that she can keep track of them, and eventually renting an apartment in Dongguan. While she relates the stories of numerous different women, she becomes closest with Min, who gave her the purse, and with Chunming, who left her home in Hunan Province in 1992 and has cycled through countless careers and relationships in the years since. (It is Chunming who can only drive forward.)

Chang's extraordinary reportorial feat is the intimacy with which she presents the stories of these two women. Min and Chunming lack the reserve of some of their colleagues. They share their diary entries and their text messages, their romantic entanglements and their sometimes strained relationships with the families they left behind. The result is an exceptionally vivid and compassionate depiction of the day-to-day dramas, and the fears and aspirations, of the real people who are powering China's economic boom.

BY delving so deeply into the lives of her subjects, Chang succeeds in exploring the degree to which China's factory girls are exploited — working grueling hours in sometimes poor conditions for meager wages with little job security — without allowing the book to degenerate into a diatribe. There is never any doubt that the factory owners in Hong Kong and Taiwan — and the consumers in American shopping malls — have the better end of the bargain. But for all the dislocation, isolation and vulnerability they experience, Chang makes clear that for the factory girls life in Dongguan is an adventure, and an affirmation of the sort of individualism that village life would never allow.

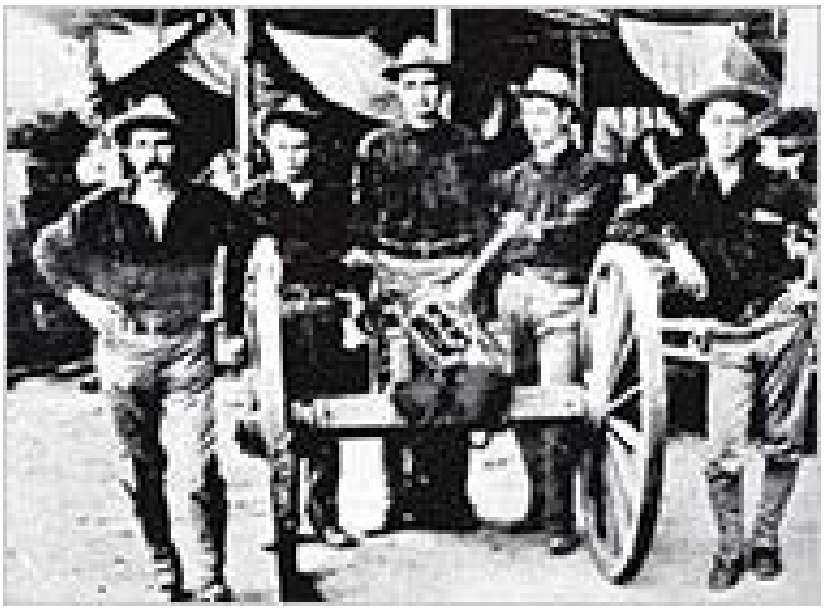
"If it was an ugly world," Chang concludes, "at least it was their own."

Patrick Radden Keefe is a fellow at the Century Foundation. His book "The Snakehead," about the Chinese human smuggler Sister Ping, will be published next year.

http://www.nytimes.com/2008/11/09/books/review/Keefe-t.html?8bu&emc=bua2

The Bullet Machine

By MAX BYRD



MR. GATLING'S TERRIBLE MARVEL

The Gun That Changed Everything and the Misunderstood Genius Who Invented It

By Julia Keller

Illustrated. 294 pp. Viking. $25.95

In the cover photograph of Julia Keller's book, taken in 1893, Dr. Richard J. Gatling poses in a dark suit and black derby hat, admiring at waist level, one hand on its crank, the latest model of the heroically phallic machine gun that bears his name.

It's a pity that Keller neglects the sexual symbolism — one is tempted to say dimension — of Gatling's obsession with his famous gun. But to her credit, she touches on almost every other possible aspect of his life, a life, she argues in "Mr. Gatling's Terrible Marvel," profoundly representative of that generation of 19th-century Americans "who made the modern world, who took an overgrown, half-formed hunk of wilderness still broken and dazed by the Civil War and shoved it into the next century by force of will and wizardry of invention."

Gatling himself had the same rather grandiose sense of context: his invention, he maintained, "bears the same relation to other firearms that McCormick's reaper does to the sickle, or the sewing machine to the common needle." And in many ways, this was no exaggeration.

The "revolving battery gun," which he patented in 1862, consisted of six .58-caliber rifled metal barrels arranged in a circle, mounted on wagon wheels and operated by a single crank; even this primitive version could fire up to 200 bullets a minute. In an era when many infantry soldiers were still loading their muskets at the muzzle with paper cartridges and ramrods, if Gatling's "gat" had not quite "changed the world," as Keller insists, it most certainly revolutionized the nature of warfare.

He invented it, he said in the gymnastic logic of gun makers, to save lives: its unparalleled firepower would enable one man to replace hundreds on the battlefield and thus "supersede the necessity of large armies." And though the Gatling gun saw very limited action in the Civil War, afterward it proved extremely effective against Indians in the West, striking laborers in the East and anti-imperialist rebels all across the world.

Keller, a Pulitzer Prize-winning cultural critic for The Chicago Tribune, pays due attention to the military significance of Gatling's "terrible marvel" and its direct descendants in World War I and later. But her book is far more original when she links the events of Gatling's life, large and small, to social history.

In a fascinating digression on Gatling's medical education, for example, she describes the connection between 19th-century smallpox epidemics and steamship travel. She is properly amused (as a Chicagoan) when The New York Times, in 1863, installed a Gatling gun on its roof to drive away a mob of draft protesters. She discusses Lincoln's little-known interest in personally testing new Army weapons and, in a brilliant passage, rhapsodizes about creativity and the Patent Office: "If a country can be said to possess a soul, then America's is the patent system: the simple, fair method of staking claim to a new idea and getting the chance to make money from it."

This thought leads her to Gatling's other inventions (he made an early fortune with a wheat-seed planting device and worked on a flush toilet), the role of con men and carnivals in American business and, eventually, the paradox of post-Civil War Hartford as both a center of genteel culture — Mark Twain and Harriet Beecher Stowe lived there — and home to the Colt firearms factory and the Gatling Gun Company.

Keller loads her pages with interesting information: Edgar Rice Burroughs, the creator of Tarzan, started life as a Gatling gun instructor; the Buffalo Bill Wild West show ended with Gatling guns turned against howling Indians on horseback. She has a splendid eye for quotations: "Treat them to a little Gatling music," The Times of London instructed the British Army. And her own prose can be vivid (John Sutter left behind him "towering debts and sputtering creditors") and funny: "the kind of facial hair that seems to have a mind of its own."

But these virtues are repeatedly undercut by a rapid-fire breeziness of tone: "No, no, no. His head was too full of all the things he wanted to build." Her images are often bizarre: "A dark shape is rising in Richard Gatling's mind. He rides out to meet it." And time and again she chooses exactly the wrong word: "The country was still young and petite." Swords and sabers were "what made war special."

Worse still are the maddening repetitions and exaggerations. Twice in four pages she tells us that Lew Wallace was the author of "Ben-Hur," and twice that Leonardo dreamed of a multiple-firing gun. Things are rarely said once: "Business was good. Business was very good." Generalizations float away into absurdity: in 19th-century America, Keller asserts, speaking of assembly lines and factories, "people, like things, were unique and distinctive, created one at a time, knowable as discrete entities. That would change, of course. . . . The land of the second chance would give way to a country of interchangeable parts, interchangeable people."

Like so many other purveyors of destruction, Richard Gatling appears to have been a bland, conventional, somewhat naïve personality. What inner demons drove him to create an instrument of mass slaughter — and keep "refining" it for 30 years — we will probably never understand. "We know him," Keller concludes, characteristically and unhelpfully, "but we don't know him."

Max Byrd's most recent book is the historical novel "Shooting the Sun."

http://www.nytimes.com/2008/11/09/books/review/Byrd-t.html?8bu&emc=bua2

The Melancholy Easel

By RICHARD B. WOODWARD

ANTOINE'S ALPHABET

Watteau and His World

By Jed Perl

Illustrated. 210 pages. Alfred A. Knopf. $25

Antoine Watteau (1684-1721) is a painter for those who expect disappointment from life and wouldn't be happy if things turned out any other way. He did not invent neurotic melancholia or bittersweet irony, but many of the delicate young men and women sashaying through his paintings, whether in pastoral or urban settings, seem precociously aware of acting in a world whose uncertain meaning they don't dare to fathom.

A Frenchman who serves to define European Rococo, Watteau also has the ability to be continually modern. As with Giorgione and Vermeer, the paucity of biographical facts attracted Romantic mythomancers. (It helped that Watteau died young, at 37, of tuberculosis.) In 1873-74 the Goncourt brothers published an influential essay about him in their history of 18th-century art. The aesthetic movement elevated him higher still. His paintings inspired numerous literary works, including a story by Walter Pater and a poem by Proust.

Jed Perl is another smitten writer. When asked to name his favorite artist, Perl, the longtime art critic for The New Republic, always names Watteau "without a moment's hesitation." "Antoine's Alphabet," his slender new book, is a love letter to art and tradition in which he counts all the ways Watteau's themes of love, daydreaming, flirtation and time have for years pleasingly impinged on his daily routine and thought.

When a writer is as carried away with his subject as Perl appears to be, it's no fun for a reviewer to be a killjoy. He has digested the pertinent scholars and could have produced a solid, more prosaic study, had he wanted to. For a critic who delivers regular jeremiads against the contemporary art world, this exercise in dandyism must have been a welcome diversion.

But his decision to confess his enthusiasm within an alphabet of topics — a format intended, he writes, to reflect "myriad aspects of a great artistic imagination" — makes for bumpy reading. The logic of certain entries — the letter N features only three: (Gérard de) "Nerval," "New" and "New York City" — can be harder to interpret than the flighty thoughts of Watteau's airheads.

It doesn't take long to realize that we are being given an art and literary appreciation tour around Perl's mind rather than a cool-headed analysis of Watteau's achievement. Anyone not immersed in the oeuvre is likely to be at sea, or misled. (The tiny illustrations aggravate this problem.)

We hear more about the circle of family, writers and artists who make up Perl's social world than we do about Watteau's, and not much about individual works. The longest piece of analysis, a meandering seven

pages on “The Pilgrimage to the Isle of Cythera,” is followed by a mysterious paragraph in which Perl tells of a friend who had a Watteau postcard of a nude on a bookcase in his office.

These attempts at flâneurism in the style of Walter Benjamin would be fine if they created a more shimmering picture of Watteau’s world and art. His decorous courtliness asks for an understated and indirect approach. But many of Perl’s prancing generalities are either flat-footed (“Painting stops time — at least it stops time as we know time in our day-to-day lives”) or questionable (“Painting is one of the bellwethers of modernity — and who can doubt that it is?”). A declaration that Watteau “practically invented the bohemian imagination” is nowhere buttressed with evidence. An interesting comparison between Watteau’s women and Hollywood screwball heroines deserves more than the few asides he gives it.

Even when Perl has something specific for us to look at, he misses obvious points. The entry for “Backs” — “think of his paintings, and you’re immediately thinking about a back” — goes on about the “extraordinary psychological power” of this body part without stating clearly why this should be so. The back sends a strong erotic signal to viewers because people with their backs turned aren’t aware of being observed. If backs seem exceptionally prominent in Watteau — and I’m not convinced they are from Perl’s scant examples — this voyeuristic quality, found in everything from paintings of Susannah and the elders to countless horror films, is an important factor, and one that Perl fails to note.

Likewise, “White” for Perl “equals possibility” and not anything darker. The Pierrot character in “Gilles,” Watteau’s most famous painting, is, he writes, “the archetype of the artist as pure potentiality.” That may be one reading. But it’s just as possible that the blanched face and costume of the hapless clown equal fear, sickness or even death.

Watteau’s literary devotees over the centuries comprise a select and eccentric group, and Perl has done a superb job of identifying many writers (Heinrich von Kleist, Paul Verlaine, the Sitwells, Samuel Beckett) not commonly associated with such an unsensational artist. Among his finds is a taped conversation about Watteau from 1956 in which Jean Cocteau tells Louis Aragon that “all that smoky beauty somehow predicts the storm to come. The people at those parties of Watteau’s are like people coming together as a result of a railway accident, or during a halt or bombardment when they have left their cars on the road.”

If only Perl’s own musings were as cogent and illuminating as the writers he quotes.

Richard B. Woodward is an arts critic in New York.

http://www.nytimes.com/2008/11/09/books/review/Woodward-t.html?8bu&emc=bua2

WILLIAM EGGLESTON
Old South Meets New, in Living Color

By HOLLAND COTTER

Thirty years ago photography was art if it was black and white. Color pictures were tacky and cheap, the stuff of cigarette ads and snapshot albums. So in 1976, when William Eggleston had a solo show of full-color snapshotlike photographs at the august Museum of Modern Art, critics squawked.

It didn't help that Mr. Eggleston's pictures, shot in the Mississippi Delta, where he lived, were of nothings and nobodies: a child's tricycle, a dinner table set for a meal, an unnamed woman perched on a suburban curb, an old man chatting up the photographer from his bed.

That MoMA's curator of photography, John Szarkowski, had declared Mr. Eggleston's work perfect was the last straw. "Perfectly banal, perfectly boring," sniffed one writer; "erratic and ramshackle," snapped another; "a mess," declared a third.

Perfect or not, the images quickly became influential classics. And that's how they look in "William Eggleston: Democratic Camera, Photographs and Video, 1961-2008," a retrospective at the Whitney Museum of American Art that is this artist's first New York museum solo since his seditious debut.

Naturally we see the work more clearly now. We know that it was not cheap. The dye transfer printing Mr. Eggleston used, adapted from advertising, was the most expensive color process then available. It produced hues of almost hallucinatory intensity, from a custard-yellow sunset glow slanting across a wall to high-noon whiteness bleaching a landscape to pink lamplight suffusing a room.

And compositions that at first seemed bland and random proved not to be on a 2nd, 3rd and 20th look. The tricycle was shot from a supine position so as to appear colossal. The woman on the curb sits next to a knot of heavy chains that echoes her steel-mesh bouffant. The affable guy on the bed holds a revolver, its barrel resting on his vintage country quilt.

Although unidentified, these people and others were part of Mr. Eggleston's life: family, friends and neighbors. The retrospective — organized by Elisabeth Sussman, curator of photography at the Whitney, and Thomas Weski, deputy director of the Haus der Kunst in Munich — takes us through that life, or what the pictures reveal of it, on a tour that is a combination joy ride, funeral march and bad-trip bender. Patches of it feel pretty tame now, but whole stretches still have the morning-after wooziness of three decades ago.

Mr. Eggleston is a child of the American South. He was born in Memphis in 1939 and spent part of his childhood living with grandparents on a Mississippi cotton plantation. His family was moneyed gentry; he has never had to work for a living. Self-taught, he was already seriously taking pictures by the time he got to college (he went first to Vanderbilt, later to the University of Mississippi); his encounter with the work of Henri Cartier-Bresson and Walker Evans pushed him along.

By his own account, unless he is working on commission his choice of subjects for pictures is happenstantial. He shoots whatever or whoever is at hand. The earliest picture in the show, from 1961, is of a prison farm adjoining his family's plantation. Murky and grainy, it could be a scene from the 19th century; the prisoners are all black. Then come any-old-thing images of post-World War II strip malls and suburbs; almost everyone is white.

Although Mr. Eggleston rejects the label of regional photographer, he was, at least initially, dealing with the complicated subject of a traditional Old South (he says the compositions in his early pictures were based on the design of the Confederate flag) meeting a speeded-up New South, which he tended to observe from a distance, shooting fast-food joints and drive-ins almost surreptitiously, as if from the dashboard of a car.

Around 1965 he started to use color film, and his range expanded. He moved in close. The first picture he considers a success is in the show. It's of a teenage boy standing about arm's length from the camera. He's seen in profile, pushing carts at a supermarket. His face is slack, his eyes a little glazed, his body bent in an effortful crouch. He's ordinary, but the golden sunlight that falls on him is not: it turns his red hair lustrous and gilds his skin. A prosaic subject is transformed but unromantically; lifted up, but just a little, just enough.

In 1967 Mr. Eggleston made a trip to New York, where he met other photographers, important ones, like Diane Arbus, Lee Friedlander and Garry Winogrand, learning something from each. Although he has a reputation for being remote, even reclusive, he also has a public persona as a dandyish hell raiser, a kind of exemplar of baronial boho. In any case he has never lacked for art-world connections. Mr. Szarkowski was one; another was the curator Walter Hopps, who became a friend and traveling companion beginning in the 1960s and '70s.

These were the Merry Prankster and "Easy Rider" years, when road trips and craziness were cool, and Mr. Eggleston set out on some hard-drinking picture-taking excursions. He also embarked on repeated shorter expeditions closer to home in the form of epic bar crawls, which resulted in the legendary video "Stranded in Canton."

Originally existing as countless hours of unedited film and recently pared down by the filmmaker Robert Gordon to a manageable 76 minutes, it was shot in various places in 1973 and 1974. (The new version is in the retrospective.) Mr. Eggleston would show up with friends at favorite bars, turn on his Sony Portapak, push the camera into people's faces and encourage them to carry on.

And they did. Apart from brief shots of his children and documentary-style filming of musicians, the result is like some extreme form of reality television. Your first thought is: Why do people let themselves be seen like this? Do they know what they look like? You wonder if Mr. Eggleston is deliberately shaping some tragicomic Lower Depths drama or just doing his customary shoot-what's-there thing, the what's-there in this case being chemical lunacy. For all the film's fringy charge there's something truly creepy

and deadly going on, as there is in much of Mr. Eggleston's art. You might label it Southern Gothic; but whatever it is, it surfaces when a lot of his work is brought together.

Images of gravestones and guns recur, but the real morbidity comes indirectly, like mood, through association. A little girl stands outside a playhouse reminiscent of a Victorian mausoleum; a young man sits in the back of a car, dazed, like a zombie from "Night of the Living Dead." Houses look empty, meals abandoned; an oven stands open, as if inviting entry; a green-tiled shower suggests an execution chamber.

In many of these images color has the artificial flush of a mortician's makeup job. This effect achieves its apotheosis in a series of commissioned photographs from 1983 of Elvis Presley's Graceland. Mr. Eggleston depicts the singer's home as an airless, windowless tomb, a pharaonic monument to a strung-out life embalmed in custom-made bad taste.

But then there are moments of utter old-fashioned beauty, natural highs. You're outdoors in the farmlands of Jimmy Carter's Georgia, in a series of pictures commissioned by Rolling Stone before the 1976 election. Or you're standing under mountainous clouds on a piece of wide, flat earth that is Mr. Eggleston's family land.

Probably no one asked for this picture. He took it because he takes pictures a lot, and that's where he was with his camera that day. The clouds just happened, the way clouds do.

As a group Mr. Eggleston's more recent pictures, in the series called "The Democratic Forest," add to, rather than develop or depart from, what came with that giant step he took in the '60s and '70s. There are more images of pop-cultural glut, unsavory home cooking and soulful skies. There is also more obvious artfulness as his travels take him to Europe and Asia and onto film sets at the invitation of directors like David Lynch, Gus Van Sant and Sofia Coppola, all of whose work he has profoundly influenced.

The color has grown lusher than ever and the angle of vision indirect as we see reality layered on, refracted through glass, in mirror reflections. The world is still chipped and scarred, but cleaner. The subjects in the pictures feel lingered over. The stoned, on-the-road, trapped-in-yesterday rawness is gone. Some of these new pictures really are banal and a little boring, in part because the mess of life gets left out.

This isn't surprising. Part of being a long-term traveler is that you get comfortable; you relax. You stop living on adrenaline, stop bracing for jolts to the system. The irritated alertness conducive to a certain kind of art subsides. At some basic level the world is less strange and you're less of a stranger to it, unless you deliberately derange yourself or hit the road again, or adjust yourself to a new now.

Mr. Eggleston, who lives in Memphis, is now on a project with Mr. Lynch; beyond that, I don't know what his plans are. The America he presented to such shocking effect more than 30 years ago is now full color — not black and white, not North and South — in every sense. The national soul is still as delirious and furious, but maybe a little more sober, or about to become so. I wonder what one of our finest living photographers will continue to make of it.

"William Eggleston: Democratic Camera, Photographs and Video, 1961-2008" continues through Jan. 25 at the Whitney Museum of American Art; (212) 570-3600, whitney.org.

http://www.nytimes.com/2008/11/07/arts/design/07eggl.html?th&emc=th

Fingers, Loops And Bays In The Crab Nebula's Pulsar Wind Viewed By Chandra X-ray Observatory

View of the faint boundary of the Crab Nebula's X-ray-emitting pulsar wind nebula. (Credit: NASA/CXC/SAO/F.Seward)

ScienceDaily (Nov. 6, 2008) — NASA's Chandra X-ray Observatory has provided the first clear view of the faint boundary of the Crab Nebula's X-ray-emitting pulsar wind nebula.

The nebula is powered by a rapidly-rotating, highly-magnetized neutron star, or "pulsar" (white dot near the center). The combination of rapid rotating and strong magnetic field generates an intense electromagnetic field that creates jets of matter and anti-matter moving away from the north and south poles of the pulsar, and an intense wind flowing out in the equatorial direction.

The inner X-ray ring is thought to be a shock wave that marks the boundary between the surrounding nebula and the flow of matter and antimatter particles from the pulsar. Energetic electrons and positrons (antielectrons) move outward from this ring to brighten the outer ring and produce an extended X-ray glow.

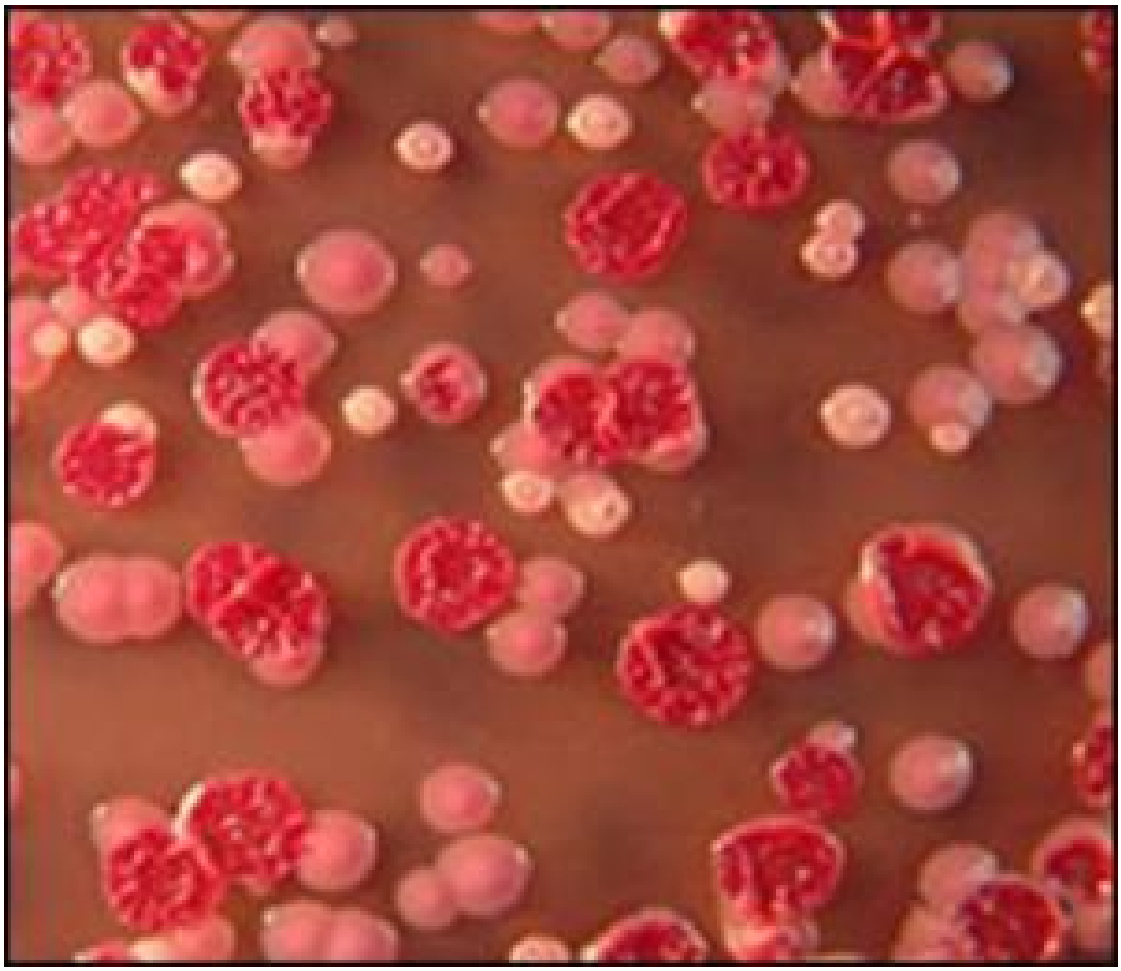
The fingers, loops, and bays in the image all indicate that the magnetic field of the nebula and filaments of cooler matter are controlling the motion of the electrons and positrons. The particles can move rapidly along the magnetic field and travel several light years before radiating away their energy. In contrast, they move much more slowly perpendicular to the magnetic field, and travel only a short distance before losing their energy.

This effect can explain the long, thin, fingers and loops, as well as the sharp boundaries of the bays. The conspicuous dark bays on the lower right and left are likely due to the effects of a toroidal magnetic field that is a relic of the progenitor star.

Adapted from materials provided by NASA.

http://www.sciencedaily.com/releases/2008/11/081105175721.htm

Gene Against Bacterial Attack Unraveled



Burkholderia Pseudomallei. (Credit: Image courtesy of Netherlands Organization for Scientific Research)

ScienceDaily (Nov. 6, 2008) — Dutch researcher Joost Wiersinga from AMC Medical Centre in Amsterdam has unravelled a genetic defence mechanism against the lethal bacteria Burkholderia pseudomallei. The research is the next step towards a vaccine against this bacterium suitable for bioweapons.

Humans have an innate defence system against deadly bacteria. However, how the step from gene to anti-bacterial effect occurs in the body is not yet known. To date, B. Pseudomallei, a bacterium suitable for bioweapons, had managed to elude medics. It can remain hidden in the human body for many years without being detected by the immune system. The bacteria can suddenly become activated and spread throughout the body, resulting in the patient dying from blood poisoning.

AMC physician Joost Wiersinga and the Laboratory for Experimental Internal Medicine discovered which gene-protein combination renders the lethal bacteria B. pseudomallei harmless.

Immune system fooled

Wiersinga focussed on the so-called Toll-like receptors. These are the proteins that initiate the fight against pathogens. There are currently ten known Toll-like receptors which are located on the outside of

immune cells, our body's defence system. The toll-like receptors jointly function as a 10-figure alarm code. Upon coming into contact with the immune cell each bacterium enters its own Toll code. For known pathogens this sets off an alarm in the immune system and the defence mechanism is activated. Yet B. pseudomallei fools the system by entering the code of a harmless bacterium. As a result the body's defence system remains on standby.

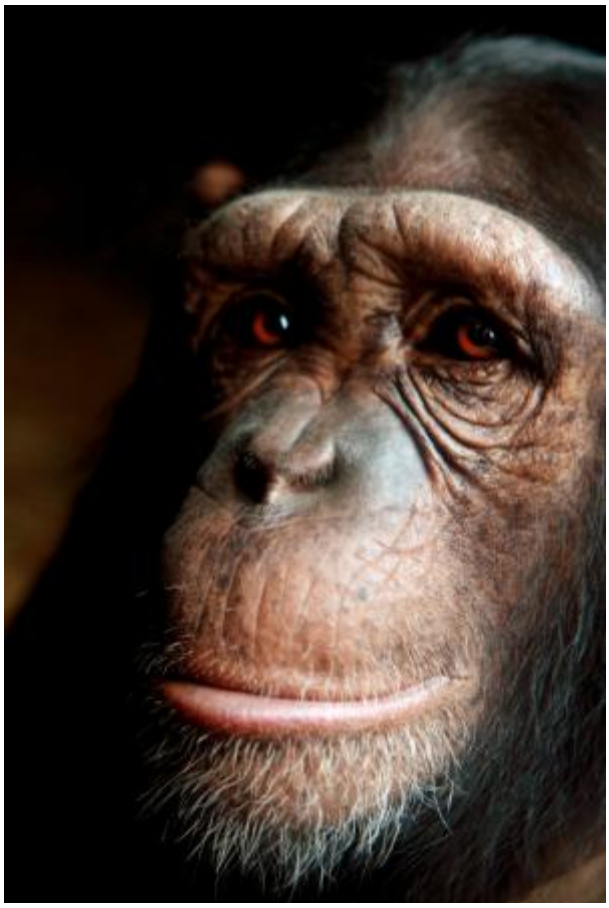
Yet some people are resistant: they become infected but not ill. Wiersinga found a genetic cause for this resistance. He discovered which toll receptor can fend off B. pseudomallei. He did this by rearing mice DNA in which the gene for Toll2 production was switched on and off. 'The group where the gene for Toll2 was switched off, survived the bacterial infection', says Wiersinga. 'The other receptor that we investigated, Toll4, had no effect - even though for the past ten years medics had regarded this as the most important receptor.' The ultimate aim of this study is to develop a vaccine.

Wiersinga and his colleagues are working together with the Wellcome Trust in Oxford and a clinic in Thailand. B. pseudomallei is endemic in Asia and claims thousands of victims each year. The research was published in PloS Medicine, and Science and Nature Reviews also ran articles on it. NWO funded the work.

Adapted from materials provided by Netherlands Organization for Scientific Research.

http://www.sciencedaily.com/releases/2008/10/081028120957.htm

DNA Chunks, Chimps And Humans: Marks Of Differences Between Human And Chimp Genomes



Researchers have identified regions that have been duplicated or lost during evolution of humans and chimpanzees. (Credit: iStockphoto/Peter-John Freeman)

ScienceDaily (Nov. 6, 2008) — Researchers have carried out the largest study of differences between human and chimpanzee genomes, identifying regions that have been duplicated or lost during evolution of the two lineages. The study, published in Genome Research, is the first to compare many human and chimpanzee genomes in the same fashion.

The team show that particular types of genes - such as those involved in the inflammatory response and in control of cell proliferation - are more commonly involved in gain or loss. They also provide new evidence for a gene that has been associated with susceptibility to infection by HIV.

"This is the first study of this scale, comparing directly the genomes of many humans and chimpanzees," says Dr Richard Redon, from the Wellcome Trust Sanger Institute, a leading author of the study. "By looking at only one 'reference' sequence for human or chimpanzee, as has been done previously, it is not possible to tell which differences occur only among individual chimpanzees or humans and which are differences between the two species.

"This is our first view of those two important legacies of evolution."

Rather than examining single-letter differences in the genomes (so-called SNPs), the researchers looked at copy number variation (CNV) - the gain or loss of regions of DNA. CNVs can affect many genes at once and their significance has only been fully appreciated within the last two years. The team looked at

genomes of 30 chimpanzees and 30 humans: a direct comparison of this scale or type has not been carried out before.

The comparison uncovered CNVs that are present in both species as well as copy number differences (CNDs) between the two species. CNDs are likely to include genes that have influenced evolution of each species since humans and chimpanzees diverged some six million years ago.

"Broadly, the two genomes have similar patterns and levels of CNVs - around 70-80 in each individual - of which nearly half occur in the same regions of the two species' genomes," continues Dr Redon. "But beyond that similarity we were able to find intriguing evidence for key sets of genes that differ between us and our nearest relative."

One of the genes affected by CNVs is CCL3L1, for which lower copy numbers in humans have been associated with increased susceptibility to HIV infection. Remarkably, the study of 60 human and chimpanzee genomes found no evidence for fixed CNDs between human and chimp and no within-chimp CNV. Rather, they found that a nearby gene called TBC1D3 was reduced in number in chimpanzee compared to human: typically, there were eight copies in human, but apparently only one in all chimpanzees.

The authors suggest that it might be evolutionary selection of CNDs in TBC1D3 that have driven the population differences. Consistent with this novel observation, TBC1D3 is involved in cell proliferation (favoured category) and is on a core region for duplication - a focal point for large regions of duplication in human genome.

"It is evident that there has been striking turnover in gene content between humans and chimpanzees, and some of these changes may have resulted from exceptional selection pressures," explains Dr George Perry from Arizona State University and Brigham and Women's Hospital, another leading author of the study. "For example, a surprisingly high number of genes involved in the inflammatory response - APOL1, APOL4, CARD18, IL1F7, IL1F8 - are completely deleted from chimp genome. In humans, APOL1 is involved in resistance to the parasite that causes sleeping sickness, while IL1F7 and CARD18 play a role in regulating inflammation: therefore, there must be different regulations of these processes in chimpanzees.

"We already know that inactivation of an immune system gene from the human genome is being positively selected: now we have an example of similar consequences in the chimpanzee."

CNVs in humans and chimpanzees often occur in equivalent genomic locations: most lie in regions of the genomes, called segmental duplications, that are particularly 'fragile'. However, one in four of the 355 CNDs that the team found do not overlap with CNVs within either species - suggesting that they are variants that are 'fixed' in each species and might mark significant differences between human and chimpanzee genomes.

DNA Samples and analysis

The project used DNA samples from 30 chimpanzees (29 from W Africa, one from E Africa): the chimpanzee reference was produced using DNA from Clint, the chimpanzee whose DNA was used for the genome sequence.

Human DNA samples were obtained from following participants: ten Yoruba (Ibadan, Nigeria), ten Biaka rainforest hunter-gatherers (Central African Republic) and ten Mbuti rainforest hunter-gatherers (Democratic Republic of Congo). The human reference is a European-American male from the HapMap Project (NA10852).

CNVs and CNDs were detected using a whole-genome tilepath of DNA clones spanning the human genome used previously to map human CNVs: this platform can reveal structural variants greater than around 10,000 base-pairs in size.

This work was funded by the Wellcome Trust, the LSB Leakey Foundation, the Wenner-Gren Foundation for Anthropological Research, the National Institutes of Health, The University of Louisiana at Lafayette-New Iberia Research Center and the Howard Hughes Medical Institute.

The authors thank the Human Genome Diversity Project, the Coriell Institute for Medical Research, the Integrated Primate Biomaterials and Information Resource, New Iberia Research Center, and the Primate Foundation of Arizona for samples.

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Adapted from materials provided by Wellcome Trust Sanger Institute.

http://www.sciencedaily.com/releases/2008/11/081105191731.htm

Extreme Weather Postpones Flowering Time Of Plants

Among the ten species studied included the heather (Calluna vulgaris). (Credit: Dr. Jürgen Kreyling/University of Bayreuth)

ScienceDaily (Nov. 5, 2008) — Extreme weather events have a greater effect on flora than previously presumed. A one-month drought postpones the time of flowering of grassland and heathland plants in Central Europe by an average of 4 days. With this a so-called 100-year drought event equates to approx. a decade of global warming.

The flowering period of an important early flowerer, the common Birds-foot Trefoil (Lotus corniculatus) was even shortened by more than a month due to heavy rain and started flowering early by almost one month. In a study conducted by the University of Bayreuth and the Helmholtz-Centre for Environmental Research (UFZ) researchers came to this conclusion.

Using experimental plots in Bayreuth the researchers generated artificial heavy rain and drought in their experiment and the effects on ten different plant species were observed accordingly over a two-year period. With climate change it is expected that such extreme weather events will increase in frequency and intensity, which entails a risk for animal-plant interactions and ecological services. In this respect it is conceivable that the synchronisation between flowering plants and pollinating insects could be uncoupled and the rhythm of evolution lost due to extreme weather events. For example, the activity of pollinating insects is determined more so by temperatures as opposed to changes in rainfall, as researchers have reported in the scientific journal Global Change Biology.

Changes to the flowering time of plants are regarded as one of the most evident signs of global warming. Other studies have already shown that since 1960 the beginning of Spring has been postponed in the northern hemisphere by an average of 2.5 days per decade. Although forecasts like the IPCC-Report 2007 reckon with a more considerable increase in extreme weather events, the effects of such events on

ecology have previously been researched very little. Scientists working with Prof. Anke Jentsch have therefore set up an experimental site in the ecological botanical garden in Bayreuth, to investigate the effects of extreme weather events such as droughts or heavy rains.

The investigation area with an average annual temperature of 8.2º C and 724 millimeters annual rainfall is situated in a transitional zone between the Atlantic and Continental climates. One hundread plants of each widely distributed species like for example Yorkshire Fog (Holcus lanatus), Ribwort Plantain (Plantago lanceolata) and Heather (Calluna vulgaris) were planted on each of 30 4m2 experimental plots. Using plastic tarpaulin covers the researchers were able to simulate an extreme dry period of 32 days and a period of extreme rain using artificial rain with 170 millimeters of rainfall lasting 14 days, corresponding to a local 100-year extreme weather event. Both simulations correspond to the historical highest values that were recorded in Bayreuth in the summer of 1976 and 1977.

The sites were observed over two years and the flowering time of all plants recorded. During this period it transpired that two weeks of heavy rain shortened the flowering period by 3 to 5 days, and in the case of an important spring-time the flowering period was even shortened by 37 days and started 26 days earlier. Conversely with a long drought period of one month: on average the plants flowered in total for four days longer and also four days earlier than usual. "A single extreme drought can therefore have similar effects on flowering as a decade of global warming", explains Anke Jentsch. "The climate change with more frequent extreme weather events will have extensive consequences for ecosystems and interactions between species."

Adapted from materials provided by Helmholtz Centre For Environmental Research - UFZ.

http://www.sciencedaily.com/releases/2008/11/081105083540.htm

Stressed Older Drivers Are Three Times More Likely To Brake Than Calm Drivers

older adults alter their behavior more than young adults when under stress — particularly in situations involving risk. (Credit: iStockphoto/Brian Toro)

ScienceDaily (Nov. 5, 2008) — Life can be stressful, whether you're an individual watching the stock market crash or a commuter stuck in traffic. A new study, forthcoming in the journal Psychological Science, examines how stress affects decision-making and finds that older adults alter their behavior more than young adults when under stress — particularly in situations involving risk.

"People haven't looked at how stress affects decision making, even though so many of our decisions are made under stress," explained Mara Mather of USC Davis School of Gerontology, lead author of the study. "There's very little information about this whole topic, and, when you get to age differences, there's even less."

Mather and her colleagues Marissa Gorlick, of the USC Emotion and Cognition Lab, and Nichole Kryla-Lighthall, a USC doctoral student, exposed young adults (18 to 33) and older adults (65 to 89) to a stressful event, in this case, holding a hand in ice-cold water for three minutes.

Participants were then asked to play a driving game correlating to a real-life situation in which taking a small amount of risk is common: whether to go for it on a yellow light. Participants started at a green light, and points were awarded for every second spent driving during a yellow, but lost if the light turned red while driving. The length of time for the yellow lights was determined randomly.

In other words, Mather explained, participants had to decide to take some risk — driving during a yellow light — to score any points at all.

"This is the way life is, quite often. To make more money in your investments, you have to take risk. To end up dating someone, you have to take the risk of going up and saying hello," Mather said. "When there's a potential payoff, most of the time you have to take some risk."

In the control group, which was not exposed to ice-cold water, older adults were actually better drivers than younger adults, the researchers found, scoring higher on the game.

However, in the stressed group, older adults were not only more cautious but were also jerkier drivers, braking and restarting almost three times as much as their calmer peers.

The differences in the effects of stress were consistent even when the researchers accounted for gender, level of education, mood and health self-ratings.

"The everyday commute can be stressful: someone cuts you off, you're late already. Are you more likely to try and take a risk than if you weren't stressed out?" Mather asks. "Our results indicate that stress changes older adults' strategies."

The exposure to ice-cold water caused a rise in levels of the hormone cortisol, measured in saliva. Cortisol levels increased significantly (and about the amount) among stressed younger and older adults, but did not change significantly from pre-test levels for the control group, which was not exposed to ice-cold water.

As Mather explained: "The brain regions that are involved in and activated by stress overlap quite a lot with the brain regions that are involved in decision making and, in particular, in decisions about risk."

The study was supported by the National Institute of Aging.

Journal reference:

1. Mara Mather, Marissa Gorlick, and Nichole Kryla-Lighthall. **To brake or accelerate when the light turns yellow? Stress reduces older adults' risk taking in a driving game**. *Psychological Science*, (in press)

Adapted from materials provided by University of Southern California.

http://www.sciencedaily.com/releases/2008/10/081028074331.htm

How To Stop Winter From Weathering Your Skin

ScienceDaily (Nov. 5, 2008) — All winter flakes are not made of snow. Cold weather wreaks havoc on our skin, sometimes making it dry and flaky. Skin dries out if it's deprived of water and this dryness often causes itchiness, resulting in a condition commonly referred to as "winter itch."

