Infoteca's E-Journal

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Fainting in America

By: Kirk Nielsen

There's really no good time or place for a blackout, though some are significantly worse than others. Mine, one subzero evening in downtown St. Paul, Minn., last December, fell solidly on the inauspicious side of the spectrum.

The Level 2 lobby of the Ordway Center for the Performing Arts was teeming with people waiting for the second half of a fine production of Irving Berlin's White Christmas to begin. I was standing with my mom, sister and her three young-adult kids. Through the windows of a dazzling curtain-wall that spans the front of the trapezoidal building, I was admiring the golden lights on the canopy of trees in the park across the street. On the warm side of the glass, a professional trio of carolers had just finished a short intermission set. I was in a good mood; a fantastic woman in Duluth was expecting my call after the show to finalize plans for our first date the next night.

Suddenly, I felt weirdly lightheaded, so I turned to hasten to my seat. I took three steps, got the spins and took a nosedive, just missing the edge of a wine and coffee bar. Upon impact, I regained some consciousness and sat half-sprawled with my elbows on the carpet. A short-haired middle-age woman was crouching next to me, asking me if I knew my name, what day of the week it was, where I was. I did, which eliminated the possibility of stroke. "You blacked out ... I'm not a doctor ... That happens to me ... You should lay down," I recall her saying.

Assuming the dead man's pose in the Ordway lobby sounded fairly embarrassing, so I resolved to head for one of the lobby's posh benches several paces away. With someone's help, I got to my feet, and within two steps, a heavy wave of dizziness nearly sent me back down. I made it to the bench and sat, feeling exhausted and nauseated, and exchanging glances with the horrified faces of my mom and sister. I hoped my nieces and nephew were inside watching the rest of White Christmas, not their uncle's freak show.

There was talk of an usher who was also a paramedic. He — a polite young man in a dark suit — appeared and took my blood pressure, which was very low as was my pulse. He said calmly that one option was to call an ambulance. I was afraid, I thought I might be dying, I was thinking about my

deductible. The number "$2,500" flashed through my mind. Or was that my maximum "out of pocket"?

I knew for sure that I was enrolled in a $129-per-month emergency and hospitalization plan with Blue Cross Blue Shield of Florida. Like everyone, I'd heard that a trip to an emergency room could cost several grand.

"I can't afford that," I muttered.

"Now isn't the time to worry about money," my sister responded, slightly scolding.

Then my eyes rolled upward into my skull as I blacked out again, my chin dropping to the top of my chest and the rest of me still just sitting there.

Moments later, I awoke from a frenzied dream, intensely disoriented, then realized I was still on the bench. The usher was looking at me. "You did it again," he said. Not certain I wasn't in the early stages of some kind of gradual heart failure — I had felt some weirdness in my chest before my sprawl on the carpet — I consented to the ambulance ride.

Within a few minutes I was rolling feet-first on a stretcher, into the elevator, out into the subzero air and aboard the rescue truck. As I recall they affixed an intravenous tube into my arm and asked me to open my mouth so one of them could toss in some tiny nitroglycerine pellets, which dilate the blood vessels. "I bet you don't wear those shoes in Miami," one of the paramedics joshed, referring to a pair of (my dad's) old brown rubber jobbies that clashed badly with my black wool suit pants. Then they put an oxygen mask over my mouth.

Soon I was in an emergency room bed at United Hospital in downtown St. Paul, still connected to an IV while nurses further hooked me up to an EKG and drew blood from my arm to start testing for heart attack enzymes.

Within an hour came the impression from my emergency-room doctor, a serious, trim, capable-looking man. I had suffered syncope, a manly term for fainting. The question now, the doctor continued, is why. There were many possible causes of syncope. "When your heart rate drops to 40 all of a sudden and you pass out, it's a good idea to find out what's going on," he said tersely. Thus, I would be spending the night in the hospital, having my heart monitored and my blood analyzed.

The doctor had me recap my day. I live in Miami Beach. Flew to Minneapolis a few days ago. Didn't eat much today. Went for a three-mile run this afternoon (in 7-degree weather). Felt great afterward. Had a glass of wine at dinner a few blocks from the theater. Saw first half of White Christmas. Etcetera. The doctor mentioned something about blood sometimes "pooling" in people's legs when they sit or stand for extended periods of time. Then he left. Eventually, I was rolled upstairs to a room in the cardiac wing.

The nocturnal heart monitoring, followed by a midday echocardiogram, turned up nothing but a very healthy heart. Diagnosis: a case of dehydration-induced syncope. Dehydration (apparently caused by the cumulative effects of my Miami to Minneapolis plane ride, a long hot sauna at my parents' house, too much alcohol and coffee, not enough glasses of water and the desiccating air of a very cold, extraordinarily dry Minnesota winter) had reduced my blood volume. It pooled in my legs as I mingled in the Ordway lobby. There wasn't enough left to make it to my head. My low heart rate was from conditioning, the doctors said, because I tend to run for an hour about several times a week (in Florida).

I was discharged, my sister picked me up, and off we went to enjoy a white Christmas. I put the ordeal behind me and managed to forget about my deductible — until late January, when the bills started arriving at my Miami Beach apartment.

I received six of them from the hospital — for "Emergency Department Visit," for "Initial Hospital Care," for "Facility Service," for "Hospital Discharge Day," and more — and one from the ambulance company. They all added up to thousands of dollars. I'm still not sure how much I really owe.

To their credit, the folks at Blue Cross Blue Shield send their customers concise statements that summarize medical services rendered and billed. According to the one I recently received, the total cost of my fainting emergency: $10,260.

But lucky me. I owe only $2,267. "Your savings: $7,992.87," the summary states. Good thing I paid BCBS $1,500 in premiums over the past year to cover me for emergencies, one of which is now costing me an additional two thousand.

Of course, I was relieved, if not grateful, to learn that I'm not liable for the whole $10,260, and thus not like guys who faint and don't have emergency coverage. But upon further inspection of my statement I noticed a curious and disturbing thing. BCBS had to pay only $2,582 — about one-fourth — of that $10,260. So who paid the balance of my $7,992 in "savings"? I wondered.

No one.

The $7,992 was all discounted because hospitals let BCBS and other big insurance companies pay lower rates than ordinary, underinsured Americans.

Similarly, the statement indicates that BCBS would have gotten a huge discount on, and had to pay only one-fourth of, the $1,409 ambulance bill that St. Paul Fire & Safety Service is now pressuring me to pay in full. I'm responsible for all but $17.65 of it, BCBS says, because the ambulance service was "out of network." BCBS has been kind enough to cover less than half of the $48 worth of oxygen I inhaled during my ambulance ride. Hence the check for $17.65 that BCBS mailed me. Some of the oxygen was "in network," I guess.

A few years ago, in order to control price gouging, Congress ordered up a national fee schedule for Medicare payments to ambulance services. According to that legally binding schedule, Medicare, like BCBS, would have to pay St. Paul Fire & Safety Service only about one-fourth of the $1,409 the company says I owe.

My date in Duluth gave me a break. When are America's health care givers going to give all of us one?

http://www.miller-mccune.com/health/fainting-in-america-1107

Posthumous Crichton Novels on the Way

By MOTOKO RICH

Michael Crichton, the best-selling author of technological thrillers like "The Andromeda Strain" and "Jurassic Park" who died of cancer in November, left behind at least one finished novel and about one-third of a second. Both will be released over the next year and a half, his publisher said.

HarperCollins, Mr. Crichton's publisher for his previous three books, will release "Pirate Latitudes," an adventure story set in Jamaica in the 17th century, on Nov. 24. The company also plans to publish a technological thriller in the fall of 2010, a novel that Mr. Crichton was working on when he died.

Jonathan Burnham, publisher of Harper, an imprint of HarperCollins, said Mr. Crichton evidently wrote "Pirate Latitudes" at the same time that he wrote "Next," his last published novel.

The new novel, discovered by Mr. Crichton's assistant in the writer's computer files after his death, features a pirate named Hunter and the governor of Jamaica, and their plan to raid a Spanish treasure galleon.

"It's eminently and deeply and thoroughly researched," Mr. Burnham said. "It's packed through with great detail about navigation and how pirates operated, and links between the New World and the Caribbean and Spain."

The novel represents a departure from Mr. Crichton's longtime fictional preoccupation with the moral and social ramifications of science and technology. But Mr. Burnham pointed out that "Pirate Latitudes" also harks back to the kind of historical yarn that Mr. Crichton wrote in the "The Great Train Robbery," first published in 1975. Mr. Burnham said that the book needed little editing and that Harper planned a first printing of 1 million copies.

At the time of Mr. Crichton's death he was under contract for the second of a two-book deal that began with "Next." He had begun that second novel, a technological thriller, but was only about a third of the way through. Mr. Burnham said that the publisher would work with Lynn Nesbit, Mr. Crichton's agent of 40 years, and his estate to select a co-writer who would finish the book, working from Mr. Crichton's notes.

"We want a high-level thriller writer, somebody who understands Michael's work," Mr. Burnham said. "From what I gather, there are notes and indications of which direction the novel was going, so the writer has material to work from apart from the actual material that was finished."

Neither Mr. Burnham nor Ms. Nesbit has seen the unfinished novel. Ms. Nesbit said that Mr. Crichton was "the most private of all authors that I have ever met in my life," and that he never showed his agent or his editor any material before he had a complete draft. She said that other than the general category of technological thriller, she had no idea what the incomplete novel was about.

Ms. Nesbit said that she and Mr. Burnham had discussed some possible co-writers, but no decision had been made. She added that any selection would be made in collaboration with Sherri Crichton, Mr. Crichton's widow, acting on behalf of his estate.

In "Next" Mr. Crichton explored the ethical dilemmas posed by the expanding field of genetics. According to Nielsen BookScan, which represents about 70 percent of retail sales and does not cover retailers like WalMart, the book sold 500,000 copies. Mr. Burnham said that the figure was closer to 800,000 copies.

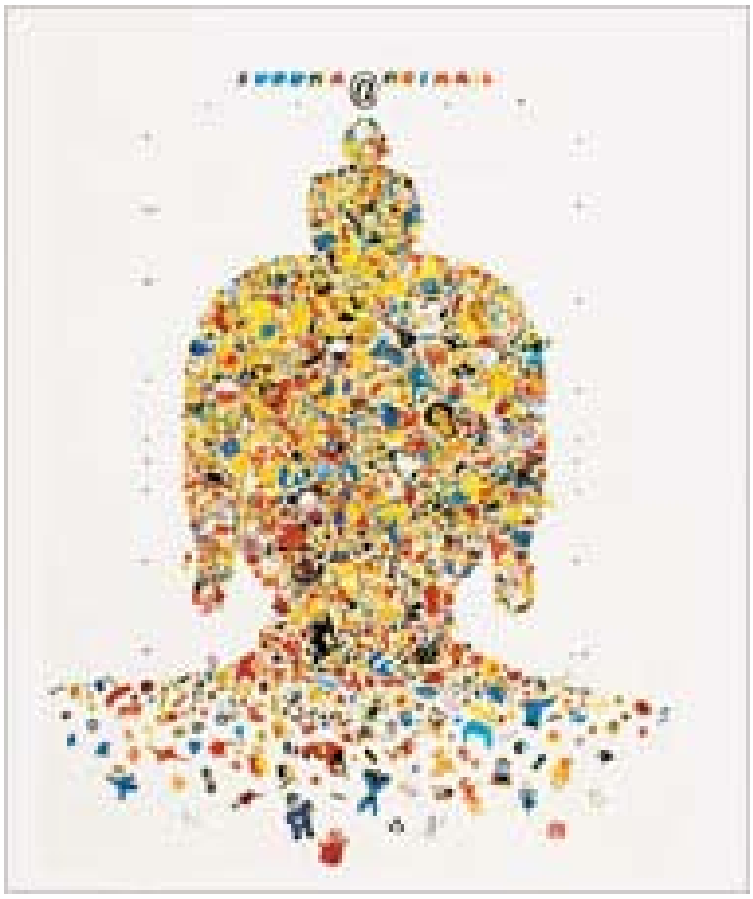
Ms. Nesbit said that Mr. Crichton left "many, many electronic files," and that there could well be other novels or unfinished material. "We haven't begun to really go through it all," she said.