"Most of us experience dry and itchy skin from time to time, but you should seek medical attention if discomfort becomes severe," says Dr. Anjali Dahiya, a dermatologist at the Iris Cantor Women's Health Center at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. "The best thing you can do to relieve the itch is to moisturize your skin because, unfortunately, you can't do anything about the weather."

"Remember, dry skin is due to lack of water. Apply moisturizers immediately after bathing or showering, while your skin is still wet to trap water in the skin," notes Dr. Dahiya.

She suggests the following tips to turn your skin from alligator into suede:

- Moisturize daily. Cream moisturizers are better than lotions for normal to dry skin. If you have sensitive skin, choose a moisturizer without fragrance or lanolin.
- Cleanse your skin, but don't overdo it. Too much cleansing removes skin's natural moisturizers. It is enough to wash your face, hands, feet, and between the folds of your skin once a day. While you can rinse your trunk, arms, and legs daily; it is not necessary to use soap or cleanser on these areas every day.
- Limit the use of hot water and soap. If you have "winter itch," take short lukewarm showers or baths with a non-irritating, non-detergent-based cleanser. Immediately afterward, apply a mineral oil or petroleum jelly type moisturizer. Gently pat skin dry.
- Humidify. Humidifiers can be beneficial. However, be sure to clean the unit according to the manufacturer's instructions to reduce mold and fungi.
- Protect yourself from the wind. Cover your face and use a petroleum-based balm for your lips.
- Avoid extreme cold. Cold temperatures can cause skin disorders or frostbite in some people. See a doctor immediately if you develop color changes in your hands or feet accompanied by pain or ulceration. If you develop extreme pain followed by loss of sensation in a finger or toe, you may have frostbite.
- Protect your skin from the sun. Winter sun can be as dangerous to the skin. Even in the winter months you should use a sunscreen with a sun-protection factor of 15 or greater, if you will be outdoors for prolonged periods. Overexposure to the sun's rays can lead to premature aging of the skin and skin cancer.
- See your dermatologist. If you have persistent dry skin, scaling, itching, skin growths that concern you, or other rashes, see your dermatologist -- not only in winter but throughout the year.

Adapted from materials provided by NewYork-Presbyterian Hospital/Columbia University Medical Center and NewYork-Presbyterian Hospital/W, via Newswise.

http://www.sciencedaily.com/releases/2008/10/081031161836.htm

Dried Mushrooms Slow Climate Warming In Northern Forests

Fungi. The fight against climate warming has an unexpected ally in mushrooms growing in dry spruce forests covering Alaska, Canada, Scandinavia and other northern regions, a new UC Irvine study finds. (Credit: Image courtesy of University of California - Irvine)

ScienceDaily (Nov. 5, 2008) — The fight against climate warming has an unexpected ally in mushrooms growing in dry spruce forests covering Alaska, Canada, Scandinavia and other northern regions, a new UC Irvine study finds.

When soil in these forests is warmed, fungi that feed on dead plant material dry out and produce significantly less climate-warming carbon dioxide than fungi in cooler, wetter soil. This came as a surprise to scientists, who expected warmer soil to emit larger amounts of carbon dioxide because extreme cold is believed to slow down the process by which fungi convert soil carbon into carbon dioxide.

Knowing how forests cycle carbon is crucial to accurately predicting global climate warming, which in turn guides public policy to curb greenhouse gas emissions. This is especially important in northern forests, which contain an estimated 30 percent of the Earth's soil carbon, equivalent to the amount of atmospheric carbon.

"We don't get a vicious cycle of warming in dry, boreal forests. Instead, we get the reverse, where warming actually prevents further warming from occurring," said Steven Allison, ecology and evolutionary biology assistant professor and lead author of the study. "The Earth's natural processes could give us some time to implement responsible policies to counteract warming globally."

Soils in the far north contain a lot of carbon from dead grasses, trees and shrubs. Like humans, fungi and bacteria in soil use plant carbon as a food source and convert it into carbon dioxide.

Allison and his colleague, Kathleen Treseder, sought to find out what happens to carbon dioxide levels when boreal forest soil not containing permafrost is warmed. About one-third of the world's boreal forests do not contain permafrost, which is mostly located in Alaska, Canada, Western Siberia and Northern Europe.

Global warming is expected to hit northern latitudes hardest, raising temperatures between 5 and 7 degrees Celsius by the year 2100.

The scientists conducted their experiment in a spruce forest near Fairbanks, Alaska. They built small greenhouses and identified similar unheated plots nearby to serve as controls. Both plots received equal amounts of water.

In mid-May when growing season began, air and soil temperatures were the same in greenhouses and control plots. When greenhouses were closed, air temperature rose about 5 degrees Celsius, and soil temperature rose about 1 degree.

The scientists took measurements in the greenhouses and unheated plots and found that by growing season's end in mid-August, soil in warmed greenhouses produced about half as much carbon dioxide as soil in cooler control plots.

A soil analysis found that about half as much active fungi were present in experimental greenhouse samples compared with samples from the controls. When fungi dry out, they either die or become inactive and stop producing carbon dioxide, the scientists said.

"It's fortuitous for humans that the fungi are negatively affected by this warming," said Treseder, ecology and evolutionary biology associate professor. "It's not so great for the fungi, but might help offset a little bit of the carbon dioxide we are putting directly into the atmosphere by burning fossil fuels."

This study appears online Nov. 3 in the journal Global Change Biology.

This work was supported by the National Science Foundation, the U.S. Department of Energy, and a NOAA Climate and Global Change Postdoctoral Fellowship.

Adapted from materials provided by University of California - Irvine.

http://www.sciencedaily.com/releases/2008/11/081103084045.htm

Time Invested In Practicing Pays Off For Young Musicians, Research Shows

Children who study a musical instrument for at least three years outperform children with no instrumental training, a new study has found. (Credit: iStockphoto/Alex Potemkin)

ScienceDaily (Nov. 5, 2008) — A Harvard-based study has found that children who study a musical instrument for at least three years outperform children with no instrumental training—not only in tests of auditory discrimination and finger dexterity (skills honed by the study of a musical instrument), but also on tests measuring verbal ability and visual pattern completion (skills not normally associated with music).

The study, published October 29 in the online, open-access journal PLoS ONE, was led by Drs. Gottfried Schlaug and Ellen Winne.

A total of 41 eight- to eleven-year-olds who had studied either piano or a string instrument for a minimum of three years were compared to 18 children who had no instrumental training. Children in both groups spent 30-40 minutes per week in general music classes at school, but those in the instrumental group also received private lessons learning an instrument (averaging 45 minutes per week) and spent additional time practicing at home.

While it is no surprise that the young musicians scored significantly higher than those in the control group on two skills closely related to their music training (auditory discrimination and finger dexterity), the more surprising result was that they also scored higher in two skills that appear unrelated to music—verbal ability (as measured by a vocabulary IQ test) and visual pattern completion (as measured by the

Raven's Progressive Matrices). And furthermore, the longer and more intensely the child had studied his or her instrument, the better he or she scored on these tests.

Studying an instrument thus seems to bring benefits in areas beyond those that are specifically targeted by music instruction, but that is not the end of the story. Although this research sheds light on the question of whether connections between music and other, unrelated skills do exist, more studies examining the causal relationships between instrumental music training, practice intensity, and cognitive enhancements are needed.

Journal reference:

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

http://www.sciencedaily.com/releases/2008/11/081104132916.htm

Lung Airway Cells Activate Vitamin D And Increase Immune Response

ScienceDaily (Nov. 5, 2008) — Vitamin D is essential to good health but needs to be activated to function properly in the human body. Until recently, this activation was thought to happen primarily in the kidneys, but a new University of Iowa study finds that the activation step can also occur in lung airway cells.

The study also links the vitamin D locally produced in the lung airway cells to activation of two genes that help fight infection. The study results appear in the Nov. 15 issue of the Journal of Immunology, now online.

In addition to contributing to calcium absorption and bone health, vitamin D is increasingly recognized for its beneficial effects on the immune system. Vitamin D deficiency has been recently linked to increased risk of some infections, autoimmune diseases such as multiple sclerosis and type 1 diabetes, and some cancers.

"The more scientists have been studying vitamin D, the more we learn about new roles it plays in the human body," said the study's lead author Sif Hansdottir, M.D., fellow in internal medicine in the University of Iowa Carver College of Medicine. "The active form of vitamin D is known to affect the expression of more than 200 genes, so we were interested both in the possible lung-specific production of active vitamin D and in vitamin D-dependent production of proteins that fight infections."

The first step in vitamin D activation takes place in the liver, where an enzyme called 25-hydroxylase converts vitamin D into a "storage" form. The next step takes place typically in the kidneys, but in recent years, tissue and organs such as skin, intestines, breast and prostate have been found also to express the enzyme that completes vitamin D conversion.

The University of Iowa team, based in the laboratory of Gary Hunninghake, M.D., professor of internal medicine and the study's senior author, used cells from deceased human donors to demonstrate that the presence of the enzyme 1 alpha-hydroxylase in the airway cells helps convert the storage form of vitamin D into its active form.

"When we put the storage form of vitamin D on the lung airway cells, we saw them convert it to the active form," Hansdottir said. "The next step was to investigate whether this active form could affect the expression of genes."

The team then showed that vitamin D activated by airway cells affects two genes involved in immune defense. One gene expresses a protein called cathelicidin that can kill bacteria. The second gene, called CD14, produces a protein that helps cells recognize different kinds of pathogens that could be a threat.

"Vitamin D converted by the kidneys circulates in the bloodstream, but vitamin D converted by other organs appears to stay within those organs and protect them from infection," Hansdottir said. "We were able to see this happen in cells lining the trachea and main bronchi."

The team also found that when lung airway cells are infected by a virus, they express more of the enzyme that activates vitamin D. Hansdottir said the team is very interested in pursuing studies on the role of viral infections in vitamin D production and subsequent effects on lung infections.

"Vitamin D not only increases proteins involved in bacterial killing but also can dampen inflammation," Hansdottir said. "Controlling inflammation through vitamin D is good because too much inflammation can cause problems such as sepsis and seems to contribute to autoimmune disease."

Hansdottir noted that vitamin D insufficiencies and deficiencies (which are more severe) are fairly common, particularly for people living in northern latitudes. While vitamin D can be generated through sun exposure, such exposure is generally not recommended as a remedy because of skin cancer risks. Instead, supplements can be used.

The American Academy of Pediatrics recently recommended that the vitamin D dosage for children be increased to 400 IU (international units) per day. Optimal daily intake for adults is still being studied but may be as high as 800 to 1,000 IU.

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

http://www.sciencedaily.com/releases/2008/11/081104080317.htm

Low Cost Vehicle Stability Chip Reduces Rollover Risk

Computer chips help reduce rollovers. Engineering professor Andrei Shkel and the UCI MicroSystems Laboratory developed the robust, low-cost sensor for automobile safety systems. (Credit: Daniel A. Anderson / University Communications)

ScienceDaily (Nov. 5, 2008) — Drivers worldwide soon will be able to navigate dangerous road conditions more safely, due to sensor technology developed at UC Irvine.

A research team led by Andrei Shkel, mechanical and aerospace engineering professor and UCI MicroSystems Laboratory director, has designed a 1.7 millimeter-wide device that helps stabilize automobiles, allowing them to pass safely through hazardous conditions such as sharp turns and slippery roads that could result in a rollover.

The device – a micro-electro-mechanical systems gyroscope – maintains a constant center of gravity and alerts the safety system to correct when it detects the vehicle beginning to spin or roll. The MEMS gyroscope is a significant technological step forward because it can operate under harsh conditions and it also is relatively inexpensive.

Microscopic gyroscopes are helping enable an emerging technology called electronic stability control. The resulting system helps prevent accidents by automatically activating brakes on out-of-control vehicles. The technology can be particularly useful for vehicles with a higher center of gravity, which makes them prone to rolling.

“To be useful for electronic stability control, these sophisticated microscopic sensors have to be fast, reliable and cheap,” Shkel said. “They also must operate with confidence in the harsh automotive environment, which encompasses a daunting combination of factors including temperature, vibration, shock and humidity.”

Electronic stability control is available in luxury vehicles, but sensors made from quartz were too expensive for widespread installation. Innovations in MEMS gyroscope technology make these systems more affordable. Shkel expects the sensors to be widely deployed after about four years of testing. His goal is to have a reliable, sophisticated stability system in every car.

"In the next few years, these systems will be as common as present-day passenger protection airbags, he said. "They will help save millions of lives."

Funding for the UCI project came from Systron Donner Automotive, a manufacturer of advanced automotive safety devices, and a UC Discovery Grant.

Adapted from materials provided by University of California, Irvine.

http://www.sciencedaily.com/releases/2008/11/081103145111.htm

MRI Reveals Relationship Between Depression And Pain

ScienceDaily (Nov. 5, 2008) — The brains of individuals with major depressive disorder appear to react more strongly when anticipating pain and also display altered functioning of the neural network that modifies pain sensitivity, according to a new report.

"Chronic pain and depression are common and often overlapping syndromes," the authors write as background information in the article. Recurring or chronic pain occurs in more than 75 percent of patients with depression, and between 30 percent and 60 percent of patients with chronic pain report symptoms of depression "Understanding the neurobiological basis of this relationship is important because the presence of comorbid pain contributes significantly to poorer outcomes and increased cost of treatment in major depressive disorder."

Irina A. Strigo, Ph.D., of the University of California San Diego, La Jolla, and colleagues studied 15 young adults with major depressive disorder (average age 24.5) who were not taking medication and 15 individuals who were the same age (average 24.3 years) and had the same education level but did not have depression. Patients with depression completed a questionnaire that evaluated their tendencies to magnify, ruminate over or feel helpless in the face of pain. All participants underwent functional magnetic resonance imaging (fMRI) while their arms were exposed to a thermal device heated to painful levels (an average of 46.4 degrees to 46.9 degrees Celsius, or about 115 degrees to 116 degrees Fahrenheit) and also to non-painful temperatures. Visual cues (a green shape for non-painful warmth and a red shape for painful warmth) were presented before the heat was applied.

Compared with the controls, patients with depression showed increased activation in certain areas of their brain—including the right amygdala—during the anticipation of painful stimuli. They also displayed increased activation in the right amygdala and decreased activation in other areas, including those responsible for pain modulation (adjusting sensitivity to pain), during the painful experience.

To examine whether the activation of the amygdala was associated with passive coping styles, the researchers compared the percentage change in the activations of the amygdala with the helplessness, rumination and ramification reported by the participants with depression. "Significant positive correlations were observed in the major depressive disorder group between greater helplessness scores and greater activity in the right amygdala during the anticipation of pain," the authors write.

"The anticipatory brain response may indicate hypervigilance to impending threat, which may lead to increased helplessness and maladaptative modulation during the experience of heat pain," the authors write. "This mechanism could in part explain the high comorbidity of pain and depression when these conditions become chronic."

"Future studies that directly examine whether maladaptive response to pain in major depressive disorder is due to emotional allodynia [a pain response to a non-painful stimulus], maladaptive control responses, lack of resilience and/or ineffectual recruitment of positive energy resources will further our understanding of pain-depression comorbidity," they conclude.

This study was supported by Barrow Neurological Foundation, grants from the National Institute of Mental Health, the National Association for Research in Schizophrenia and Depression and the University of California San Diego Center of Excellence for Stress and Mental Health.

Journal reference:

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Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2008/11/081103170617.htm

Could Life Have Started In Lump Of Ice? Very Cold Ice Films In Laboratory Reveal Mysteries Of Universe

Physicists are creating ice films in cold conditions similar to outer space and observe the detailed molecular organization. (Credit: iStockphoto/Christine Balderas)

ScienceDaily (Nov. 5, 2008) — The universe is full of water, mostly in the form of very cold ice films deposited on interstellar dust particles, but until recently little was known about the detailed small scale structure. Now the latest quick freezing techniques coupled with sophisticated scanning electron microscopy techniques, are allowing physicists to create ice films in cold conditions similar to outer space and observe the detailed molecular organisation, yielding clues to fundamental questions including possibly the origin of life.

Researchers have been surprised by some of the results, not least by the sheer beauty of some of the images created, according to Julyan Cartwright, a specialist in ice structures at the Andalusian Institute for Earth Sciences (IACT) of the Spanish Research Council (CSIC) and the University of Granada in Spain.

Recent discoveries about the structure of ice films in astrophysical conditions at the mesoscale, which is the size just above the molecular level, were discussed at a recent workshop organised by the European Science Foundation (ESF) and co-chaired by Cartwright alongside C. Ignacio Sainz-Diaz, also from the IACT. As Cartwright noted, many of the discoveries about ice structures at low temperatures were made possible by earlier research into industrial applications involving deposits of thin films upon an underlying substrate (ie the surface, such as a rock, to which the film is attached), such as manufacture of ceramics and semiconductors. In turn the study of ice films could lead to insights of value in such industrial applications.

But the ESF workshop's main focus was on ice in space, usually formed at temperatures far lower than even the coldest places on earth, between 3 and 90 degrees above absolute zero (3-90K). Most of the ice

is on dust grains because there are so many of them, but some ice is on larger bodies such as asteroids, comets, cold moons or planets, and occasionally planets capable of supporting life such as Earth.

At low temperatures, ice can form different structures at the mesoscale than under terrestrial conditions, and in some cases can be amorphous in form, that is like a glass with the molecules in effect frozen in space, rather than as crystals. For ice to be amorphous, water has to be cooled to its glass transition temperature of about 130 K without ice crystals having formed first. To do this in the laboratory requires rapid cooling, which Cartwright and colleagues achieved in their work with a helium "cold finger" incorporated in a scanning electron microscope to take the images.

As Cartwright observed, ice can exist in a combination of crystalline and amorphous forms, in other words as a mixture of order and disorder, with many variants depending on the temperature at which freezing actually occurred. In his latest work, Cartwright and colleagues have shown that ice at the mesoscale comprises all sorts of different characteristic shapes associated with the temperature and pressure of freezing, also depending on the surface properties of the substrate. For example when formed on a titanium substrate at the very low temperature of 6K, ice has a characteristic cauliflower structure.

Most intriguingly, ice under certain conditions produces biomimetic forms, meaning that they appear life like, with shapes like palm leaves or worms, or even at a smaller scale like bacteria. This led Cartwright to point out that researchers should not assume that lifelike forms in objects obtained from space, like Mars rock, is evidence that life actually existed there. "If one goes to another planet and sees small wormlike or palm like structures, one should not immediately call a press conference announcing alien life has been found," said Cartwright.

On the other hand the existence of lifelike biomimetic structures in ice suggests that nature may well have copied physics. It is even possible that while ice is too cold to support most life as we know it, it may have provided a suitable internal environment for prebiotic life to have emerged.

"It is clear that biology does use physics," said Cartwright. "Indeed, how could it not do? So we shouldn't be surprised to see that sometimes biological structures clearly make use of simple physical principles. Then, going back in time, it seems reasonable to posit that when life first emerged, it would have been using as a container something much simpler than today's cell membrane, probably some sort of simple vesicle of the sort found in soap bubbles. This sort of vesicle can be found in abiotic systems today, both in hot conditions, in the chemistry associated with 'black smokers' on the sea floor, which is currently favoured as a possible origin of life, but also in the chemistry of sea ice."

This is an intriguing idea that will be explored further in projects spawned by the ESF workshop. This may provide a new twist to the idea that life arrived from space. It may be that the precursors of life came from space, but that the actual carbon based biochemistry of all organisms on Earth evolved on this planet.

The workshop, Euroice2008, was held in Granada, Spain in October 2008.

Adapted from materials provided by European Science Foundation.

http://www.sciencedaily.com/releases/2008/11/081105083545.htm

Vitamin B3 Reduces Alzheimer's Symptoms, Lesions: Clinical Trial On Nicotinamide Effect In Alzheimer's Patients

Kim Green. (Credit: Photo by Daniel A. Anderson)

ScienceDaily (Nov. 5, 2008) — An over-the-counter vitamin in high doses prevented memory loss in mice with Alzheimer's disease, and UC Irvine scientists now are conducting a clinical trial to determine its effect in humans.

Nicotinamide, a form of vitamin B3, lowered levels of a protein called phosphorylated tau that leads to the development of tangles, one of two brain lesions associated with Alzheimer's disease. The vitamin also strengthened scaffolding along which information travels in brain cells, helping to keep neurons alive and further preventing symptoms in mice genetically wired to develop Alzheimer's.

"Nicotinamide has a very robust effect on neurons," said Kim Green, UCI scientist and lead author of the study. "Nicotinamide prevents loss of cognition in mice with Alzheimer's disease, and the beauty of it is we already are moving forward with a clinical trial."

The study appears online Nov. 5 in the Journal of Neuroscience.

Nicotinamide is a water-soluble vitamin sold in health food stores. It generally is safe but can be toxic in very high doses. Clinical trials have shown it benefits people with diabetes complications and has anti-inflammatory properties that may help people with skin conditions.

Nicotinamide belongs to a class of compounds called HDAC inhibitors, which have been shown to protect the central nervous system in rodent models of Parkinson's and Huntington's diseases and amyotrophic lateral sclerosis. Clinical trials are underway to learn whether HDAC inhibitors help ALS and Huntington's patients.

In the nicotinamide study, Green and his colleague, Frank LaFerla, added the vitamin to drinking water fed to mice. They tested the rodents' short-term and long-term memory over time using water-maze and object-recognition tasks and found that treated Alzheimer's mice performed at the same level as normal mice, while untreated Alzheimer's mice experienced memory loss.

The nicotinamide, in fact, slightly enhanced cognitive abilities in normal mice. "This suggests that not only is it good for Alzheimer's disease, but if normal people take it, some aspects of their memory might improve," said LaFerla, UCI neurobiology and behavior professor.

Scientists also found that the nicotinamide-treated animals had dramatically lower levels of the tau protein that leads to the Alzheimer's tangle lesion. The vitamin did not affect levels of the protein beta amyloid, which clumps in the brain to form plaques, the second type of Alzheimer's lesion.

Nicotinamide, they found, led to an increase in proteins that strengthen microtubules, the scaffolding within brain cells along which information travels. When this scaffolding breaks down, the brain cells can die. Neuronal death leads to dementia experienced by Alzheimer's patients.

"Microtubules are like highways inside cells. What we're doing with nicotinamide is making a wider, more stable highway," Green said. "In Alzheimer's disease, this highway breaks down. We are preventing that from happening."

Adapted from materials provided by University of California - Irvine.

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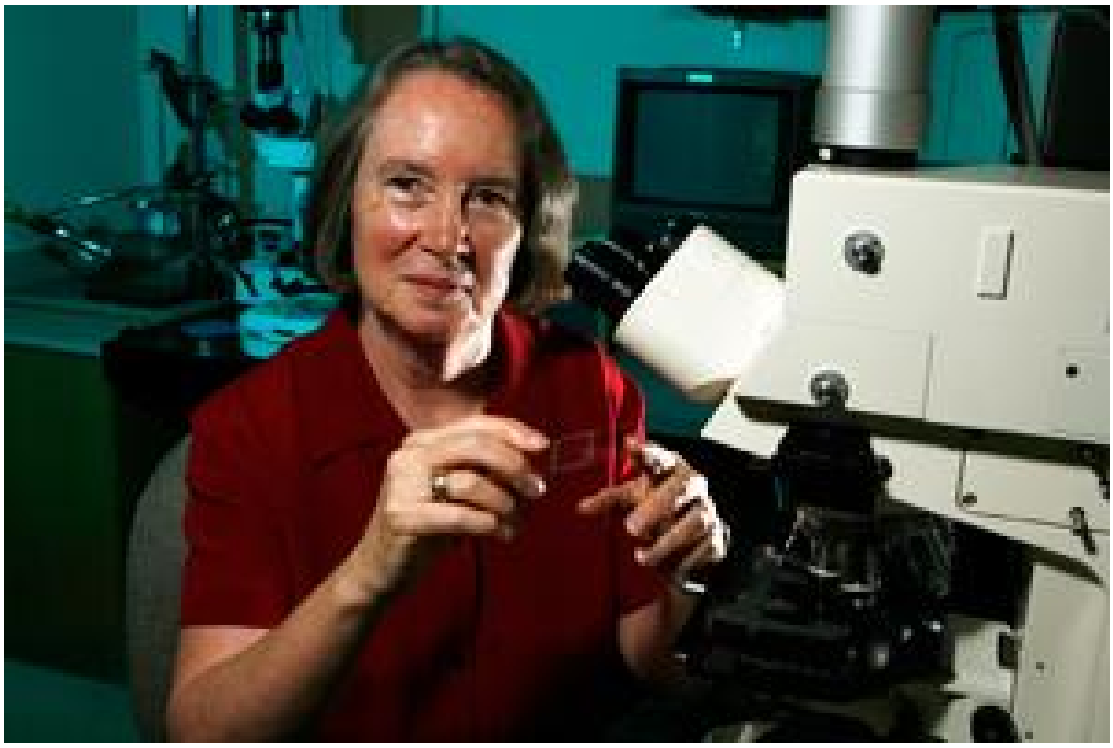
Clue Discovered In Spread Of 'Superbugs'



Philip Silverman, Ph.D., and Margaret Clarke, Ph.D., have obtained the first visual evidence of a key piece in the puzzle of how deadly superbugs spread antibiotic resistance in hospitals and throughout the general population. (Credit: Image courtesy of Oklahoma Medical Research Foundation)

ScienceDaily (Nov. 5, 2008) — A discovery from the Oklahoma Medical Research Foundation has put scientists are one step closer to finding a defense against dangerous antibiotic-resistant bacteria, sometimes called “superbugs.”

In a study that will be published in the Nov. 11 edition of the Proceedings of the National Academy of Sciences, OMRF researchers Philip Silverman, Ph.D., and Margaret Clarke, Ph.D., have obtained the first visual evidence of a key piece in the puzzle of how deadly superbugs spread antibiotic resistance in hospitals and throughout the general population.

“These ‘superbugs’ have become increasingly common since the widespread use of antibiotics began and they are now a serious public health menace,” said Silverman, who holds the Marjorie Nichlos Chair in Medical Research at OMRF. “Now, for the first time, we can begin to see, literally, how they acquire and disseminate antibiotic resistance.”

Last year, a government report estimated that nearly 19,000 people in the United States had died in a single year after being infected with the virulent superbug known as methicillin-resistant Staphylococcus aureus, or MRSA.

“MRSA and other antibiotic-resistant bugs are one of the greatest threats facing health care today,” said OMRF President Stephen Prescott, M.D. “These infections are easily transmitted—they make their way into the body through breaks in the skin, even microscopic ones, and through nasal passages. They resist treatment with standard antibiotics, which makes them dangerous. And they are particularly threatening in hospitals, because they attack patients whose immune systems may already be compromised.”

The new study from OMRF casts light on the role that structures known as conjugative pili—slender, thread-like bacterial filaments —play in spreading antibiotic resistance. Although scientists have known for decades that these filaments are required to transmit antibiotic resistance genes from one bacterium to another, Silverman and Clarke are the first to capture images of them as they extend and retract on live cells.

The OMRF research team, which included Cindy Maddera and Robin Harris, attached a fluorescent dye to a virus, which in turn bound specifically to the filaments on live bacteria. This allowed the behavior of the filaments to be recorded with a high-powered fluorescence microscope. Using this process, the scientists were able to capture a detailed series of images showing filament growth, attachment to other cells, and retraction to pull the cells together in preparation for genetic transfer.

“This is an important step forward in understanding how antibiotic resistance spreads,” said Silverman. Silverman and Clarke will continue to study the ways in which antibiotic resistance spreads. The aim of that work will be to help develop a better understanding of—and, ultimately, tools to combat—this life-threatening phenomenon.

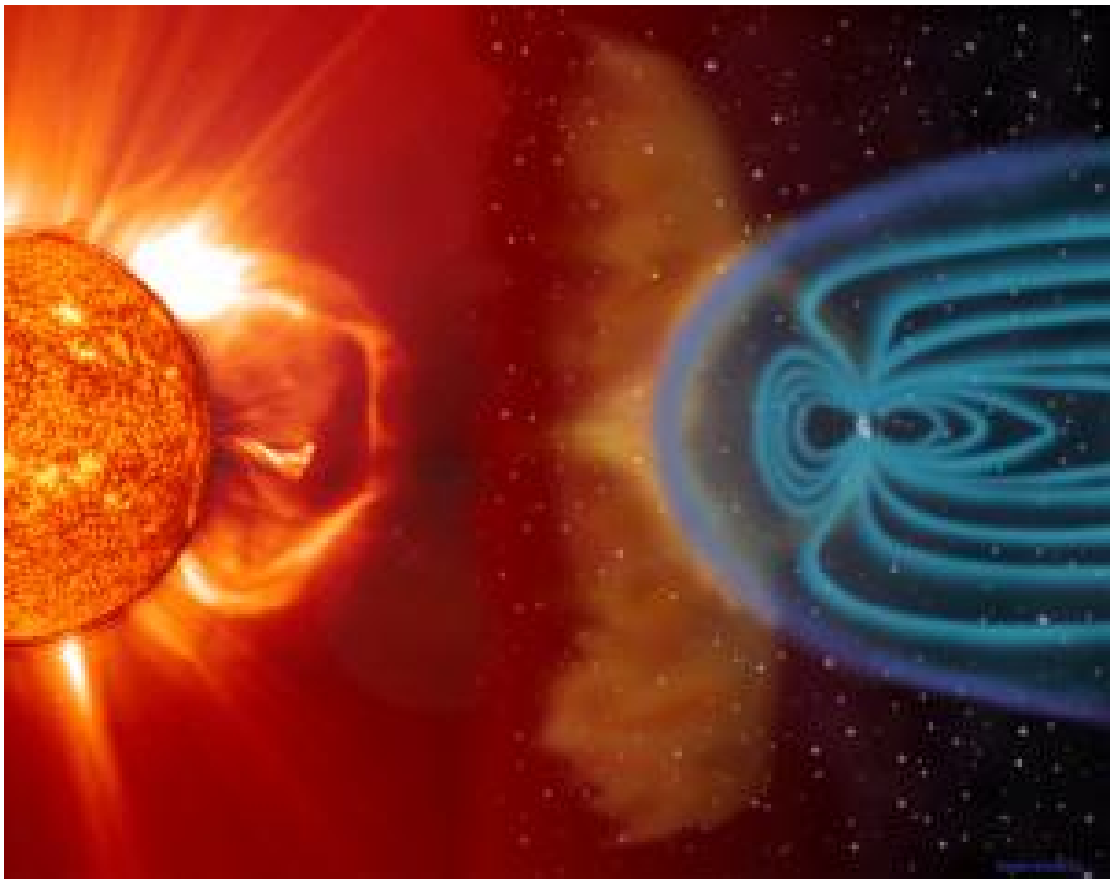
“More people in the U.S. die of MRSA each year than of HIV/AIDS,” said Silverman. “It’s crucial that we do all we can to combat this profound threat to human health.”

The research, which was done in collaboration with OMRF’s Imaging Center, was funded through grants from the National Science Foundation and the Oklahoma Center for the Advancement of Science and Technology.

Adapted from materials provided by Oklahoma Medical Research Foundation.

http://www.sciencedaily.com/releases/2008/11/081103192409.htm

New Spaceship Force Field Makes Mars Trip Possible



Solar wind shapes the Earth's magnetosphere and magnetic storms are illustrated here as approaching Earth. These storms, which occur frequently, can disrupt communications and navigational equipment, damage satellites, and even cause blackouts. (Credit: SOHO / ESA & NASA)

ScienceDaily (Nov. 5, 2008) — According to the international space agencies, "space weather" is the single greatest obstacle to deep space travel. Radiation from the sun and cosmic rays pose a deadly threat to astronauts in space. New research shows how knowledge gained from the pursuit of nuclear fusion research may reduce the threat to acceptable levels, making humanity's first mission to Mars a much greater possibility.

The solar energetic particles, although just part of the 'cosmic rays' spectrum, are of greatest concern because they are the most likely to cause deadly radiation damage to the astronauts.

Large numbers of these energetic particles occur intermittently as "storms" with little warning and are already known to pose the greatest threat to man. Nature helps protect the Earth by having a giant "magnetic bubble" around the planet called the magnetosphere.

The Apollo astronauts of the 1960's and 70's who walked upon the Moon are the only humans to have travelled beyond the Earth's natural "force field" – the Earth's magnetosphere. With typical journeys on the Apollo missions lasting only about 8 days, it was possible to miss an encounter with such a storm; a journey to Mars, however, would take about eighteen months, during which time it is almost certain that astronauts would be enveloped by such a "solar storm".

Space craft visiting the Moon or Mars could maintain some of this protection by taking along their very own portable "mini"-magnetosphere. The idea has been around since the 1960's but it was thought impractical because it was believed that only a very large (more than 100km wide) magnetic bubble could possibly work.

Researchers at the Science and Technology Facilities Council's Rutherford Appleton Laboratory, the Universities of York, Strathclyde and IST Lisbon, have undertaken experiments, using know-how from 50 years of research into nuclear fusion, to show that it is possible for astronauts to shield their spacecrafts with a portable magnetosphere - scattering the highly charged, ionised particles of the solar wind and flares away from their space craft.

Computer simulations done by a team in Lisbon with scientists at Rutherford Appleton last year showed that theoretically a very much smaller "magnetic bubble" of only several hundred meters across would be enough to protect a spacecraft.

Now this has been confirmed in the laboratory in the UK using apparatus originally built to work on fusion. By recreating in miniature a tiny piece of the Solar Wind, scientists working in the laboratory were able to confirm that a small "hole" in the Solar Wind is all that would be needed to keep the astronauts safe on their journey to our nearest neighbours.

Dr. Ruth Bamford, one of the lead researchers at the Rutherford Appleton Laboratory, said, "These initial experiments have shown promise and that it may be possible to shield astronauts from deadly space weather."

Journal reference:

1. R Bamford et al. **The interaction of a flowing plasma with a dipole magnetic field: measurements and modelling of a diamagnetic cavity relevant to spacecraft protection**. *Plasma Physics and Controlled Fusion*, 50 124025 (11pp) November 4, 2008 Online DOI: 10.1088/0741-3335/50/12/124025

Adapted from materials provided by Institute of Physics.

http://www.sciencedaily.com/releases/2008/11/081104080309.htm

New Device Controls, Measures Dynamics Of Chemicals In Live Tissue

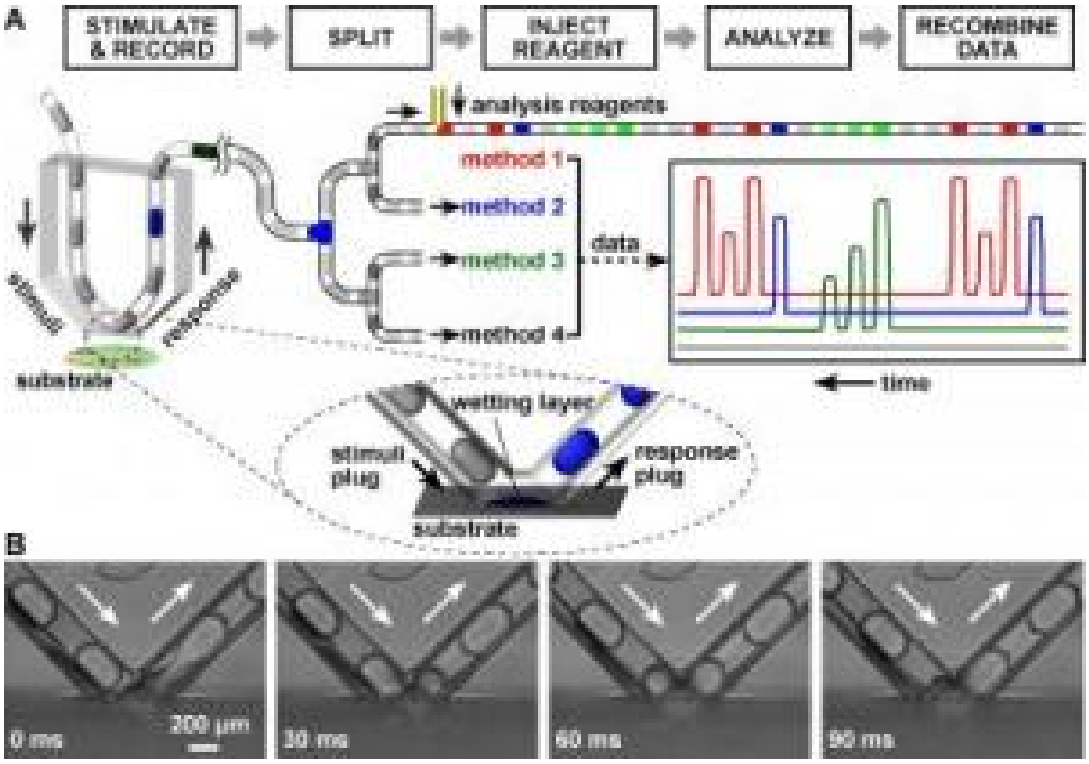


Chart showing how the chemistrode works. The device is used by being brought into contact with the surface of a cell or tissue under investigation. An array of tiny droplets containing chemical stimuli is then delivered to the sample; chemical reactions occur or molecules are released from the sample, as in the case of a hormone; and the resultant chemical-laden droplets are carried away. All the while, the fluorocarbon carrier fluid remains in contact with the droplets and shields them from the wall of the device. (Credit: Ismagilov Lab/University of Chicago)

ScienceDaily (Nov. 5, 2008) — Measuring an electrical current in an organism is pretty straightforward. All you need is an electrode. Measuring the flow of chemicals in cells or live tissue, however, is much more difficult because the molecules diffuse, mix with one another, and interact with their surroundings.

So to help understand biological processes, university researchers have invented a new device, the "chemistrode," that makes it possible to stimulate, record, and analyze molecular signals at high resolution—in terms of precisely when, where, and in what sequence the signals occurred.

The chemistrode will help researchers study any surface that responds to chemical stimulation, including cells, tissue, biofilms and catalytic surfaces. It may also help neurologists, cardiologists, and endocrinologists study and diagnose diseases, according to those who developed the device in the Ismagilov Lab in the Department of Chemistry at the University of Chicago. Researchers in the Lab have already used it to measure how a single murine islet responds to glucose.

The developers have begun to apply for a patent on the new device, and their research describing it will be published online Oct. 27, 2008, by the Proceedings of the National Academy of Science. (The paper will appear in the print version of the journal on Nov. 4, 2008.)

"An analogue of the electrode, the chemistrode is a droplet-base microfluidic device that will provide exciting opportunities to study stimulus-response dynamics in chemistry and biology," said Rustem

Ismagilov, Associate Professor in Chemistry, who conceived the device, coined its name, and heads up the team that developed it.

Previous techniques for stimulating and measuring chemical reactions in organisms relied on laminar flow, which allows the chemicals in question to intermingle and disperse, making them hard to control and measure. The new V-shaped device, on the other hand, traps the chemicals in water droplets and suspends the droplets in a fluorocarbon carrier fluid. This keeps the chemical-laden droplets intact, allowing a controlled stream of stimulating chemicals to enter on one end of the device and a steady stream of distinct resultant chemicals to be captured on the other end. The chemical-laden droplets can be analyzed immediately or stored for future analysis. Furthermore, the droplets can be split up for parallel study by different techniques.

"The inspiration for this work was the microelectrode, but the key to its success was encapsulating the chemicals in aqueus droplets so that the chemicals could be delivered to and picked up from the reactive site in a controllable, measurable fashion," said Delai Chen, a graduate student in the Department of Chemistry and Institute for Biophysical Dynamics at the University of Chicago. Chen was one of the four lead authors of the PNAS research paper, along with University post-doctoral researchers Wenbin Du and Ying Liu, and graduate student Weishan Liu.

A year and one-half in the making, the chemistrode is compatible with traditional methods of culturing cells and tissues because—like the electrode—it can be used on any surface. The device is used by being brought into contact with the surface of a cell or tissue under investigation. An array of tiny droplets containing chemical stimuli is then delivered to the sample; chemical reactions occur or molecules are released from the sample, as in the case of a hormone; and the resultant chemical-laden droplets are carried away. All the while, the fluorocarbon carrier fluid remains in contact with the droplets and shields them from the wall of the device.

"The chemistrode offers a time-resolved, high-fidelity record of molecular stimulation and response dynamics," Ismagilov said. "Our PNAS paper describes the physical principles that guide the operation of the chemistrode. It also implements the chemistrode to test the feasibility of each step and the compatibility of this platform with living cells."

For now, the device "allows you to look very hard and precisely at living cells in a dish, but it has the potential to be used in whole organisms, as well," said Louis Philipson, a professor in the Department of Medicine and co-author on the paper. "The chemistrode offers real-time input-output analysis captured in excellent resolution. As such, it will facilitate research in a lot of areas and holds the potential for widespread applications in medicine.