Mr. Burnham said, though, that HarperCollins had no plans to take Mr. Crichton's name and create a franchise in the way that ghostwriters have continued to publish books under Robert Ludlum's name long after his death. "We're not taking a name brand and spinning books out of it," Mr. Burnham said.

http://www.nytimes.com/2009/04/06/books/06crichton.html?_r=1&th&emc=th

The Newark Museum at 100 Years Old

By BENJAMIN GENOCCHIO



"Unbounded: New Art for a New Century," an exhibition celebrating the 100th anniversary of the Newark Museum, is a magical show of astonishing, beautiful things from the museum's encyclopedic collection. It contains works by 40 living artists from around the world, all acquired in the last 15 years.

They are arranged thematically in order to allow, as the exhibition wall label puts it, "unexpected connections or groupings that transcend traditional divisions of objects according to geography, genre or media." That is a fancy way of explaining that the museum's curators, Christa Clarke (Arts of Africa), Ulysses Grant Dietz (Decorative Arts), Katherine Anne Paul (Arts of Asia) and Beth Venn (American Art) have set aside the usual turf wars and decided to mix things up — to jumble together painting, sculpture, decorative art, folk art, glass, industrial design, jewelry, clothing and much more.

The results are variously intriguing and spectacular, beginning with a grouping of three apparently disparate objects: the monumental sculpture "Untitled" (1997-2001), by the American artist Martin Puryear; the painting "Movement No. 36" (2002), by Kwesi Owusu-Ankomah of Ghana; and the silkscreen print "Buddha@Hotmail" (2006), by Gonkar Gyatso of Tibet.

Take a moment to compare and contrast the three works and you begin to realize that they have a lot to say about one another. All are extremely detail-oriented; all blur the line between craft and art; and all combine small shapes and forms to create a larger whole.

But beyond these visual and formal references, the three works share similar ideas and concerns, albeit approached from individual perspectives. All, for instance, find inspiration in the visual power of

language and symbols: Mr. Gyatso uses hundreds of mass-produced stickers of pop cultural icons to form a silhouette of the Buddha, while Mr. Owusu-Ankomah combines and abstracts symbols, logos and ideograms from different times and places. Meanwhile, Mr. Puryear's sculptures serve as symbols themselves, making covert references to the human body.

The tension between the visual appearances of language and symbols and their associated meanings is the subject of "Mixed Messages," the first thematic section. In addition to the three works mentioned, it includes many wonderful things, like a patterned dress and skirt incorporating words, from Bamako, Mali, placed next to an oxidized silver necklace and two brooches that together spell out "m & m." Here our interest is piqued by the use of a familiar symbol in an unfamiliar context.

The second theme, "Revisiting History," looks at the way contemporary artists everywhere like to turn something old into something new. This can mean reworking well-known historical objects or art forms, like "Dream of China" (2005), a traditional robe made of fishing line and chain by Wang Jin, a Chinese artist. But it can also involve the artists' directing attention to personal experience or a particular moment in history, as in Vivan Sundaram's photomontage of historical imagery of his family as the basis for an exploration of his Indian identity.

The final theme, "The Human Condition," covers something that perhaps seems obvious but is frequently overlooked in discussions of contemporary art — that artists everywhere deal with the stuff of daily life, the core struggles of existence. The video installation "Dissolution" (2005) by the American Bill Viola, a major acquisition for the museum, shows a man and woman slowly submerging and then re-emerging from water. It is all about life and death, but also about human consciousness and experience.

Alongside Mr. Viola's video is an equally important acquisition, Dahlia Elsayed's "My Favorite Ruins So Far" (2002), one of her metaphorical landscapes that map out the personal symbolism of various places across New Jersey, where the artist lives. I love her work, as much for its flashes of anxiety and neediness spiked with humor as for its warped graphic sensibility — the scale is all mixed up, with people tiny in comparison with everything else.

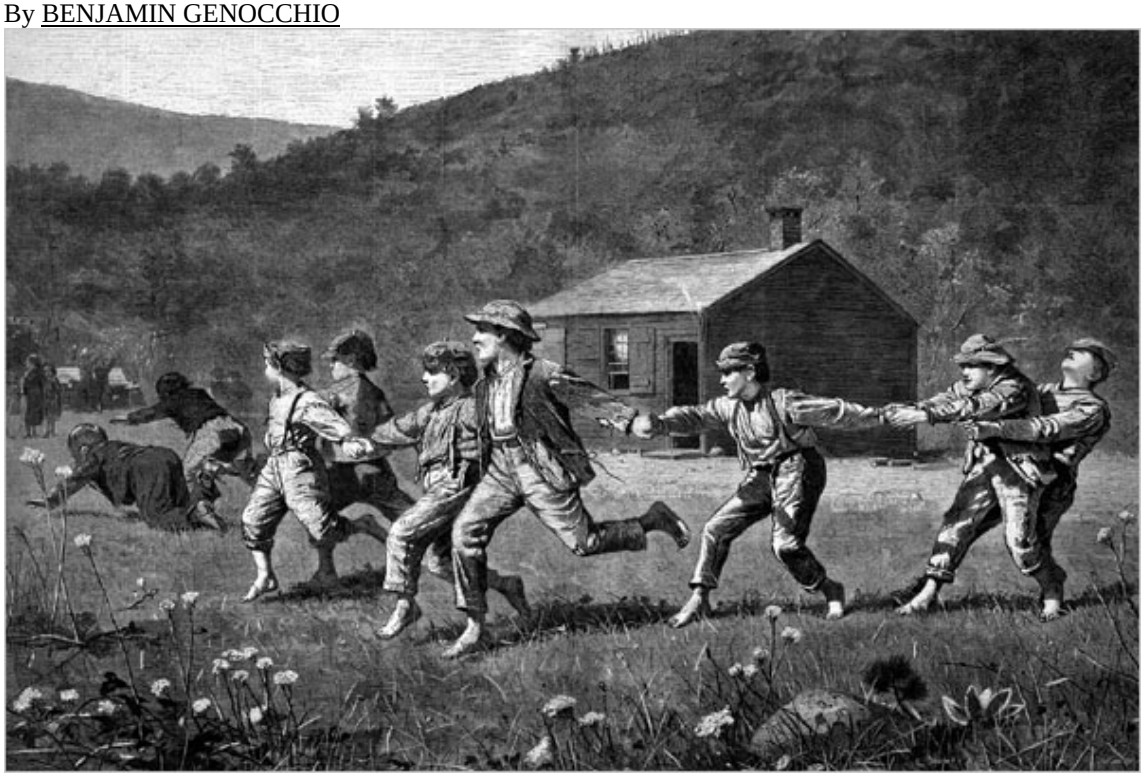
"Unbounded" is the first of a series of exhibitions showcasing elements of the Newark Museum collection scheduled for its centennial celebration. They are welcome, for this outstanding collection deserves to be better known and appreciated.

"Unbounded: New Art for a New Century," Newark Museum, 49 Washington Street, Newark, through Aug. 16.
Information: (973) 596-6550 or
newarkmuseum.org.

http://www.nytimes.com/2009/04/05/nyregion/new-jersey/05artsnj.html?ref=design

Portraits of a Simpler, Gentler Time

By BENJAMIN GENOCCHIO



When Winslow Homer was growing up in Cambridge, Mass., his mother, an amateur watercolorist, taught him the rudiments of painting and drawing. That was the beginning of the career of this largely self-taught artist, who today is considered one of the greatest figures in 19th-century American art.

Homer got his first break in the art world immediately after school when his father, concerned about his poor grades and despairing for his future, got him a job in a local commercial graphics shop. He was 19 years old. Two years later, in 1857, he had become so adept at making illustrations he received an offer to join the staff of Harper's Weekly. He turned it down, moved to New York and opened a studio where he worked freelance making prints for money, painting on the side.

During the next two decades Homer graduated from workaday illustrator to great American painter. But along the way he made hundreds of illustrations for magazines like Ballou's Pictorial and Harper's Weekly, capturing a variety of subjects reflecting 19th-century America. Around 100 of them are showing at the Nassau County Museum of Art in an exhibition called "Winslow Homer: Illustrating America," organized by the Brooklyn Museum from its collection. It is a fine show.

Most of the works are wood engravings, the primary medium for newspaper, book and magazine illustration throughout the second half of the 19th century. In this form of printmaking, areas of wood are cut away from a block (on which a design is drawn) to leave a final image, which is then inked and printed. The hardness of the wood allows innumerable copies to be made. While Homer drew the pictures, skilled engravers nearly always cut the blocks.

The show is hung more or less chronologically, split between a series of small upstairs rooms and a hallway. I won't dwell on the many limitations of the space, but suffice it to say this is a less than perfect display environment for works of this caliber. On the plus side, almost every work comes with an extended wall label so you can tell immediately what you are looking at.

The chief virtue of a chronological arrangement is that it enables viewers to see the artist's evolution as a printmaker, which is considerable. Compare, for instance, the sketchy, simplified forms in an early print like "August in the Country — The Sea Shore" (1859) with the refined lines and dramatic contrasts of light and dark in "Sea-Side Sketches — A Clam Bake" (1873) or "The Bathers" (1873), produced a decade and a half later. By the mid-1870s Homer was a master printmaker.

On the minus side, to some extent a chronological display obscures the attention paid to certain themes and issues that recur over the course of Homer's long career as a printmaker: women and children, the country and outdoors, the seashore and winter scenes, family, work and social life. As I have stated elsewhere, Homer's prints present a portrait of American innocence. They are mostly simple, gentle, nostalgic pictures that were expressly designed to entertain and please.

Some of them are really quite wonderful. "Cutting a Figure" (1871) shows a young woman in full dress skating across the glassy surface of a frozen pond, her head turned back to look at a lover or friend. It is a lovely, elegant image. But it is also devilishly intricate; note, for instance, the way the shadows of surrounding trees and even passing clouds in the sky above are reflected in the frozen surface of the pond. This print is exquisite.

The Civil War series provides a notable exception to the artist's generally rosy image of American life. In the early 1860s, Harper's sent Homer to cover the war, where he sketched everything from gruesome battle scenes to the relaxed, intimate and sometimes even playful moments of camp life. To me these are his crowning achievement as a printmaker, although I value them more for their historical importance than their beauty or technical qualities.

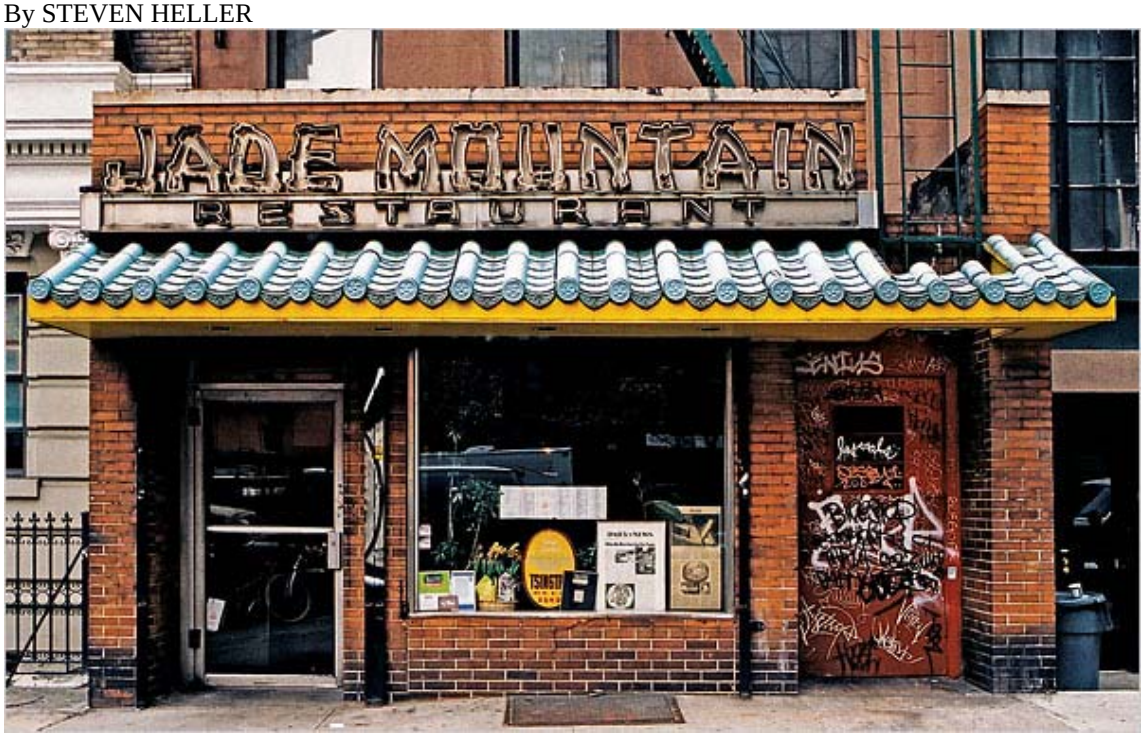
The Civil War work was difficult and dangerous. But in addition to making his reputation as a reliable, skillful, reportorial illustrator, it also provided Homer with themes for his paintings, sometimes based on the prints. One of these war paintings was exhibited at the National Academy of Design in 1863, where it achieved favorable critical notice and led to the artist's being elected an associate member of the Academy. With that, Homer was on his way to becoming a famous painter.