"The development of this device is a wonderful example of the lack of walls at the University of Chicago," Philipson added. "Here, physicians can interact with other scientists in unconventional ways and bring together different kinds of technology. The result is new ways of looking at things and new answers to old problems."

Adapted from materials provided by University of Chicago.

http://www.sciencedaily.com/releases/2008/10/081027174632.htm

'Junk' DNA Proves Functional; Helps Explain Human Differences From Other Species

According to a new study, what was previously believed to be "junk" DNA is one of the important ingredients distinguishing humans from other species. (Credit: iStockphoto)

ScienceDaily (Nov. 5, 2008) — In a paper published in Genome Research on Nov. 4, scientists at the Genome Institute of Singapore (GIS) report that what was previously believed to be "junk" DNA is one of the important ingredients distinguishing humans from other species.

More than 50 percent of human DNA has been referred to as "junk" because it consists of copies of nearly identical sequences. A major source of these repeats is internal viruses that have inserted themselves throughout the genome at various times during mammalian evolution.

Using the latest sequencing technologies, GIS researchers showed that many transcription factors, the master proteins that control the expression of other genes, bind specific repeat elements. The researchers showed that from 18 to 33% of the binding sites of five key transcription factors with important roles in cancer and stem cell biology are embedded in distinctive repeat families.

Over evolutionary time, these repeats were dispersed within different species, creating new regulatory sites throughout these genomes. Thus, the set of genes controlled by these transcription factors is likely to significantly differ from species to species and may be a major driver for evolution.

This research also shows that these repeats are anything but "junk DNA," since they provide a great source of evolutionary variability and might hold the key to some of the important physical differences that distinguish humans from all other species.

The GIS study also highlighted the functional importance of portions of the genome that are rich in repetitive sequences.

"Because a lot of the biomedical research use model organisms such as mice and primates, it is important to have a detailed understanding of the differences between these model organisms and humans in order

to explain our findings," said Guillaume Bourque, Ph.D., GIS Senior Group Leader and lead author of the Genome Research paper.

"Our research findings imply that these surveys must also include repeats, as they are likely to be the source of important differences between model organisms and humans," added Dr. Bourque. "The better our understanding of the particularities of the human genome, the better our understanding will be of diseases and their treatments."

"The findings by Dr. Bourque and his colleagues at the GIS are very exciting and represent what may be one of the major discoveries in the biology of evolution and gene regulation of the decade," said Raymond White, Ph.D., Rudi Schmid Distinguished Professor at the Department of Neurology at the University of California, San Francisco, and chair of the GIS Scientific Advisory Board.

"We have suspected for some time that one of the major ways species differ from one another – for instance, why rats differ from monkeys – is in the regulation of the expression of their genes: where are the genes expressed in the body, when during development, and how much do they respond to environmental stimuli," he added.

"What the researchers have demonstrated is that DNA segments carrying binding sites for regulatory proteins can, at times, be explosively distributed to new sites around the genome, possibly altering the activities of genes near where they locate. The means of distribution seem to be a class of genetic components called 'transposable elements' that are able to jump from one site to another at certain times in the history of the organism. The families of these transposable elements vary from species to species, as do the distributed DNA segments which bind the regulatory proteins."

Dr. White also added, "This hypothesis for formation of new species through episodic distributions of families of gene regulatory DNA sequences is a powerful one that will now guide a wealth of experiments to determine the functional relationships of these regulatory DNA sequences to the genes that are near their landing sites. I anticipate that as our knowledge of these events grows, we will begin to understand much more how and why the rat differs so dramatically from the monkey, even though they share essentially the same complement of genes and proteins."

Journal reference:

1. Bourque et al. **Evolution of the mammalian transcription factor binding repertoire via transposable elements**. *Genome Research*, 2008; 18: 1752-1762 DOI: 10.1101/gr.080663.108

*Adapted from materials provided by Agency for Science, Technology and Research (A*STAR), Singapore.*

http://www.sciencedaily.com/releases/2008/11/081104180928.htm

Steroid Therapies Following Transplant Can Be Eliminated, Study Suggests

Steve Woodle, MD. Using modern immunosuppressive drugs eliminates the need for steroid therapy as early as seven days following a transplant surgery while still maintaining kidney function, according to new research. (Credit: Image courtesy of University of Cincinnati)

ScienceDaily (Nov. 5, 2008) — A new study by researchers at UC shows that using modern immunosuppressive drugs eliminates the need for steroid therapy as early as seven days following a transplant surgery while still maintaining kidney function.

Steve Woodle, MD, chief of UC's transplant surgery division, principal investigator and designer of the study, says the elimination of a daily dose of steroids following transplantation minimizes chronic health conditions common to kidney transplant recipients.

The data—from what is believed to be the longest-running, double-blinded study of its kind in the transplant field—is published in the October issue of the Annals of Surgery.

"Steroids have long been the primary source of morbidity and complications following successful kidney transplantation," Woodle says. "This study demonstrates that elimination of even small, daily prednisone (pred-ne-zone) doses does not compromise results while minimizing weight gain, diabetes and bone complications."

Corticosteroids were the first anti-rejection drug used in transplant patients, dating back to the first transplant surgeries over 50 years ago.

Traditionally patients who have undergone organ transplantation have required life-long steroid treatments given in combination with other drugs that help suppress the body's immune system and allow the transplanted organ to function properly.

However, the steroid treatment—given as the oral drug, prednisone—can cause serious side effects including cardiovascular disease, high cholesterol and blood pressure, weight gain, diabetes, bone weakness and cataracts.

To test the effectiveness of early steroid elimination, researchers studied 397 patients from 25 U.S. kidney transplant centers for a five-year period following transplant. They administered low doses of prednisone to one group of transplant patients while the other group of patients received a placebo.

The results showed that early steroid elimination caused reduction in many steroid-related complications, even when prednisone was given in very low doses.

Kidney function was similar in both patient groups. “By demonstrating identical kidney transplant survival and function for five years, we now have a scientific basis for offering steroid-free therapies in kidney recipients,” Woodle says.

However, he notes that risk of rejection episodes in patients was slightly increased with early steroid discontinuation. “These episodes were mild and easily treated,” he says.

He adds that although the five-year kidney transplant survival and function were identical between those who received predisone and those who received other immunosuppressive drugs in this study, it doesn’t mean that it will be the same in 10 or 20 years.

“Our hope is that with our modern anti-rejection drugs and new drugs being developed, even this small risk of increased rejection combined with longer-term results will not be changed,” he says.

The results of this study are now being used in different transplant populations, resulting in much lower prednisone doses or complete elimination with fewer complications.

This study also involved researchers from the University of Wisconsin; the University of Utah; the Methodist Hospital, Houston; and Weill Cornell Medical College.

This study was funded by Astellas Pharma U.S., Inc. Study authors cite receipt of payment for participating in pharmaceutical-sponsored speaking engagements about immunosuppressants.

Adapted from materials provided by University of Cincinnati.

http://www.sciencedaily.com/releases/2008/10/081021185203.htm

High-performance Steel For Possible Use In ITER Fusion Project Developed

Jeremy Busby of the ORNL Materials Science and Technology Division headed development of a new cast stainless steel being evaluated for use in the ITER fusion device. (Credit: Image courtesy of DOE/Oak Ridge National Laboratory)

ScienceDaily (Nov. 5, 2008) — Researchers at Oak Ridge National Laboratory and the U.S. ITER Project Office, which is housed at ORNL, have developed a new cast stainless steel that is 70 percent stronger than comparable steels and is being evaluated for use in the huge shield modules required by the ITER fusion device.

ITER is a multibillion-dollar international research and development project to demonstrate the scientific and technological feasibility of fusion power and to enable studies of self-heating burning plasmas. It will require hundreds of tons of complex stainless steel components that must withstand the temperatures associated with being in the proximity of a plasma heated to more than 100 million degrees Celsius.

The ITER device will be assembled in Cadarache, France, using components fabricated in the United States and in the other partner nations – China, the European Union, India, Japan, the Republic of Korea and the Russian Federation. It is based on the tokamak concept, in which a hot gas is confined in a torus-shaped vessel using a magnetic field. When operational, the device will produce some 500 MW of fusion power.

Jeremy Busby of the ORNL Materials Science and Technology Division said the ITER shield modules present a particular challenge. "The United States must produce nearly 100 of these modules that are 3-4 tons each and include geometric shapes and openings," he explained, adding that drilling holes in solid steel would result in the removal and loss of 30 percent of the material.

Busby said casting the steel into a near-final shape was another alternative, but it weakens its properties. "We're working to improve the materials' properties to reduce the amount of machining and welding and allow for better performance," he said. "The use of casting can have potential value engineering benefits

resulting in cost savings on the order of 20 to 40 percent as compared to machining, so this could be a fairly significant economic issue, both for ITER and in other future uses."

Busby and his team have worked on the effort for some 18 months, after being approached by Mike Hechler, USIPO manager of Blanket Shielding and Port Limiter systems. "He talked with us because of ORNL's materials science expertise," Busby said. "He was familiar with our industry work and hopeful that we could help provide a solution."

The team has utilized a science-based approach involving modeling, advanced analytical techniques and industrial experience, building upon past R&D 100 award-winning efforts with other cast steels. The availability of advanced materials property simulations at ORNL also played a significant role. "We have used all the science tools available to us at the laboratory," Busby added.

The effort began with the preparation of test steel compositions in small batches that will be scaled up to more representative geometries. Focus areas include improvements in fracture properties, tensile strength, microstructure properties, welds, impact properties, corrosion performance and radiation resistance.

Busby is hopeful about when the new material might be needed for ITER. The overall design of the device is being tweaked as part of an international review held earlier this year. "We expect to hear fairly soon about how our cast stainless steel may be used in this groundbreaking project," he said.

Adapted from materials provided by DOE/Oak Ridge National Laboratory.

http://www.sciencedaily.com/releases/2008/10/081024115328.htm

A Genial Explorer of Literary Worlds

By A. O. SCOTT

My literary education was feverish and haphazard. From later childhood through the end of adolescence, from Jimmy Carter to the first George Bush, I schooled myself by snatching novels from my parents' shelves, haunting the stacks at the local public library, and clawing through boxes of dry-rotted Penguins and Bantams at yard sales. Those books formed a life raft, a tool kit, a compendium of clues about what the world might look like and how a person might live in it. Like many other restless, bookish young souls, I read ravenously and indiscriminately, until over time patterns started to emerge, half-occult links between one volume and the next.

The name John Leonard was one of these links. The works of fiction that seemed to contain the most galvanizing news of the world — the ones that disclosed entire undreamed-of universes within their pages — all seemed to bear this man's endorsement on their front or back covers. Toni Morrison, Gabriel García Márquez, Don DeLillo, Grace Paley, V. S. Naipaul: writers like these were drawing a new global map of literary possibility, and John Leonard, more than any other critic, was assisting in the cartography, pointing readers toward freshly liberated zones of imagination. He spoke in the voice not of disembodied authority, but of enthusiasm.

I tracked his byline to the pages of this newspaper, and then to the first few issues of the reborn Vanity Fair, which at the time (the early 1980s) was devoting more of its pages to the likes of Mr. García Márquez and Mr. Naipaul than to the collected young blondes of Hollywood. It might have been on the fourth or fifth rereading of one of Mr. Leonard's essays in that magazine — I think it was his long, sharp and generous consideration of William F. Buckley, who two decades before had published some of Mr. Leonard's earliest writing in National Review — that a long-held intimation blossomed into conscious thought. Wow, I said to myself, I wish I could write like that.

A vain wish, of course. Who could possibly write like that? A single John Leonard sentence is, more often than not, an unmatchable catalog of learning, wit, enthusiasm and combativeness, and by the time Mr. Leonard died on Wednesday, those sentences surely numbered in the millions. No other critic could range so giddily over so much material — was there a book he hadn't read? A television show or a film he hadn't watched? A scrap of telling historical trivia he hadn't unearthed? An improbable connection he hadn't made? — without ever losing his ethical bearings, his sense of humor or the thread of his argument.

To write like John Leonard was out of the question. (Though there are times, like right now, when I'm still sorely tempted to try.) The real point, in any case, was to read like him. Not to match the quantity of his reading, necessarily — again, honestly, who could? — but to approach something like the quality of attention he brought to everything, the combination of open-mindedness and skepticism, the willingness to be enthralled and enraged, inflamed and entertained. And not only with respect to books, which he regarded with a near-religious reverence he described as "one part Hegel, two parts Tinkerbell, with garnishes of Pure Thought, Sacred Text and Counter-Geography." Mr. Leonard wrote about television, movies, politics, his friends, the intimate details of his own life with the same passion and liberality of spirit.

He wrote novels too, four of them, and they are the only books of his I've never cracked.

He matters to me as a critic, and there is no critic who ever mattered to me more. I would say this even if John Leonard were not, incidentally and inadvertently, the author of my own career. In college I made friends with a brilliant young woman who turned out to be his stepdaughter, and I tried not to wear my hero worship on my sleeve when I was invited to dinner, or to drink morning coffee in the garden behind the narrow, book-glutted house on the East Side, a house I already knew from the columns gathered up in "Private Lives in the Imperial City."

A few years later I showed up at the offices of The Nation, where John and his wife, Sue, were serving as literary editors. They sent me home with galleys and accepted the copy I sent back. The Leonards were glad to open the back pages of the magazine to the young and obscure, and they helped quite a few of us grow more mature, as well as less obscure. John told me that writing criticism was not a very sensible way to make a living, and then gave me whatever help and advice he could when I decided to try it anyway.

But this is not the place to tally personal and professional debts, which in any case can never be repaid. I keep John's books close at hand because they teach me how to read other books, and also because they remind me why I write.

"I'd say we either relate our profession to the world we live in or we have no more ethics than a can of Spam," he declared in the introduction to "This Pen for Hire," his first collection of reviews and essays. He was referring specifically to those of us who make our livings at criticism, but for John criticism was only secondarily a career. It was a vocation, a passion, an ecstasy, a way of life.

"It turns out I want to be glorious, too," he wrote in an essay called "Happy Bastille Day," the epilogue to his last collection of essays and reviews. There followed a roster of literary heroes and martyrs, from Lord Byron to Vaclav Havel, all of them mirrors of the radical, romantic side of John's sensibility, a tendency that coexisted with the practical, skeptical, democratic aspects of his temperament. And of course he was glorious. He demonstrated in every sentence what a critic could be — what a critic must be. Not a cop, a saint, a celebrity, a judge, a bureaucrat or a priest. A citizen. A teacher. A friend.

http://www.nytimes.com/2008/11/08/books/08leon.html?th&emc=th

An Anti-frailty Pill For Seniors? New Drug Increases Muscle Mass In Arms And Legs Of Older Adults

A new study finds that a daily single oral dose of an investigational drug, MK-677, increased muscle mass in the arms and legs of healthy older adults without serious side effects, suggesting that it may prove safe and effective in reducing age-related frailty. (Credit: iStockphoto/Glenn Bo)

ScienceDaily (Nov. 5, 2008) — Researchers at the University of Virginia Health System report that a daily single oral dose of an investigational drug, MK-677, increased muscle mass in the arms and legs of healthy older adults without serious side effects, suggesting that it may prove safe and effective in reducing age-related frailty.

Published in the November 4, 2008 issue of Annals of Internal Medicine, the study showed that levels of growth hormone (GH) and of insulin-like growth factor I (IGF- I) in seniors who took MK-677 increased to those found in healthy young adults. The drug restored 20 percent of muscle mass loss associated with normal aging.

"Our study opens the door to the possibility of developing treatments that avert the frailty of aging," explains Dr. Michael O. Thorner, a nationally recognized researcher of growth hormone regulation and a professor of internal medicine and neurosurgery at UVA. "The search for anti-frailty medications has become increasingly important because the average American is expected to live into his or her 80s, and most seniors want to stay strong enough to remain independent as they age."

Funded by the National Institutes of Health, the two-year, double-blind, placebo-controlled, modified-crossover study involved 65 men and women ranging in age from 60 to 81.

The study drug, MK-677, mimics the action of ghrelin, a peptide that stimulates the growth hormone secretagogue receptor (GHSR). Drug developers are focusing on GHSR because it plays an important role in the regulation of growth hormone and appetite. They think it may prove to be an excellent treatment target for metabolic disorders such as those related to body weight and body composition.

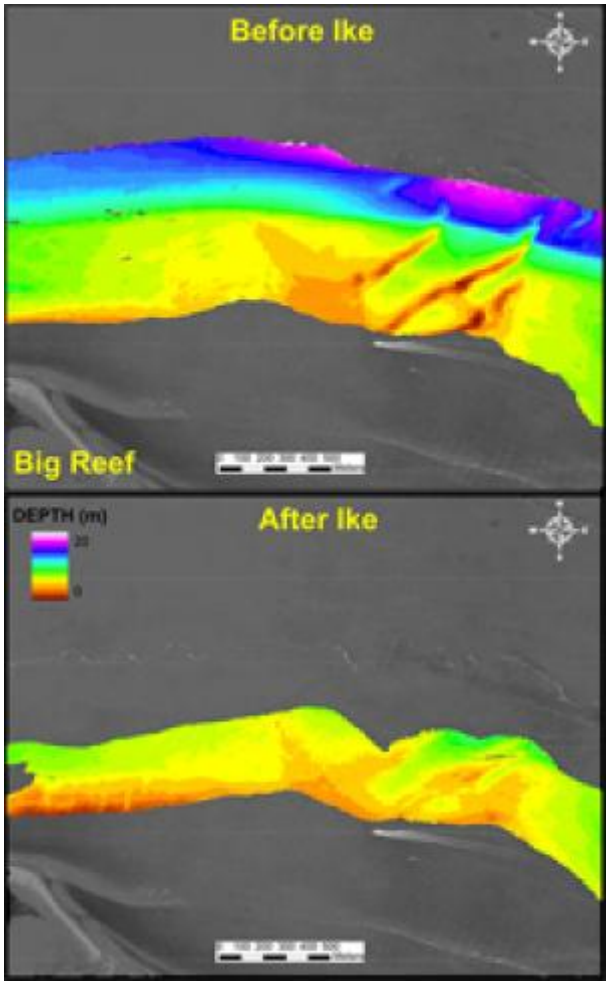
According to Dr. Thorner, the UVA research was a "proof-of-concept" study that sets the stage for a larger and longer clinical trial to determine whether MK-677 is effective in people who are frail and to assess its long term safety.

Adapted from materials provided by University of Virginia Health System.

http://www.sciencedaily.com/releases/2008/11/081104132902.htm#

Hurricane Ike Caused Underwater Damage To Galveston

ScienceDaily (Nov. 5, 2008) — Conducting a rapid response research mission after Hurricane Ike, scientists at The University of Texas at Austin surveyed the inlet between Galveston Bay and the Gulf of Mexico, discovering the hurricane significantly reshaped the seafloor and likely carried an enormous amount of sand and sediment out into the Gulf.



The ongoing research could help coastal communities gauge the effectiveness of their sometimes controversial efforts to replenish eroding sand along shorelines while revealing the role storms play in building and eroding barrier islands such as Galveston.

“The big question is whether the sand was entirely removed from the system or if it’s still close enough to the shoreline to get back into the system,” said John Goff, survey team member and senior research scientist at the university’s Jackson School of Geosciences.

Goff and Mead Allison, another research scientist at the Jackson School, used the 60-foot research vessel R/V Acadiana to conduct a seafloor survey of the Bolivar Roads inlet just a week and a half after Hurricane Ike made landfall on the Texas coast. The inlet is the main passage between the Gulf of Mexico and Galveston Bay and is the route of the Houston Ship Channel as it passes between Galveston Island to the west and the Bolivar Peninsula to the east. The team used sonar to map the depth of the seafloor and seismic instruments to measure the thickness of sediments.

The researchers knew the area well having led a group of university students on a marine geology and geophysics field class to Galveston this summer, collecting the most recent pre-Ike seafloor mapping and sample data from Bolivar Roads.

"The timing of our previous study was fortuitous," said Goff, "adding to the practical and public benefit of our post-Ike data."

Hurricane Ike's surge last Sept. 13 filled Galveston Bay with 12 feet of water, which subsequently drained back into the ocean as a "back surge." Although considerable amounts of water flowed over the Bolivar Peninsula and other lower-lying portions of the barrier system, most of the surge and back surge likely passed through Bolivar Roads, by far the deepest access between the Gulf and the Bay. The very high rate of flow that must have passed through the inlet had the potential to cause substantial erosion and transport sediment long distances.

Comparing pre- and post-Ike surveys, the scientists determined the hurricane's surge and back surge significantly modified the seabed over broad areas. Ike either erased or substantially degraded large shell-gravel ridges up to 10 feet high. The storm gouged out sediments deposited hundreds of thousands of years ago to create "erosional pits" up to five feet deep in one area. It appears to have mobilized and redeposited sediments over large regions in a layer eight to 40 inches thick, and in isolated spots up to 6.5 feet thick. Most of the movement of sediments is associated with the back surge.

In conducting their post-Ike survey, the scientists are primarily interested in investigating the impact of the storm surges on the movement of sediment into and out of the beach barrier system. Maintenance of a barrier system requires an influx of sand, provided naturally by rivers such as the Mississippi. Human modifications to rivers by dams or levees disrupt the delivery of sand to the shore, which can cause the barrier system to degrade.

Until now, the transport of sediments during large storms was a poorly known quantity. Surges could potentially boost the barrier island sand budget by delivering sediments to the shore face, or they could subtract from it by moving sand too far off shore to be incorporated into the barrier system. The pre- and post-Ike survey work will also identify any storm-affected changes to the inlet channel that could affect navigation.

Weather permitting, the team will conduct an additional survey Nov. 6-8 offshore of Bolivar Roads to identify the extent of storm-related deposition, and offshore of the Bolivar Peninsula, where aerial and satellite photos suggest significant amounts of surface erosion during the back surge and consequential deposition off shore. Jackson School researcher Sean Gulick will also participate in this extended effort.

Funding for the survey was provided by the Jackson School's Rapid Response Program, which funds field research requiring immediate action, in advance of the months it often takes to receive federal or non-profit grant money. Such projects include research into the effects of natural disasters like sinkholes, hurricanes, earthquakes and tsunamis.

Adapted from materials provided by University of Texas at Austin.

http://www.sciencedaily.com/releases/2008/10/081030144724.htm#

Elderly Women Can Increase Strength But Still Risk Falls

ScienceDaily (Nov. 5, 2008) — Elderly women can increase muscle strength as much as young women can, a new study from the University of New Hampshire finds, indicating that decline in muscle function is less a natural part of the aging process than due to a decline in physical activity.

The research compared strength gains of inactive elderly women and inactive young women after both groups participated in an eight-week training regime. Yet while the two groups increased similar percentages of strength, the older group was far less effective in increasing power, which is more closely related to preventing falls.

"Power is more important than strength for recovery from loss of balance or walking ability," says Dain LaRoche, assistant professor of exercise science at UNH and the lead author of the study. Preventing falls, which occur in 40 percent of people over 65 and are the top reason for injury-related emergency room visits, is the driving force behind LaRoche's research agenda.

LaRoche compared the initial strength of 25 young (18 - 33) and 24 old (65 - 84) inactive women then had both groups participate in resistance training on a machine that targeted knee extensor muscles, which are critical for walking, stair-climbing, or rising from a chair. "They're what let you live on your own," he says.

After eight weeks of training, the older group not only increased their strength by the same percentage as the younger group, they achieved gained strength similar to a control group of young inactive women. But the older group's ability to increase power - force over time - was significantly less than the younger group's; the elderly women saw only a ten percent increase in power versus the younger women's 50 percent increase.

"It's somewhat troublesome that these older individuals had a reduced capacity to increase performance that's so closely associated with falls," says LaRoche. It seems that the key to muscle power in the elderly is to maintain it over the lifespan rather than try to develop it later in life, he says.

Acknowledging that the type or frequency (six sets, three times per week) of his training protocol may have affected the older group's ability to make gains in power, LaRoche is continuing to research older women's capacity to develop muscle power. As baby boomers age, doubling the over-65 population by 2030, research that supports fall prevention and independent living is a growth area. "I tell my students, 'there's room for you in this field,'" says LaRoche.

Of those 40 percent of elderly people who will fall, research has shown that 20 to 30 percent suffer injuries that reduce mobility, independence and longevity. Health care cost of a fall injury totals nearly $20,000, and following a hip fracture, life expectancy is just two years.

LaRoche's own interest in fall prevention in the elderly arose after helping his parents and sister care for his completely sedentary grandmother, helping her stay in her own home until she died at age 93. She broke both hips, lost six inches of height, and had osteoporosis so severe that a caregiver accidently crushed several of her ribs just helping her out of a chair.

"There's a gap between life expectancy and quality of life in older age," LaRoche says. "We can improve that a lot with physical activity."

Journal reference:

1. Laroche et al. **Elderly Women Have Blunted Response to Resistance Training Despite Reduced Antagonist Coactivation**. *Medicine & Science in Sports & Exercise*, 2008; 40 (9): 1660 DOI: 10.1249/MSS.0b013e3181761561

Adapted from materials provided by University of New Hampshire.

http://www.sciencedaily.com/releases/2008/10/081023113111.htm#

Coral Reefs Found Growing In Cold, Deep Ocean

ScienceDaily (Nov. 5, 2008) — Imagine descending in a submarine to the ice-cold, ink-black depths of the ocean, 800 metres under the surface of the Atlantic. Here the tops of the hills are covered in large coral reefs. NIOZ-researcher Furu Mienis studied the formation of these unknown cold-water relatives of the better-known tropical corals.

Furu Mienis studied the development of carbonate mounds dominated by cold-water corals in the Atlantic Ocean at depths of six hundred to a thousand metres. These reefs can be found along the eastern continental slope from Morocco to Norway, on the Mid-Atlantic Ridge and on the western continental slope along the east coast of Canada and the United States. Mienis studied the area to the west of Ireland along the edges of the Rockall Trough.

In her research Mienis analysed environmental factors like temperature, current speed and flow direction of seawater as these determine the growth of cold-water corals and the carbonate mounds. The measurements were made using bottom landers, observatories placed on the seabed from the NIOZ oceanographic research vessel 'Pelagia' and brought back to the surface a year later.

Food highways down to the deep

Cold-water corals are mainly found on the tops of carbonate mounds in areas where the current is high due to strong internal waves. These waves are caused by tidal currents and lead to an increase in local turbulence that results in the seawater being strongly mixed in a vertical direction. The outcome is the creation of a kind of highway between the nutrient-rich, sunlit zone at the sea surface and the deep, dark strata where the 380 metre-high tops of the mounds are found. This allows the cold-water corals to feed on algae and zooplankton that live in the upper layers of the sea. Lophelia pertusa and Madrepora oculata are the most important coral species found on the European continental slopes.

Carbonate mounds

How the carbonate mounds were formed was investigated by using a piston core from the research vessel to take samples of up 4.5 metres of sediment. These cores were then cut into thin slices that were analysed separately; the deeper the layer, the older the sediment. The samples studied were aged up to 200,000 years old. Large hiatuses found in the core were possibly caused by major changes in tidal currents.

The groups of carbonate mounds develop in the direction of the strongest current and their tops are of equal height. The mounds were found to be built up from carbonate debris and sediment particles caught in between coral branches. These cold-water coral reefs have, therefore, not developed as a result of leakage of natural gas from the sea bed. However, that may well be the case in the Gulf of Mexico. This area is currently being studied from the American research vessel 'Nancy Foster' by Furu Mienis, her supervisor Tjeerd van Weering and NIOZ associate researcher Gerard Duineveld.

Threats

Climate change has exerted a considerable influence on the growth of corals and the development of carbonate mounds. For example, corals stopped growing during ice ages. Present-day global warming and the resulting acidification of the oceans also pose a threat: organisms are less effective at taking up carbonate from seawater that is too acidic. This is true not only for corals but also for some species of algae that are a source of food for the corals. Other activities on the seabed that can cause damage to the coral reefs are offshore industries and bottom trawlers. A number of European areas containing cold-water coral reefs have thankfully already obtained protected status.

Reference: Furu Mienis. '*Environmental Contraints on cold-water coral growth and carbonate mound formation*'. ISBN: 978-90-9023457-1.

This research was funded by the Netherlands Organisation for Scientific Research (NWO) and the European Science Foundation (ESF).

Adapted from materials provided by NWO (Netherlands Organization for Scientific Research).

http://www.sciencedaily.com/releases/2008/11/081104084210.htm

Model Predicts Equipment's Remaining Life And Links Info To Inventory Decisions

ScienceDaily (Nov. 5, 2008) — New research at the Georgia Institute of Technology could soon make predicting the degradation and remaining useful life of mechanical and electronic equipment easier and more accurate, while significantly improving maintenance operations and spare parts logistics.

Nagi Gebraeel, an assistant professor in Georgia Tech's H. Milton Stewart School of Industrial and Systems Engineering, has developed models that use data from real-time sensor measurements to calculate and continuously revise the amount of remaining useful life of different engineering systems based on their current condition and health status. These predictions are then integrated with maintenance management and spare parts supply chain policies as part of an autonomous "sense and respond" logistics paradigm.

"Recent advances in sensor technology and wireless communication have enabled us to develop innovative methods for indirectly monitoring the health of different engineering systems," said Gebraeel, who started working on this project at the University of Iowa. "This has created an environment with an abundance of data that can be exploited in decision-making processes across different application domains such as manufacturing, aging infrastructure, avionics systems, military equipment, power plants and many others."

Gebraeel's predictive models were detailed during two presentations on October 14 at the Institute for Operations Research and the Management Sciences Annual Meeting. Funding for model development was provided by the National Science Foundation.

Because Gebraeel's sensor-driven prognostic models combine general reliability characteristics with real-time condition-based signals, they provide an accurate and comprehensive assessment of a system's current health status and its future evolution. These accurate predictions are then used to determine the most economical time to order a spare part component and schedule a maintenance replacement by accounting for different costs, including those due to unexpected failures, spare part inventory holding and out-of-stock situations.

Gebraeel began his research by monitoring the vibration and acoustic emissions signals from rotating machinery, namely bearings. He extracted degradation-based characteristics pertaining to key components on the machinery and used them to develop condition-based signals. Gebraeel then created stochastic models to characterize the evolution of these condition-based signals and predict the remaining life of these critical components.

After extensive experimentation and testing, results showed that his techniques can potentially reduce the total failure costs and costs associated with running out of spare parts inventory by approximately 55 percent. With such positive results, Gebraeel turned his attention to developing models for electronics. He recently began working with Rockwell Collins to develop adaptive models to estimate the remaining useful life of aircraft electronic components.

"Aircraft take off at ambient ground temperatures and quickly reach their cruising altitudes, where the temperatures tend to be below zero," explained Gebraeel. "It's these changes in temperature coupled with inherent vibrations that affect the deterioration and lifetime of electronic equipment."

Gebraeel's goal is to embed his prognostic methodology into key avionic systems so that decisions can be made about whether an aircraft is capable of carrying out a specific mission or if it should be assigned to a shorter mission or grounded.

Gebraeel is also working closely with Virginia-based Global Strategic Solutions LLC, which has funding from two U.S. Navy Small Business Innovation Research (SBIR) grants. The focus of one of the grants is to advance the development of embedded diagnostics and prognostics to predict the remaining life distributions of electrical power generation systems on board U.S. Naval aircraft. The focus of the second grant is to develop advanced health monitoring and remaining useful life models for aircraft communication, navigation and identification (CNI) avionics systems used on the Joint Strike Fighter.

"The long term impact of all of these projects on human safety and maintenance costs will be tremendous, especially in the airline industry," noted Gebraeel.

Adapted from materials provided by Georgia Institute of Technology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081014160500.htm#

World's Most Innovative Nations: Where New Technologies And Products Take Off

ScienceDaily (Nov. 5, 2008) — A new study reveals the world's most innovative countries, with Japan and the Nordic countries earning top spots and the United States finishing in sixth.The study, which evaluates 31 countries based on the time it takes for new products to take off, is among the most comprehensive research of its kind. Wherever applicable, researchers analyzed 16 different product categories over a time span of 50 years.

The report was co-authored by Deepa Chandrasekaran, assistant professor of marketing at Lehigh University, and Gerard J. Tellis, director of the Center for Global Innovation and professor of marketing at the University of Southern California's Marshall School of Business.

"The changing dynamics of the global marketplace are redefining the concept of innovativeness," says Chandrasekaran. "More products are being introduced at a quick rate, and the ability of a nation to embrace those changes is a true indicator of how innovative it has become."New products take off faster in Japan (5.4 years) than any other nation, closely followed by Norway and its north European neighbors of Sweden, Netherlands and Denmark. The United States (6.2 years), Switzerland and Austria ranked high, as well.

The results also revealed that newly developed or developing countries, like South Korea and Venezuela, saw faster product take off times than more established Mediterranean nations with longer histories of industrialization.The authors find that take off is driven by culture and wealth, in addition to product class, product vintage and prior take offs. More importantly, "time-to-take off" is shortening over time and converging across developed countries.

"What we're learning is that culture plays a significant role in influencing how quickly a country is willing to embrace new products and technology, but it's not an exclusive indicator," says Tellis. "Differences in wealth are also contributing factors. Taken together, we can get a pretty clear snapshot of a nation's innovativeness and its ability to adapt to the changing environment."

Chandrasekaran and Tellis examined products split between two categories: those that were fun, used for information or entertainment, and those that were used only for work. Fun products included such technologies as cell phones, MP3 players, digital cameras, broadband and internet use. Work products—essentially household appliances—were microwave ovens, dishwashers, freezers, tumble dryers and washing machines.The study indicated that take off was significantly shorter for fun products (seven years) than work products (12 years) across-the-board—a discrepancy that merits different product launch strategies, according to the co-authors. They argue that fun products like gadgets could be introduced simultaneously across nations (a "sprinkler" strategy), while the introduction of appliances and other work-related technologies should be staggered ("waterfall") for maximum impact.

Journal reference:

1. Chandrasekaran et al. **Global Takeoff of New Products: Culture, Wealth, or Vanishing Differences?** *Marketing Science*, 2008; 27 (5): 844 DOI: 10.1287/mksc.1070.0329

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

http://www.sciencedaily.com/releases/2008/10/081031141524.htm

Consuming Even Small Amounts Of Caffeine When Pregnant May Affect Growth Of Unborn Child

ScienceDaily (Nov. 4, 2008) — Consuming caffeine at any time during pregnancy is associated with an increased risk of fetal growth restriction (low birth weight), according to research published on the British Medical Journal website.

Although some previous studies have also shown this, this BMJ study additionally shows that any amount and type of caffeine intake—from tea, cola, chocolate, cocoa, and some prescription drugs, as well as coffee—is linked with relatively slower fetal growth.

Dr Justin Konje and colleagues from the University of Leicester as well as collaborators from the University of Leeds, examined the association of maternal caffeine intake and individual caffeine metabolism on birth weight.

From two large teaching hospitals in the UK between September 2003 and June 2006 the authors recruited 2645 low risk pregnant women of average age 30, who were between 8-12 weeks pregnant. They used a caffeine assessment tool (CAT) to record caffeine intake from all possible dietary sources in the four weeks before and throughout pregnancy, and also used a saliva sample test to calculate individual caffeine metabolism.

The researchers report that the average caffeine intake during pregnancy was 159mg/day, much lower than the limit of 300mg/day recommended by the UK government's Food Standards Agency. Interestingly, 62% of the caffeine use reported came from tea. Other sources were coffee (14%), cola (12%), chocolate (8%), and soft drinks (2%).

Most of the babies were born at full term, with an average birth weight of 3450g (which is around the UK average), while 4% were born prematurely, 0.3% were stillborn, and 0.7% were miscarried late. Overall, the results confirmed that these were low risk pregnancies. However, the authors found a 'dose-response relationship', showing that increasing caffeine intake was associated with increasing risk of fetal growth restriction (FGR).

Compared to pregnant women consuming less than 100mg/day (the equivalent of less than one cup of coffee), the risk estimates of having a lower birth weight baby increased by 20% for intakes of 100-199mg/day, by 50% for those taking between 200-299mg/day, and by 40% for over 300mg/day.

There was no level of caffeine intake at which the increased risk of FGR stopped increasing during pregnancy. Caffeine consumption of more than 100mg/day, the equivalent of one cup of coffee, was associated with a reduction in birth weight of 34-59g in the first, 24-74g in the second, and about 66-89g in the third trimesters. This effect was significant and consistent across all trimesters with consumption of over 200mg/day. The authors also noted that the link between caffeine and FGR was stronger in women who metabolised caffeine more quickly.

The authors explain that, although these reductions in birth weight may seem small given that the average birth weight is over 3kg, a drop of 60-70 g might be important for a baby that was already small and at risk. Pregnant women should make every effort to significantly reduce their caffeine consumption before and during pregnancy, they warn.

In light of this evidence, the UK Government's Food Standards Agency are altering their guidance on the recommended daily limit of caffeine consumption and reducing it from 300mg to 200mg.

These findings will reinforce the concern that caffeine is a potential fetotoxic substance, say Professor Jørn Olsen and Professor Bodil Hammer Bech, in an accompanying editorial. But the advice offered by the authors could unnecessarily frighten women who have consumed some caffeine during pregnancy.

Pregnant women should reduce their intake of caffeine, but must not replace it with unhealthy alternatives such as alcoholic drinks or soft drinks full of sugar, they add.

Adapted from materials provided by BMJ-British Medical Journal, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081103102125.htm

Violent Video Game Feed Aggression In Kids In Japan And U.S.

ScienceDaily (Nov. 4, 2008) — t's not just American kids who become more aggressive by playing violent video games. A new study -- presented last month at the inaugural seminar sponsored by Iowa State University's Center for the Study of Violence -- showed effects of violent video games on aggression over a 3-6 month period in children from Japan as well as the United States.

ISU Distinguished Professor of Psychology Craig Anderson -- director of the Center for the Study of Violence -- presented the results from the study, which is published in the November issue of Pediatrics, the professional journal of the American Academy of Pediatrics.

The research links an earlier ISU study of 364 American children ages 9-12 with two similar studies of more than 1,200 children between the ages of 12-18 from Japan. It found that exposure to violent video games was a causal risk factor for aggression and violence in those children.

"Basically what we found was that in all three samples, a lot of violent video game play early in a school year leads to higher levels of aggression during the school year, as measured later in the school year -- even after you control for how aggressive the kids were at the beginning of the year," said Anderson, who was recently elected president-elect for the International Society for Research on Aggression (IRSA).

ISU Assistant Professor of Psychology Douglas Gentile, the center's associate director, and Akira Sakamoto -- an associate professor of psychology at Ochanomizu University and a leading violent video games researcher from Japan -- collaborated with Anderson and additional Japanese researchers on the study.

Studying kids video game habits and aggression

Researchers assessed the children's video game habits and their level of physical aggression against each other at two different times during the school year.

"The studies varied somewhat in the length of time between what we're calling time one and time two (times between the reports of video game use and physical behavior)," Anderson said. "The shortest duration was three months and the longest was six months.

"Each of the three samples showed significant increases in aggression by children who played a lot of violent video games," he said.

Anderson began collaborating with Japanese researchers on the study several years ago when he visited Japan to give an invited address at the International Simulation and Gaming Association convention. He says Japan's cultural differences with the U.S. made it attractive for the comparison studies.

"The culture is so different and their overall violence rate is so much lower than in the U.S.," Anderson said. "The argument has been made -- it's not a very good argument, but it's been made by the video game industry -- that all our research on violent video game effects must be wrong because Japanese kids play a lot of violent video games and Japan has a low violence rate.

"By gathering data from Japan, we can test that hypothesis directly and ask, 'Is it the case that Japanese kids are totally unaffected by playing violent video games?' And of course, they aren't," he said. "They're affected pretty much the same way American kids are."

"It is important to realize that violent video games do not create schools shooters," Gentile said. "They create opportunities to be vigilant for enemies, to practice aggressive ways of responding to conflict and to see aggression as acceptable. In practical terms, that means that when bumped in the hallway, children begin to see it as hostile and react more aggressively in response to it. Violent games are certainly not the only thing that can increase children's aggression, but these studies show that they are one part of the puzzle in both America and Japan."

Adapted from materials provided by Iowa State University

http://www.sciencedaily.com/releases/2008/11/081103180252.htm

Personalized Learning Puts Students In A Class Of Their Own

ScienceDaily (Nov. 4, 2008) — A new learning platform is giving the traditional classroom a radical makeover. Using innovative ICT technology, iClass is putting pupils at the centre of the learning experience and providing them with more control over what they learn.

Every parent believes their child is unique. And they are right. Every pupil has their own individual strengths and weaknesses, and their own particular way of learning. However, putting this commonsense observation into practice is no mean feat, and our schools have generally not been very successful at personalising the learning experience.