"Winslow Homer: Illustrating America," Nassau County Museum of Art, 1 Museum Drive, Roslyn Harbor, through May 26. Information: (516) 484-9337 or nassaumuseum.com.

http://www.nytimes.com/2009/04/05/nyregion/long-island/05artsli.html?ref=design

Signs and Portents

By STEVEN HELLER



I own a fairly large vintage sign that sits imposingly on my living room floor. It once hung outside a place called Velulich's Bakery, somewhere in New Jersey, and is typical of the painted metal displays of the 1930s, with Art Deco contours and neon illumination. It's as beautiful as the hand-painted shoe-repair sign I keep in my bedroom. Both are artifacts of consumer culture before commercial branding and environmental signage (as signs are now called) became so self-conscious — when sign painters plied their craft without pretense. A store sign had to be bold, eye-catching and immediately recognizable, so that customers would understand the purpose of the establishment. Clever names designed to tickle the imagination would not do. What you saw was what you got: Bakery, Drugstore, Smoke Shop, Meat Market, Liquors, Dry Cleaners. Examples of these signs are, of course, still found on old buildings all over New York City, but are gradually beingreplaced by more contemporary designs and L.E.D. screens.

For those who think modernization is always a virtue, the demise of these relics may be a good thing. For me, it marks the end of an era of sign painting and storefront innocence. Which is why my eyes widened when I saw James T. Murray and Karla L. Murray's oversize (11 3/4 by 13 1/4 inches) coffee-table book, STORE FRONT: The Disappearing Face of New York (Gingko, $65). The Murrays, authors of two books on graffiti art, "Broken Windows" and "Burning New York," have been photographing storefronts for more than eight years, and in this book they employ large-scale horizontal pages (and a few gatefolds) as they track their odyssey from the Lower East Side to Harlem to the Bronx, from Brooklyn to Queens to Staten Island. If you're at all interested in the passing cityscape, this book is a documentary mother lode; if you're happy to see these joints disappear, it might at least kindle appreciation for them.

The Murrays' photographs, however, do not romanticize these not very picturesque locales. The images are bright and crisp, though most of what the authors photographed was dingy and covered with graffiti; quite a few fronts and signs were falling apart or grungy to begin with. Yet it is in this state of decay that the stores hold a curious fascination — indeed, a raw beauty — for anyone concerned with vernacular design. I was particularly taken with the Lower East Side remnants that are slowly being squeezed out by hip restaurants and shops. Zelig Blumenthal's religious articles store, on Essex Street, appears not to have changed since my grandparents lived nearby. The Hebrew lettering on the window is as clean as it was back then. Meanwhile, at Rabbi M. Eisenbach's shop, the painted signs seem to be fading. Beny's

Authorized Sales and Service, which sells “fine jewelry, electric shavers, lighters, pens,” is not just a throwback; it also exhibits a totally alien aesthetic compared with that of most stores today.

“Store Front” is not mired in nostalgia. Take the photograph of the (now closed) Jade Mountain Restaurant, on Second Avenue near 12th Street, where I ate cheap Chinese food as a teenager. It is not a storefront I get misty-eyed seeing again; even the so-called chop-suey-style sign lettering does not make me long for what’s lost. But it’s part of a larger mosaic that was (and is) New York’s retail consumer culture.

The book is also a study of urban migration, featuring Jewish delis and Italian “latticini freschi” stores downtown, Hispanic bodegas and Irish bars uptown, and a white-bread Howard Johnson’s in Midtown (now gone). There are also photos of single blocks, with various contrasting storefronts tightly packed next to one another, that resemble a third-world market. Downtown is much more alluring than uptown — but maybe that’s because I was raised downtown.

Nonetheless, as I was examining all the images in sequence, somewhere around the middle of the book, actually in Midtown, my interest began to wane and picked up again only toward the end, when I reached the pages devoted to Coney Island. Funny, that was the exact experience I had as a kid in the ’60s when my dad would drive us across the Manhattan Bridge and then through Brooklyn, past all those old neighborhood shops, to the famous amusement park, with its great storefronts and signs.

At the risk of sounding too nostalgic, I would say that Laurence S. Cutler and Judy Goffman Cutler’s J. C. LEYENDECKER: American Imagist (Abrams, $50), a profusely illustrated monograph, demonstrates how beautifully composed and exquisitely painted the editorial and advertising illustration was during the profession’s golden age — the turn of the century through the mid-’40s. Magazines and billboards were wellsprings of illustrious popular art, created by masters like J. C. Leyendecker, his brother F. X. Leyendecker, Charles Dana Gibson, Coles Phillips, Maxfield Parrish, Norman Rockwell, James Montgomery Flagg and others. This is not to imply that illustrators today are less proficient or creative; but with the current preference for raw expressionism over pristine exactitude, not as many artists do the same level of virtuosic work today.

The German-born Joseph Christian Leyendecker (1874-1951) left behind a huge number of images, mostly covers for The Saturday Evening Post (when Rockwell wasn’t doing them), as well as others for The Century, The Literary Digest, McClure’s, Vanity Fair and dozens more. All of his Post covers from the early 1900s to the early 1940s were stylized vignettes, each painted in the same muted brown-and-red palette. But the nuances he captured — in such details as leather coats, athletes’ jerseys and the shiny skin of New Year’s cherubs (he did a lot of them) — were luminescent. Apparently, he wiped oil on his models’ muscles (though not on the cherubs) to enhance those “male surfaces” he most admired. He also often painted in a dark room by candlelight to underscore a model’s erotic qualities. His most famous advertising campaign, for Arrow shirts and collars, which is still cited as a symbol of the flapper era, was the quintessence of stylishness and put the company on the fashion map. His “Man and Woman Dancing” (1923), “Dancing Couple” (1930) and “Couple Descending Staircase” (1932), for which he painted his friend Phyllis Frederic and the actor Brian Donlevy, were reproduced in so many magazines that the models became starring characters in their own right.

Leyendecker was a keen commercial strategist. “In evaluating how to best promote himself and his work,” the Cutlers write, “Leyendecker believed that his greatest impact as an artist was creating images easily reproduced, immediately recognized and broadly distributed for audiences by the millions to appreciate.” He made certain that upon seeing his work people would say, “That’s a Leyendecker!”

Still, not much is known about him, which accounts for the book’s limited, though entertaining, narrative. We are told Leyendecker shied away from the limelight and “an adoring public” because he was “a homosexual when it was nearly impossible to live such a life openly.” So, to ensure his privacy and “conceal his gay lifestyle, Leyendecker meticulously cleansed his files and records of anything homosexually explicit or implicit.” The only clues were in his artwork. “The gay subculture saw the irony

in his work and appreciated the erotic images he lavished upon the world," the authors explain. Yet "these homoerotic images appealed to heterosexual viewers as well."

Despite the fame during his lifetime, Leyendecker has never received the kind of acclaim bestowed on Norman Rockwell, who in 2001 was the subject of an exhibition at the Guggenheim Museum. According to the Cutlers, only one other book devoted to Leyendecker has been published since his death, and that came out in 1974. So it is time for reassessment, and the wealth of illustrations here allows readers to reassess for themselves.

Leyendecker represented the epitome of craft. Another kind of illustration, the manipulated news photographs common in tabloid and broadsheet newspapers from the turn of the century through the '50s (and even into the '70s at some papers), was at the lower end. Virtually every periodical used some form of manipulation: retouchers would remove backgrounds to make stark silhouettes or add additional elements, including cut-in vignettes or cutaway diagrams of events. Today, "regulation and standards for newspaper photographic submission and publication have come under the scrutiny of industry and professional organizations," according to Stanley B. Burns and Sara Cleary-Burns, the authors of NEWS ART: Manipulated Photographs From the Burns Archive (PowerHouse, $45). "If a photojournalist for a newspaper stage-manages a news event without telling the editor, it is grounds for immediate dismissal." But in the early days (The New York Daily Graphic published the first photograph in a newspaper in 1880), manipulation designed to make an image clearer or enhance the information was de rigueur. I remember seeing such photographs in the old picture morgue at The New York Times; they were covered with thick, cracking paint to block out unwanted details or smoothly airbrushed in gouache to make the backgrounds lighter. Some were even painted with contoured borders around them.

In this handsomely designed book, the authors present original photographic prints (as well as reproductions of some newspaper clippings) to show how the truth was helped along. Included are a photograph of Leopold and Loeb, the "notorious coldblooded killers of young friend Bobby Franks," in which the background is sloppily blotted out by airbrush; a picture of American soldiers on leave in Paris during World War I in which light airbrushing, India ink outlines of the figures and a fully painted woman's coat are visible; a photo collage of the Mexican revolutionary Pancho Villa that consists of several photographs pasted together to make one image, with airbrushing, as well as India ink and white and gray paint, to fill in seams and backgrounds; and a photo of a model in evening dress in which a suggestive keyhole is painted around the figure. Another trope in the more sensational tabloids included artists' renderings of murder scenes. In "Montage With Signed Drawing of Shooting," the outline of a dead man on a kitchen floor is glued onto the picture. In fact, it was "post-mortem and spirit photography" that piqued Stanley Burns's curiosity about photo manipulation in the first place.

Taken out of context, the images in "News Art" (they're referred to as "art" in newspaper lingo) are a distinct artistic form born of necessity. While each photograph represents a real person or event, the enhancements and the way they are applied to the photographic surface can be seen as a kind of proto-Pop Art, and the results are not all that dissimilar to some Dada pieces. This book provides a fresh perspective on a common aspect of photography.

Staged photography may be verboten in the newspaper industry, but in the fashion and art worlds it has a long history, building on the concept of the tableau vivant. In Eleanor Antin's HISTORICAL TAKES (San Diego Museum of Art/Prestel, $45), the staging is as ambitious as that of any major Broadway production or Hollywood costume drama. Antin, who is based in San Diego, has made a career of producing "shrewd narratives that are delivered with all the cool detachment expected of conceptual artists," Derrick R. Cartwright says in the foreword. Her work here includes human friezes set in ancient times, organized in historical groupings like "The Last Days of Pompeii," in which photos titled "Drusilla and the Elders" (2001) and "The Sacrifice" (2001) represent key scenes before the eruption of the volcano. In the section "Helen's Odyssey," an image called "Judgment of Paris (After Rubens) — Light Helen" (2007) mixes a cast of old and contemporary characters: a sexy guerrilla fighter; a woman in a '50s-style polka-dot dress, holding a vacuum cleaner; a cherub.

Antin has said that she “invents histories,” as Amelia Jones notes in one of the essays in this book. Jones adds, “Antin’s practice is profoundly critical and profoundly feminist in that it articulates a self in process that performs across time and space to enliven the past and to prick us where we are right now.” I have not been pricked by the tableaus’ social meanings, but I admire the devotion to exactitude and the level of wit Antin brings to these extremely ambitious works.

Antin makes art that looks like the stage. In Jerry Pinto and Sheena Sippy’s BOLLYWOOD POSTERS (Thames & Hudson, paper, $34.95), advertising artists and designers manipulate film images into staged posters. And the images for some of the films — like the posters for the 2008 movie “Jodhaa Akbar,” showing a Rajput princess and a Mughal emperor — come across as the humorless counterparts of Antin’s amusing heroes and heroines.