In fact, the image of classrooms as 'knowledge factories' has not changed much since the Industrial Revolution, despite the major advances in teaching methods that have occurred. This model holds that teachers input information, pupils process it, and out comes the learning in neat little packages.

"A school is not a factory," bemoaned British novelist JL Carr in his acclaimed novel, The Harpole Report, which tells the story of a primary school headmaster. "Its raison d'être is to provide opportunity for experience."

In recent decades, learning theories have shifted to a 'student-centred' focus, and moved attention away from the teacher, as the imparter of all knowledge and wisdom, towards the pupil or student, while the educator's role has become more that of a mentor and facilitator. However, the standardisation of demanding school curricula and the often-large sizes of classrooms make the transition to this more personalised form of learning difficult.

ICTs present an opportunity to place the learner at the centre of the learning experience. Traditionally, computers and other information technologies have been treated as subjects in curricula, as word processors or, with the advent of the internet, as powerful research tools for assignments. But ICTs are gradually evolving to become an integral component of the learning experience in general.

Learning gets personal

The EU-funded iClass project has been working to develop an innovative learning platform based on the concept of self-regulated personalised learning (SRPL) which is designed to empower pupils aged 14 to 18 to take more control of the learning process. Led by Siemens IT Solutions and Services, the project brings together 17 partners from the EU, Turkey and Israel to develop an intelligent cognitive-based open learning system and environment.

"We aim to make education more effective, worthwhile and, above all, enjoyable," explains Eric Meyvis, the project's coordinator. "Pupils are becoming increasingly unmotivated. We are using ICTs, the internet and an attractive interface to make learning more fun."

SRPL boosts a pupil's motivation to learn by personalising the learning process, placing an emphasis on self-direction and self-reliance, and trusting the learner to make mindful and meaningful choices. The model follows three distinct stages: planning, learning and reflecting.

In practice, this means that a teacher creates a learning plan based on a goal to be achieved, suggesting some sub-goals and activities, while some activities can be left 'open' for the student to shape. Students then click on the 'Learn' button to start the assignment. During this process, a system called 'tips and alerts' provides the pupil with some optional guidance. A personal journal encourages the learner to reflect on their choices and what they have learnt.

The path to lifelong learning

Teenagers spend 15% of their time in a school setting, while adults spend a meagre 3% in formal education. The upshot of this is the increasing recognition of informal, as well as lifelong, learning as an important aspect of education. The web-based iClass platform is well placed to link seamlessly the formal and informal learning environment.

It has been designed to provide pupils with ubiquitous access to encourage them to exploit formal and informal learning environments to the maximum.

In addition, by promoting greater self-reliance and a passion for inquiry among pupils, iClass helps equip them with crucial attitudes for the emerging knowledge-based economy, which requires people to update and upgrade their skills and knowledge constantly throughout their lives.

Nothing like a real teacher

At first, the iClass project set itself the ambitious and unrealistic aim of creating an electronic substitute for the teacher.

“We were convinced that the platform could replace teachers, but we soon discovered that this was too technology oriented. We refocused the project to strike more of a balance between technology and pedagogy,” recalls Meyvis.

Instead, the platform has evolved to aid the teacher in empowering his or her charges. It also promotes a more open approach to education. However, this departure places new demands on teachers.

“It is a big challenge for schools to switch from traditional learning to iClass methodology, and that is why we have developed a teacher training package. We piloted the training material and teachers were generally enthusiastic about it and the platform,” notes Meyvis.

The platform also recognises that the school curriculum in different countries places different demands on teachers, and so has built-in flexibility to allow the system to be customised.

“We have created a versatile infrastructure and it will be up to developers to take the next step and customise the platform for individual countries,” says Meyvis.

A leading German publisher is already developing content for the German market and opportunities abound for developers in other countries to tailor the system to other national markets.

iClass was funded by the ICT strand of the Union’s Sixth Framework Programme for research.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com/releases/2008/10/081027144645.htm#

Antioxidant Effects From Eating Almonds

ScienceDaily (Nov. 4, 2008) — Eating almonds significantly decreased levels of two biomarkers for oxidative stress in a group of 27 male and female volunteers with elevated cholesterol. The study was conducted by scientists funded by the Agricultural Research Service, the Almond Board of California, and the Canada Research Chair Endowment.

Coauthor Jeffrey Blumberg is director of the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, Mass. He and colleagues reported the findings from this study in the Journal of Nutrition.

HNRCA scientists analyzed blood and urine samples from the subjects who had consumed three different dietary treatments, consisting of the same amount of calories each, for one month. The study was a cross-over, randomized clinical trial, so each subject received each treatment in random order.

Treatments consisted of a "full dose" of almonds, defined as 73 grams daily (about 2.5 ounces), a "half-dose" of almonds plus a half-dose of muffins, and a full-dose of muffins as a control. The subjects consumed a low-fat background diet and were counseled on strategies to maintain weight and to consistently follow their usual exercise routines throughout each test phase.

The researchers wanted to investigate possible antioxidant effects from eating almonds.

The team found that when the volunteers ate the full dose of almonds, their concentration of two biomarkers of oxidative stress--plasma malondialdehyde (MDA) and urinary isoprostanes--were significantly lowered. MDA decreased by nearly 19 percent compared to the start of the study in the full-dose almond group. Isoprostane decreased by 27 percent in both the almond groups when compared to the control period, suggesting a possible threshold effect for that biomarker.

While this study helps to show the antioxidant benefit of eating almonds, further research is needed to shed light on the individual contributions of vitamin E and polyphenolic constituents, such as flavonoids, found in almonds and other tree nuts. The study did not demonstrate a minimum amount of dietary almonds that would result in a biological effect.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2008/10/081031213057.htm

Grandmothers As Caregivers Can Cut Risk Of Childhood Injury In Half

ScienceDaily (Nov. 4, 2008) — For working parents, having grandparents as caregivers can cut the risk of childhood injury roughly in half, according to a new study by researchers from the Johns Hopkins Bloomberg School of Public Health. Compared to organized daycare or care by the mother or other relatives, having a grandmother watch a child was associated with a decreased risk of injury for the child.

The study is among the first to examine the relationship between grandparents' care and childhood injury rates.

In addition to source of caregiving, researchers examined the connections between family structure and the likelihood of injury. According to the researchers, the odds of injury were significantly greater among children whose parents never married compared with children whose mothers stayed married throughout the child's life. Similarly, odds of injury were greater for children living in homes in which the father did not co-reside. These associations were independent of family income.

"Recent growth in the number of grandparents providing childcare has some observers concerned they don't adhere to modern safety practices," said lead study author David Bishai, MD, PhD, MPH, a professor with the Bloomberg School's Department of Population, Family and Reproductive Health. "To the contrary, this research tells us not only is there no evidence to support this assumption, but families that choose grandparents to care for their children experience fewer child injuries."

Bishai and colleagues analyzed data from the National Evaluation of the Healthy Steps for Young Children Program, which includes information on over 5,500 newborns enrolled in 15 U.S. cities in 1996-97 with follow-up for 30-33 months. Data on child care arrangements reported by the mother were linked to claims reporting children's office visits, allowing researchers to identify medically attended injuries.

"As injuries are the number one cause of death for children in the United States, it's critical we continue to determine risk and protective factors," said study co-author Andrea C. Gielen, ScD, ScM, a co- author of the study and director of the Center for Injury Research and Policy in the Department of Health Policy and Management at the Bloomberg School of Public Health. "Additional studies of how households choose relatives to watch their children and the actual caregiving style of grandparents are warranted because the protective effect of grandparents may depend on choosing the right grandparent."

The research was funded by a grant from the Maternal and Child Health Bureau R40MC05475.

Journal reference:

1. Bishai et al. **Risk Factors for Unintentional Injuries in Children: Are Grandparents Protective?** *Pediatrics*, 2008; 122 (5): e980 DOI: 10.1542/peds.2007-2995

Adapted from materials provided by Johns Hopkins University Bloomberg School of Public Health.

http://www.sciencedaily.com/releases/2008/11/081103084050.htm#

Bacteria Shown To Cause Blood Clots: Bacterial Clotting Depends On Clustering

ScienceDaily (Nov. 4, 2008) — Bacteria can directly cause human blood and plasma to clot—a process that was previously thought to have been lost during the course of vertebrate evolution, according to new research at the University of Chicago, National Institute of Allergy and Infectious Diseases, and Institut Pasteur in Paris.

The discovery will improve scientists' understanding of coagulation during bacterial infections and may lead to new clinical methods for treating serious medical conditions such as sepsis and anthrax.

It has long been known that blood often coagulates during sepsis or bacterial infections, but this has generally been regarded as a host's immune and inflammatory response. It also has been known that bacteria can activate factors that precede coagulation, but it had not previously been known that bacteria can pass the coagulation threshold and cause blood clots to form. Once they form, the clots can grow and propagate. Although this may help prevent the dissemination of the bacteria through the host, it often leads to serious vascular damage due to blocked and injured blood vessels.

The key to clot formation is the location of the bacteria, rather than the total number of bacteria or their level of concentration. In other words, for those bacteria that can activate coagulation factors, coagulation occurs only when a cluster of bacteria forms.

"Our research demonstrates that coagulation can be controlled by changing the spatial distribution, or clustering, of bacteria," said study co-author Christian Kastrup, Post-Doctoral Assistant at the Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology. "Therefore, considering the location of bacterial cells, instead of just their presence or absence and their total numbers, could significantly change our understanding of coagulation."

Kastrup, who worked on this research as a graduate student in the Ismagilov Lab at the University of Chicago's Department of Chemistry, is the first author of the Nature paper. Rustem Ismagilov, Professor of Chemistry at the University of Chicago, is the corresponding author. Researchers at the National Institute of Allergy and Infectious Diseases, Institut Pasteur in Paris, and Ben-May Department for Cancer Research at the University of Chicago co-authored the paper.

Coagulation can occur if enough proteases that activate coagulation accumulate near the bacteria, rather than diffuse away. This research used Bacillus anthracis, the anthrax-causing pathogen (using a safe strain that does not infect humans). It found that in the case of human blood, coagulation required the secretion of zinc metalloprotease InhA1, which activated prothrombin and factor X directly—not via factor XII or tissue-factor pathways.

"We refer to this mechanism as 'quorum acting' to distinguish it from quorum sensing, in which bacteria coordinate certain actions based, in part, on their density," said Wei-Jen Tang, Professor at the Ben-May Department for Cancer Research.

This work opens up a new field of study, he added. "We will now explore the commonality of quorum acting, and how quorum acting can affect evolutionary dynamics."

The results of this research have broad implications, according to Ismagilov. "The work emphasizes the importance of bacteria's spatial distribution, rather than just its average concentration in the functioning of nonlinear biochemical networks," he said.

The National Institute of Health, National Science Foundation and the Office of Naval Research supported the research.

Journal reference:

1. . **Spatial Localization of Bacteria Controls Coagulation of Human Blood**. *Nature Chemical Biology*, Nov. 2, 2008

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

http://www.sciencedaily.com/releases/2008/11/081102154519.htm

Aerobic Exercise Combined With Resistance Training Improves Glucose Control In Diabetics, Study Shows

ScienceDaily (Nov. 4, 2008) — Patients with diabetes who participate in a program combining aerobic and high-force eccentric resistance exercise demonstrate improvements in glucose control, physical performance, and body fat composition, according to a new study.

"Although aerobic exercise is what is typically recommended for treating people with diabetes, this study shows that adding a high-force strength training component has significant advantages," says APTA spokesperson Robin L Marcus, PT, PhD, OCS, assistant professor at the University's Department of Physical Therapy and the study's lead researcher. Diabetes affects approximately 24 million adults and children in the United States.[1] The onset of type 2 diabetes — a chronic illness marked by decreased insulin sensitivity and overall poor glucose control — is fostered by decreased physical activity.

"This study, which comes as the nation marks American Diabetes Month, is especially pertinent in light of new research highlighting the escalating costs and serious side effects of certain diabetes drugs," said Marcus. "Patients with diabetes and their health care providers should be encouraged that physical therapy has been shown to be a cost-effective and safe treatment alternative."

The study evaluated 15 people with type 2 diabetes who participated in a 16-week supervised exercise training program: seven in a combined aerobic and eccentric resistance exercise program, and eight in a program of aerobic exercise only.

Paul LaStayo, PT, PhD, the study's senior author, notes that the eccentric resistance exercise program was specifically designed to increase strength and muscle size, using a recumbent stepper that produced a lengthening contraction, such as when lowering the dumbbell in a bicep curl.

After 3 months, Marcus and LaStayo found that both groups showed improved glucose control and physical performance in a 6-minute walk, as well as a decrease in fat composition within the leg muscles. "This study is particularly interesting because the patients who did both aerobic and resistance exercise had additional improvements, most notably a decreased overall BMI and a gain in leg muscle," Marcus said.

"Although aerobic exercise is still key in treating diabetes, it should not be used in isolation," Marcus observes. "As people age, they lose muscle mass and, subsequently, mobility, resulting in a greater risk of falls. Adding resistance training to the diabetes treatment regimen leads to improved thigh lean tissue which, in turn, may be an important way for patients to increase resting metabolic rate, protein reserve, exercise tolerance, and functional mobility, she notes.

This study is part of PTJ's special issue on diabetes, which illustrates that physical therapy interventions can have a dramatic and positive effect in fighting the complications associated with diabetes. As the movement experts, physical therapists are ideally suited to help this population safely and to effectively address their movement dysfunctions.

A podcast titled "Fat, Muscle, and the Benefits of Exercise for People With Diabetes" is available at: http://www.ptjournal.org/misc/podcasts.dtl. Marcus and other experts discuss new information about the roles of fat in people with diabetes, especially fat in muscle, and about how this fat appears to impair muscle function.

[1]American Diabetes Association

Journal reference:

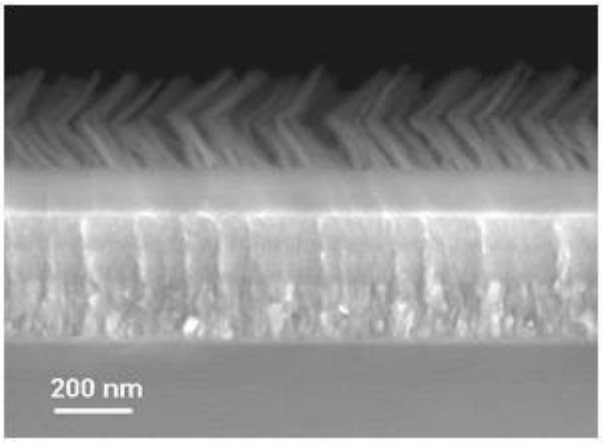
1. Marcus et al. **Comparison of Combined Aerobic and High-Force Eccentric Resistance Exercise With Aerobic Exercise Only for People With Type 2 Diabetes Mellitus**. *Physical Therapy*, 2008; DOI: 10.2522/ptj.20080124

Adapted from materials provided by American Physical Therapy Association, via EurekAlert!, a service of AAAS

http://www.sciencedaily.com/releases/2008/10/081031161255.htm

Solar Power Game-changer: 'Near Perfect' Absorption Of Sunlight, From All Angles

ScienceDaily (Nov. 4, 2008) — Researchers at Rensselaer Polytechnic Institute have discovered and demonstrated a new method for overcoming two major hurdles facing solar energy. By developing a new antireflective coating that boosts the amount of sunlight captured by solar panels and allows those panels to absorb the entire solar spectrum from nearly any angle, the research team has moved academia and industry closer to realizing high-efficiency, cost-effective solar power.



"To get maximum efficiency when converting solar power into electricity, you want a solar panel that can absorb nearly every single photon of light, regardless of the sun's position in the sky," said Shawn-Yu Lin, professor of physics at Rensselaer and a member of the university's Future Chips Constellation, who led the research project. "Our new antireflective coating makes this possible."

An untreated silicon solar cell only absorbs 67.4 percent of sunlight shone upon it — meaning that nearly one-third of that sunlight is reflected away and thus unharvestable. From an economic and efficiency perspective, this unharvested light is wasted potential and a major barrier hampering the proliferation and widespread adoption of solar power.

After a silicon surface was treated with Lin's new nanoengineered reflective coating, however, the material absorbed 96.21 percent of sunlight shone upon it — meaning that only 3.79 percent of the sunlight was reflected and unharvested. This huge gain in absorption was consistent across the entire spectrum of sunlight, from UV to visible light and infrared, and moves solar power a significant step forward toward economic viability.

Lin's new coating also successfully tackles the tricky challenge of angles.

Most surfaces and coatings are designed to absorb light — i.e., be antireflective — and transmit light — i.e., allow the light to pass through it — from a specific range of angles. Eyeglass lenses, for example, will absorb and transmit quite a bit of light from a light source directly in front of them, but those same lenses would absorb and transmit considerably less light if the light source were off to the side or on the wearer's periphery.

This same is true of conventional solar panels, which is why some industrial solar arrays are mechanized to slowly move throughout the day so their panels are perfectly aligned with the sun's position in the sky. Without this automated movement, the panels would not be optimally positioned and would therefore absorb less sunlight. The tradeoff for this increased efficiency, however, is the energy needed to power the automation system, the cost of upkeeping this system, and the possibility of errors or misalignment.

Lin's discovery could antiquate these automated solar arrays, as his antireflective coating absorbs sunlight evenly and equally from all angles. This means that a stationary solar panel treated with the coating would absorb 96.21 percent of sunlight no matter the position of the sun in the sky. So along with significantly better absorption of sunlight, Lin's discovery could also enable a new generation of stationary, more cost-efficient solar arrays.

"At the beginning of the project, we asked 'would it be possible to create a single antireflective structure that can work from all angles?' Then we attacked the problem from a fundamental perspective, tested and fine-tuned our theory, and created a working device," Lin said. Rensselaer physics graduate student Mei-Ling Kuo played a key role in the investigations.

Typical antireflective coatings are engineered to transmit light of one particular wavelength. Lin's new coating stacks seven of these layers, one on top of the other, in such a way that each layer enhances the antireflective properties of the layer below it. These additional layers also help to "bend" the flow of sunlight to an angle that augments the coating's antireflective properties. This means that each layer not only transmits sunlight, it also helps to capture any light that may have otherwise been reflected off of the layers below it.

The seven layers, each with a height of 50 nanometers to 100 nanometers, are made up of silicon dioxide and titanium dioxide nanorods positioned at an oblique angle — each layer looks and functions similar to a dense forest where sunlight is "captured" between the trees. The nanorods were attached to a silicon substrate via chemical vapor disposition, and Lin said the new coating can be affixed to nearly any photovoltaic materials for use in solar cells, including III-V multi-junction and cadmium telluride.

Along with Lin and Kuo, co-authors of the paper include E. Fred Schubert, Wellfleet Senior Constellation Professor of Future Chips at Rensselaer; Research Assistant Professor Jong Kyu Kim; physics graduate student David Poxson; and electrical engineering graduate student Frank Mont.

Funding for the project was provided by the U.S. Department of Energy's Office of Basic Energy Sciences, as well as the U.S. Air Force Office of Scientific Research.

Journal reference:

1. Kuo et al. **Realization of a near-perfect antireflection coating for silicon solar energy utilization**. *Optics Letters*, 2008; 33 (21): 2527 DOI: 10.1364/OL.33.002527

Adapted from materials provided by Rensselaer Polytechnic Institute.

http://www.sciencedaily.com/releases/2008/11/081103130924.htm

Using Living Cells As Nanotechnology Factories

ScienceDaily (Nov. 4, 2008) — In the tiny realm of nanotechnology, scientists have used a wide variety of materials to build atomic scale structures. But just as in the construction business, nanotechnology researchers can often be limited by the amount of raw materials. Now, Biodesign Institute at Arizona State University researcher Hao Yan has avoided these pitfalls by using cells as factories to make DNA based nanostructures inside a living cell.

The results were published in the early online edition of the Proceedings of the National Academy of Sciences.

Yan specializes in a fast-growing field within nanotechnology -- commonly known as structural DNA nanotechnology -- that uses the basic chemical units of DNA, abbreviated as C, T, A, or G, to self-fold into a number of different building blocks that can further self-assemble into patterned structures.

"This is a good example of artificial nanostructures that can be replicated using the machineries in live cells" said Yan. "Cells are really good at making copies of double stranded DNA and we have used the cell like a copier machine to produce many, many copies of complex DNA nanostructures."

DNA nanotechnologists have made some very exciting achievements during the past five to 10 years. But DNA nanotechnology has been limited by the need to chemically synthesize all of the material from scratch. To date, it has strictly been a test tube science, where researchers have developed many toolboxes for making different DNA nanostructures to attach and organize other molecules including nanoparticles and other biomolecules.

"If you need to make a single gram of a DNA nanostructure, you need to order one gram of the starting DNA materials. Scientists have previously used chemical methods to copy branched DNA structures, and there has also been significant work in using long-stranded DNA sequences replicated from cells or phage viruses to scaffold short helper DNA sequences to form 2-D or 3-D objects," said Yan, who is also a professor in the Department of Chemistry and Biochemistry at ASU.

"We have always dreamed of scaling up DNA nanotechnology. One way to scale that it up is to use the cellular system because simple DNA can be replicated inside the cell. We wanted to know if the cell's copy machine could tolerate single stranded DNA nanostructures that contain complicated secondary structures."

To test the nanoscale manufacturing capabilities of cells, Yan and his fellow researchers, Chenxiang Lin, Sherri Rinker and Yan Liu at ASU and their collaborators Ned Seeman and Xing Wang at New York University went back to reproducing the very first branched nanostructure made up of DNA- a cross-shaped, four-arm DNA junction and another DNA junction structure containing a different crossover topology.

To copy these branched DNA nanostructures inside a living cell, the ASU and NYU research team first shipped the cargo inside a bacteria cell. They cut and pasted the DNA necessary to make these structures into a phagemid, a virus-like particle that infects a bacteria cell. Once inside the cell, the phagemid used the cell just like a photocopier machine to reproduce millions of copies of the DNA. By theoretically starting with just a single phagemid infection, and a single milliliter of cultured cells, Yan found that the cells could churn out trillions of the DNA junction nanostructures.

The DNA nanostructures produced in the cells were also found to fold correctly, just like the previously built test tube structures. According to Yan, the results also proved the key existence of the DNA

nanostructures during the cell's routine DNA replication and division cycles. "When a DNA nanostructure gets replicated, it does exist and can survive the complicated cellular machinery. And it looks like the cell can tolerate this kind of structure and still do its job. It's amazing," said Yan.

Yan acknowledges that this is just the first step, but foresees there are many interesting DNA variations to consider next. "The fact that the natural cellular machinery can tolerate artificial DNA objects is quite intriguing, and we don't know what the limit is yet."

Yan's group may be able to change and evolve DNA nanostructures and devices using the cellular system and the technology may also open up some possibilities for synthetic biology applications.

"I'm very excited about the future of DNA nanotechnology, but there is a lot of work to be done. An interesting research topic to pursue is the interface of DNA nanostructures with live cells; it is full of opportunities," said Yan.

Adapted from materials provided by Arizona State University.

http://www.sciencedaily.com/releases/2008/10/081008095710.htm

Oral Rinses Used For Tracking HPV-positive Head And Neck Cancers Holds Promise For Cancer Screening

ScienceDaily (Nov. 4, 2008) — A study published in the journal Clinical Cancer Research, a journal of the American Association for Cancer Research, validates a non-invasive screening method with future potential for detection of human papillomavirus (HPV)-positive head and neck cancers.

In the study, researchers at Johns Hopkins University used oral rinses and targeted DNA amplification to track and identify oral HPV infections in patients with HPV16-positive and negative head and neck carcinomas (HNSCC) before and after therapy.

Findings showed detection of high-risk HPV infections in patients with HPV16-positive HNSCC for up to five years after therapy, indicating a high rate of persistent infection and reaffirming the connection between high-risk types of HPV and HPV-positive head and neck cancer.

"There is no question of cause," said the study's co-author Maura Gillison, M.D., Ph.D. associate professor of oncology. "It has now become a question of tracking the infection over time to identify those at risk of developing HPV-positive cancer, and for those who have had it, the risk of recurrence and risk of transmission. This is the first study in which we have been able to track the disease and related oral infections for an extended period of time."

Researchers obtained oral rinse samples from a group of 135 patients with head and neck carcinomas. Tissue analysis showed that 44 of these patients had HPV16-positive tumors. Both the tissue and oral rinse samples were genetically sequenced to specify the HPV variants in each. Patients with HPV16-positive tumors were significantly more likely to have oral HPV16 infections, with an almost ten-fold increase prior to therapy and a fourteen-fold increase after. Patients with high-risk oral HPV infections prior to therapy also had a 44-fold increase of post-treatment infection.

Findings showed no significant odds of tumor recurrence among those with post treatment infections and no association between these infections and the development of second primary tumors at two years. However, this possibility cannot be excluded as longer observation may be needed.

Future studies will be able to use the data and methodology to further explore the connection between HPV and head and neck cancer formation, as well as the biological factors, such as HLA type, that are involved, Gillison said.

"The big question in HPV research is centered on biological factors that cause one person to have a medical consequence from an oral HPV infection and another to be able to clear the infection without any consequences," Gillison said.

Adapted from materials provided by American Association for Cancer Research.

http://www.sciencedaily.com/releases/2008/10/081031102045.htm

Genetic Evidence For Avian Influenza Movement From Asia To North America Via Wild Birds

ScienceDaily (Nov. 4, 2008) — Wild migratory birds may be more important carriers of avian influenza viruses from continent to continent than previously thought, according to new scientific research that has important implications for highly pathogenic avian influenza virus surveillance in North America.

As part of a multi-pronged research effort to understand the role of migratory birds in the transfer of avian influenza viruses between Asia and North America, scientists with the U.S. Geological Survey (USGS), in collaboration with the U.S. Fish and Wildlife Service in Alaska and the University of Tokyo, have found genetic evidence for the movement of Asian forms of avian influenza to Alaska by northern pintail ducks.

In an article published this week in Molecular Ecology, USGS scientists observed that nearly half of the low pathogenic avian influenza viruses found in wild northern pintail ducks in Alaska contained at least one (of eight) gene segments that were more closely related to Asian than to North American strains of avian influenza.

It was a highly pathogenic form of the H5N1 avian influenza virus that spread across Asia to Europe and Africa over the past decade, causing the deaths of 245 people and raising concerns of a possible human pandemic. The role of migratory birds in moving the highly pathogenic virus to other geographic areas has been a subject of debate among scientists. Disagreement has focused on how likely it is for H5N1 to disperse among continents via wild birds.

"Although some previous research has led to speculation that intercontinental transfer of avian influenza viruses from Asia to North America via wild birds is rare, this study challenges that," said Chris Franson, a research wildlife biologist with the USGS National Wildlife Health Center and co-author of the study. Franson added that most of the previous studies examined bird species that are not transcontinental migrants or were from mid-latitude locales in North America, regions far removed from sources of Asian strains of avian influenza.

Scientists with the USGS, in collaboration with the U.S. Fish and Wildlife Service, state agencies, and Alaska native communities, obtained samples from more than 1,400 northern pintails from locations throughout Alaska. Samples containing viruses were then analyzed and compared to virus samples taken from other birds in North America and Eastern Asia where northern pintails are known to winter. Researchers chose northern pintails as the focus of the study because they are fairly common in North America and Asia, they are frequently infected by low pathogenic avian influenza, and they are known to migrate between North America and Asia. None of the samples were found to contain completely Asian-origin viruses and none were highly pathogenic.

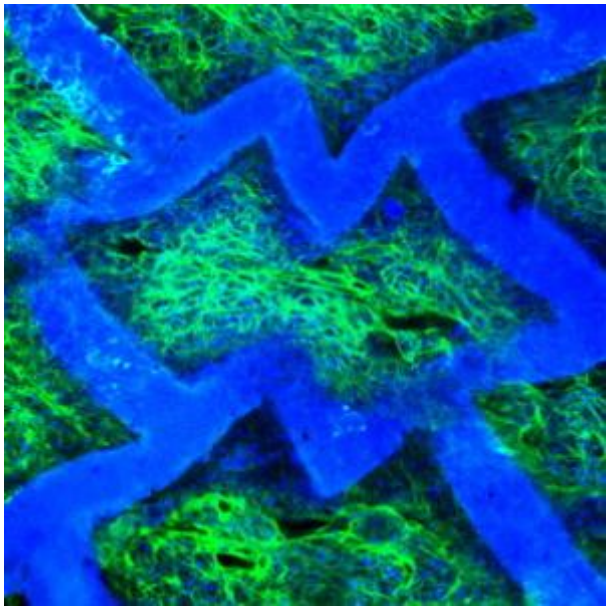
"This kind of genetic analysis - using the low pathogenic strains of avian influenza virus commonly found in wild birds - can answer questions not only about the migratory movements of wild birds, but the degree of virus exchange that takes place between continents, provided the right species and geographic locations are sampled," said John Pearce, a research wildlife biologist with the USGS Alaska Science Center and co-author of the study. "Furthermore, this research validates our current surveillance sampling process for highly pathogenic avian influenza in Alaska and demonstrates that genetic analysis can be used as an effective tool to further refine surveillance plans across North America, Pearce added.

Adapted from materials provided by United States Geological Survey.

http://www.sciencedaily.com/releases/2008/10/081027152121.htm

Mending Broken Hearts With Tissue Engineering

ScienceDaily (Nov. 4, 2008) — Broken hearts could one day be mended using a novel scaffold developed by MIT researchers and colleagues. The new scaffold approach could also aid the engineering of other tissues.



The idea is that living heart cells or stem cells seeded onto such a scaffold would develop into a patch of cardiac tissue that could be used to treat congenital heart defects, or aid the recovery of tissue damaged by a heart attack. The biodegradable scaffold would be gradually absorbed into the body, leaving behind new tissue.

The accordion-like honeycomb scaffold, reported in the Nov. 2 online edition of Nature Materials, is the first to be explicitly designed to match the structural and mechanical properties of native heart tissue. As a result, it has several advantages over previous cardiac tissue engineering scaffolds.

Further, the MIT team's general approach has applications to other types of engineered tissues. "In the long term we'd like to have a whole library of scaffolds for different tissues in need of repair," said Lisa E. Freed, corresponding author of the paper and a principal research scientist in the Harvard-MIT Division of Health Sciences and Technology (HST). Each scaffold could be tailor-made with specific structural and mechanical properties. "We're already on the way to a few other examples," Freed said.

With respect to the current work, "previous scaffolds did not necessarily possess structural or mechanical properties consistent with the native myocardial [heart muscle] structure," said George C. Engelmayr Jr., lead author of the paper and an HST postdoctoral fellow. Heart muscle, he explained, is "directionally dependent" — meaning its cells are aligned in specific directions.

The researchers reasoned that "borrowing more closely from nature's lessons," as they write in Nature Materials, might lead to a tissue with properties closer to the real thing. So, using a laser similar to that used for eye surgery, they created a scaffold with directionally dependent structural and mechanical properties.

The scaffold has three principal advantages over its predecessors. First, its mechanical properties closely match those of native heart tissue. For example, it is stiffer when stretched circumferentially as compared to longitudinally.

Engelmayr found that he could essentially "dial in" specific mechanical properties for the polymer scaffold by varying the time it is allowed to set, or cure. He noted that with this ability, coupled with the flexibility of the laser technique, "we might be able to come up with even better pore shapes with better mechanical properties."

In a second advantage, the team found that a patch of tissue created from neonatal rat heart cells cultured on the scaffold showed directionally dependent electrophysiological properties similar to native tissue. In other words, when an electrical field was applied the engineered patch contracted more readily in one direction than in another.

In a third advantage, "the scaffold itself has an intrinsic ability to guide the orientation of cultured heart cells," Freed said. (In 2004 Freed was part of another MIT team that showed that heart cells cultured on a traditional scaffold could also be coaxed into alignment, but only with electrical stimulation.)

The researchers note that the scaffold used in the experiments described above has some limitations. For example, they write, it is "too thin to address reconstruction of full-thickness myocardium." However, as they report in Nature Materials, they have already begun addressing those problems by creating new honeycomb scaffolds that, among other things, allow much thicker, multi-layered tissue structures.

Other authors of the Nature Materials paper are MIT Institute Professor Robert Langer; Mingyu Cheng, currently at Children's Hospital Boston; Christopher J. Bettinger, '03, MNG '04, PhD '08, currently at Stanford University; and Jeffrey T. Borenstein of the Charles Stark Draper Laboratory.

This work was sponsored by the National Institutes of Health, NASA, and Draper Laboratory.

Adapted from materials provided by Massachusetts Institute of Technology.

http://www.sciencedaily.com/releases/2008/11/081102134625.htm

Fluid Transducer: Electricity From Gas And Water

ScienceDaily (Nov. 4, 2008) — A large number of technical systems work with air or water. Air compression systems and water pipes are just two examples. Researchers of the Fraunhofer Technology Development Group TEG have now successfully managed to convert this fluidic energy into electricity. This could enable sensors to supply themselves with energy in future.

Air compression systems can be found in many manufacturing operations. If a leak occurs anywhere in the system, the air pressure drops and production comes to a halt until the source of failure has been found. Sensors constantly monitor the pressure in order to keep costly fault-related losses to a minimum. At present, these sensors are either battery-driven or connected up by complex technical wiring. This often makes it very difficult or even impossible to install sensors in places that are hard to reach. Fraunhofer researchers from Stuttgart have developed a new technology that enables the production of energy-autonomous and thus low-maintenance sensors. “Our system is eminently suitable for sensors in pneumatic plants, as we can convert the kinetic energy from air or water into electricity,”

explains José Israel Ramirez, who is doing research on this topic at the TEG. “The fluidic energy transducer generates electricity in the microwatt or milliwatt range. This is sufficient to supply cyclically operating sensors with enough energy to read out and transmit the relevant data.”

The fluid-electricity conversion takes place in a fixed housing, through which the medium is fed on a course similar to that of blood circulating in the heart. The Coandã effect causes the constant stream of fluid to oscillate. This produces a periodic pressure fluctuation in the feedback branches, which are coupled to piezoceramics. “The piezoceramics convert the fluidic energy into electricity,” says group leader Axel Bindel, summarizing the principle.

This fluidic conversion is simple and cost-efficient. " We have the advantage that both air and water can be used to generate energy. What's more, we don't have any movable parts in our system. The structure can be produced in simple processes, and that saves costs." The new technique can be applied to any system in which a fluid or a gas is guided through a fixed geometry – in supply networks or in medical engineering, for example. "Our objective is to be able to provide currently battery-driven devices, such as water meters, with an autonomous supply of energy in the near future, resulting in completely independent systems," says Bindel.

The new fluidic energy transducer will be on display at the joint Fraunhofer stand number 634 in Hall B2 at the electronica trade fair in Munich from November 11 to 14, 2008.

Adapted from materials provided by Fraunhofer-Gesellschaft.
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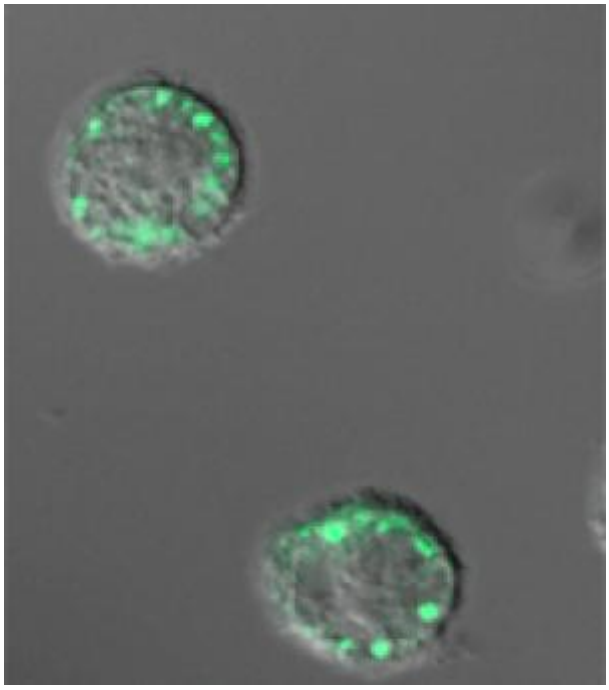
http://www.sciencedaily.com/releases/2008/10/081027152117.htm

New Mechanism Of Resistance To Dengue Virus

ScienceDaily (Nov. 4, 2008) — It is becoming increasingly common to see individuals infected by the dengue virus who develop an ultimately fatal hemorrhagic syndrome, particularly in children during epidemics. However, in most cases, dengue remains a generally benign or even asymptomatic viral infection.



One explanation for this phenomenon has just been put forward by researchers from CNRS, Institut Pasteur, Inserm and the University of Berkeley (in a recent publication in the journal PloS NTD. The demonstration of a new mechanism of resistance to dengue virus could form the basis for new strategies to prevent this disease.

Among the cells in the immune system, dermal dendritic cells are described as the initial cell targets of dengue virus at the site of inoculation by its vector, the mosquito. An interaction between the viral glycoprotein envelope and the CD209/DC-SIGN surface molecule of dermal dendritic cells may be the principal event that triggers infection of these cells and then disseminates the dengue virus throughout the infected individual.

The scientists observed that human dermal macrophages(4) expressing CD209/DC-SIGN were able to capture the dengue virus inoculated by the mosquito without the virus being able to multiply. This unexpected inhibition of viral replication, despite the virus being present in the macrophage, has recently been demonstrated by a group of researchers from CNRS, Institut Pasteur, Inserm and the University of Berkeley who were collaborating on this project on dengue. Their report constitutes the first description of a new resistance mechanism that represents an important innate defence system against dengue virus infection in humans.

Each year, dengue affects more than 100 million people out of the two billion who live in regions infested by the vector mosquito Aedes aegypti. This disease constitutes a growing public health problem linked to the extension of infested zones and the increase in the number of severe cases in regions with high

endemicity. It has become the principal emerging vector-borne viral disease in tropical and subtropical regions of South-East Asia and Latin America, including French overseas departments and territories such as the French West Indies and Guiana, and French Polynesia. In mainland France, dengue has been a notifiable disease since 2006.

Journal reference:

1. Kwan et al. **Dermal-Type Macrophages Expressing CD209/DC-SIGN Show Inherent Resistance to Dengue Virus Growth**. *PLoS Neglected Tropical Diseases*, 2008; 2 (10): e311 DOI: 10.1371/journal.pntd.0000311

Adapted from materials provided by CNRS.

http://www.sciencedaily.com/releases/2008/10/081016085029.htm

Criminal Offenders: Childhood Anxiety May Delay Onset Of Criminal Behavior Until After Age 21

ScienceDaily (Nov. 4, 2008) — Being nervous, socially isolated, anxious or neurotic during childhood protects young men from becoming criminal offenders until they enter adulthood, but the protective effect seems to wear off after the age of 21.

These are the findings of Dr. Georgia Zara, from the University of Turin in Italy, and Dr. David Farrington, from the University of Cambridge in the UK, who explored whether or not certain childhood factors delay the onset of criminal behavior until adulthood.

Zara and Farrington followed a total of 400 males in London, who took part in The Cambridge Study in Delinquent Development, between the ages of 8 to 10 and 48 to 50. Participants were split into three groups: 35 late onset criminals first convicted at 21 years old or older with no overt signs of delinquency at ages 10 to 14 and 15 to 18; 129 early offenders first convicted between the ages of 10 and 20 years old; and 236 law-abiding men.

The authors found that being nervous and withdrawn shielded boys against committing criminal acts during adolescence, but, after the age of 21, it no longer held them back. Compared with early onset offenders, late onset criminals were more nervous, had fewer friends from ages 8 to 10, and were less likely to have had sexual intercourse by the age of 18. Compared with nonoffenders, those who turned to crime later in life were more anxious at school from ages 12 to14 and very neurotic by age 16.

The results of this study show that adult offending can be predicted from childhood and may shed light on early psychological and temperamental traits likely to play a role in delaying criminal behavior until adulthood. The findings provide insight into how children with these characteristics may find themselves in high-risk situations later in their lives, being unprepared to cope with the pressures and difficulties of adult life.

The authors suggest that tackling the issues involved in delayed criminal behavior early is key: “Given that diverse strongest predictors of adult criminality in this study can be addressed (e.g., nervousness), kept under control (e.g., anxiety), or modified (e.g., not having had sexual intercourse), they imply possible targets for successful intervention. Hence, there is enormous scope for significant cost savings, both economically and in the quality of life, from early intervention policies.”