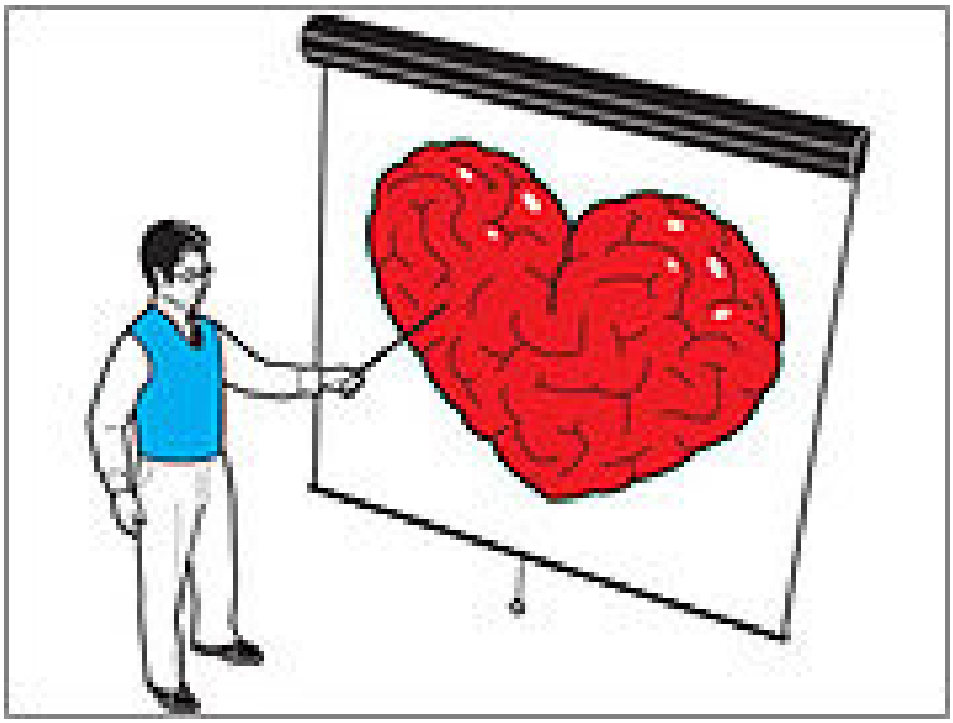
These posters do show, though, a range of styles and approaches, from the slavishly historical pastiche of the ones for “Mughal-E-Azam” to the pulp-crime look of “Pocket Maar” to the steamy romance of “Barsaat.” There are also a few very contemporary, Hollywood-type posters, like the comic one for “Chandni Chowk to China.” As a history of Bollywood (a name the authors say is itself contentious), the narrative is informative. As a book of popular art, it is evidence that in India the graphic design used to promote movies to the masses is just as clunky as it often is in the United States.

http://www.nytimes.com/2009/04/05/books/review/Heller-t.html?ref=design

The other kind of smart

Is it time for schools to try to boost kids' emotional intelligence?

By Drake Bennett | April 5, 2009



FOR MOST OF us, what we were taught in school and what we remember from our school years are two different things. We sat through uncountable hours of lessons about denominators and organelles, about precipitates and dangling participles, about Boo Radley and Shays' Rebellion, and yet the memories that sneak up on us today are more likely to be the humiliations suffered on the school bus or the awkward moments from a pubertal romance, the triumph of a deftly parried insult or the sheltering solidarity we felt in a now long-dispersed clique.

Much of what we learn about social life, in other words, we learn in school. The learning process is a fumbling and painful one, administered not by teachers but through schoolyard intrigues and emotional outbursts. And in this part of our education, we are largely on our own. While some people - Franklin Delano Roosevelt was one, Ronald Reagan another - seem born with a gift for emotional perception, the rest of us muddle through as we can. School is set up for one kind of learning, but when it comes to emotional matters, the assumption has always been that these are instincts we have to develop for ourselves.

Today, however, a number of educators and psychologists are arguing that, actually, we don't. What they call "social and emotional knowledge" - the ability to read other people, manage our own emotions, and thereby master social situations - doesn't have to be imparted solely through the cut and thrust of lived life. It can be taught, they say, just like trigonometry or French grammar. Psychologists are designing curricula that aim, step by step, to build up students' emotional knowledge: a typical teaching unit might include a role-playing exercise, or a set of diagrams breaking down the components of different facial expressions, or, in older children, a discussion of the subtle differences between disgust and contempt.

And while the basic idea that school should help refine social skills is not a new one, the proponents of social and emotional literacy programs are armed and emboldened by promising new findings that

suggest just how teachable these skills are. With a little training, studies show, grade-schoolers can dramatically improve how accurately they read emotions in others' faces, how well they head off impending tantrums - even how empathetic they are toward classmates.

Education officials are starting to take notice. Around 10 percent of American grade school and high school students now go through some form of social and emotional learning curriculum, according to the Collaborative for Academic, Social, and Emotional Learning (CASEL), a Chicago-based emotional learning research organization. A handful of states have instituted emotional learning guidelines for their public schools - the most comprehensive is Illinois's, which sets "self-management," "social awareness," and "interpersonal skills" benchmarks, among others, for kids at each grade level.

The movement has been fed by a confluence of factors. Parents and school administrators are increasingly worried about the disruptive effects of bullying and other antisocial behaviors in schools. At the same time, cognitive scientists are emphasizing the vital role emotions play in rational thought.

Supporters point to a growing collection of studies showing the benefits of emotional learning programs in everything from test scores to lowered anxiety levels and rates of drug use. But the ultimate goal is something larger: a redefinition of what school is meant to teach, and what sort of knowledge we value. What emotional literacy campaigners are arguing is that the problems of the American school system won't be solved by getting kids reading sooner or ensuring that they can find Alaska on a map - they need to better understand what drives them and others.

"This is not meant to be part of the school mental health plan, but part of the regular instructional plan," says Mary Utne O'Brien, a research professor at the University of Illinois at Chicago and an executive at CASEL. "It's about more than making school nice; it's specific skills, just like what you're doing in language or math."

The champions of emotional learning claim an intellectual pedigree stretching back to Aristotle, who described emotional control and understanding as vital virtues. Writing in the early 20th century, the philosopher and influential education reformer John Dewey fleshed out this idea, insisting that schools should impart not just information but habits of mind that would ensure that graduates were active participants in a democratic society. Educational reformers in the intervening decades have echoed Dewey's arguments.

Still, these ideas have had a hard time finding purchase in the traditional "reading, writing, and arithmetic" curriculum, especially as standardized tests on traditional topics have come to determine more and more of how students and their schools are judged.

Today's emotional education movement, however, is energized by something new: a surge of studies suggesting that "softer" knowledge like social and emotional skills can be analyzed and taught in the same way that math and critical thinking can be.