Journal reference:

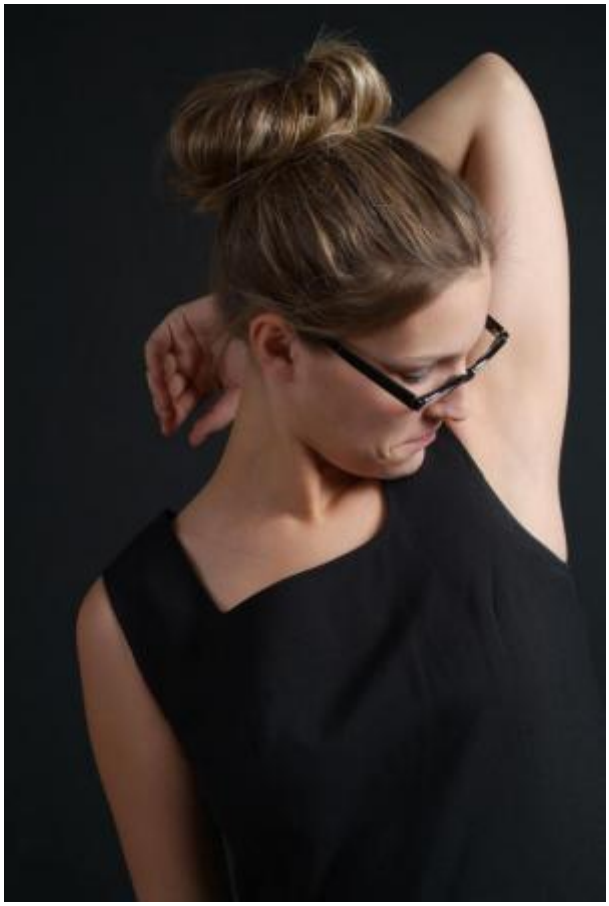
1. Zara et al. **Childhood and Adolescent Predictors of Late Onset Criminal Careers**. *Journal of Youth and Adolescence*, November 2008; DOI: 10.1007/s10964-008-9350-3

Adapted from materials provided by Springer Science+Business Media.

http://www.sciencedaily.com/releases/2008/11/081103121317.htm

Odorprints Like Fingerprints? Personal Odors Remain Distinguishable Regardless Of Diet

ScienceDaily (Nov. 3, 2008) — Scientists from the Monell Center present behavioral and chemical findings to reveal that an individual's underlying odor signature remains detectable even in the face of major dietary changes.



"The findings using this animal model support the proposition that body odors provide a consistent 'odorprint' analogous to a fingerprint or DNA sample," said Gary Beauchamp, PhD, a behavioral biologist at Monell and one of the paper's senior authors. "This distinctive odor can be detected using either an animal's nose or chemical instruments."

Mammals such as mice and humans are known to have unique genetically-determined body odors, called 'odortypes.' Thought to be identity biomarkers that help distinguish individuals from one another, odortypes are determined in part by genes of the major histocompatability complex (MHC). The same genes also are involved in the immune system.

Odortype information is transmitted through body fluids such as sweat and urine, which contain numerous airborne chemical molecules known as volatile organic compounds, or VOCs, many of which are odorous.

The type of food eaten also can influence an individual's body odor; garlic, for example can be detected by smell when consumed in large amounts. As such, dietary changes potentially could obstruct detection of genetically-determined odortype and thus mask individual identity. To address this question, the researchers conducted a series of behavioral and chemical experiments.

In behavioral tests, 'sensor' mice were trained to use their sense of smell to choose between pairs of test mice that differed in MHC genes, diet or both. Chemical analyses used instrumentation to examine the array of VOC's in urine of mice having different MHC backgrounds and fed different diets.

The results indicate that genetically-determined odortypes persist regardless of diet, even though dietary changes do strongly influence odor profiles of individual mice. Changing diet ingredients did not obscure detection of underlying odortypes using either behavioral or chemical methods.

"These findings indicate that biologically-based odorprints, like fingerprints, could be a reliable way to identify individuals. If this can be shown to be the case for humans, it opens the possibility that devices can be developed to detect individual odorprints in humans," said lead author Jae Kwak, PhD, a Monell chemist.

According to Beauchamp, similar approaches are being used to investigate body odor differences associated with disease. Such research could lead to the development of electronic sensors for early detection and rapid diagnosis of disorders such as skin and lung cancer and certain viral diseases.

This research is published in the October 31 issue of the online journal PLoS ONE. Also contributing to the study were Monell researchers Koichi Matsumura, Maryanne Curran Opiekun, Weiguang Yi (currently at the University of Georgia), George Preti, and Kunio Yamazaki, and Alan Willse (Battelle – Pacific Northwest Division, currently at Monsanto Company).

Journal reference:

1. Kwak et al. **Genetically-Based Olfactory Signatures Persist Despite Dietary Variation**. *PLoS ONE*, 2008; 3 (10): e3591 DOI: 10.1371/journal.pone.0003591

Adapted from materials provided by Monell Chemical Senses Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081030203247.htm

Parasites And Global Change: Past Patterns, Future Projections

ScienceDaily (Nov. 3, 2008) — Throughout history, environmental disturbances and global climate change have strongly influenced how humans are affected by parasites, according to parasitologist Eric P. Hoberg. He works at the Agricultural Research Service (ARS) Animal Parasitic Diseases Laboratory in Beltsville, Md.

Now Hoberg and University of Toronto zoologist Daniel R. Brooks have formulated a new theory to explain evolutionary and geographic histories for complex associations of hosts and their parasites.

During the past 300 million years, a period extending deep into evolutionary time, repeated episodes of environmental disruption have exerted a pervasive influence on the distribution of hosts, pathogens and diseases. These disturbances can limit--or enhance--the ability of a pathogen to move to a new host or geographic region, and are central to understanding the link between ecological change and emerging disease.

For instance, tapeworms survived the extinction event that killed the dinosaurs by "jumping" from their ancient reptilian hosts to seabirds and then later to marine mammals. During the glacial ages, which ended only 10,000 years ago, the movement of hosts and parasites shaped present-day faunal distributions across land and sea.

Hoberg and Brooks suggest that similar evolutionary patterns, determined by what is known as host switching or geographic colonization, will continue as environmental perturbation, including global climate change, becomes more pronounced.

Lessons learned from Earth's history can provide a foundation for understanding how these complex biological associations will respond as the climate warms and habitats change. These patterns and associations emphasize the connection between ecological disturbances and the shifting relationships between host and the emergence of disease.

Accelerated climate change and the attendant disruption of ecological continuity will produce global shifts that may well support the emergence and spread of novel pathogens, parasites and diseases. These potentially dramatic changes could play important roles in human health and agricultural productivity.

Understanding the historical host-parasite systems and interactions over hundreds of millions of years--including the relatively recent past--is essential for successfully addressing the challenges that will arise from this dynamic environmental change.

A paper on this research appears in the September 2008 issue of Journal of Biogeography.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2008/10/081031212350.htm

Antioxidants Can Reduce The Toxic Effects Of Lead, Study Suggests

ScienceDaily (Nov. 3, 2008) — A research study carried out by the Universidad Complutense de Madrid (UCM) shows that administering natural antioxidants can reduce the effects of lead poisoning in animals during the gestation and lactation periods. The study suggests that it could also be effective in humans.

In this study, published in the magazine Food and Chemical Toxicology, the researchers aimed to prove that since the principal toxicity mechanism of lead poisoning is that it creates free radicals that lead to cellular destruction; administrating natural antioxidants could reverse this process and re-establish the organism's lost balance. The results of the study are preliminary but they could be the beginning of a possible therapeutic treatment to cure the disease.

In order to prove their theory, the researchers carried out an experiment using gestating mice that were separated in to four different groups with different additives in their drinking water. The control group was only subjected to purified water, the drinking water for the second group was contaminated with lead, the drinking water for the third group was also contaminated with lead, but the mice were also treated with antioxidants (zinc, vitamins A,C, E and B6) and the fourth group was just treated with the antioxidants and uncontaminated water.

The research stemmed from the belief that the main cause of the toxicity of lead is the oxidative stress, an imbalance between the antioxidants and the free radicals present in an organism, leading to an excess of free radicals and a consequent destruction of tissues. The results have concluded that such alterations, measured by evaluating various biochemical changes in the brain of the baby mice, diminish in subjects subjected to lead and treated with antioxidants, almost reaching the levels of the control group. The symptoms of lead poisoning were also drastically reduced, reinforcing the theory that administering antioxidants could be a very effective therapy.

Lead poisoning also known as “saturnism” for its violent and demented character that is associated with the god Saturn has been identified at least before the fifth century before Christ. The most common symptoms range from anaemia to irritability, with headaches, motor impairment or weight loss in between. The damages are greater the younger the affected subject, since their organs are at the early stages of development, and they are particularly harsh in subjects below 3 years of age. During gestation, lead can penetrate through the placenta easily and accumulate in the tissues of the embryo, including the brain, which can cause permanent damage such as developmental delay, learning difficulties, hearing problems, diminished memory or aggressiveness. In Europe, the disease occurs in humans mainly as an occupational hazard, and in animals, as a direct consequence of eating hunting pellets. Nevertheless, in other countries, the disease is widely present. For example, the Dominican Republic is home to one of the cities most contaminated by this metal, or the United States, where it is estimated that up to 3% of children are chronically exposed to lead.

The study, carried out by the researchers Mª Teresa Antonio García and Elvira Massó González from the Universidad Complutense de Madrid, used low doses of lead of a similar size to what could normally be assimilated through food or by contact with the environment and has concluded that the treatment with antioxidants is effective. Hopefully these results will provide beneficial treatments for humans in the future.

Adapted from materials provided by Universidad Complutense de Madrid, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081031102632.htm

Long-term Stabilization Of Carbon Dioxide In Atmosphere Will Require Major Cuts In Emissions

ScienceDaily (Nov. 3, 2008) — Carbon dioxide, the greenhouse gas that has had the largest impact on our climate, will continue to rise even if current national and international targets for reducing emissions are met, scientists warn. But, they say, strong action taken now– such as the 80% target recently announced by the UK government – will continue to have benefits a long time into the future.

A group of scientists have, for the first time, combined the outcomes of proposals by the G8 countries and the UK Government's Stern Review with the latest knowledge of climate change feedbacks relating to the carbon cycle (the way carbon moves between the oceans, atmosphere and land).

Their findings show that short-term cuts alone will not solve the problem and that policy makers need to plan for hundreds of years into the future.

Jo House, from the Natural Environment Research Council's QUEST programme at the University of Bristol, led the research. She says, "To be able to predict the climatic impact of various levels of emissions we need to know, and account for, what happens to the greenhouse gases once they enter the atmosphere. Gases such as methane or nitrous oxide only remain in the atmosphere for a few years or decades. Carbon dioxide is a different matter as a portion of emitted gas stays in the atmosphere for thousands of years. "

"Furthermore, as the climate changes, a larger proportion of the carbon dioxide will remain in the atmosphere. Carbon dioxide is taken up by land and ocean sinks, which become less effective as the climate warms, leading to even greater warming for a given level of emissions – this is known as climate feedback. Our calculations demonstrate the level of emissions reduction we need to achieve to limit climate change to below what is considered 'dangerous'."

Working alongside colleagues from the NERC Centre for Ecology and Hydrology, the Met Office Hadley Centre and the University of Exeter, Jo House ran computer models to see what would happen under the G8 plans to cut global emissions by 50% by 2050. The models show that under this scenario, unless emissions cuts continue beyond 2050, atmospheric carbon dioxide concentrations will continue to rise rapidly.

By 2100 the models suggest that carbon dioxide concentrations could be as high as 590 parts per million (ppm) – more than double the level of 280ppm that persisted for thousands of years before the industrial revolution, and significantly higher than today's level, caused by the burning of fossil fuels and deforestation, of 386ppm. By 2300 the worst-case scenario shows that carbon dioxide levels could be 980ppm with an accompanying rise in global temperature of 5.7°C. (The European Union has taken the stance in international climate negotiations that climate change should be limited to 2°C to avoid "dangerous impacts")

Using the Stern Review proposal, of cutting emissions by 25% by 2050 and continuing to make cuts down to 80% towards the end of the century, the models show a more hopeful future. In this case the carbon dioxide levels would become almost stable, at levels of between 500 and 600ppm by 2100, although they would creep up further into the future if greater cuts were not made. In this case the temperature by 2100 ranges between 1.4 and 3.4 °C depending on the model used, and by 2300 it is also almost stable with a maximum of 4.2 °C.

The Stern Review concluded that, to avoid the worst impacts of climate change, the concentrations of all greenhouse gases should be limited to what is equivalent to between 450 and 550ppm of carbon dioxide concentration.

House and her colleagues say that making cuts in other greenhouse gases is no good if the longer term problem of atmospheric carbon dioxide is ignored.

"To achieve long-term stabilisation of carbon dioxide levels at around 550ppm will require cuts in global emissions of between 81% and 90% by 2300, and even more beyond that time. We applaud the government's new plans to cut UK emissions by 80% by 2050. This is a realistic assessment of the scale of the problem and the action needed," says House. "Our research confirms that bringing other countries on board to meet a global target of 80% reductions towards the end of the century will virtually stabilise carbon dioxide levels, but a much longer-term strategy is still needed to reduce future emissions even further," .

She adds, "Tackling the problem of global warming seems even more daunting when climate change feedbacks are taken into account, but we shouldn't feel despondent and give up on the challenge. It should encourage us to carry on making cuts in emissions, however small they seem to start with, because whatever we do now will have a beneficial long-term legacy."

The research was supported by the Natural Environment Research Council through the QUEST Programme and the Centre for Ecology & Hydrology, and by the Joint Defra/ MoD Integrated Climate Change Programme.

Journal reference:

1. House et al. **What do recent advances in quantifying climate and carbon cycle uncertainties mean for climate policy?** *Environmental Research Letters*, 2008; 3 (4): 044002 DOI: 10.1088/1748-9326/3/4/044002

Adapted from materials provided by Natural Environment Research Council (NERC).

http://www.sciencedaily.com/releases/2008/10/081029105811.htm

Compound Stabilizes Main Natural Suppressor Of Tumors

ScienceDaily (Nov. 3, 2008) — An interdisciplinary team of researchers, headed by Ernest Giralt at the Institute for Research in Biomedicine (IRB Barcelona) and Javier de Mendoza at the "Institut Català d'Investigació Química" (ICIQ, Tarragona), have discovered a substance with the capacity to maintain protein p53 stable and active even when it presents certain mutations that promote the appearance of cancer.

Giralt, head of the Chemistry and Molecular Pharmacology programme and senior professor at the University of Barcelona, explains that, "tentatively, this could be the starting point to develop a new approach for anti-tumour treatments". The study has been published today in the journal Proceedings of the National Academy of Sciences (PNAS) in an advanced edition.

Protein p53 is considered the most important tumour suppressor and is at the centre of the machinery that regulates cell cycle arrest and the death of cells with damaged DNA. In its active form, p53 protein is a tetramer, that is to say it is formed by four identical copies of proteins bound together, which has four domains with differentiated functions: activation of transcription, DNA binding, tetramerization and regulation. The tetramerization domain is responsible for stabilizing the tetrameric structure.

More than 50% of cancer patients have mutations in the p53 gene. Although most of these are located in the DNA binding domain, several mutations are found in the tetramerization domain, thereby causing destabilization of the entire protein with the consequent loss of activity. Two well documented examples of this kind of congenital predisposition are pediatric adrenocortical carcinoma and Li-Fraumeni syndrome. Therefore, the design of compounds with the capacity to stabilize the tetramerization domain of p53 represents a new and attractive strategy for the development of anti-tumour drugs.

The article describes the design, synthesis and study of a compound with the capacity to interact with the p53 tetramerization domain. Javier de Mendoza, group leader at ICIQ and senior professor at the

"Universidad Autónoma de Madrid", explains, "it is a conical shaped molecule with four positive charges prepared to recognize and stabilize four negative charges of the protein".

To obtain results in the design and study of new molecules, it is necessary to have an in-depth knowledge of the language that proteins use to communicate with each other, to recognise each other and to bind to exert their function. From this perspective, more associated with basic science, Giralt emphasizes that "the study demonstrates the high level of maturity" that has been reached in the field of molecular recognition.

Drugs that act as tethers

The first author of the article, Susana Gordo, researcher with Giralt's team, explains that "this work also opens up a new avenue for the design of drugs based on the use of small molecules that act as moulds or tethers to preserve the active form of proteins". Among these possible applications of synthetic binding compounds, the researchers point out the stabilization of native forms of proteins or the recovery and rescue of mutated proteins. "The anti-tumoural factor p53, because of its fundamental role in the appearance of cancer, provides a magnificent opportunity for this kind of study", concludes Giralt.

Through the combination of several techniques, including nuclear magnetic resonance, the researchers have been able to describe in detail the interaction of the new compound with the tetramerization domain. Furthermore, computer simulations and in vitro experiments have allowed the scientists to demonstrate the functionality of the complex.

The design and analysis of the compound has also involved the collaboration of the biologist Vera Martos, Javier de Mendoza's team, and the researcher Margarita Menéndez at the "Consejo Superior de Investigaciones Científicas". The computational chemistry part of the study was directed by Carles Bó at ICIQ, with the help of Eva Santos, from the same institute.

Journal reference:

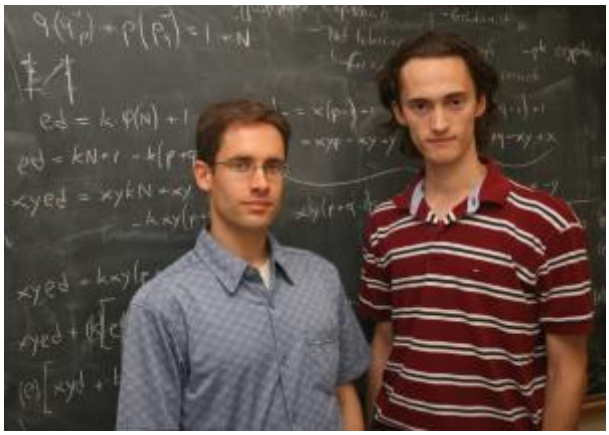
1. Susana Gordo, Vera Martos, Eva Santos, Margarita Menéndez,, Carles Bo, Ernest Giralt, and Javier de Mendoza. **Modulation Stability and structural recovery of the tetramerization domain of p53-R337H mutant induced by a designed templating ligand**. *PNAS*, 2008 (in press)

Adapted from materials provided by Institute for Research in Biomedicine (IRB Barcelona).

http://www.sciencedaily.com/releases/2008/10/081014145902.htm

Good Code, Bad Computations: A Computer Security Gray Area

ScienceDaily (Nov. 3, 2008) — If you want to make sure your computer or server is not tricked into undertaking malicious or undesirable behavior, it's not enough to keep bad code out of the system.



Two graduate students from UC San Diego's computer science department—Erik Buchanan and Ryan Roemer—have just published work showing that the process of building bad programs from good code using "return-oriented programming" can be automated and that this vulnerability applies to RISC computer architectures and not just the x86 architecture (which includes the vast majority of personal computers).

Last year, UC San Diego computer science professor Hovav Shacham formally described how return-oriented programming could be used to force computers with the x86 architecture to behave maliciously without introducing any bad code into the system. However, the attack required painstaking construction by hand and appeared to rely a unique quirk of the x86 design.

This new automation and generalization work from graduate students and professors from UC San Diego's Jacobs School of Engineering will be presented on October 28 at ACM's Conference on Communications and Computer Security (CCS) 2008, one of the premier academic computer security conferences.

"Most computer security defenses are based on the notion that preventing the introduction of malicious code is sufficient to protect a computer. This assumption is at the core of trusted computing, anti-virus software, and various defenses like Intel and AMD's no execute protections. There is a subtle fallacy in the logic, however: simply keeping out bad code is not sufficient to keep out bad computation," said UC San Diego computer science professor Stefan Savage, an author on the CCS 2008 paper.

Return-oriented Programming

Return-oriented programming exploits start out like more familiar attacks on computers. The attacker takes advantage of a programming error in the target system to overwrite the runtime stack and divert program execution away from the path intended by the system's designers. But instead of injecting outside code—the approach used in traditional malicious exploits—return-oriented programming enables attackers to create any kind of nasty computation or program by using just the existing code.

"You can create any kind of malicious program you can imagine—Turing complete functionality," said Shacham.

For example, a user's Web browser could be subverted to record passwords typed by the user or to send spam e-mail to all address book contacts, using only the code that makes up the browser itself.

"There is value in showing just how big of a potential problem return-oriented programming may turn out to be," said computer science graduate student Erik Buchanan.

The term "return-oriented programming" describes the fact that the "good" instructions that can be strung together in order to build malicious programs need to end with a return command. The graduate students showed that the process of building these malicious programs from good code can be largely automated by grouping sets of instructions into "gadgets" and then abstracting much of the tedious work behind a programming language and compiler.

Imagine taking a 700 page book, picking and choosing words and phrases in no particular order and then assembling a 50 page story that has nothing to do with the original book. Return-oriented programming allows you to do something similar. Here the 700 page book is the code that makes up the system being attacked—for example, the standard C-language library libc—and the story is the malicious program the attacker wishes to have executed.

"We found that return-oriented programming poses a much more general vulnerability than people initially thought," said computer science graduate student Ryan Roemer. He and Buchanan chose to study return-oriented programming for a class project after they heard Shacham outline a series of open questions in a guest lecture he gave in Savage's computer security course last winter.

Living with Return-Oriented Programming

"The threat posed by return-oriented programming, across all architectures and systems, has negative implications for an entire class of security mechanisms: those that seek to prevent malicious computation by preventing the execution of malicious code," the authors write in their CCS 2008 paper.

For instance, Intel and AMD have implemented security functionality into their chips (NX/XD) that prevents code from being executed from certain memory regions. Operating systems in turn use these features to prevent input data from being executed as code (e.g., Microsoft's Data Execution Prevention feature introduced in Windows XP SP2). The new research from UC San Diego, however, highlights an entire class of exploits that would not be stopped by these security measures since no malicious code is actually executed. Instead, the stack is "hijacked" and forced to run good code in bad ways.

"We have demonstrated that return-oriented exploits are practical to write, as the complexity of gadget combination is abstracted behind a programming language and compiler. Finally, we argue that this approach provides a simple bypass for the vast majority of exploitation mitigations in use today," the computer scientists write.

The authors outline a series of approaches to combat return-oriented programming. Eliminating vulnerabilities permitting control flow manipulation remains a high priority—as it has for 20 years. Other possibilities: hardware and software support for further constraining control flow and addressing the power of the return-oriented approach itself.

"Finally, if the approaches fail, we may be forced to abandon the convenient model that code is statically either good or bad, and instead focus on dynamically distinguishing whether a particular execution stream exhibits good or bad behavior," the authors write.

Journal reference:

1. Erik Buchanan, Ryan Roemer, Hovav Shacham, and Stefan Savage. **When Good Instructions Go Bad: Generalizing Return-Oriented Programming to RISC**. *Proceedings of CCS 2008*, Oct. 2008

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2008/10/081027155903.htm

Earliest Known Hebrew Text In Proto-Canaanite Script Discovered In Area Where 'David Slew Goliath'

ScienceDaily (Nov. 3, 2008) — The earliest known Hebrew text written in a Proto-Canaanite script has been discovered by Hebrew University archaeologists in an ancient city in the area where legend has it that David slew Goliath – the earliest Judean city found to date. The 3,000 year old finding is thought to be the most significant archaeological discovery in Israel since the Dead Sea Scrolls – predating them by 1,000 years.

The ostracon (pottery shard inscribed with writing in ink) comprises five lines of text divided by black lines and measures 15 x 15 cm. and was found at excavations of a 10th century B.C.E. fortress - the oldest known Judaic city.

The ostracon was found lying on the floor inside a building near the city gate of the site, known as the Elah Fortress at Khirbet Qeiyafa.

Excavations are being led by Prof. Yosef Garfinkel, the Yigal Yadin Professor of Archaeology at the Institute of Archaeology at the Hebrew University of Jerusalem and his partner Saar Ganur, in partnership with Foundation Stone, a non-profit educational organization which works to provide a contemporary voice to ancient stories. The excavations and analysis are also being supported by J.B. Silver and the Brennan Foundation.

Why is this inscription so special?

Carbon-14 dating of organic material found with the ostracon, administered by Oxford University, along with pottery analysis dates this inscription to the time of King David ca. 3,000 years ago – predating the Dead Sea Scrolls by approximately a millennium, and placing it earlier than the famed Gezer Calendar.

It is hoped the text inscribed on the 'Qeiyafa Ostracon' will serve as an anchor in our understanding of the development of all alphabetic scripts.

While the inscription has yet to be deciphered, initial interpretation indicates the text was part of a letter and contains the roots of the words "judge", "slave" and "king". This may indicate that this is a legal text that could provide insights into Hebrew law, society and beliefs. Archaeologists say that it was clearly written as a deliberate message by a trained scribe.

What is the Elah Fortress?

Dating to the 10th century B.C.E., the Elah Fortress is the earliest known fortified city of the biblical period in Israel. Excavations began on the site in June 2008.

Comprising 23 dunams [2.3 hectares], the Elah Fortress (Khirbet Qeiyafa) was situated on the border between Philistia and the Kingdom of Judea (5 kilometers south of current day Bet Shemesh.). It is thought to have been a major strategic checkpoint guarding the main road from Philistia and the Coastal Plain to Jerusalem, which was just a day's walk away.

Nearly 600 square meters of the Elah Fortress have so far been unearthed. Surrounded by a 700 meter-long massive city wall, the fortress was built with megalithic stones - some weighing four to five tons. The city wall is four meters wide, constructed with casemates. Archaeologists estimate that 200,000 tons of rock were hewn, moved and used in the construction of these fortifications.

A four-chambered gate, 10.5 meters across, is the dominant feature of the massive fortifications. Further excavations will reveal whether it is really six chambers and whether there are other gates. The larger rocks in the gate structure weigh five to eight tons.

To date, only four percent of the site has been excavated, promising many more incredible discoveries in the remaining 96 percent in the future.

How do we know this is a Judean fortress?

The early Hebrew ostracon, Judean pottery similar to that found at other Israelite settlements, and the absence of pig bones among the animal bones found at the site all point to this fortress being a city of the Kingdom of Judea.

Elah Fortress proof of United Monarchy

The Elah Fortress archaeological site could prove the existence of the United Monarchy, which scholars often question ever existed. The artifacts found at the site thus far all indicate that there was most likely a strong king and central government in Jerusalem - earlier than any discovered until now - rather than a number of small villages scattered throughout Judea. This would verify descriptions and narratives found in Samuel and Chronicles.

Over 100 jar handles bear distinct impressions which may indicate a link to royal vessels. Such a large quantity of this feature found in one small locale is unprecedented.

David & Goliath

The site of Khirbet Qeiyafa is situated among four biblical cities in Judea's inheritance chronicled in the Book of Joshua 35:15 - Azeka, Socho, Yarmut and Adulam. The biblical narrative located the battle between David and Goliath between Socho and Azeka. According to legend, David selected five stones from the nearby Elah Creek with which to slay Goliath.

According to Prof. Garfinkel, this is the only site in Israel where one can investigate the historical King David. "The chronology and geography of Khirbet Qeiyafa create a unique meeting point between the mythology, history, historiography and archaeology of Kind David."

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

http://www.sciencedaily.com/releases/2008/11/081103091035.htm

Vigorous Activity Protects Against Breast Cancer, Study Shows

ScienceDaily (Nov. 3, 2008) — Normal-weight women who carry out lots of vigorous exercise are approximately 30% less likely to develop breast cancer than those who don't exercise vigorously. A study of more than thirty thousand postmenopausal American women has revealed that a sedentary lifestyle can be a risk factor for the disease – even in women who are not overweight.

While an Investigator at the National Cancer Institute of the U.S. National Institutes of Health, Michael F. Leitzmann led a team of researchers who followed the 32,269 women for eleven years and found that vigorous activity may protect against breast cancer, independent of body weight control. Vigorous activity was judged to include things like heavy housework (scrubbing floors, washing windows, heavy yard-work, digging, chopping wood) and strenuous sports or exercise (running, fast jogging, competitive tennis; aerobics, bicycling on hills, and fast dancing).

Leitzmann said, "Notable strengths of our study include its large sample size, prospective design, high follow-up rate, and availability of relevant known or suspected breast cancer risk factors. These features enabled us to minimize any effects from other factors apart from exercise."

Interestingly, the authors found that non-vigorous activity, such as light housework (vacuuming, washing clothes, painting, general gardening) and light sports or exercise (walking, hiking, light jogging, recreational tennis, bowling) was not protective. Furthermore, vigorous activity was only protective in lean women and not those who were overweight or obese. According to Leitzmann, "Possible mechanisms through which physical activity may protect against breast cancer that are independent of body mass include reduced exposure to growth factors, enhanced immune function, and decreased chronic inflammation, variables that are related both to greater physical activity and to lower breast cancer risk".

The authors added, "An alternative explanation for the stronger apparent effect of vigorous activity among lean over heavy women is that heavier women may misreport non-vigorous activities as vigorous ones".

Journal reference:

1. Michael F Leitzmann, Steven C Moore, Tricia M Peters, James V Lacey, Arthur Schatzkin, Catherine Schairer, Loiuse A Brinton and Demetrius Albanes. **Prospective study of physical activity and risk of postmenopausal breast cancer**. *Breast Cancer Research*, (in press)

Adapted from materials provided by Breast Cancer Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081030203239.htm

Satellites Approach Theoretical Shannon Limit

ScienceDaily (Nov. 3, 2008) — Satellites are achieving unparalleled efficiency with a new protocol, DVB-S2. The performance of DVB-S2 satellite systems is very close to the theoretical maximum, defined by the Shannon Limit. That efficiency could be pushed even further by network optimisation tools and equipment recently developed by European researchers.

European researchers have created network optimisation hardware and software tools that are able to manage satellite resources more efficiently. The developed tools are able to push the state of the art in satellite transmission technology even further. The increased efficiencies lead to cheap broadband, TV and voice access from anywhere.

The satellite option is a compelling solution to the broadband problem for rural areas, known as the digital divide. Currently, the vast majority of broadband access is confined to Europe's cities and towns, where people live close to telephone exchanges and can access cheap and efficient ADSL.

But vast numbers of Europeans also live in rural or even isolated regions and providing broadband access for them is more complicated.

But not, perhaps, for much longer. Recent progress in satellite technology has led to vastly improved bandwidth efficiencies. The newly developed DVB-S2, which stands for digital video broadcast satellite second generation, improves on DVB-S by a purported 30%.

"Using satellite resource management tools, based on cross-layer techniques, the IMOSAN project is trying to push that technology even further, in order to make it more attractive not only from the technical aspects, but from the business point of view as well," explains Anastasios Kourtis, coordinator of the EU-funded project.

Cross-layer techniques work across the application, service and physical layers of a communication medium to maximise efficient usage of bandwidth.

Approaching the Shannon Limit

The Shannon Limit establishes the maximum capacity of any channel. A channel is subject to bandwidth and noise restrictions, but its capacity can be improved with clever modulation and multiplexing techniques. The theoretical ultimate limit of a channel for specific bandwidth and signal-to-noise ratio is called the Shannon Limit.

Like the speed of light, that limit cannot be overcome and, again like the speed of light, it is very difficult even to approach it.

The inherent feature of DVB-S2, called Adaptive Coding and Modulation (ACM), allows a satellite system to adapt, in real time, to various transmission conditions and service demands. In this respect, satellite channels are very close to their theoretical limit.

"The IMOSAN consortium developed innovative software and hardware modules and protocols, called the Satellite Resource Management System (SRMS) that apply ACM to voice, data and TV in a clever way, allowing the provision of cost-effective 'triple-play' satellite services to users in rural or isolated areas," Kourtis explains.

Key advance

SRMS was a key advance, but only one of a series of innovations and improvements the team performed on the DVB-S2 system. They also developed hardware and software that supports MPEG-2 HDTV. They developed software that can use both the older Multiprotocol Encapsulation (MPE) scheme and the newer Ultra Light Encapsulation (ULE) one. Both have also been optimised for IPv4 or IPv6.

IPv4 is the current Internet Protocol (IP) that we mainly use for all data communications. But the unique IP addresses are running out rapidly, and the protocol is creaking under the strain of modern network demands. IPv6 will address this shortage and offer other new features to improve the internet.

It offers so many unique addresses that it would be possible to give an address to every individual grain of sand on earth and still have enough numbers left to give a unique one to every individual on the planet, any pets they have and all the devices they own. IPv6 also provides better security and error correction and it is the IP standard of the future. Including it in their system means that IMOSAN has future-proofed its work.

The work of IMOSAN is expected to have significant impact on satellite communications.

"The innovative tools and techniques that were developed in the frame of IMOSAN, gave [us] a great opportunity [for] efficient collaboration among private-sector companies and public academic organisations, with a common goal: to provide cost-effective broadband satellite services to rural and isolated areas," Kourtis concludes. This should help tackle the digital divide problem.

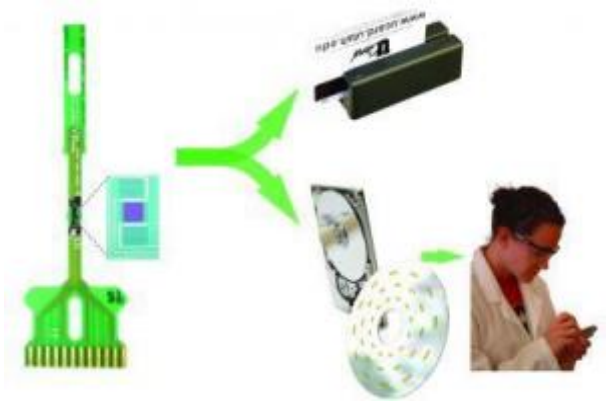
The IMOSAN project is funded by the ICT strand of the EU's Sixth Framework Programme for research.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com/releases/2008/10/081031103030.htm

Credit Card-swipe Device To Test For Hundreds Of Diseases

ScienceDaily (Nov. 3, 2008) — University of Utah scientists successfully created a sensitive prototype device that could test for dozens or even hundreds of diseases simultaneously by acting like a credit card-swipe machine to scan a card loaded with microscopic blood, saliva or urine samples.



The prototype works on the same principle – giant magnetoresistance or GMR – that is used to read data on computer hard drives or listen to tunes on portable digital music players.

"Think how fast your PC reads data on a hard drive, and imagine using the same technology to monitor your health," says Marc Porter, a Utah Science, Technology and Research (USTAR) professor of chemistry, chemical engineering and bioengineering.

Porter is the senior author of a pair of studies demonstrating the new method for rapid disease testing. The research will be published in the Saturday, Nov. 1, 2008, issue of the journal Analytical Chemistry.

"You can envision this as a wellness check in which a patient sample – blood, urine, saliva – is spotted on a sample stick or card, scanned, and then the readout indicates your state of well-being," says USTAR research scientist Michael Granger, a co-author of the research. "We have a great sensor able to look for many disease markers."

Unlike lab tests today, results could be available in minutes, not hours to weeks.

Porter and Granger conducted the research with John Nordling, Rachel Millen and Heather Bullen at Iowa State University in Ames – where Porter once worked – and Mark Tondra, then at NVE Corp., in Eden Prairie, Minn.

The Utah Science, Technology and Research initiative seeks to create new high-tech jobs by recruiting world-class research teams to develop products and services that can be commercialized to start new businesses and stimulate Utah's economy.

Homeland Security, Environmental Monitoring, Veterinary Medicine

The prototype card-swipe device consists of a GMR "read head" and sample stick. Right now, the device is about the size of a PC. But Granger says that when it is developed commercially, the GMR sensor device will look like a credit card reader.

Porter expects a more advanced version will start being used to test farm animals for diseases in about two years, and a version for human medical tests might begin clinical evaluation in five years, perhaps sooner if pursued by certified laboratories.

"We also think it has homeland security applications," Porter says.

A card swipe device could be taken into the field, where a sample card or stick "could be dipped in groundwater, dried off and read in our device to look for E. coli, plague, smallpox or other suspects on the homeland security list," he says.

Granger says cards with GMR sensors also could be used for environmental monitoring of various toxins or toxic chemicals in an office building's water or air.

The new research showed the method was very sensitive, detecting as few as 800 microscopic particles that mimicked disease-related substances.

GMR's capability to detect a single particle of a biological substance "is just over the horizon," which could be used to test blood or other samples for viruses that can cause disease in minute concentrations, Porter says.

Card-swipe testing devices would be inexpensive because they use existing, inexpensive hard-drive technology, Granger says. "The price would be such that small diagnostic labs could buy them, and eventually your local pharmacist could have one," Porter envisions.

Porter says a sample card swiped in a GMR sensor device conceivably could hold 1,900 different samples for testing, but that in most medical settings, less than a dozen tests would be needed. Nevertheless, "you eventually might test for hundreds of proteins or other compounds in the body when profiling a person's health," he says.

Turning Nobel-Winning Knowledge into Medical Technology

The new testing method makes use of "giant magnetoresistance," or GMR, a phenomenon discovered independently in 1988 by Albert Fert of France and Peter Grünberg of Germany. They shared the 2007 Nobel Prize in Physics for the discovery.

Magnetoresistance is the change in a material's resistance to electrical current when an external magnetic field is applied to the material. That change usually is not more than 1 percent. But some multilayer materials display a change in resistance of as much as 80 percent. That is giant magnetoresistance.

Porter says GMR "is an ultrasensitive method to detect magnetic footprints," and is used to read data from computer hard disks and from MP3 music players.

According to the Nobel Foundation: "A hard disk stores information, such as music, in the form of microscopically small areas magnetized in different directions. The information is retrieved by a read-out head that scans the disk and registers the magnetic changes. … A read-out head based on the GMR effect can convert very small magnetic changes into differences in electrical resistance and therefore into changes in the current emitted by the read-out head. The current is the signal from the read-out head and its different strengths represent ones and zeros."

In the first new study, Porter, Granger and colleagues set the stage for using GMR devices to test medical, environmental or other biological samples.

The prototype reader had four GMR devices: two sensors to detect changes to the magnetic fields of the sample spots, and two "reference elements" to distinguish how magnetic measurements were affected by temperature changes as opposed to the presence of disease indicators in medical samples.

The prototype does not yet look like a credit card reader or card-swipe device. Instead, it is used to "read" a Pyrex glass sample stick about three-quarters-inch long and one-eighth-inch wide. Biological samples can be placed on the sample stick, which then is "scanned much like a credit card reader," Porter says.

In the first study, instead of holding blood or other medical samples, the sample stick had 15 raised spots of iron-nickel "permalloy," a magnetic material that produces a magnetic signature read by GMR sensors.

"We are simulating a signal to test the card-swipe device," Granger says. "It's not a real sample."

The study determined how measurements by the GMR sensors – the heart of a future card-swipe device – can be calibrated to account for variations in the size of the permalloy spots, the amount of separation between the sensors and the sample stick, and the angle of the sample stick as it is scanned by the sensors.

Those factors determine how consistently and accurately a card-swipe device would detect minute amounts of substances associated with diseases.

Simulating a Disease Test

In the second study, the sample stick's alloy spots were replaced by the material that would be used on real medical test cards: microscopic spots or "addresses" of gold that were no longer than the smallest known bacterium. The widths were varied to test which size of addresses could be "read" most accurately.

A substance named biotin or vitamin B-7 was bound chemically to the gold spots on the sample stick. Tiny drops of magnetic particles coated with streptavidin – a protein found in eggs – were placed on the gold spots.

"The gold address has no magnetic signature," Granger says. "Once the particles are bound to it, GMR picks up that magnetic signature. It's a proof of principle."

The experiment was repeated hundreds of times with different concentrations of magnetic particles bound to the biological substance.

"We could detect as few as 800 magnetic particles on an address," Porter says. "We believe that with further development, we can get down to single-particle detection."

The Utah scientists cite examples of how a GMR card reader might be used medically for humans and animals:

Current tests for prostate specific antigen (PSA) – an indicator for possible prostate cancer – only look for "free" PSA but not for other forms. A card-like sample stick with multiple "addresses," each with an antibody that binds to a different kind of PSA, would be able to test a blood sample for multiple forms of PSA and for their relative abundances, and thus be more reliable in predicting prostate cancer, Porter says.

"The same approach can be used to screen patients for other cancers or heart disease," Granger says.

A rapid, card-reader test for genital or oral herpes could help reduce the number of Caesarean sections. If obstetricians suspect maternal herpes, they sometimes do C-sections to avoid transmission to the newborn, Porter says. A conclusive, rapid test for herpes can tell doctors if a C-section is really necessary.

Porter envisions GMR sensors as tools for personalized medicine, in which "you want to establish everybody's baseline with various health markers" – tests for various diseases and disease susceptibilities. Then, people would monitor health changes by periodic re-testing in a doctor's office, pharmacy or perhaps at home.

GMR sensors could provide rapid detection of porcine parvovirus, a respiratory infection that kills pigs; feline calicivirus, which does the same to cats; and bacteria that cause Johne's (pronounced yo-knees) disease, a fatal wasting disorder in dairy cows that costs $1.5 billion annually in the United States.

Adapted from materials provided by University of Utah.

http://www.sciencedaily.com/releases/2008/10/081030083052.htm

Can Your Doctor Correctly Read A Critical Heart Test? Improving Accuracy Of Electrocardiogram Interpretation

ScienceDaily (Nov. 3, 2008) — You have a burning chest pain and a doctor looks at a squiggly-lined graph to determine the cause. That graph, an electrocardiogram (ECG or EKG), can help the doctor decide whether you're having a heart attack or an acid attack from last night's spaghetti. Correct interpretation may prompt life-saving, emergency measures; incorrect interpretation may delay care with life-threatening consequences. Currently, there is no uniform way to teach doctors in training how to interpret an ECG or assess their competence in the interpretation.

To address the lack of uniformity, a team of physicians from the University of Maryland School of Medicine and the American College of Cardiology has developed the first Web-based training and examination program for reading ECGs. It is an interactive computer program to teach and assess the competence of doctors in training. Details of the new tool will be revealed on October 31, 2008, during the annual meeting of the Association of Program Directors in Internal Medicine, in Orlando.

"We hope this tool helps increase expertise among general practitioners in the interpretation of a very commonly used screening test that's part of nearly every adult examination," says team leader R. Michael Benitez, M.D., associate professor of medicine at the University of Maryland School of Medicine in Baltimore and director of the Cardiovascular Fellowship Training Program. "There is no mechanism now for establishing competency among internists or family physicians or for an interim analysis of how a trainee is performing," says Dr. Benitez, who is also a cardiologist at the University of Maryland Medical Center.

Two major medical accrediting bodies, the Accreditation Council for Graduate Medical Education's Residency Review Committee for Internal Medicine and the American College of Physicians, recognize the importance of establishing competent ECG interpretation during Internal Medicine residency. But there is no consensus on how competence should be achieved, documented or even defined.

A physician who wants to specialize in cardiology must pass electrocardiographic interpretation as part of the initial certifying process; failure of the ECG section means failure of the entire exam. However, physicians who will practice general internal medicine do not have to pass an ECG interpretation section in order to pass their board examination, according to Dr. Benitez.

General practitioners are often the first to detect a person with an underlying cardiac disease during a general screening evaluation. "They need to correctly identify and diagnose problems that can significantly and imminently affect the health of their patients," says Dr. Benitez.

The New ECG Training Program

The Web-based computer module, called ACCIS (American College of Cardiology In-Service), includes both an assessment section and a "Teaching Materials" section. The test-taker is presented with 50 electrocardiograms that focus on 12 key categories of ECG interpretation. Test-takers and training program directors receive the test results. In the case of an incorrect diagnosis, the test-taker is referred to more than 100 case studies with additional teaching materials for self-directed learning. The results will be followed over time to determine if the training program actually improves ECG knowledge and will be used to set benchmarks of competency in ECG interpretation.

ECG Background

An electrocardiogram shows the heart's electrical activity. An ECG can indicate heartbeat irregularities and pinpoint heart muscle abnormalities. There are 120 codes used to define events detected through 12 leads attached to the chest. Doctors in internal medicine are expected to learn how to read the ECG to

identify a potential heart problem; cardiologists are expected to be experts at ECG readings, pinpointing specific or rare problems.

"A lot of memorization is necessary to learn how to read an ECG," says Dr. Benitez. "The rules include such things as: what is the voltage in a particular lead or a combination of leads or what is the axis of the vector of this electrical signal?" Pattern recognition is also part of the learning process.

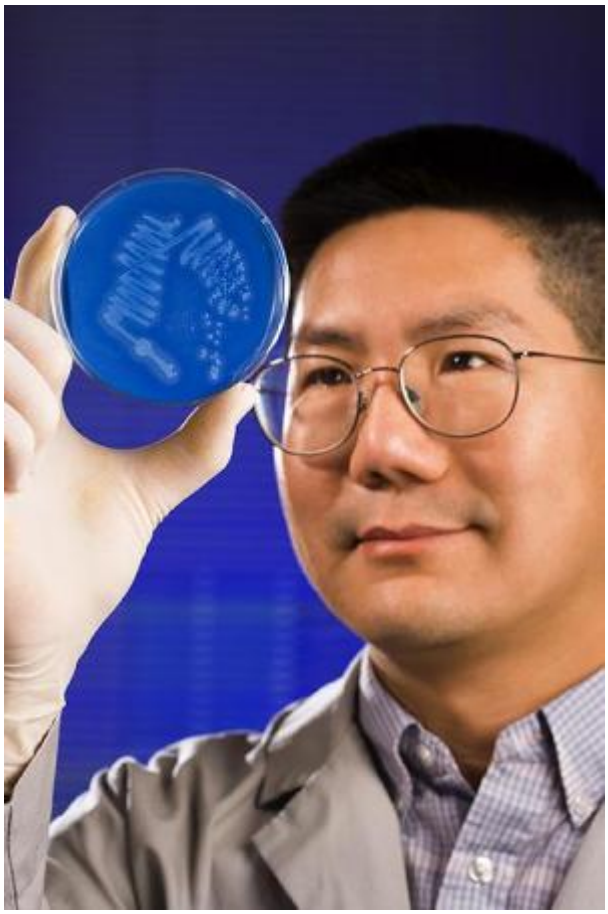
While the basic ECG technology was developed more than a hundred years ago, the field of ECG interpretation has become part of the high-tech revolution. Computers can make a preliminary interpretation of the ECG readout. But more often than not, says Dr. Benitez, the computer gets certain things wrong, such as the interpretation of rhythm abnormalities. "It does not usually under-call things like acute heart attack, but it does over-call them," he says. "Somehow our brains are better than computers in terms of the amalgamation of all the data that's required to read ECGs."

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

http://www.sciencedaily.com/releases/2008/10/081031102051.htm

'Superenzymes' Could Streamline Biofuels Refining

ScienceDaily (Nov. 3, 2008) — Stain removers that make even the most stubborn spots on your clothes vanish in the wash may be powered by molecules known as enzymes. Agricultural Research Service (ARS) scientists at Albany, Calif., are in search of similarly strong, fast-acting enzymes. But the ones they want would be put to work not in your laundry room, but instead at biofuels refineries, where the enzymes' job would be to break down the cell walls of bioenergy crops such as switchgrass.



The tight matrix of compounds—cellulose, hemicellulose, and lignin—in the walls of switchgrass cells is difficult for familiar enzymes to disassemble. That's a factor that makes refining cellulosic ethanol more costly and complex than making ethanol from starch.

The search for enzymes that excel in degrading plant cell walls has led Albany research chemist Charles Lee, with the ARS Bioproduct Chemistry and Engineering Research Unit, to probe dank soil beneath 25-foot-high piles of decaying rice straw, and to carefully draw samples of murky liquid from dairy-waste lagoons.

Back at the lab, Lee and colleagues scrutinize these and other samples—a miscellany of anonymous microbes—to determine whether any of them contain genes that have the blueprint for enzymes of interest.

From one dairy lagoon sample, they found a microbe with a gene that they've named xyn8. It contains the blueprint for a xylanase, an enzyme that specializes in breaking down xylan, a troublesome component of the hemicellulose in plant cell walls.

But there's even more to like about this xylanase: It works well in temperatures regarded as "cold" in the biofuels business. Cold-loving xylanases would sidestep the need for the costly heating typically needed at today's biorefineries.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2008/10/081031213335.htm

Videoconferencing More Confusing For Decision-makers Than Face-to-face Meetings

ScienceDaily (Nov. 3, 2008) — Although videoconferencing has become a billion-dollar substitute for flying business people to meetings, it leaves distant participants less likely to make sound judgments about speakers being viewed over a screen, according to a study published in a journal of the Institute for Operations Research and the Management Sciences (INFORMS®).

"Videoconferencing in the Field: A Heuristic Processing Model" is by Carlos Ferran of Pennsylvania State University Great Valley and Stephanie Watts of Boston University. It appears in vol. 54, number 9 of the INFORMS flagship journal Management Science.

The researchers find that attendees of videoconferences must work harder to interpret information delivered during a conference than they would if they attended face-to-face.

A field study of medical professionals reveals differences in information processing: participants attending a seminar via videoconference are more influenced by the likeability of the speaker than by the quality of the arguments presented, whereas the opposite pattern is true for participants attending in person.

"Important business decisions may suffer if videoconferencing is used to make them without adjusting the process to take its differences into account," says Prof. Ferran.

Professors Ferran and Watts offer guidelines for understanding when videoconferencing is most appropriate and for improving the design of videoconferencing equipment:

> Videoconferencing may not be appropriate for decision making when some stakeholders are present face-to-face and others attend via video, because these two groups are likely to process information differently.
>
> Videoconferencing equipment may be improved by the addition of features that reduce cognitive workload, such as support for turn taking, audio localization, and personal distance location.
>
> Videoconference presenters can use heuristic cues to increase the influence of their message.

The research was conducted in a medical setting. (The name of the medical organization was not released by the researchers).

Medical professionals were surveyed as they attended 1 of 19 different live interactive seminars, either face-to-face or via videoconference. The seminars spanned a 12-week period, comprising part of the teaching activities of an urban healthcare consortium. Each interactive one-hour seminar was delivered live by a different physician in a large auditorium, followed by questions and answers. These seminars were simultaneously broadcasted via videoconference to a number of smaller sites. Both face-to-face and remote attendees could ask questions. Attendees were primarily residents, attendings, and local physicians specializing in pediatrics, psychiatry, or orthopedics.

Adapted from materials provided by Institute for Operations Research and the Management Sciences.

http://www.sciencedaily.com/releases/2008/10/081028184748.htm

Tools Give Earlier Date For 'modern-thinking' Humans

ScienceDaily (Nov. 3, 2008) — An international team, including Oxford University archaeologists, has dated two explosions of sophisticated stone tool making in southern Africa much more precisely than has previously been possible.

The team dated the two events, known as the Still Bay and Howieson's Poort industries, to around 80,000 and 60,000 years ago respectively.

This provides further evidence that humans (Homo sapiens) in southern Africa were 'behaviourally modern' – that is, thought and behaved like modern humans – before any migration of biologically modern humans to the rest of the world: most likely dated at around 60,000 years ago according to the 'out of Africa 2' theory.

'These new findings reinforce the understanding that we have to massively expand the timeframe over which people in southern Africa were no different from people today,' said Professor Peter Mitchell of Oxford University's School of Archaeology. 'We will now have to think much more creatively about the past and what sorts of sophisticated human behaviours were going on in Africa over this vast new landscape of tens of thousands of years.'

The evidence comes from archaeological sites in Lesotho and South Africa. Characteristic of the older Still Bay objects are generally spearhead-shaped forms with sharp edges that may have seen them function as spear points or knife blades. The younger Howieson's Poort objects are typically no more than

a few centimetres long and have been worked into half-circles or other geometric shapes – they were probably set into bone or wooden shafts as points or barbs for spears and, possibly, even arrows.

'What is particularly exciting is that recent research is also now suggesting that some of the Howieson's Poort objects may have been used for arrowheads – if this is correct then our dating would push archery, and the invention of the bow and arrow, back to 60,000 years ago, perhaps even before modern humans left Africa,' said Professor Peter Mitchell.

As part of the research Professor Mitchell and colleagues from Oxford helped to take samples of sediment from a number of sites in Lesotho where their excavations had revealed Howieson's Poort objects. These samples, and others, were then analysed by scientists from The University of Wollongong, Australia, and University College London using a luminescence technique that provided the new dates.

Oxford University is the only UK university to specialise in archaeological research in southern Africa. Professor Mitchell has been investigating sites in Lesotho for 25 years and believes these findings will stimulate further research into the neglected history of early modern humans in southern Africa.

Journal reference:

1. Jacobs et al. **Ages for the Middle Stone Age of Southern Africa: Implications for Human Behavior and Dispersal**. *Science*, 2008; 322 (5902): 733 DOI: 10.1126/science.1162219

Adapted from materials provided by University of Oxford.

http://www.sciencedaily.com/releases/2008/10/081031102630.htm

Media Coverage Affects How People Perceive Threat Of Disease

ScienceDaily (Nov. 3, 2008) — Popular media coverage of infectious diseases greatly influences how people perceive those diseases, making them seem more dangerous, according to a new study from McMaster University.

The research, published online in the Public Library of Science: ONE, suggests diseases that show up frequently in the print media –like bird flu –are considered more serious than similar diseases that do not receive the same kind of coverage, such as yellow fever.

"The media tend to focus on rare and dramatic events," says Meredith Young, one of the study's lead authors and a graduate student in the Department of Psychology, Neuroscience & Behaviour. "When a certain disease receives repeated coverage in the press, people tend to focus on it and perceive it as a real threat. This raises concerns regarding how people view their own health, how they truly understand disease and how they treat themselves."

Researchers chose 10 infectious diseases drawn from the Centre for Disease Control database. Five were medical disorders that have been highly prevalent in the recent print media –anthrax, SARS, West Nile virus, Lyme disease and avian flu –and five were medical disorders that have not often been present in current media: Tularemia, human babesiosis, yellow fever, Lassa fever and hantavirus.

Two groups of students, undergraduate and medical students, were asked to rate how serious, how prevalent, and how "disease-like" various conditions were.

"We see that a single incident reported in the media, can cause great public concern if it is interpreted to mean that the potential risk is difficult to control, as with the possibility of a pandemic like in the case of Avian flu, and bioterrorism, as in the case of anthrax infection," says Young.

Conversely, when participants were presented with the descriptions of the disease, without the name, they actually thought that the diseases which received infrequent media coverage –the control group –were actually worse.

"Another interesting aspect of the study is when we presented factual information about the diseases along with the names of them, the media effect wasn't nearly as strong," says Karin Humphreys, one of the study's authors and assistant professor in the Department of Psychology, Neuroscience & Behaviour. "This suggests that people can overcome the influence of the media when you give them the facts, and so objective reporting is really critical."

Equally surprising, says Humphreys, is the fact that the medical students –who would have more factual knowledge about these diseases – were just as influenced by the media, despite their background.

The study was funded by the National Science and Engineering Research Council (NSERC).

Adapted from materials provided by McMaster University.

http://www.sciencedaily.com/releases/2008/10/081029121818.htm

Women's hands 'harbour more bugs'

Women have a greater range of different types of bacteria on the palms of their hands than men, US research suggests.

The study also found that human hands harbour far higher numbers of bacteria species than previously thought.

Using powerful gene sequencing techniques, researchers found a typical hand had roughly 150 different species of bacteria living on it.

The Proceedings of the National Academy of Sciences study found bacteria types varied greatly between individuals.

> **The sheer number of bacteria species detected on the hands of the study participants was a big surprise**
> Dr Noah Fierer
> Universithy of Colorado at Boulder

The researchers, from the University of Colorado at Boulder, hope their work will help scientists to establish a "healthy baseline" of bacteria species on the human hand.

This could potentially help them to identify which species are linked to specific diseases.

Lead researcher Dr Noah Fierer said: "The sheer number of bacteria species detected on the hands of the study participants was a big surprise, and so was the greater diversity of bacteria we found on the hands of women."

The study detected and identified more than 4,700 different bacteria species across 102 human hands in the study.

However, only five species were shared among all 51 participants.

Even the right and left palms of the same individual shared an average of only 17% of the same bacteria types.

On average, women had 50% more bacterial species on their hands than men.

Acidic skin

Dr Fierer said that the higher bacterial diversity on women's hands may be due to the fact that men tend to have more acidic skin, which provides a more harsh living environment for the microscopic bugs.

BACTERIA ON WOMEN'S HANDS
Enterobacteriales: 400% more abundant on women
Moraxellaceae: 180% more
Lactobacillaceae: 340% more
Pseudomonadaceae: 180% more

Alternatively, differences in sweat, oil gland or hormone production may be key - or the fact that women and men tend to make different use of cosmetics such as moisturisers.

Dr Fierer said the study also found hand washing had little impact on the diversity of bacteria found on an individual's hands.

While some groups of bacteria were less abundant following hand washing, others were more abundant.

However, the researchers said that washing with anti-bacterial cleansers was still an effective way to minimise the risk of disease, as it seemed particularly to target harmful bugs.

The diversity of bacteria types on the palm was three times higher than that found on the forearm and elbow and appeared to outstrip that found in the mouth and lower intestine.

Important role

Dr Fierer said: "We know that skin associated bacteria are likely to have an important influence on skin health, a minority may act as pathogens and many may actually have a beneficial effect, protecting us from disease.

"However, we do not know how differences in bacterial communities may impact skin health and we do not know if specific types of bacteria are more beneficial than others.

"This is an active area of research but our results suggest that answering these questions will be very difficult given that there is so much background variability in bacterial communities between healthy individuals."

Dr Valerie Curtis, director of the Hygiene Centre at the London School of Hygiene and Tropical Medicine, said science still had much to learn about how bacteria interact with the human body.

She said: "Most are likely to be neutral, just living there without doing any harm or good."

But she added: "It is thought that having such flora on our hands is probably beneficial, because the bacteria occupy niches which are then unavailable to pathogens."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7705608.stm

Published: 2008/11/04 00:09:43 GMT

The story plays out

With a book, trading cards, and online game, 'The 39 Clues' clicks with kids
By David Mehgan, Globe Staff | October 28, 2008

More than a year has passed since the final book in the Harry Potter series appeared, ending J.K. Rowling's hugely successful fantasy epic. While the Potter books will go on selling, children's publishing is struggling lately, and the industry is wondering where the next Harry Potter is going to come from. Now Scholastic Corp., US publisher of the Potter novels, thinks it has the answer: "The 39 Clues," a 10-book adventure series for ages 8 to 12. Published last month with a first printing of 500,000 in the United States and more than 1 million in English worldwide, the first volume, "The Maze of Bones," jumped to No. 1 on The New York Times children's chapter-book bestseller list. While it dropped to No. 3 last Sunday, Scholastic is confident it has a formula with the future written all over it. And a lot of kids are clearly on board, even if there is skepticism among some booksellers.

It's not the book that's especially unusual but the bells and whistles that go with it - what Scholastic calls the "multiplatform" package. Along with the book comes an Internet game, an elaborate system of card collecting, and cash prizes up to $10,000. The idea is simple but radical: Rather than have kids sit there reading the book, make them part of it.

"We want to live in the context that our readers are living in, to think broadly about reading and the potential of storytelling," said David Levithan, Scholastic's executive editorial director. "All studies show kids are both readers and gamers, and we thought: Why not give them something to read and a technology that will appeal to both interests?"In the story, orphaned siblings Amy and Dan Cahill of Boston, where the action begins (but doesn't stay long), learn that their rich grandmother has died. Her will reveals that the Cahill family has a secret history of international power and influence. Those who accept an invitation to join a worldwide quest, fraught with danger, may find the key to the Cahill fortune. Amy and Dan accept, as do sinister relatives who try to beat them to the prize.

But unlike Harry Potter, there's much more than a story. On the cover of "The Maze of Bones," which sells for $12.99, is the line: "Read the Books. Play the Game. Win the Prizes." Inside is a pack of six clue cards. Readers are urged to register at www.the39clues.com and, using the cards, join in the hunt for the 39 clues, which lead to the ultimate secret. They discover which branch of the family they belong to, and soon find themselves immersed in the quest. More cards are sold in $7.99 packs. Eventually, there will be

more than 300, though readers don't need them all to solve the mystery. Volume 2, "One False Note," comes out Dec. 2, and two more will follow by July. The other six will appear over the next two years.

It's a new idea, and kids' publishing badly needs new ideas. While other fantasy series have taken off since Harry Potter, especially Christopher Paolini's "Inheritance" cycle and Stephenie Meyer's "Twilight" books, they're rare sparks in a gloomy picture. The Association of American Publishers reports that children's and young adult hardcover sales fell 9.3 percent in August and are down 35 percent for the year.

"The 39 Clues" is not the first kids series with an Internet connection - Jeff Kinney's bestselling "Diary of a Wimpy Kid" was an online story before it was a book - but it is the first to be wholly planned by a large publisher, even before it had a story or an author. Early on, Scholastic signed up Rick Riordan, author of the bestselling Percy Jackson children's series, to write "The Maze of Bones." Others will write later installments.For a typical adult, the "39 Clues" website is like Lewis Carroll's rabbit hole. It truly is a maze, and very little is explained beforehand. "It's difficult to explain in a way that adults can get their heads around," Riordan said, "but when you explain it to kids, they intuitively get it. They've grown up with the online experience. They understand the connection between books and the Internet. They don't see them as that different."

The book is selling well nationwide, especially among big chains. "Customers have responded positively," said Brian Monahan, a buyer with Barnes & Noble. "Our booksellers are excited. We're looking forward to the next book."Some children's-reading specialists take a positive view. "The theory sounds great - I could see the kids I work with jumping all over this," said Michael Sullivan, an author and former librarian from Portsmouth, N.H., whose website, www.talestoldtall.com, promotes reading among boys. "Rick Riordan is a big seller among boys, but he also sells to girls."

Still, Potter-like hysteria hasn't broken out yet. Indeed, local children's booksellers say demand in their stores has been tepid. "We've sold a few, but it's not flying off the shelves," said Terri Schmitz, owner of Brookline's Children's Book Shop. "It's kind of a test case - we've not had this Internet link capacity before. For the big fantasy readers, this isn't their thing. They're capable of happily curling up with an 800-page book."

Alison Morris, children's book buyer at Wellesley Booksmith, had a similar report. "There's no rush by kids to get through the door to buy their copy," she said. "I think there is resistance on the part of some parents, who think it's a ploy to get kids online to play a game. And the fact that you buy cards to unlock more of the story seems off-putting to some people. It doesn't especially enhance the experience of reading the book."

Even so, some kids clearly are interested. Sisters Juliana and Olivia Van Amsterdam of Natick came across it in Wellesley Booksmith. "We saw it and said, 'Omigod, it's Rick Riordan,' " said Juliana, who is 12. "We were really excited because we loved the Percy Jackson series. I started reading it, and by the 10th page I loved it. The plot is absolutely racing."

They hadn't yet ventured onto the website, though they said they intend to. "I don't go on the computer that much, but I was looking at the cards and thought, 'Wow, you can discover your own little world based on this story,' which is really cool," said Olivia, 11.

Both girls said they are already avid readers, and neither needs the Internet to stoke her interest. "You don't have to go online every day," said Julia, "and if you don't like it, you can just read the books."

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http://www.boston.com/ae/books/articles/2008/10/28/the_story_plays_out/

A Moving Skyscraper for N.Y.?

By John Tierney

Each of the floors of the Dynamic Tower rotates independently, giving the building different shapes throughout the day. (Dynamic Architecture/ David Fisher)

Would you like to see a building twisting itself into different shapes night and day on the New York skyline? Would you like to live in an apartment with a view that rotates 360 degrees? It may be a little hard at the moment to arrange financing for such tower — or any other new skyscraper in Manhattan — but the architect David Fisher is looking for a place to build it here someday.

He's already designed such an edifice in Dubai called the Dynamic Tower, billed as the "world's first building in motion." Dr. Fisher, an architect based in Florence, he told me that he hopes groundbreaking for the Dubai tower will occur "within a matter of weeks," and said that the problems in the credit market haven't affected the project.

The tower is supposed to generate enough electricity to supply the power needs for itself as well as buildings nearby. The electricity will come from horizontal wind turbines tucked away between each of its 80 floors, and from solar photovoltaic cells on the roof each story. As the individual floors move, about 20 percent of each roof is expected to be exposed to the sun at any time of the day.

Dr. Fisher, who's working on another of these towers for Moscow, was in town this week to discuss plans for New York. Where might it go? "We are currently looking at a few sites," he told me. "It should be a place from where the view is attractive and also where people can stand and watch the building changing its shape."

Any suggestions for him? Any predictions on how well those turbines and photovoltaic cells will work? And would you pay a premium to live in a room with a moving view?

http://tierneylab.blogs.nytimes.com/2008/10/29/a-moving-skyscraper-for-ny/?hp

Just When You Thought It Was Safe to Work Out

By JANET MASLIN

JUST AFTER SUNSET

Stories

By Stephen King

367 pages. Scribner. $28.

Most people think of the roadside rest area as a functional place to stop during a long drive. Not Stephen King. Mr. King sees potential nightmares in even the most mundane experiences. And his new collection of short stories mines the rest-stop idea to the max. Of the 13 stories in "Just After Sunset," one entirely revolves around a bathroom break. One uses a rest area as a crucial turning point in its suspense plot. And one is the retch-worthy tale of a man locked inside a tipped-over, heavily used Portosan.

"I even grossed myself out," Mr. King says of that last one in his notes about the book. Quite a feat. His gross-out threshold is a whole lot higher than yours.

In any case, he is a tireless storyteller. One tale in this collection was written during a few hours' lag time in a hotel room in Australia, just because he had time to kill. Mr. King's introduction explains that his new surge of short-story writing was prompted by the job of editing the 2006 volume in the Best American Short Stories series . He wondered whether he still had the knack of miniaturization and decided to find out. And simple, everyday situations became his open portals to fantasy and horror. Even a stationary exercise bicycle yields a richly scarifying tale.

There are specific fears that haunt this succinct, fast-moving collection. Two stories find Mr. King trying to convey the terrors of 9/11, one in a stark visual evocation (a sight that is "in very poor taste," according to a Connecticut matron who witnesses it), and the other in a ghostly exploration of the event's aftermath. Two others expand on the possibilities of obsessive-compulsive disorder by summoning it viscerally. You'll know this book is having the desired effect when you can't write down the numbers that the number-obsessed main character in "N." deems terribly unlucky.

"For all I knew, that flattened snakehead with the pink eyes and what looked like great long quills growing out of its snout was only a baby," writes Mr. King at his wicked best. The prospect of a sentence

like that is what keeps his fans die-hard, even when a book is more of a quota-filler than a consistently top-flight collection.

After all, “Just After Sunset” also features an action story that includes the following exchange of dialogue: “Don’t.” “Yes.” “Stop.” “No.” Not to mention: “I’ll lift your eye right out of its socket and flip it into the sink.”

In “Just After Sunset” Mr. King must work more quickly and efficiently than he has in recent sprawling novels. And the mechanics of his methods are illuminatingly exposed.

For the main rest-stop story he chose the title “Rest Stop” and grafted the rest-stop experience onto the psyche of a writer who has two identities: his Clark Kent-ish real self and the tough-guy character in his novels. When he sees a man brutally bullying a woman, the real man is paralyzed; the hero leaps into action. And Mr. King wryly acknowledges that “Don’t hurt me, mister” is a line that a writer is likelier to find on the page than hear in real life.

It is a testament to Mr. King’s fear-soaked psyche that the least interesting thing his characters can do is be dead. Sure, he does a few obligatory “Twilight Zone”-style tricks of this sort: One person gets wind of his own demise when he figures out that he can’t buy cigarettes, and one tale centers on a dead person’s ability to use the telephone. But those aren’t the good parts. Mr. King can pull such stunts in his sleep. Speaking of the somnolent: this book also includes a nightmare story that delivers a double-whammy. It describes a frightful dream that reveals someone’s death.

This collection’s most successful stories start unprepossessingly but then head for unknown territory, off in the far reaches of Mr. King’s imagination. The escalation of these narratives is carefully calibrated. Take “Stationary Bike,” which originated in what Mr. King calls “my hate/hate relationship not just with stationary bikes but with every treadmill I ever trudged and every Stairmaster I ever climbed.” The bike may have been his enemy, but tedium is his friend.

So he writes of how a man named Richard Sifkitz visits his doctor. And the doctor gives Sifkitz a baby-talk version of a medical prognosis. High cholesterol is straining his patient’s body, the doctor says. He adds: “It helps at this point to think of the metabolic process as a work crew. Men in chinos and Doc Martens.” This may sound silly to Sifkitz, but it’s an idea that soon takes over his imagination.

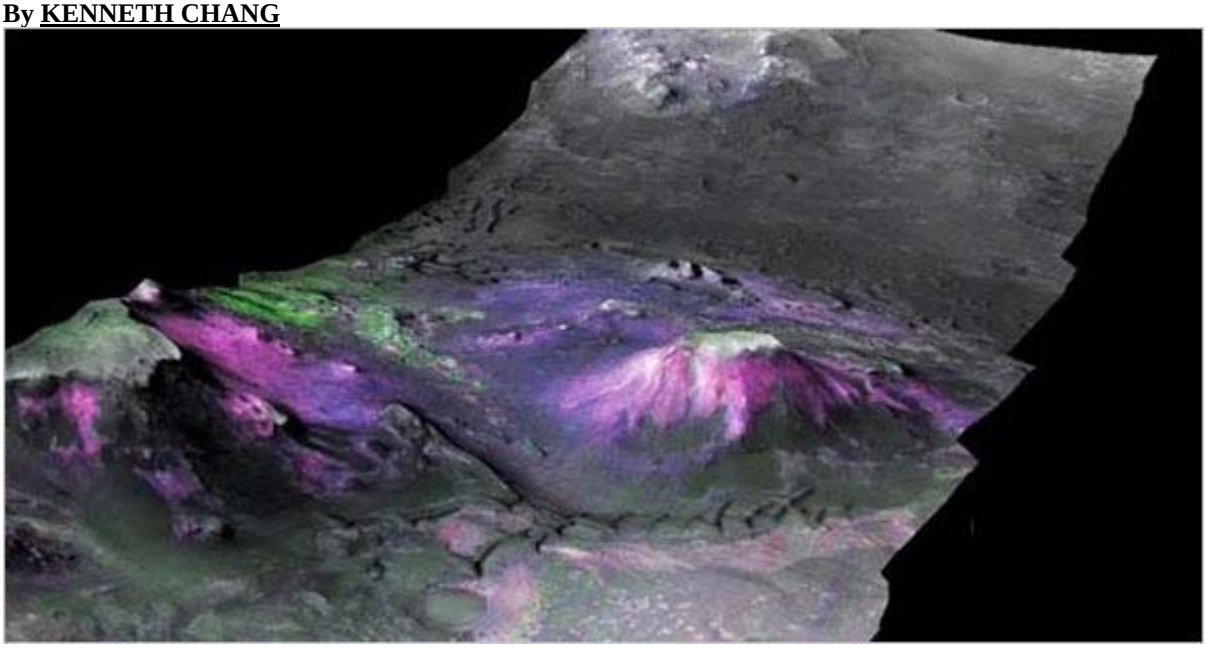
So he pedals away, conjuring a full cast of little men who work in the blood-vessel maintenance business. Soon he is hooked on strenuous exercise and is pedaling past vivid roadside scenery, even though the bike is in a basement. As in his most recent novel, “Duma Key,” Mr. King also lets a mysteriously changeable picture tell his story, and Sifkitz’s vision becomes more and more elaborate as he rides along. The denouement takes a turn away from horror to arrive at Sifkitz’s happy compromise about what he has to do to stay alive.

The stories in “Just After Sunset” are varied in ways that reflect the publications in which they first appeared. “Harvey’s Dream,” from The New Yorker, is unusually polished. And it is quietly eloquent about a glum, middle-age marriage. “Willa,” which has the most heavy-handed final twist, appeared in Playboy. And “N.” is the text of an original graphic video series, which means you can watch parts of it on the Internet. It will eventually become a comic book. You can watch it or you can read it on a dark and stormy night and shiver. Regardless of format, that’s the effect.

http://www.nytimes.com/2008/11/05/books/05masl.html?_r=1&th&emc=th&oref=slogin

Minerals on Mars Point to More Recent Presence of Water

By KENNETH CHANG



Still puzzling over how warm and wet Mars may have once been, scientists are now seeing global mineralogical signs that the planet was at least occasionally wet for the first two billion years of its existence.

In an article in the November issue of the journal Geology, scientists working with data from NASA's Mars Reconnaissance Orbiter report that they have spotted widespread deposits of opals and related minerals on the surface of Mars.

Opals belong to a class of minerals known as hydrated silicas, with water molecules wedged into silicon-based minerals like quartz. The formation of hydrated silicas requires liquid water.

Most interesting is that the opal deposits lie in areas that appear to have formed only about two billion years ago. Previously, spacecraft have detected other water-bearing minerals like clays in regions that date back more than 3.5 billion years. Mars, like the other planets in the solar system, is about 4.5 billion years old.

"The water was more widespread and extended to younger times," said Scott L. Murchie, a staff scientist at Johns Hopkins' Applied Physics Laboratory and the principal investigator for the orbiter's spectrometer, which found the opal evidence.

In July, Dr. Murchie and other scientists reported that the orbiter had detected vast deposits of the claylike minerals on the older terrains. Images also showed ancient lakebeds with accumulations of the minerals, indicating standing water persisted for thousands of years.

The presence of water on Mars has been known for many years; its ice caps, easily visible from space, are largely made of frozen water. The unanswered question is how often the ice has melted. The Phoenix Mars Lander, now nearing the end of its six-month mission, is exploring whether the arctic ice has melted in recent millennia.

The most intriguing possibility is that Mars, when it was less than a billion years old, was warm enough for lakes and oceans of liquid water — and with that, the possibility of life. The planet's landforms offer compelling evidence for flowing water: immense canyons and channels, dried-up river deltas.

"I think most people agree there was lots of water on the surface in the first few hundred million years," said Maria Zuber, a professor of geophysics at the Massachusetts Institute of Technology. "It's later on when I get confused, although I'm confused about the whole thing. That's what makes it interesting."

Some scientists have suggested that rare catastrophic floods carved the landforms, either in the aftermath of an impact by an asteroid or comet or by underground water — melted by residual volcanic warmth — bursting to the surface.

Those who believe that liquid water was more persistent were nonetheless perplexed when earlier spacecraft detected only small quantities of carbonates, minerals that should have formed in large amounts from reactions involving carbon dioxide and liquid water.

But data collected by the two Mars rovers, Spirit and Opportunity, show a highly acidic environment that prevented the formation of carbonates. "That part of the story is fairly well agreed upon," Dr. Zuber said.

The two rovers have also found signs of past water. Opportunity found hydrated sulfates in the Meridiani Planum rocks; Spirit found opal-like minerals similar to those spotted by the Reconnaissance Orbiter from space.

But planetary scientists are still trying to explain the transition of Mars from lots of water to today's cold and dry climate. In fact, they are still trying to explain how it ever had lots of liquid water. Even if young Mars were enshrouded in a thick atmosphere of carbon dioxide belched by giant volcanoes, climatologists have had trouble coaxing enough global warming in their computer simulations to push temperatures above the melting point of ice.

James F. Kasting, a professor of geosciences at Penn State, believes he may have figured out how to warm up Mars. In research that he will present in December at a meeting of the American Geophysical Union, the key may be nitrogen dioxide.

In his climate models, carbon dioxide did act as a greenhouse gas, trapping heat near the surface, but it also reflected shorter wavelengths of light back into space, limiting the amount of heating. His models peaked at about minus-40 degrees Fahrenheit. Nitrogen dioxide, which is also released by volcanic eruptions, reduces the reflectivity of Mars in the models. With more light absorbed, temperatures jumped 100 degrees. "That would be more than you need," Dr. Kasting said.

He said he still needed to demonstrate that the nitrogen dioxide would mix throughout the atmosphere rather than remain in pockets around the volcanoes.

Even if scientists figure out the water question, they have another problem: what happened to the Martian air? The climate models suggest early Mars had an atmosphere denser than Earth's. Now, it's a faint wisp.

"Well, we don't know," Dr. Zuber said. "One day we're going to nail that one. There's a whole bunch of things on my list of things to do."

http://www.nytimes.com/2008/11/04/science/space/04mars.html?ref=science

A CONVERSATION WITH STUART L. PIMM
Asking 'Why Do Species Go Extinct?'

By CLAUDIA DREIFUS

For a man whose scholarly specialty is one of the grimmest topics on earth — extinction — Stuart L. Pimm is remarkably chipper. On a recent morning, while visiting New York City, Dr. Pimm, a 59-year-old zoologist, was full of warm stories about the many places he travels: South Africa, Madagascar and even South Florida, which he visits as part of an effort to save the endangered Florida panther. Fewer than 100 survive in the wild. In 2006, Dr. Pimm, who holds the Doris Duke professorship of Conservation Ecology at Duke University, won the Heineken Prize for Environmental Sciences, the Nobel of the ecology world.

Q. HOW DOES A PERSON MAKE EXTINCTION THE CENTERPIECE OF A PROFESSIONAL LIFE?

A. In 1978, I went to Hawaii, supposedly a tropical paradise. I am an enthusiastic birder, and I looked forward to getting into the lush forest to view the abundant flora and fauna the islands were famous for. Here you had this rich island chain, out in the midst of the Pacific, full of wondrous birds and plants — a place supposedly richer in natural diversity than even the Galápagos.

I had brought with me field guides to the fauna and flora, all published in the early 1970s. Yet once in the Hawaiian forest, I had a shock: my books were listing species that were extinct — or about to become so. I was in the forest six days a week and I kept thinking, "If I give it enough time, I'll certainly see most of the species still left." But I saw very little. In fact, in Hawaii today, I'd say there are only about 10 remaining native land bird species, with another 10 clinging to survival.

So suddenly this extinction business seemed very real. Whenever you'd meet biologists over coffee, there'd be the same conversation: "Do you ever wonder what Hawaii was like before, with 150 species of birds and 1,500 species of plants?" That changed my life.

Q. HOW DID IT DO THAT?

A. Well, I realized that extinction was something that as a scientist, I could study. I could ask, "Why do species go extinct?" and "How fast does it happen?" Once armed with that information, one might do something about it.

I now spend a fair amount of time in Washington, working for laws to protect species. I train young people to do the same. I often tell my students that if they want to become environmental biologists, they have to be prepared to go out into the field at dawn to collect their data and then dress up in a suit in the afternoon to meet the visiting politician.

Q. WHICH WOULD YOU SAY ARE, AT THIS MOMENT, THE MOST ENDANGERED OF THE WORLD'S CREATURES?

A. There are too many to name. Something like 12 percent of all birds, a third of all amphibians and, likely, similarly large numbers of plants are in serious danger, I'd say. What's more, about 1 percent of all species on the planet are in such trouble that if we don't do the right things immediately they will be gone in a decade.

The river dolphin in China was declared extinct just last year. Another small dolphin in the Sea of Cortez is in immediate danger.

Q. WHAT CAN ONE PERSON DO TO STOP EXTINCTIONS?

A. One of the things I've done is start an NGO — a nongovernmental organization — called SavingSpecies.org. And it does what its title suggests. We've been working with local conservation groups and governments in Brazil and Madagascar doing a variety of projects that we hope will halt the potential extinctions there.

One of the things we know is that many endangered animals live over large areas. But their populations become fragmented because of farming and development. The remaining creatures can't find a date on a Saturday night. So we've been trying to buy up degraded land around their broken environments and try to create land corridors for the wildlife.

Q. HAVE YOU HAD ANY SUCCESSES YET?

A. Yes. On the Atlantic Coast of Brazil, we've been trying to help save the golden lion tamarin, an endangered primate about the size of a house cat. Last year, with the involvement of local conservationist groups, we helped purchase about 270 acres of cattle pasture that separated two patches of their habitat. This former pasture is now being replanted with trees. The two areas will soon be bridged, and it will be possible for lonely hearts to meet members of the opposite sex and go forth and multiply.

In another South American region I won't name here, there have been a lot of illegal logs taken. Why? Because a local godfather there was getting kickbacks from loggers. My friends and I decided we'd give him a bit more money and we stopped the illegal logging. I may burn in hell forever for paying protection, but it did help the animals and the indigenous people, who were not subjected to a lot of bad things. In terms of what we got for the money, it was a very good deal.

Q. YOUR GROUP HAS BEEN DOING A LOT OF WORK WITH INDIGENOUS TRIBES. WHY IS THAT IMPORTANT?

A: Because when you set aside indigenous reserves, it reduces deforestation.

There's another project in Northern Amazonia that my group has been involved in. This particular area is inhabited by indigenous peoples who have clear title to the land in their village. Recently, settlers came

into the area, wanting to turn the forests outside of the village — the very places where these people hunt and fish — into rice fields. Their claim was that no one owned the forests. So my Brazilian students and a local Catholic mission have been teaching the tribe's teenagers the use of modern global positioning technologies — G.P.S. The idea is that G.P.S. can help them can record where they hunt and fish and that will help them define the forest land as theirs. So here's an example of when we help the local people maintain their traditional ways, we're helping the flora and the fauna survive.

Q. HOW DO YOU FINANCE SAVINGSPECIES.ORG?

A. We raise money in the traditional way, but we're also selling symbolic carbon offsets to sympathetic donors.

As you know, when you restore forests, you soak up CO2 from the atmosphere. There are people who'd like to be carbon neutral — they'd like not to burn any more carbon than they are soaking up. So if someone buys an airline ticket and feels badly about all the carbon they're putting into the atmosphere during that flight, we sell them very beautiful, very cheap offsets from the forest restoration we have done.

We hope that this kind of swap will eventually become a financial obligation in a lot of the world.

Q. ARE YOU RELIGIOUS?

A. I'm a believing Christian. "God so loved the cosmos that he gave his only son." That's an injunction from St. John. To me, this says that Christians have an obligation to look after the world — stewardship. We cannot pointlessly drive species to extinction and destroy forests and oceans. When we do that, we are destroying God's creation.

That said, I'm not a vegetarian. I like a good steak now and then. Do I go out and slaughter cattle? Yep.

http://www.nytimes.com/2008/11/04/science/04conv.html?ref=science

'Opt Out' System Could Solve Donor Organ Shortage, Says Researcher

Dr John Troyer is an expert in the issues surrounding organ donation and the illegal trade of body parts. (Credit: Image courtesy of University of Bath)

ScienceDaily (Nov. 3, 2008) — A system of presumed consent for organ donation -- where people have to opt out of donating their organs when they die -- is the best way to tackle a growing waiting list for transplant.

That is the opinion of Dr John Troyer, an expert in organ donation and the illegal trade of body parts, who has recently joined the University of Bath's Centre for Death & Society.

There are more than 7,500 patients in the UK currently on the waiting list for organ donations. Whilst nearly 16 million people in the UK, a quarter of the population, are registered as organ donors, bereaved families have the final say as to whether the organs of their loved ones are used in a transplant. This can lead to delays and can sometimes mean that the deceased person's organs are not used.

Dr John Troyer, who started a RCUK fellowship at the University in September, said: "In the UK we currently have an 'opt in' system of organ donation, where donors can register their consent for their organs to be used after their death.

"I believe a better alternative to this would be an 'opt out' or so-called presumed consent system where organs are used unless the person has specified their wish otherwise. This would encourage people to talk to their loved ones about donating their organs when they die and could have a real impact on the huge waiting list."

Dr Troyer says there is currently an illegal global trade in most body parts, with teeth, nails and bones being sold on the black market to be used as pharmaceutical products and skin being used to treat burns victims.

Organs such as kidneys are also being sold by living donors for large sums of money, with organs from the third world sometimes being used for first world patients who are desperate for a life-saving operation.

Some experts are calling for the selling of organs to be regulated rather than outlawed, to try and increase organ donation and to ensure a fair price to donors and their families. However, Dr Troyer believes this would be a dangerous step to take.

He said: “The reasoning behind regulating the organ trade is that by increasing the domestic supply of organs, the trade on the black market could be reduced.

“Another suggestion is that, instead of cash, families of deceased potential donors could be offered incentives to allow organ donation such as health insurance, funeral expenses or a gift to a charity.

“I believe that organ donation should remain altruistic – like blood donation – with the choice to opt out if preferred. This would make a big difference to the number of organs available and reduce the demand on the black market. It will also reduce the exploitation of poor people who sell their organs and endanger their health because they are desperate for money.”

“Currently, the US has central organ database that matches available organs to patients on the waiting list. Whilst the UK has a national register of potential donors, there is no fast and easy way for doctors to check which organs are available.”

He added: “Discussing death and dying is always going to be a taboo subject. The British are typically uncomfortable discussing death – the only time people seem to want to talk about it is around Halloween!

“My father was in funeral industry so I grew up around dead bodies, which probably explains why I was drawn to studying the field I do.

“But having my background I almost feel it's my obligation to start the debate and get people thinking about the difficult issues surrounding death and dying.”

Earlier this year, ministers backed proposals to overhaul the donation system, although presumed consent was not amongst the proposals. However, over the next two weeks, the Welsh Assembly is holding a series of public debates to discuss the need to introduce a system of presumed consent.

Adapted from materials provided by University of Bath.

http://www.sciencedaily.com/releases/2008/10/081031112039.htm

Coral Bleaching Disturbs Structure Of Fish Communities

Healthy and dead parts of the same coral. There is no longer any shadow of a doubt about the impact of global warming on coral reefs. A rise of a few degrees in sea surface temperature induces the expulsion of essential microscopic algae which live in symbiosis with the coral. (Credit: iStockphoto)

ScienceDaily (Nov. 3, 2008) — There is no longer any shadow of a doubt about the impact of global warming on coral reefs. A rise of a few degrees in sea surface temperature induces the expulsion of essential microscopic algae which live in symbiosis with the coral. This process is the cause of coral bleaching and is well known to scientists, but few large-scale studies have dealt with its effects on the structure of communities of hundreds of species of reef-colonizing fish.

Research work reported on recently by an international research team*, including an IRD scientist, brought out evidence of the impact on the fish communities of a mass bleaching event resulting from the 1997-1998 El Niño climatic episode. The investigation was wide in scope, focusing on more than 60 coral reef sites in the Indian Ocean, including nine located in Marine Protected Areas.

Changes in diversity, size and composition of fish communities were found to follow the decline in the coral reef's health. Nevertheless, the status of no-take Marine Protected Areas, where fishing is strictly forbidden, appeared to have little impact on the recolonization of such waters by corals. The scientists therefore recommend the setting-up of reserves specially devoted to coral reef conservation.

Reef-building coral may be defined as the result of a symbiotic relationship between microscopic dinoflagellate algae, the zooxanthellae, and an animal organism, the polyp. In terms of biodiversity, coral reefs are often compared with the tropical rain forests. The reef ecosystem harbours thousands of species, whose complex interactions are still largely unfathomed. The main destructive factor facing rain forests is deforestation. The equivalent threat to coral ecosystems is bleaching. The sea surface temperature needs to rise only by a small number of degrees for the polyp to expel the zooxanthellae, the very element that is vital for its survival. Without these microscopic algae, the coral loses its colour, no longer receives the nutrients essential for its development and hence eventually dies.

Scientists have been working on the coral bleaching process for many years, but few studies have made it possible to assess the large-scale impact on reef fish communities. Recent work by an international team

in the Indian Ocean, including an IRD scientist, has provided keys to improved measurement of the consequences of a coral bleaching event, linked to a high-intensity El Niño event in 1997-1998, on fish communities. February 1998 saw temperature rises resulting from this regional climatic anomaly provoke mass bleaching - involving almost half the Indian Ocean's corals. That represented the most severe event of this kind since biologists began to study this ecosystem.

Data concerning the size, structure, diversity and trophic composition of fish communities of 66 coral sites of seven different countries (Maldives, Chagos Archipelago, Kenya, Seychelles, Tanzania, Mauritius and Réunion Island), collected in the mid 1990s, were compared with more recent ones gathered in 2005. A regional-scale picture of the 1998 bleaching event's impact on the coral reefs was produced by superimposing the two sets of information. Analysis showed that the decrease in the proportion of living coral and modification of its architectural complexity were two decisive factors behind changes to the structure of fish communities in the reef ecosystem.

After the corals die, turf algae and macroalgae rapidly invaded the space left free by the dead corals, leading to increased uniformity of the habitat. The mortality resulting from the bleaching particularly affects the reef-building corals. The calcareous constructions the latter build up serve as shelter and nursery for dozens of fish species. The huge decline of corals therefore affects those fish that depend closely on coral colonies, either as feeding grounds, like the polyp-eating butterflyfish, or to find protection, like the small-sized damselfish. When their numbers recede, these species are often replaced by herbivore fish (parrotfish, surgeonfish and so on) adapted to consuming certain algae proliferating on dead coral. Some, such as damselfish of the Stegastes genus, can then invade the coral reefs smothered in algae, as happened on several sites following the bleaching of 1998.

Moreover, nine out of the 60 or so sites studied are located within Marine Protected Areas where fishing has been strictly forbidden since the mid 1960s. As can be expected, the scientists have observed, after bleaching, a higher density of fish and a larger size among specimens in these marine reserves. The corals, however, did not manage to recolonize these protected zones any more rapidly than in ordinary areas. The weak level of coral regeneration appears partly linked to the fact that these strictly demarcated protection areas are close to the Equator, where the ocean warming of 1998 was most intense.

These results highlight its deleterious effects on the reefs, show that it is necessary to designate marine protected areas specifically dedicated to coral conservation. The creation of a network of marine conservation zones far enough away from the Equator to limit as much as possible the global-warming related rise in sea surface temperature, could at regional level, represent refugia effective for conservation both of the corals and of the fish species closely bound to the reef ecosystem.

*This research project was run jointly with scientists from Newcastle University (United Kingdom), the Wildlife Conservation Society, New-York (USA), James Cook University, Townsville (Australia), Université de la Réunion, Université de Marseille and Université de Perpignan (France).

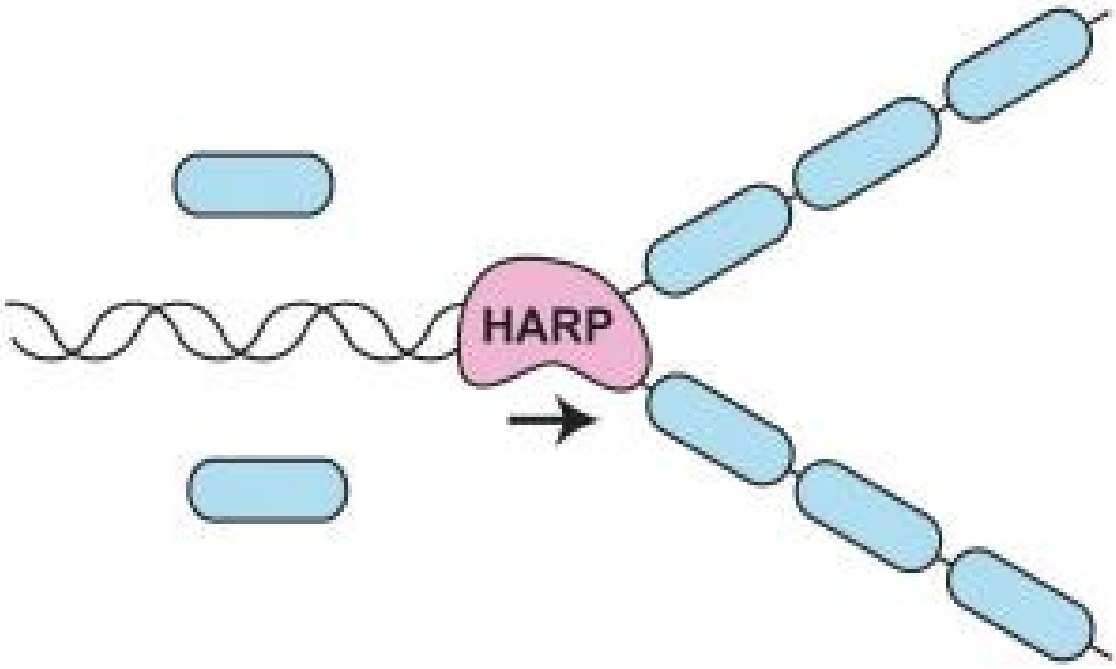
Journal reference:

1. Graham et al. **Climate Warming, Marine Protected Areas and the Ocean-Scale Integrity of Coral Reef Ecosystems**. *PLoS ONE*, 2008; 3 (8): e3039 DOI: 10.1371/journal.pone.0003039

Adapted from materials provided by Institut de Recherche pour le Développement, Paris (IRD).

http://www.sciencedaily.com/releases/2008/10/081028132106.htm

Biologists Discover Motor Protein That Rewinds DNA



The enzyme HARP "rewinds" sections of the double-stranded DNA molecule that become unwound, like the tangled ribbons from a cassette tape in DNA "bubbles" that prevent critical genes from being expressed. (Credit: James Kadonaga, UCSD)

ScienceDaily (Nov. 2, 2008) — Two biologists at the University of California, San Diego have discovered the first of a new class of cellular motor proteins that “rewind” sections of the double-stranded DNA molecule that become unwound, like the tangled ribbons from a cassette tape, in “bubbles” that prevent critical genes from being expressed.

“When your DNA gets stuck in the unwound position, your cells are in big trouble, and in humans, that ultimately leads to death” said Jim Kadonaga, a professor of biology at UCSD who headed the study. “What we discovered is the enzyme that fixes this problem.”

The discovery represents the first time scientists have identified a motor protein specifically designed to prevent the accumulation of bubbles of unwound DNA, which occurs when DNA strands become improperly unwound in certain locations along the molecule.

The UCSD researchers’ findings, detailed in the October 31 issue of Science, are also important because they provide biomedical scientists with a greater understanding of the molecular mechanisms that lead to a rare genetic disorder called Schimke immuno-osseous dysplasia. The discovery will eventually allow medical researchers to design future treatments for this devastating genetic disorder, which causes strokes, congestive heart failure, kidney failure and death in young children.

“We knew this particular protein caused this disease before we started the study,” said Kadonaga. “That’s why we investigated it. We just didn’t know what it did.”

What this protein, called HARP for HepA-related protein, did astounded Kadonaga and Timur Yusufzai, a postdoctoral fellow working in his laboratory. The two molecular biologists initially discovered that this motor protein burns energy in the same way as enzymes called helicases and, like helicases, attached to the dividing sections of DNA. But while helicases use their energy to separate two annealed nucleic acid

strands—such as two strands of DNA, two strands of RNA or the strands of a RNA-DNA hybrid— the scientists found to their surprise that this protein did the opposite; that is, it rewinds sections of defective DNA and thus seals the two strands together again.

As a consequence, the UCSD biologists termed their new enzyme activity an “annealing helicase.”

“We didn’t even consider the idea of annealing helicases before this study started,” said Kadonaga. “It didn’t occur to us that such enzymes even existed. In fact, we never knew until now what happened to DNA when it got stuck in the unwound position.”

Now scientists who study the action of helicases on DNA and RNA have an entirely new class of proteins to investigate.

“This will open up a whole new area of study,” said Kadonaga. “There are very few enzymes known that alter DNA structure. And we’ve discovered an entirely new one. This was not expected to happen in the year 2008. We should have found them all by now.”

“I believe it’s going to go beyond DNA. Just as there are DNA-DNA helicases, there are RNA-DNA helicases and RNA-RNA helicases. So it doesn’t take a lot of imagination to foresee that there are probably going to be RNA-DNA annealing helicases and RNA-RNA annealing helicases. The field potentially can be fairly large. And as more and more people discover additional annealing helicases, this field will expand.”

Kadonaga and Yusufzai are already searching for more annealing helicases, but they also plan to continue their studies of HARP.

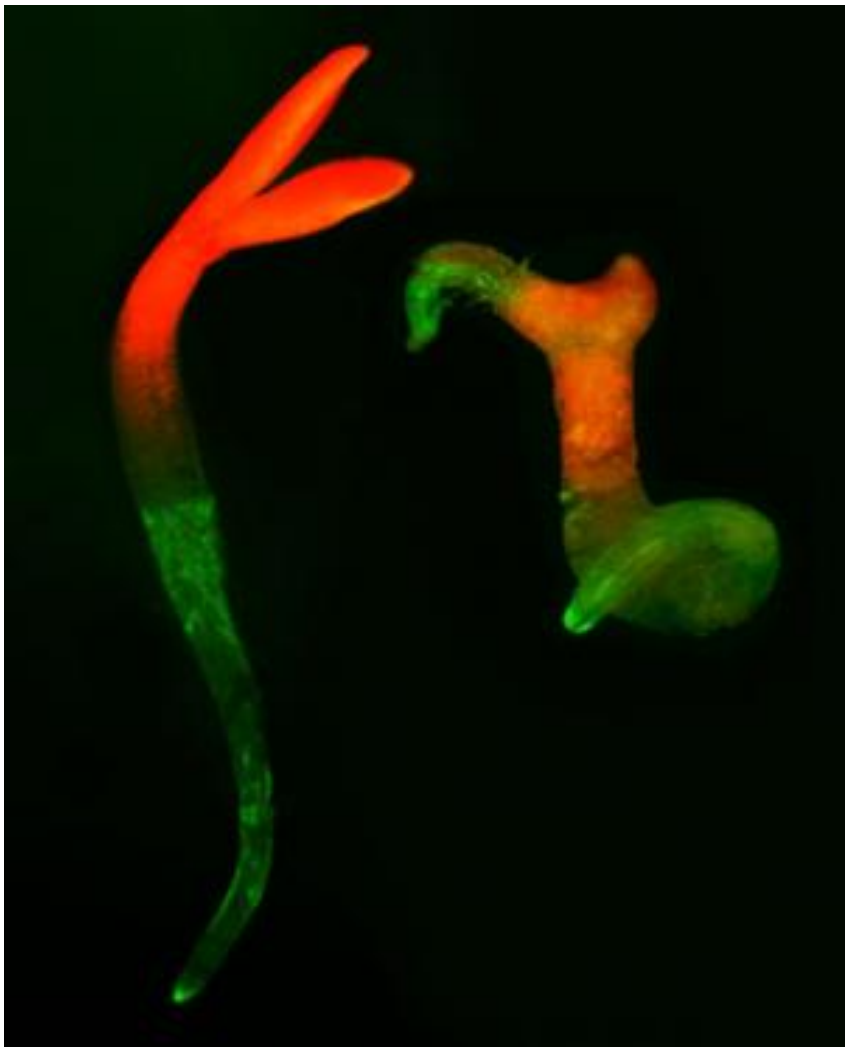
“First, what we want to do is find more of these proteins, so we’re looking for more right now,” said Kadonaga. “We also want to see what other specific processes are affected by this particular protein, HARP, in the cell.”

The project was supported by a grant from the National Institutes of Health.

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2008/10/081030144615.htm

Researcher Grows Roots On Upper Part Of Plant



The photo on the left shows a normal plant with normal leaves and a root and the photo on the right shows a plant on which root has started to grow at the place of young leaf. The shoot part is shown in orange and the roots in green. (Credit: Image courtesy of Utrecht University)

ScienceDaily (Nov. 2, 2008) — Molecular cell biologist Pankaj Dhonukshe from Utrecht University has succeeded in growing roots on plants at places where normally leaves would grow. This important step in plant modification can be highly beneficial for improving crop yields and efficiency in agriculture.

This research was largely carried out in collaboration between Utrecht University (The Netherlands) and Ghent University (Belgium) with help from scientists in Japan, USA and Switzerland. The results of this research appeared as an advance online publication of the weekly science journal Nature on 26 October 2008.

The plant hormone auxin plays a crucial role in coordination of stem cells and organ formation in plants. It promotes the formation of roots from stem cells and coordinates the growth of leaves and fruits. Auxin is produced mainly in young leaves, or shoots, and is then transported from one cell to the next towards the basal region of plant ultimately leading towards root formation.

Pankaj Dhonukshe discovered a molecular switch to alter the auxin transport. By turning on the switch, Dhonukshe was able to reduce the extent of auxin transport towards the roots. The hormone then began to accumulate at the places in the young leaves where it is produced and roots began to emerge here where normally leaves would grow.

These results are an important step in our understanding of the way plants grow and create novel future possibilities to modify the positioning of various plant organs such as roots, fruits and leaves. This specific manipulation of plant architecture promises to enhance yield-traits and crop harvesting. Molecular switches are particularly interesting for influencing plant forms, because utilization of traditional plant refinement approaches has certain limitations. The Utrecht research group is currently examining further interesting possibilities in this area.

Dhonukshe carried out the developmental biology research at Utrecht University, and the cellular biology research in cooperation with Ghent University.

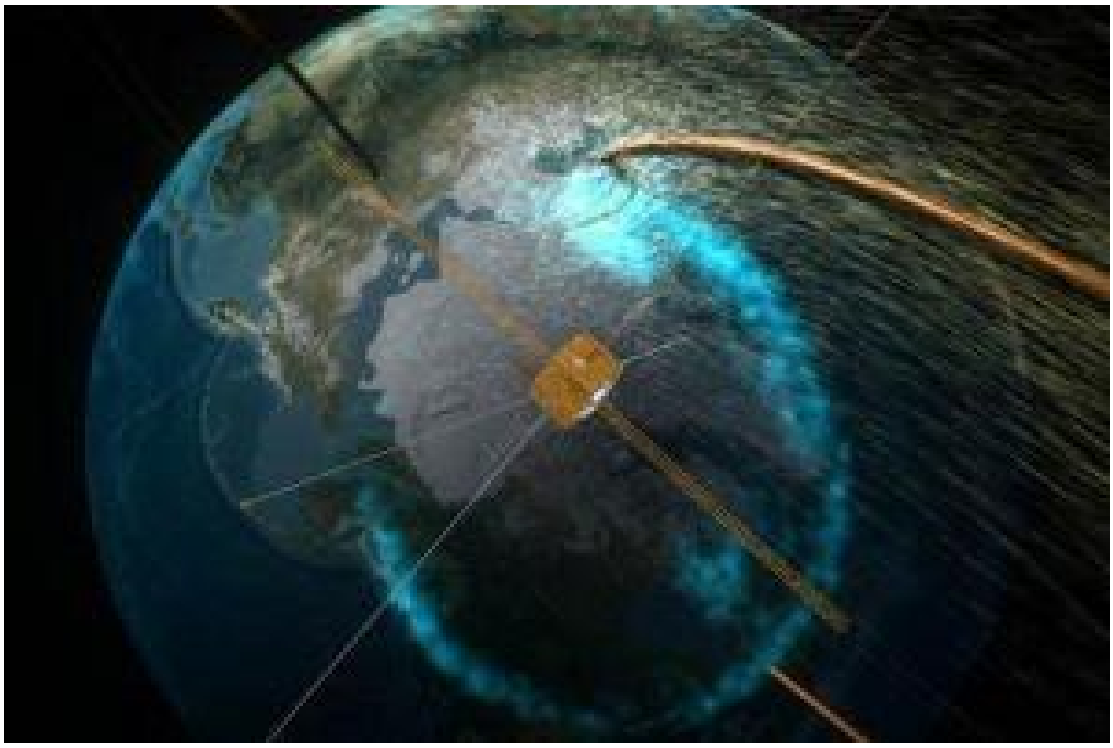
Utrecht University has organised its top-level research into fifteen focus areas, which are intended to promote high-quality research and contribute to solving major problems in society. The study described above falls under the category 'Life Sciences and Biocomplexity', in which research is being carried out into all the processes in the cell from the molecular scale to the creation of multi-celled organisms and the interaction among cells. Genomics and proteomics form an important part of this area.

For more information, please visit http://www.uu.nl/EN/research/focusareas/.

Adapted from materials provided by Utrecht University, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081030194234.htm

Magnetic Portals Connect Sun And Earth



An artist's concept of Earth's magnetic field connecting to the sun's -- a.k.a. a "flux transfer event" -- with a spacecraft on hand to measure particles and fields. (Credit: Image courtesy of Science@NASA)

ScienceDaily (Nov. 2, 2008) — During the time it takes you to read this article, something will happen high overhead that until recently many scientists didn't believe in. A magnetic portal will open, linking Earth to the sun 93 million miles away. Tons of high-energy particles may flow through the opening before it closes again, around the time you reach the end of the page.

"It's called a flux transfer event or 'FTE,'" says space physicist David Sibeck of the Goddard Space Flight Center. "Ten years ago I was pretty sure they didn't exist, but now the evidence is incontrovertible."

Indeed, today Sibeck is telling an international assembly of space physicists at the 2008 Plasma Workshop in Huntsville, Alabama, that FTEs are not just common, but possibly twice as common as anyone had ever imagined.

Researchers have long known that the Earth and sun must be connected. Earth's magnetosphere (the magnetic bubble that surrounds our planet) is filled with particles from the sun that arrive via the solar wind and penetrate the planet's magnetic defenses. They enter by following magnetic field lines that can be traced from terra firma all the way back to the sun's atmosphere.

"We used to think the connection was permanent and that solar wind could trickle into the near-Earth environment anytime the wind was active," says Sibeck. "We were wrong. The connections are not steady at all. They are often brief, bursty and very dynamic."

Several speakers at the Workshop have outlined how FTEs form: On the dayside of Earth (the side closest to the sun), Earth's magnetic field presses against the sun's magnetic field. Approximately every eight minutes, the two fields briefly merge or "reconnect," forming a portal through which particles can flow. The portal takes the form of a magnetic cylinder about as wide as Earth. The European Space Agency's

fleet of four Cluster spacecraft and NASA's five THEMIS probes have flown through and surrounded these cylinders, measuring their dimensions and sensing the particles that shoot through. "They're real," says Sibeck.

Now that Cluster and THEMIS have directly sampled FTEs, theorists can use those measurements to simulate FTEs in their computers and predict how they might behave. Space physicist Jimmy Raeder of the University of New Hampshire presented one such simulation at the Workshop. He told his colleagues that the cylindrical portals tend to form above Earth's equator and then roll over Earth's winter pole. In December, FTEs roll over the north pole; in July they roll over the south pole.

Sibeck believes this is happening twice as often as previously thought. "I think there are two varieties of FTEs: active and passive." Active FTEs are magnetic cylinders that allow particles to flow through rather easily; they are important conduits of energy for Earth's magnetosphere. Passive FTEs are magnetic cylinders that offer more resistance; their internal structure does not admit such an easy flow of particles and fields. (For experts: Active FTEs form at equatorial latitudes when the IMF tips south; passive FTEs form at higher latitudes when the IMF tips north.) Sibeck has calculated the properties of passive FTEs and he is encouraging his colleagues to hunt for signs of them in data from THEMIS and Cluster. "Passive FTEs may not be very important, but until we know more about them we can't be sure."

There are many unanswered questions: Why do the portals form every 8 minutes? How do magnetic fields inside the cylinder twist and coil? "We're doing some heavy thinking about this at the Workshop," says Sibeck.

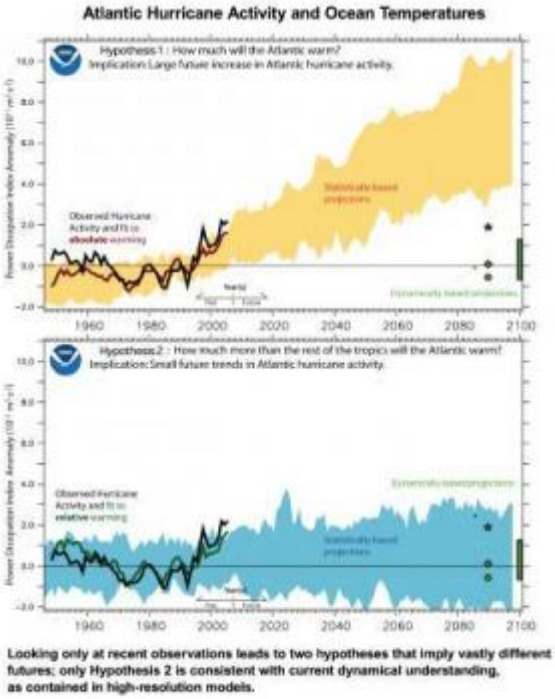
Meanwhile, high above your head, a new portal is opening, connecting your planet to the sun.

Adapted from materials provided by Science@NASA. Original article written by Dr. Tony Phillips.

http://www.sciencedaily.com/releases/2008/11/081101093713.htm

Recent Hurricane History Provides Diverging Interpretations On Future Of Hurricane Activity

Looking at recent observations leads to two hypothesize that imply vastly different futures; only hypothesis two is consistent with current dynamical understanding, as contained in high-resolution models. (Credit: NOAA GFDL)



Looking only at recent observations leads to two hypotheses that imply vastly different futures; only Hypothesis 2 is consistent with current dynamical understanding, as contained in high-resolution models.

ScienceDaily (Nov. 2, 2008) — In a paper published in the journal Science, scientists Gabriel A. Vecchi of NOAA's Geophysical Fluid Dynamics Laboratory, Kyle L. Swanson of the University of Wisconsin - Milwaukee Atmospheric Sciences Group and Brian J. Soden from the University of Miami's Rosenstiel School of Marine and Atmospheric Science teamed up to study hurricane data observed over more than 50 years.

The study explores the relationship between sea surface temperature (SST) and seasonal hurricane activity, and show how differing interpretations of the observational record can imply vastly different futures for Atlantic hurricane activity due to global warming. The two interpretations arise from assumptions of whether it is the local SST in the Atlantic in isolation, or whether it is the SST in the Atlantic 'relative' to the rest of the tropics, that drives variations in Atlantic hurricane activity.

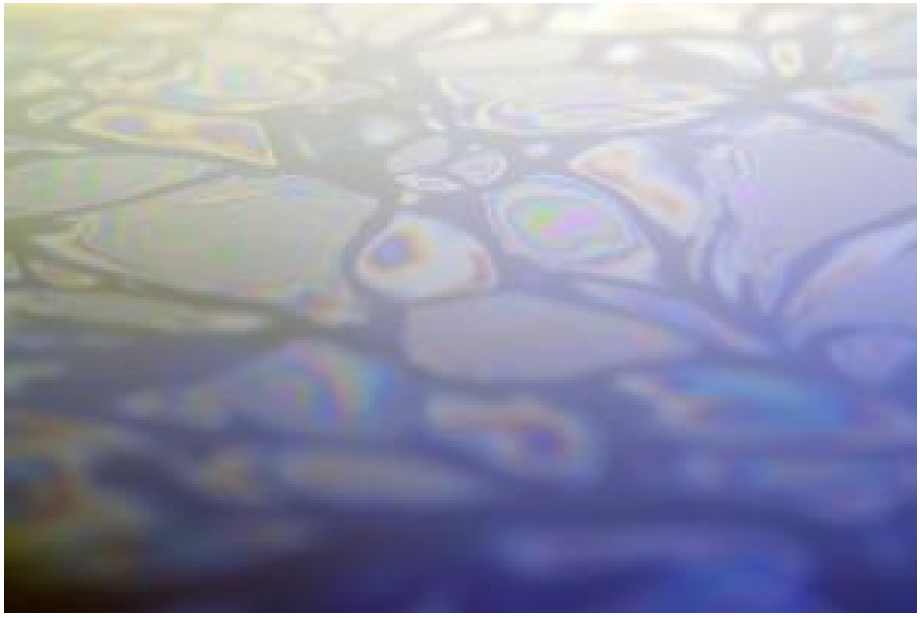
If one assumes the former (the local SST hypothesis), then by 2100, the lower bound on Atlantic hurricane activity is comparable to that of 2005, when four major hurricanes struck the continental United States, causing more than $100 billion in damage. The upper bound exceeds 2005 levels by more than a factor of two. However, if one assumes the latter (the relative SST hypothesis), then the future is similar to the recent past, with periods of higher and lower hurricane activity relative to present-day conditions due to natural climate variability, but with little long-term trend.

The statistical relationship between either interpretation of the SST/hurricane activity link is ambiguous over the period 1946-2007 (they are statistically indistinguishable, though both are significant), but they imply fundamentally different projections for the future and interpretations of the past. The team further argues that the consistency between theory, numerical models, and historical observations offers compelling evidence that the 'relative' SST hypothesis is more accurate and provides a better framework for projections of future changes in hurricane activity.

Adapted from materials provided by University of Miami Rosenstiel School of Marine & Atmospheric Science.

http://www.sciencedaily.com/releases/2008/10/081031141526.htm

Cleaning Heavily Polluted Water At A Fraction Of The Cost



A new water treatment system for industrial oil polluted water has been developed at a tenth of the cost of other commercially available tertiary treatments, leaving water so clean it can be pumped safely back out to sea without endangering flora or fauna. (Credit: iStockphoto/Achim Prill)

ScienceDaily (Nov. 2, 2008) — A European research project has succeeded in developing a water treatment system for industrial oil polluted water at a tenth of the cost of other commercially available tertiary treatments, leaving water so clean it can be pumped safely back out to sea without endangering flora or fauna.

Wastewater from ships, oil refineries and other petrochemical industries is heavily contaminated with toxic compounds. Stringent EU regulations apply to its treatment and discharge since, if left untreated, these compounds are hazardous to our health, our coastlines and deadly to all forms of aquatic life when released into our waterways.

The most complete method of treating petrochemically polluted waste water is through a series of three stages involving physicochemical and biological processes. It is the third and final stage of the treatment that renders the water clean enough to be discharged into the sea. The process is complex, requiring a combination of bioreactor, chemical coagulation, granulated activated carbon or sorption technologies.

This tertiary stage is the most expensive part of the treatment. It can also cause fouling, the growth of undesirable bacteria and problems with the waste disposal of toxic sludge produced in the process, if it isn't properly monitored.

"The cost of tertiary treatment is a big problem," says Professor Viktoras Racys at the Kaunas University of Technology in Lithuania – the main project partner in Eureka project E!2962 Euroenviron Biosorb-Tox. "You can treat petrochemically polluted water effectively, but it costs a lot. We set out to find a stable process which was as cheap as possible."

New solutions

The research group at the university's environmental engineering department had already developed and tested a new wastewater treatment model on a laboratory scale. "In order to apply our water treatment to

large industrial practices we needed financial assistance from external sources. The Eureka partnership helped in doing this," says Professor Racys.

Together with three partners, the project team came up with an ultra-efficient combination on an industrial scale. "We developed the treatment using three processes in one piece of equipment, a reactor," explains Professor Racys. "We use sorption, bio-degradation and filtration. The pollutants are degraded by micro-organisms created within the reactor," he says.

Teamwork

The project partners, all renowned experts in their field, came together from Sweden and Lithuania. The Environmental Chemistry Department of the University of Umeaa in Sweden specialises in the study of environmental problems caused by organic pollutants. Equipped with a cutting edge research laboratory, it provided the analysis and identification of the organic compounds contained in wastewater polluted with petrochemical products, using the latest technology. The department also developed procedures to evaluate these compounds and their degradation, and analyse the composition and toxicity of the sludge produced by the system.

A Swedish high-technology SME, Exposmeter, developed an in-line sampling and monitoring tool to measure the system's efficiency in treating toxic compounds. It carried out full-scale tests on the operation of the equipment and validated the methods used, providing a set of standard operating procedures.

The design, manufacture and installation of the reactor was carried out by Dinaitas, a Lithuanian SME specialising in wastewater treatment plants and technologies. Dinaitas also took on the maintenance of the entire system once it was operational.

Astounding results

The system is already up and running, treating petrochemically polluted wastewater at Lithuanian oil company, Nasta. "It works great," says Professor Racys. "We couldn't believe the results the first time. It has a high capacity, processing 160 m3 per hour. The cost is 1 euro for every 3.5 litres. Effectively it's 10 or 20 times better than what else is available."

But that's not the end of it. The purity of the end water is greatly enhanced. "The water before the treatment is highly polluted, containing 1 gram of pollutant per litre. After treatment it contains only 0.1 gram of pollutant per litre. This surpasses the EU standards and the water can be put straight back into the sea," says Professor Racys.

After two years of daily operation, the system has proved to be stable and has spawned several academic publications. It is ready to use in sensitive environmental regions, for the treatment of oil production and refinery wastewater, ballast water, the run-off from car washes and car parks and any petroleum polluted wastewaters containing both legally regulated compounds and the most toxic or persistent compounds.

Professor Racys thinks the reactor can be improved and would like to take the work further forward at an industrial level. "I'm very much involved with it, as with most scientists, my work is like my child," he says. He is looking for new industrial partners, however, with operating results already as good as these, they are proving hard to find.

Adapted from materials provided by Eureka, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081030194226.htm

Book Links Nov. 2008 (vol. 18, no. 2)

Talking with Brian Floca

The creator of the Sibert Honor Book *Lightship* discusses his life, his work, and finding new inspiration.

By Jeanette Larson

Elementary school

Brian Floca jumped into children's publishing in 1993 by being in the right place at the right time. Hand-picked by Avi to illustrate *City of Light, City of Dark*, Floca, then a student at Brown University, was able to skip a lot of the waiting and rejection faced by many aspiring illustrators. Since then, he has illustrated more than two dozen books written by others. He has also illustrated his own stories, beginning with *The Frightful Story of Harry Walfish* (Orchard, 1997), a whopper of a tale set in a natural-history museum. I first met Floca, a native Texan, at the 1998 Texas Book Festival and got to know him better when he created the art for the 2000 Texas Reading Club, a statewide summer reading program. Interestingly, after all these years and so many books—including the Sibert Honor Book *Lightship*—little has been written about this prolific and highly respected illustrator. Hoping to fill that void, I recently chatted with him about his life and work.

JL: You are something of a man of mystery. You've written or illustrated more than two dozen books, but it isn't easy to find information about you other than basic details about your life. Would you share a bit about yourself?
Floca: "Man of mystery" makes it all sound so interesting! At the risk of stripping away the mystique: I was born on January 11, 1969, and raised in Temple, Texas. My mom, a former teacher, stayed home with my younger sister and me, and my dad ran the family business, a soft-drink bottling company. (My appreciation for gears and machinery is at least partially owed to childhood visits to the bottling plant.) I grew up reading, with frequent trips to the library; exploring the woods behind our house; enjoying the company of the family pets (one cat, one dog, occasional hamsters); watching too much television; and drawing. I went to Brown University for college, where I studied art and history and, while still in school, got involved in children's book illustration, which I've been doing ever since.

JL: When did you start drawing and when did you realize that you wanted to make a career out of your art?
Floca: I've drawn for as long as I can remember. I've always loved it, and I suppose early on I recognized that it was something I could do well. Still, for a long, long time I didn't have a clear idea of whether I was good enough to make a living at it, or how I might do that. By high school, for instance, I knew that I was the go-to guy if you wanted a cartoon for your t-shirt, but what does that really tell a person? Then at Brown and also at the Rhode Island School of Design—Brown students can sign up for RISD courses and vice versa—I could hold my own in the art classes, and I began to think about some post-college

connection with art. My first choice would have been to have my *Brown Daily Herald* comic strip syndicated, but the national syndicates and I did not see eye to eye on that point.

JL: Your first published book was *City of Light, City of Dark*, a graphic novel by Avi. How did you get involved in that project?
Floca: Avi, who at the time was living in Providence, Rhode Island, had sent a manuscript titled *The Shortest Day* to his editor, Dick Jackson. They talked about turning the manuscript into a "comic-book novel"—this was after Art Spiegelman's *Maus*, but still well ahead of the mainstreaming of the graphic novel—and Dick suggested to Avi that it would be easier to consider the idea if there were some sample chapters in that format. Against all publishing conventions it fell to Avi to find someone with whom to put together an illustrated proposal. This person would need a tolerance for doing a fair amount of work for (initially) no money, and perhaps that's what led Avi to the idea of recruiting a student. Avi mentioned all this to David Macaulay, who was teaching at RISD and whose class I was taking, and Macaulay mentioned it to me. I met Avi in the summer of 1991. *City of Light, City of Dark* came out in 1993. What I got from the experience, beyond being published, were good relationships with both Avi and Dick, who during the whole course of the project treated a greener-than-green young illustrator with great generosity and trust. Fifteen years later, I continue to work with both of them.

JL: Will you be creating other graphic novels?
Floca: I enjoyed making *City of Light, City of Dark*, and there are graphic novels that I love, but I have figured out that I am really more of a picture-book guy. To be perfectly honest, sometimes I open up a graphic novel and I see all of those tiny, tiny, tiny pictures and it just feels like too much. You have more room to breathe in a picture book. You can dip into panels and sequential passages when you feel like it, but your real challenge is to create only a few essential pictures, big pictures that can epitomize and carry the key moments in the narrative, but that also end up leaving blank moments for the readers to fill in. It's an interesting, challenging, and rewarding way to tell a story.

JL: You had been illustrating and publishing for several years when you entered the master's degree program at the School of Visual Arts. What made you want to go back to school?
Floca: About 10 years ago I was at a point where I'd done several trade books, including one book of my own, and I had an agent and was getting steady freelance work in the educational market. But even though some of that work was rewarding, I was beginning to feel adrift in the career and the work. I had no focused sense of where I wanted it all to go. And the drawings for the education market, though they were keeping me fed and shod, for which I was grateful, were otherwise dispiriting to work on, and I could feel them influencing the direction of all of my work.

It was a confusing situation; on the one hand, I knew what a hard field this is to break into and felt lucky to be a part of it, but on the other hand, most of the time I wasn't really doing the kind of work that makes a person want to get into the field in the first place. And I didn't really know anyone else in the field to talk with about all of this. So simply as a break really, I signed up for a summer study-abroad course through RISD, and that ended up being a remarkable experience. It was a good, hard-working, engaged group of students, and we were living in central Rome and drinking espresso and wine and drawing and painting and looking at and talking about art. It was only a month and a half, but it was an extraordinarily productive and happy time, and that got me thinking about graduate school, about how useful it could be for me to be around other artists and to be in a space that helped me to think critically and actively about how I wanted to work.

JL: I see some of Macaulay's influence in *The Hinky-Pink*. What other artists have influenced your work?
Floca: If you grew up with Macaulay's architecture books, and then sit down to draw the brickwork on the Palazzo Pitti, it shows! As for other influences, I'll tell you whom I admire most and you can decide if there are dots there to connect: Quentin Blake, Edward Ardizzone, E. H. Shepard, David Gentleman, Robert Andrew Parker, Hergé, William Steig, and Warwick Hutton. I grew up on those Richard Scarry books, too, and the quiet cheerfulness, legibility, and amount of story (or story fragments, assembly by

reader required) that were offered on each page of those books have stuck with me. So, roughly, the line-and-watercolor gang. Line is less impressive to some people than painterly work, but there's a communicative power in line drawings that is very strong and important to young readers. We all draw as kids, and we mostly draw with line, and I think that stays with us in some deep-rooted way. Also, there's something wonderful about how line drawings can show the drawing and what's being drawn at the same time. Even, or perhaps especially, the simplest line drawings, when done well, have a magic and elegance.

JL: How do you decide on your subjects? Do you approach your work differently when you are illustrating someone else's words rather than your own?
Floca: To find my own subjects, I try to put myself in promising situations, to look actively, to be self-aware about what is catching my interest, and to take notes. As for how I work with someone else's text versus my own, it is indeed a very different process. When it's your own text you have the freedom to go in and totally rearrange the plumbing of the book. Not so with other people's writing, but it's good sometimes to have elements beyond your control, to be maneuvered by someone else's ideas into ideas that otherwise would never have occurred to you.

JL: Do you always use the same medium?
Floca: The drawings for Avi's Poppy books are simply pencil, but otherwise it's pencil, India ink, watercolor, and a little gouache.

JL: What technology do you use in your illustrating work?
Floca: I have strong gadget appreciation skills, and the computer is essential for communication and research and often for frittering away time. And I will sometimes scan in sketches and move bits around in Photoshop or work on layouts in InDesign. But when it's really time to work, the best technologies are nib, pencil, brush, and paper. There's tactile pleasure there that I can't find with a screen, keyboard, or mouse.

JL: You have a talent for telling good stories based in fact. *Lightship* won a Sibert Honor for being an outstanding informational book, although it reads like a storybook. What has the award meant for you and your work?
Floca: I try not to fetishize awards, maybe because I haven't won many of them, but receiving the Sibert Honor was a big deal. It was exciting, surprising, and humbling, and it has lifted the profile of *Lightship* and I think sharpened people's sense of the rest of my work, too. And since the forthcoming *Moonshot* is in the same vein as Lightship—it's narrative, it's historical, it doesn't spare the nuts and bolts—then hopefully the award has also helped prepare expectations a little bit for that book. So the Sibert Honor has been a professionally and personally meaningful thing, and I'm grateful for it.

JL: You clearly do some extensive research for your books. Tell me a little bit about the techniques you use.
Floca: I enjoy the research, which allows me to employ some old history-major habits, but with no midterms. I do a lot of reading—books, periodicals, and Web sites—and look for visual reference wherever I can find it. Scale models, for instance, are useful when you're trying to draw a racecar or a lunar module. When possible I connect with primary sources.

To prove my dedication to my work, I visited Tuscany for *The Hinky-Pink*. I interviewed lightship sailors for *Lightship* and—true story—I ran into Apollo 11 astronaut Michael Collins at the Dallas/Fort Worth airport days after I sold the *Moonshot* book proposal. (But admittedly that was a coincidence, and I was really only trying to convince him that even though I recognized him, I wasn't stalking him.) What stays the same from book to book is that I try to keep my eyes open not only for the central information that will make the book accurate but also for asides that can add life, texture, and interest to a work. By that I mean things such as the crew drying their laundry on deck in *Lightship*, or the manual pencil sharpener and pneumatic tubes that you'll find in Mission Control in *Moonshot*, or the sense of place that I hope you'll find in *The Hinky-Pink*, even though it's a decidedly fictional book.

JL: You started a blog in late 2007 and have posted several trailers for your books on YouTube. What do you hope to achieve with these tools?
Floca: What I most enjoy about the blog is that it offers a means of connection with readers, writers, librarians, editors, and fellow artists—with anyone who might be interested in knowing more about the work or meeting it on an additional level. Writing and illustrating can be isolating work at times, so that sense of con-nection can mean a lot. And of course, there's another element to the blogging, too, which might be summed up as shameless self-promotion. For better or worse, the sense that it's up to authors to carry a good chunk of a book's marketing load is very strong these days. I try to keep outright shilling to a minimum though.

JL: What's next for you?
Floca: I'm working now on two illustration projects. I'm just now getting the gears catching on a manuscript by Jan Greenberg and Sandra Jordan, which is going to push and pull me in all sorts of (hopefully fruitful) ways. The other project is Poppy and Ereth, the final book in Avi's Poppy series, which will be a more familiar project but, as a last chance to visit characters for whom I have great affection, will have its own challenges and rewards. In recent work, between *The Racecar Alphabet*, *Lightship*, and *Moonshot*, I feel that I've found a way of writing and drawing that fits me well. I've enjoyed taking boy-book tropes that might seem like low-hanging fruit to some people—we're talking racecars, boats, and astronauts, after all—and working hard to make good, layered books. So right now I feel that I'm in a groove that's not yet a rut, and that the books are getting better, and that I want to keep pushing on in this direction and see what I can do.

For more about Brian Floca, visit *Book Links'* November 2008 "Web Connections."

Sampling Floca

City of Light, City of Dark. By Avi. 1993. 192p. Orchard, paper, $8.99 (9780531070581). Gr. 3–6.

The Hinky-Pink: An Old Tale. By Megan McDonald. 2008. 48p. Simon & Schuster/Richard Jackson, $16.99 (9780689875885). Preschool–Gr. 2.

Lightship. 2007. 48p. Simon & Schuster/Richard Jackson, $16.99 (9781416924364). K–Gr. 3.

Moonshot. April 2009. 48p. Simon & Schuster/Richard Jackson, $17.99 (9781416950462). K–Gr. 3.

The Racecar Alphabet. 2003. 40p. Simon & Schuster/Richard Jackson, $17.99 (9780689850912). Preschool–Gr. 2.

Jeanette Larson is a children's literature consultant and adjunct instructor for Texas Woman's University's School of Library and Information Studies in Denton.

http://www.ala.org/ala/aboutala/hqops/publishing/booklinks/resources/floca.cfm

Monsoon link to fall of dynasties

The demise of some of China's ruling dynasties may have been linked to changes in the strength of monsoon rains, a new study suggests.

The findings come from 1,800-year record of the Asian monsoon preserved in a stalagmite from a Chinese cave.

Weak - and therefore dry - monsoon periods coincided with the demise of the Tang, Yuan and Ming imperial dynasties, the scientists said.

A US-Chinese team report their work in the journal Science.

Stalagmites are largely made up of calcium carbonate, which precipitates from groundwater dripping from the ceiling of a cave.

Chemical analysis of a 118mm-long stalagmite from Wangxiang Cave, in Gansu province, north-west China, told the history of strong and weak cycles in the monsoon - the rains that water crops to feed millions of people in Asia.

It also shows that, over the last 50 years, greenhouse gases and aerosols have taken over from natural variability to become the dominant influence on the monsoon.

Death of dynasties

Small variations in the forms, or isotopes, of the stalagmite's oxygen composition reflected variations in rainfall near the cave.

Proportions of the radioactive elements uranium and thorium in the deposit allowed the researchers to date the stalagmite layers to within an average of two-and-a-half years.

By comparing the rain record with Chinese historical records, Pingzhong Zhang of Lanzhou University in China, and colleagues, found three out of five "multi-century" dynasties - the Tang, the Yuan and the Ming - ended after several decades of weaker summer monsoons with drier conditions.

"Summer monsoon winds originate in the Indian Ocean and sweep into China," said Hai Cheng, co-author from the University of Minnesota, US.

"When the summer monsoon is stronger, it pushes farther north-west into China."

These moisture-laden winds bring rain necessary for cultivating rice. But when the monsoon is weak, the rains stall farther south and east, depriving northern and western parts of China of summer rains.

This could have led to poor rice harvests and civil unrest, the researchers speculate.

"Whereas other factors would certainly have affected these chapters of Chinese cultural history, our correlations suggest that climate played a key role," the researchers write in Science.

But a weak monsoon could also be linked to changes further afield. The researchers say a dry period between 850AD and 940AD coincides not only with the decline of the Chinese Tang dynasty but also with the fall of the Mayan civilization in America.

Human influence

Subsequent strengthening of the monsoon may have contributed to the rapid increase in rice cultivation, a dramatic increase in population and general stability at the beginning of China's Northern Song Dynasty.

The monsoon record also matched up nicely with the advance and retreat of Swiss glaciers.

Scientists say the natural archive shows that climate change can have devastating effects on local populations - even when this change is mild when averaged across the globe.

In the cave record, the monsoon followed trends in solar activity over many centuries, suggesting the Sun played an important role in the variability of this weather system.

To a lesser extent, it also followed northern hemisphere temperatures on a millennial and centennial scale. As temperatures went up, the monsoon became stronger and, as they dropped, it weakened.

However, over the last 50 years, this relationship has switched. The researchers attribute this to the influence of greenhouse gas emissions and sulphate aerosols released by human activities.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7714019.stm

Published: 2008/11/06 20:58:51 GMT

Climate pushing lemmings to cliff

Climate change is bringing wetter winters to southern Norway, a bleak prospect for the region's lemmings.

Scientists found that numbers of the animals no longer vary over a regular cycle, as they did until a decade ago; there are no more bumper years.

The snow is not stable enough, they think, to provide winter shelter.

Writing in the journal Nature, the researchers suggest the lack of Norwegian lemmings is affecting other animals such as foxes and owls.

In boom years, lemmings are the most plentiful and important prey for these carnivores.

Until the mid-1990s, the lemming population in the study area in southern Norway varied on a cycle of three to five years.

Rather than hibernating, lemmings spend the winter living in the space between the ground and a stable layer of snow above.

Dry winters would allow large numbers to survive until spring, resulting in a population explosion.

On occasions, there were so many that snowploughs were deployed to clear squashed animals from roads.

These years often saw Norwegian lemmings *(Lemmus lemmus)* having to compete hard for food.

The desperate search led some to jump off high ground into water, leading to the popular - but wrong - assumption that they were prone to commit collective suicide.

But the peak years are not occurring anymore. The research team, composed of Norwegian and French scientists, believes the winters are now too humid, leading to the "wrong kind of snow".

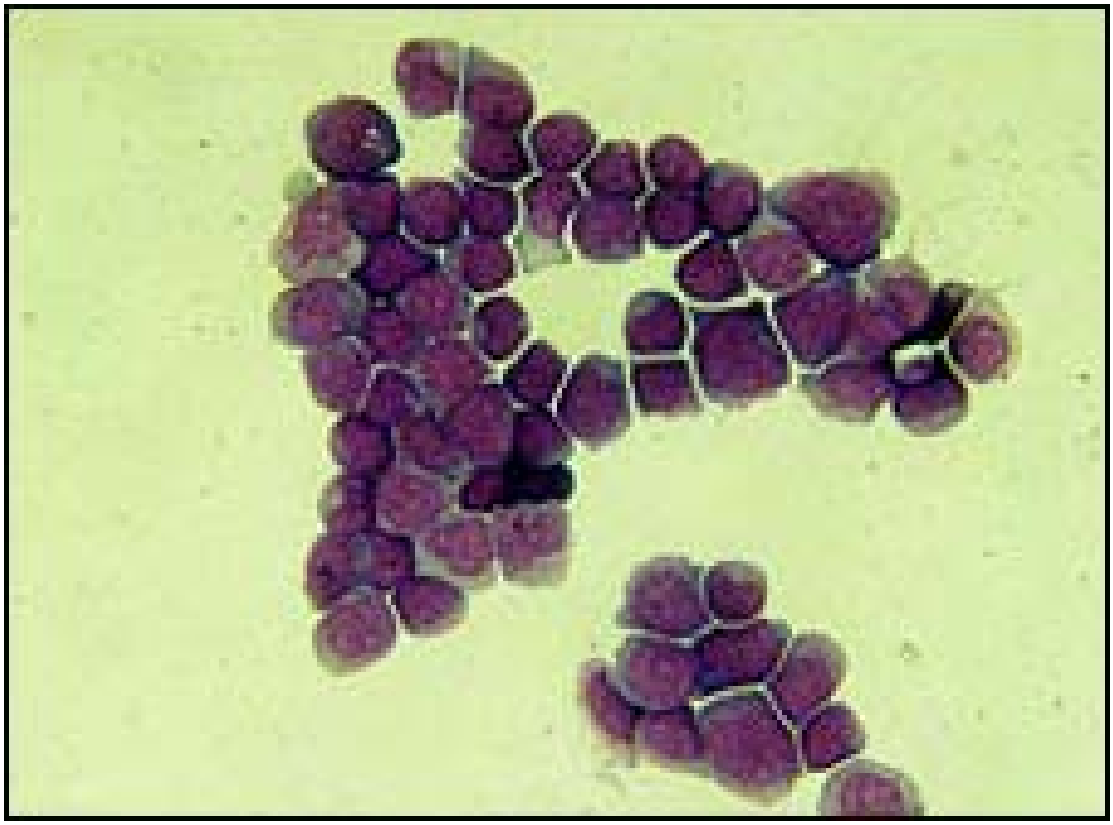
This results in a less stable subnivean space (the space between the ground and the snow layer above), meaning substantially fewer animals survive until spring.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7711709.stm

Published: 2008/11/05 19:14:15 GMT

Cancer genetic blueprint revealed

Scientists have decoded the complete DNA of a cancer patient and traced her disease to its genetic roots.



The Washington University team identified 10 gene mutations which appeared key to the development of the woman's acute myeloid leukaemia.

Just two of these had been linked to the disease before.

The sequencing technique, described in the journal Nature, could be applied to other cancers and aid the design of targeted drugs.

> **This achievement ushers in a new era of comprehensive understanding of the fundamental nature of cancer**
> Dr Francis Collins
> Geneticist

The researchers took two samples from the woman in her 50s - who later died from the disease - and examined the DNA for differences.

One sample was taken from healthy skin cells, the other from bone marrow tissue made up of cancerous cells.

They found that virtually every cell in the tumour sample had nine of the key mutations.

Like most cancers, acute myeloid leukaemia (AML) - a cancer of blood-forming cells in the bone marrow - arises from mutations that accumulate in people's DNA over the course of their lives.

However, little is known about the precise nature of those changes and how they disrupt biological pathways to cause the uncontrolled cell growth that is the hallmark of cancer.

Previous efforts to decode individual human genomes have looked at common points of DNA variation that may be relevant for disease risk.

In contrast the Washington team, using a gene sequencing technique, were able to sift through the three billion pairs of chemical bases that make up the human genome to pull out the mutations that contributed to the patient's cancer.

True landmark

Geneticist Dr Francis Collins, a former director of the US National Human Genome Research Institute, called the study a "true landmark in cancer research".

> **This is a very important piece of research, not only for our understanding of leukaemia but for many other types of cancer**
> Kat Arney
> Cancer Research UK

He said: "In the past, cancer researchers have been 'looking under the lamp-post' to find the causes of malignancy - but now the team from Washington University has lit up the whole street.

"This achievement ushers in a new era of comprehensive understanding of the fundamental nature of cancer, and offers great promise for the development of powerful new approaches to diagnosis, prevention and treatment."

Three of the newly-discovered mutations were in genes that normally suppress tumour growth, and four were in genes linked to the spread of cancer.

The other appears to affect the transport of drugs into the cells, possibly fuelling resistance to cancer therapy.

The researchers are still looking for other gene mutations which may also play a part.

They also examined tumour samples from another 187 AML patients, but found none had any of the eight new mutations.

Lead researcher Dr Richard Wilson said: "This suggests that there is a tremendous amount of genetic diversity in cancer, even in this one disease.

"There are probably many, many ways to mutate a small number of genes to get the same result, and we're only looking at the tip of the iceberg in terms of identifying the combinations of genetic mutations that can lead to AML."

The researchers suspect that the mutations occurred one after another, with each pushing the cell closer to malignancy.

Kat Arney, of the charity Cancer Research UK, said: "This is a very important piece of research, not only for our understanding of leukaemia but for many other types of cancer.

"Thanks to advances in technology it is now possible to unlock the genetic secrets within cancer cells, which will be the key to better diagnostic tools and treatments in the future."

Ken Campbell, of Leukaemia Research said: "Although it is very early days, it is realistic to think that these findings could lead to new treatments.

"Its wider application to other cancers may be limited though - the technique is particularly valuable for blood cancers in which the chromosome changes are usually simpler than in solid tumours at the time of diagnosis."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7706487.stm

Published: 2008/11/06 00:00:51 GMT

Bionic hand makes inventions list

The world's first commercially available bionic hand has been recognised as one of the top inventions of 2008.

The hand, developed by Livingston company Touch Bionics, was named alongside the Super Hadron Collider in Time magazine's top 50 innovations. It came in at 14th place, beating competition from the latest Mars Rover, designed to explore the red planet.

The hand took 20 years to develop and has five separately working fingers.

This makes it more versatile than previous hands, which have often been hook-like and limited to simple opening and closing movements. The i-limb hand has a much wider range of capabilities. It has a credit-card grip, for taking hold of narrow objects, and a power hold for larger objects such as mugs.

'Tremendous achievement'

It is made of high-strength plastics, and the fingers can easily be unscrewed from the hand, making it easy to service. Other prosthetic hands have to be removed entirely if they break meaning amputees are sometimes left for weeks without a hand while they wait for a repair. More than 400 patients have now been fitted with the i-limb hand since its launch.

Touch Bionics chief executive Stuart Mead hailed the recognition as a "tremendous achievement".

He said: "We are delighted to have been identified by Time as one of the inventions of the year, a real honour for any innovative company."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/edinburgh_and_east/7712976.stm

Published: 2008/11/06 12:05:27 GMT

Premature births 'are increasing'

There has been a dramatic rise in the number of babies being born prematurely in England, a charity has warned.

Tommy's baby's charity highlights NHS figures showing 8.6% of babies were born early in 2006/7, after remaining around 7% for the previous 15 years.

It said the increase equated to an extra 10,554 premature births. Babies born early are at increased risk of dying or developing serious problems.

Experts said the rise was partly due to more older - and younger - mothers.

But the NHS Information Centre, which published the latest statistics, said there had been changes to the way data had been collected which might have affected the rise.

Childhood risks

Being born prematurely - before 37 weeks - is responsible for 75% of neonatal deaths in the first month of life, and the majority of intensive care admissions.

Babies are also at an increased risk of disability and illness extend throughout childhood and later life.

This is a worrying increase and it highlights the need for more research in this area
Dr Rebecca Jones, Tommy's

Tommy's says there are a number of risk factors which may lead to premature birth including maternal smoking, infections in the womb, twin or triplet pregnancies.

Being a teenage or older mother is also linked to increased risk, as is being underweight.

Babies can also be delivered prematurely if doctors decide the health of the mother or baby is at risk, perhaps because the mother has developed pre-eclampsia or if the baby is abnormally small.

Dr Rebecca Jones, from Tommy's Manchester Research Centre at St Mary's General Hospital, said: "It is hard to tell from the figures whether the increase is due to spontaneous births, when the woman goes into labour early, or whether it is due to medically-induced premature delivery.

"Potential reasons for the increase may be more mothers having babies at a young or late age, more multiple pregnancies because of IVF, changes in smoking rates, or changes in the general health of the population."

But she added: "This is a worrying increase and it highlights the need for more research in this area, to understand the reasons for premature birth and develop new treatments."

Safety

Ronald Lamont, a spokesman for the Royal College of Obstetricians and Gynaecologists, said there had been disparities in how different hospitals recorded premature births, and it was possible this had changed.

"If a baby is born at 36 weeks and six days, some will round that up to 37 weeks, when they should round it down to 36."

He added: "Another reason is that now neonatal doctors can keep more babies born very early alive, so obstetricians like me can deliver them.

"And if there is a problem with the pregnancy, doctors do have the option to deliver babies safely."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7713306.stm

Published: 2008/11/07 00:01:50 GMT

Earth 'on course for eco-crunch'

The planet is headed for an ecological "credit crunch", according to a report issued by conservation groups.

The document contends that our demands on natural resources overreach what the Earth can sustain by almost a third.

The Living Planet Report is the work of WWF, the Zoological Society of London and the Global Footprint Network.

It says that more than three quarters of the world's population lives in countries where consumption levels are outstripping environmental renewal.

This makes them "ecological debtors", meaning that they are drawing - and often overdrawing - on the agricultural land, forests, seas and resources of other countries to sustain them.

Please turn on JavaScript. Media requires JavaScript to play.

WWF's David Norman says the world will need two planets by 2030

The report concludes that the reckless consumption of "natural capital" is endangering the world's future prosperity, with clear economic impacts including high costs for food, water and energy.

Dr Dan Barlow, head of policy at the conservation group's Scotland arm, added: "While the media headlines continue to be dominated by the economic turmoil, the world is hurtling further into an ecological credit crunch."

The countries with the biggest impact on the planet are the US and China, together accounting for some 40% of the global footprint.

The report shows the US and United Arab Emirates have the largest ecological footprint per person, while Malawi and Afghanistan have the smallest.

The map shows hectares' worth consumed in goods and services

"If our demands on the planet continue to increase at the same rate, by the mid-2030s we would need the equivalent of two planets to maintain our lifestyles," said WWF International director-general James Leape.

In the UK, the "ecological footprint" - the amount of the Earth's land and sea needed to provide the resources we use and absorb our waste - is 5.3 hectares per person.

This is more than twice the 2.1 hectares per person actually available for the global population.

The UK's national ecological footprint is the 15th biggest in the world, and is the same size as that of 33 African countries put together, WWF said.

"The events in the last few months have served to show us how it's foolish in the extreme to live beyond our means," said WWF's international president, Chief Emeka Anyaoku.

"Devastating though the financial credit crunch has been, it's nothing as compared to the ecological recession that we are facing."

He said the more than $2 trillion (£1.2 trillion) lost on stocks and shares was dwarfed by the up to $4.5 trillion worth of resources destroyed forever each year.

The index tracks population trends in 1,161 populations of 355 mammal species
It shows an average 19% decrease, with the most serious declines in the tropics

The report's Living Planet Index, which is an attempt to measure the health of worldwide biodiversity, showed an average decline of about 30% from 1970 to 2005 in 3,309 populations of 1,235 species.

An index for the tropics shows an average 51% decline over the same period in 1,333 populations of 585 species.

A new index for water consumption showed that for countries such as the UK, the average "water footprint" was far greater than people realised, with thousands of litres used to produce goods such as beef, sugar and cotton shirts.

"In Britain, almost two thirds [62%] of the average water footprint comes from use abroad to produce goods we consume," said Mr Leape.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7696197.stm

Published: 2008/10/29 00:06:57 GMT

UK unveils CO2 footprint standard

By Mark Kinver
Science and environment reporter, BBC News

A new standard that allows UK firms to measure the size of their goods' carbon footprints has been launched.

It is hoped the new audit will show customers how much CO2 has been emitted during the production, consumption and disposal of a range of products.

Some schemes that measure carbon emissions have been criticised in the past for being inconsistent, confusing or lacking transparency.

The system, known as PAS 2050, will be managed by BSI British Standards.

"PAS 2050 has been developed using BSI's rigorous consultation process, involving almost a thousand industry experts from within the UK and internationally," said Mike Low, director of BSI British Standards.

"The result is a robust framework within which businesses and public sector bodies will be able to assess the greenhouse gas emissions of their goods and services in a consistent manner."

Mr Low added that he hoped the new audit tool would be used by organisations of all sizes.

'Carbon labels'

The precursor to PAS 2050 was initially launched in 2006 by the Carbon Trust, a government-funded organisation, in response to a growing number of consumers who wanted to know the size of products' carbon footprint.

> **Consumers want to know that emissions are being cut by businesses and this standard will help businesses do that**
> Hilary Benn
> UK Environment Secretary

Trials, involving companies such as Walkers and Boots, led to "carbon labels" appearing on some goods in April 2007.

Despite the issue creeping up the political agenda in recent years, a survey by the Trust in December found that just 1% of firms questioned knew the size of their operation's carbon footprint.

Carbon Trust chief executive Tom Delay said he hoped making the scheme publicly available would improve the situation.

"For the first time, businesses have a robust, consistent standard for measuring the carbon footprint of their goods and services," he observed.

"This… development will help businesses really understand the carbon impact of their products and to follow this up with tangible ways to cut carbon emissions across the supply chain."

The Department for Environment, Food and Rural Affairs (Defra) co-sponsored the scheme, and Environment Secretary Hilary Benn said he hoped firms would use the tool.

"Companies have said that they want to be able to count their carbon emissions in a better way, and we have responded to that," he added.

"Consumers want to know that emissions are being cut by businesses and this standard will help businesses do that."

Later this year, the Climate Change Bill is expected to become law and will commit future governments to reducing carbon emissions by 80% from 1990 levels by 2050.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7694212.stm

Published: 2008/10/29 00:08:03 GMT

Encouraging Interdisciplinarity

In summer 2007, when organizing a consortium of 10 research universities to consider ways to better "institutionalize" interdisciplinary research, Gail Dubrow, vice provost and dean of the graduate school at the University of Minnesota-Twin Cities, told *Inside Higher Ed*, "We don't yet have the solutions. But we know what the problems are."

Now, she says: "In this area of work, the issue is no longer identifying either the barriers or the recommended changes, but acting on them and figuring out what is getting in the way of these critical actions."

Later this month at an invitational conference in Minnesota, consortium members will be sharing their findings from a series of institutional self-studies spanning eight so-called "functional areas" – academic administration and faculty governance, collaborative technology, development and fund-raising, education and training, equity and diversity, finance and budget, research, and space and capital planning. Among some of the general trends observed across participating universities:

A major barrier to encouraging interdisciplinary work is the widespread perception that it is not rewarded in the departmental-based **promotion and tenure process**. At the University of Wisconsin at Madison, several committees have said that interdisciplinary faculty members have a tougher time earning tenure, but institutional data suggest that professors involved in interdisciplinary activities get tenure at or slightly above the rate for the rest of the faculty, says Peyton Smith, assistant vice chancellor for extended programs. "It may well be that people engaged in interdisciplinary activities have a tougher time documenting the scholarship of their work to go through divisional committees, but the end result is we're not granting tenure at lesser rates."

"In many cases it comes down to who's your advocate in preparing your tenure dossier," Smith says.

Still, "Widespread anecdotal reports as well as perceptions of disadvantage toward faculty who do interdisciplinary work persist," says Dubrow. "So the bottom line is that we need more systematic studies of faculty, tenure and promotion, I think, as well as in-depth interviews with faculty who pursue interdisciplinary research agendas – to understand whether the perception of this disadvantage matches the realities of the tenure and promotion system. And where there are gaps, there may be the need for changes in policy and practice."

The consortium didn't limit its inquiry to faculty-specific concerns, but considered interdisciplinary issues in administrative contexts as well.

For instance, **in development**, and particularly at public research universities, which are under pressure to keep central administration lean, the fund-raising apparatus is often highly decentralized by college. "And that means that inter-college initiatives, including what universities would consider to be potentially transformational gifts, that deal with some of the world's most complex issues – and which necessarily span multiple colleges – lack advocates or may conflict with collegiate priorities for development," says Dubrow.

"So they either need to develop systems of cooperation in going after these major gifts across colleges, [implement] incentives that reward successful cooperation – so shared credit for major gifts – or they need development officers in place literally in the central foundation offices who are well-prepared to

deal with cross-college or interdisciplinary issues. And what we're hearing is everyone needs this, but we're just beginning to figure out how to do it," says Dubrow.

As one approach, the University of Illinois at Urbana-Champaign recently began assigning development officers to interdisciplinary institutes, says Feniosky Peña-Mora, the associate provost.

Another main issue discussed at UIUC was **space — virtual and actual**. Virtually speaking, "We have a tool for managing coursework. We can publish our presentations, our materials, our notes, the students can go there, see the notes, submit their homework and we can put grades there; there is that space there for course management," says Peña-Mora. "We do not have the same types of investment — that is as coordinated and institutionalized — for supporting interdisciplinary research," he says. He points out that much proposal and publication-writing happens online and not in newly designed interdisciplinary spaces on campus.

On that note, consortium members also examined **building practices**, including the creation of common or "hearth-like" social spaces. While many university officials recognize their value, in tight budget years, these common areas are also the most tempting for administrators to cut, says Dubrow.

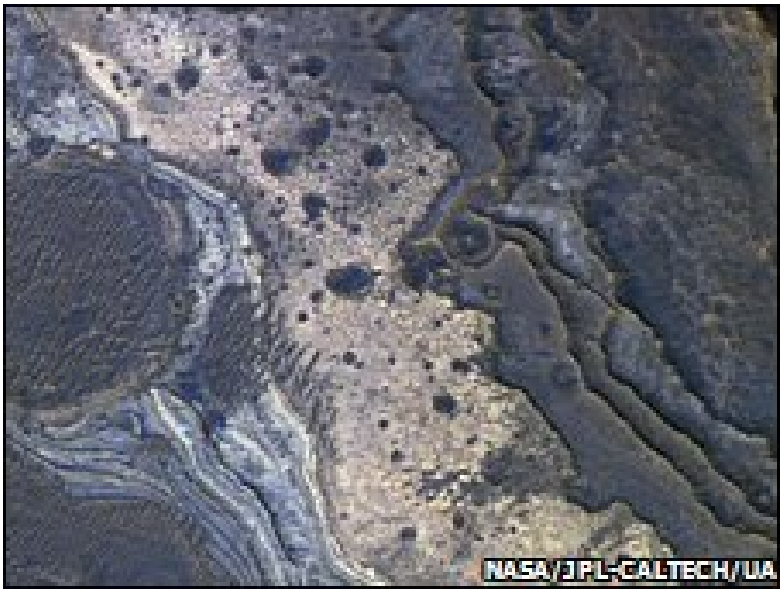
"They are essentially the overhead a building carries."

— Elizabeth Redden

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/06/interdiscipline.

New minerals point to wetter Mars

A Nasa space probe has discovered a new category of minerals spread across large regions of Mars.



The find suggests liquid water remained on Mars' surface a billion years later than scientists had previously thought.

The US Mars Reconnaissance Orbiter (MRO) spacecraft found evidence of hydrated silica, better known as opal.

The discovery adds to the growing body of evidence that water played a crucial role in shaping the Martian landscape and - possibly - in sustaining life.

Hydrated, or water-containing, minerals are telltale signs of when and where water was present on ancient Mars.

Researchers made the discovery using the Compact Reconnaissance Imaging Spectrometer (CRISM) instrument on MRO.

The $720m (£449m; 565m euro) MRO robotic probe reached the Red Planet in 2006; its objectives are to study Mars' geology, climate and atmosphere from orbit, as well as to search for signs of water.

Details of the latest findings appear in the November issue of the academic journal Geology.

The minerals were recently found at Gusev Crater on Mars by the Spirit rover. This study reveals that they are widespread and occur in relatively young terrains.

Gem of a find

"This is an exciting discovery because it extends the time range for liquid water on Mars, and the places where it might have supported life," said Scott Murchie, from Johns Hopkins University Applied Physics Laboratory in Maryland.

Dr Murchie, who is chief scientist on the CRISM team, added: "The identification of opaline silica tells us that water may have existed as recently as two billion years ago."

CRISM works by "reading" over 500 colours in reflected sunlight to detect particular minerals on the Martian surface - including those that formed in the presence of water.

Until now, only two major groups of hydrated minerals, phyllosilicates and hydrated sulfates, had been observed by spacecraft orbiting Mars.

Clay-like phyllosilicates formed more than three-and-a-half billion years ago where igneous rock came into long-term contact with water. During the next several hundred million years, until about three billion years ago, hydrated sulfates formed from the evaporation of salty and sometimes acidic water.

The newly discovered "opaline silicates" are the youngest of the three types of hydrated minerals.

They formed where liquid water altered materials created by volcanic activity or meteorite impacts on Mars' surface. One such location is the large Martian canyon system known as Valles Marineris.

Acidic water

"We see numerous outcrops of opal-like minerals, commonly in thin layers extending for very long distances around the rim of Valles Marineris and sometimes within the canyon system itself," said Ralph Milliken of Nasa's Jet Propulsion Laboratory (JPL) in Pasadena, California.

In some locations, CRISM observed opaline silica with iron sulfate minerals, either in or around dry river channels.

This suggests the acidic water remained on the Martian surface for an extended period of time. Dr Milliken and his colleagues think that in these areas, low-temperature acidic water was involved in forming the opal.

However, in areas where there is no clear evidence that the water was acidic, deposits may have formed under a wide range of conditions.

"What's important is that the longer liquid water existed on Mars, the longer the window during which Mars may have supported life," said Ralph Milliken.

"The opaline silica deposits would be good places to explore to assess the potential for habitability on Mars, especially in these younger terrains."

Nasa is due to send a robotic rover, Mars Science Laboratory (MSL), to the planet in 2009 to look for signs of past or present life.

The European Space Agency (Esa) also plans to send a rover to investigate Mars' habitability. This mission, called ExoMars, is now scheduled to launch in 2016.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7696669.stm

Published: 2008/10/29 04:06:14 GMT

UK couples 'choosing baby gender'

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Hidden camera footage

Many British couples are choosing the sex of their babies at clinics abroad, which often offer the procedure illegally, the BBC has learned.

Representatives from one Turkish fertility clinic, the Jinemed Center, were secretly filmed when they came to London to see prospective patients.

They guaranteed if pregnancy occurred it would be of the chosen sex.

Sex selection is illegal in Turkey and in the UK. The clinic, which denies wrongdoing, is now being investigated.

The Turkish government, which is carrying out the inquiry into the Jinemed Center, has warned patients not to travel there for the treatment.

> **Some countries do allow sex selection like the US and Russia but I quickly realised there was a problem with all of this**
> Colette McBeth, BBC reporter

The Center told its prospective patients during a London visit that there was a big demand for gender selection from UK couples.

The BBC's Colette McBeth said it was possible to almost guarantee the sex of a baby using IVF and a type of embryo screening called Pre-Implantation Genetic Diagnosis (PGD).

But in most countries PGD is only used for medical reasons, our reporter added.

She said: "Some countries do allow sex selection like the US and Russia but I quickly realised there was a problem with all of this.

"Many patients who were planning to go abroad were completely confused as to where it was legal and where it wasn't."

The Jinemed Center denies it offers sex selection and says it always warns patients about the risks of multiple pregnancies.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/7696696.stm

Published: 2008/10/29 05:14:27 GMT

Evaluating the Adjunct Impact

Adjunct faculty members are increasingly pointing out the inequities of the way they are treated — even as the recession leads some colleges to rely on them more and others to eliminate their positions.A series of studies being released this week suggest that the current model for using adjuncts — with relatively low pay, little if any job security, and minimal financial or other support for time on campus or professional development — also has a significant impact on students. Using large samples of community colleges, studies find that as colleges use more part timers, their students are less likely to graduate or transfer to four-year institutions. And another study finds that as part-time use goes up, institutional averages in class participation (for *all* faculty members) go down.

The studies are being presented this week at the annual meeting of the Association for the Study of Higher Education.Some studies looking at the impact of part-time faculty members in the past have frustrated many adjuncts because of the implication that these impacts suggest poor performance by the adjuncts themselves. These studies don't make such a suggestion and are in fact consistent with the views of adjunct activists that mistreating part timers creates conditions that hurt students.If adjuncts don't have offices and aren't paid for time outside of class, the theory goes, is it any surprise that they are going to spend less one-on-one time with students? But raising these issues is a double-edged sword for part timers, who fear that this kind of research can encourage negative views of individual adjuncts — even if the researchers take care (as these researchers did) not to "blame" part timers for setting up the current higher education system.

The findings on adjuncts and community college performance were both based on studies of California community college transcripts and were conducted by Audrey Jaeger of North Carolina State University, and M. Kevin Eagan of the University of California at Los Angeles.On transfer rates, they found a "significant and negative association between students' transfer likelihood and their exposure to part-time faculty instruction. Indeed, for every 10 percent increase in students' exposure to part-time faculty instruction, students tended to become almost 2 percent less likely to transfer. Although the strength of this association may seem small, the average student in this sample had almost 40 percent of his or her academic credits with part-time faculty members, which translates into being, on average, about 8 percent less likely to transfer compared to peers who had no exposure to part-time faculty members."

Similarly, the study on teaching preparation — conducted by Paul Umbach of North Carolina State University — notes differences in class preparation time, likelihood of attending professional workshops and so forth. Adjuncts, not surprisingly, have less time for these activities, the study finds.

The authors of the new reports take care to relate these trends to the conditions of part-time employment, not to the performance or quality of adjuncts. And they note that at many institutions, especially community colleges, part-time faculty members provide a growing share of instruction — a trend likely to grow with increased enrollments and state funds.

"Community colleges must learn to work within the system that they have perpetuated by identifying ways to tap into the talents offered by part-time faculty members," says the conclusion of the study on transfer rates. "Finding ways in which to encourage part-timers to make time for students outside of class, such as by providing part-time faculty with office space or additional money to compensate them for holding office hours, may mitigate the negative relationship between part-time faculty exposure and students' likelihood to transfer."

— Scott Jaschik

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/06/adjuncts.

Safety fears over nanocosmetics

Cosmetics containing tiny "nano" particles are being used widely despite unresolved issues surrounding their safety, a consumer watchdog warns.

Many skin care products, including sunscreens and wrinkle creams, contain this technology to make them easier to apply and invisible on the skin.

But experts are concerned about their possible long-term effects on the body, Which? reports.

Which? wants more safety checks and tighter regulation of their use.

It says, at the moment, consumers cannot tell which products use nanomaterials as many fail to mention it.

Nanocosmetics

Nanotechnology is the science of manipulating atoms and molecules on the nanoscale - 80,000 times smaller than the width of a human hair.

The cosmetics industry is using it to create new materials with novel properties.

> **We're not saying the use of nanotechnology in cosmetics is a bad thing... but until all the necessary safety tests are carried out, the simple fact is we just don't know enough**
> Sue Davies of Which?

On the flip-side, that might mean unexpected risks.

Which? wrote to 67 cosmetics companies, including all of the main brands as well as smaller ones, asking them about their use of nanotechnology, what benefits they thought it brought and how they ensured product safety.

Seventeen firms responded, and of these, eight were willing to provide information about how they used nanotechnology.

Most of the eight, which included The Body Shop, Boots, Nivea, Avon, L'Oréal, Unilever, Korres and The Green People, used nanotechnology for the UV filters in their sunscreens.

Which? also found evidence of other cosmetics companies offering nanocosmetics online.

Skin penetration

These products included nano emulsions - preparations containing oil and water droplets reduced to nano size - used to preserve active ingredients, such as vitamins and anti-oxidants, and for their lightness and transparency.

Another example was a type of nanomaterial called "fullerenes" used in anti-aging cream products.

Scientists have raised particular concerns about potential toxicity of fullerenes if they were able to penetrate the skin.

There is also a concern that the nanomaterials in sunscreens might be able to breach sunburned skin.

The industry is working with government to provide more information on the safety of these products
A spokeswoman for the Cosmetic, Toiletry and Perfumery Association

The Which? report says all nanocosmetic products should have an independent safety assessment.

The precautionary principle should be applied to products where there are potential risks but where it is not currently possible to assess their safety so that consumers are not put at risk, it says.

Sue Davies of Which? said: "We're not saying the use of nanotechnology in cosmetics is a bad thing, far from it. Many of its applications could lead to exciting and revolutionary developments in a wide range of products, but until all the necessary safety tests are carried out, the simple fact is we just don't know enough.

"The government must introduce a compulsory reporting scheme for manufactured nanomaterials so we are all aware - and only those that are independently assessed as safe should be allowed to be used in cosmetics."

Regulation

In September 2006, the government launched a voluntary reporting scheme for all engineered nanomaterials to find out what was, or could be, on the market, to guide the development of regulations. This has had a limited response - 12 responses in two years - and is now under review.

A spokeswoman for the Cosmetic, Toiletry and Perfumery Association said: "The industry is working with government to provide more information on the safety of these products.

"The safety assessment of cosmetic products is a legal requirement and that assessment is robust and takes into consideration the particle size of ingredients."

Professor Dame Ann Dowling, chairman of the Royal Society working group on nanotechnologies, said: "The Royal Society has been calling, for the last four years, for companies to make public the safety testing methods they have been using on their nanoproducts. We are disappointed at continuing lack of transparency in this area.

"More research does need to be done on the effects of manufactured nanoparticles on human health and the environment. This is important so that regulation can be built on a proper understanding of any risks."

A European Commission spokeswoman said: "We are working towards improving our ability to assess the safety of all consumer products using nanomaterials including cosmetics.

"The Scientific Committee on Emerging and Newly Identifed Health Risks (SCENIHR) is currently preparing an update of its 2006 opinion on the risk assessment of products of nanotechnologies. This update will be available in January 2009."

Boots said it did not consider its current use of materials was of concern to health.

The Body Shop said its products helped to protect human skin.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7706818.stm

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