The emotional knowledge research field arose in the early 1990s with the work of the psychologists John Mayer, of the University of New Hampshire, and Peter Salovey of Yale. Mayer and Salovey weren't interested in emotional knowledge per se, but emotional intelligence: people's ability to process new emotional information (a sort of emotional IQ). But, according to Mayer, their interest grew out of earlier research exposing some of the mechanics by which emotions guide us and, at times, give us away - work by the neurologist Antonio Damasio, for example, showed how people rendered emotionless by brain damage became not more but less rational in many ways. Also influential was psychologist Paul Ekman, who developed an exhaustive taxonomy of what he called "micro-expressions," tiny, inadvertent facial movements that betray our true emotions. (The current TV crime drama "Lie to Me" is inspired by Ekman's work.)

In Ekman's work in particular, seemingly innate social skills were being broken down into the kind of units that could be studied, and taught - Ekman began offering courses in how to spot and interpret micro-expressions.

What really transformed the field, however, was the 1995 publication of the runaway bestseller "Emotional Intelligence," by the psychologist and journalist Daniel Goleman. In the book, Goleman drew on Mayer and Salovey's work but also made some sweeping arguments of his own. The book was written for a popular audience, and emotional intelligence researchers are careful to distance themselves from some of its more dramatic claims. But its popularity fueled interest among educators, and the sometimes seat-of-the-pants emotional education efforts they embarked on provided ample research fodder for curious psychologists.

In recent years, the results have started to come in, and they suggest that emotional knowledge can indeed be learned in the classroom. Emory University psychologist Stephen Nowicki has found that interventions can teach kids to read faces better. Mark Greenberg of Penn State has found that emotional learning classes can make kids better at controlling themselves when upset. Researchers looking at a curriculum called the Resolving Conflict Creatively Program found that such classes also made children less likely to falsely misread intent - in particular less likely to assume hostility in ambiguous social situations.

"The extent to which this is now research-based is new," says Larry Dieringer, the executive director of the Educators for Social Responsibility, a Cambridge-based education-reform research organization. "The accumulation of evidence has been both basic research about brain development and evidence that comes from the evaluation of social and emotional programs."

Among the most highly regarded of the curricula that both fed and fed off that research is one created by Marc Brackett, the deputy director of the Yale University's health, emotion and behavior laboratory. His program is dubbed RULER (for Recognizing, Understanding, Labeling, Expressing, and Regulating emotions) and Brackett has trained more than 25,000 teachers in it.

"People are just not exposed to this information because it hasn't been valued in our society," Brackett argues. "I can show that people can become better at it."

The RULER curriculum is tailored to different age groups, but in general it involves dozens of sessions: workshops in which students discuss feelings they are having or interview each other about their emotions, role-playing exercises in which they act out different emotions or are presented with emotionally charged situations, then have to work through how to defuse them. There is an emphasis on learning a richer vocabulary to describe emotions, the idea being that students better able to express how they feel will be both more conscious of their feelings and less likely to be misunderstood by others. And there are Ekman-like courses in basic facial expression recognition - many kids, Brackett says, confuse surprise and fear.

One of the central tools of Brackett's system is something he calls the "mood meter," a 2-by-2 chart on which kids can plot their subjective state along with their energy level. Brackett argues that doing so allows kids to better understand what they're feeling and even why. High energy and positive is excited, low energy and positive is relaxed; low energy and negative is sad or depressed, high energy and negative is agitated or angry. A more fine-grained, systematic understanding about what emotions are, Brackett argues, is a key step in learning how to anticipate and control them.

The Obama administration has made clear that it plans to use the tens of billions of stimulus dollars it is injecting into the nation's schools as leverage to demand reform. Much of the administration's agenda has yet to be spelled out, but there is a sense in the education world that fundamental changes could result. And while the administration has yet to mention emotional learning, champions of the idea have taken heart at smaller signals of support: California congressman George Miller, for example, chair of the

House Education Committee, has expressed interest in the idea of using federal money to help expand emotional learning programs.

With the administration's much-touted affection for data-driven decision-making, emotional learning supporters believe their growing bundle of research results will only help their cause. Several recent studies have linked social and emotional learning programs to a variety of positive outcomes: better grades, fewer fights, less drug use, and the ability to form more lasting personal relationships.

Still, there are psychologists who argue that it's still very early - after all, general intelligence has been a topic of debate for more than a century - and that teaching emotional intelligence comes with its own risks. In "What We Know About Emotional Intelligence," a book due out this month, the psychologists Moshe Zeidner, Gerald Matthews, and Richard Roberts point out that there's little research demonstrating how emotional learning programs work. And since many programs combine emotional learning with things like antibullying and antiviolence workshops, it's hard to tease out the effect of the emotional curriculum alone.

These critics also raise the question of whether a classroom full of emotionally aware kids might also be a class of adroit emotional intriguers. "If you know how to understand and manipulate other people's emotions, it can turn into something Machiavellian," says Zeidner, director of the center for interdisciplinary research on emotions at Israel's University of Haifa.

Other critics wonder whether reducing social and emotional life to a series of workshops and tests, where some emotions are right and others wrong, risks creating a sort of emotional conformism, the opposite of the vigorous taste for dissent that John Dewey wanted to inculcate.

Supporters of the programs dismiss these concerns as unfounded - the best programs, they argue, are about perceiving and managing emotions, not stifling them. But at the same time, they point out, uniformity runs both ways. Part of the appeal of emotional learning curricula is that they promise to make up for the fact that some kids come armed with a well-developed social sense and all the benefits it confers, and some do not.

"The 'aha' of this field is that it doesn't have to be the luck of the draw - coming up in a family that has it together or naturally being a people person or a self-aware person," says O'Brien, of CASEL. "It's that you can teach these skills to everyone."

Drake Bennett is the staff writer for Ideas. E-mail drbennett@globe.com. ■

http://www.boston.com/bostonglobe/ideas/articles/2009/04/05/the_other_kind_of_smart/

Stephen King completes epic novel after 25 years

Under the Dome, which King began writing in the 1980s, runs to more than 1,000 pages and will be published in November

- Alison Flood
- guardian.co.uk, Friday 3 April 2009 13.24 BST

'I sure hope people like it' ... Stephen King. Photograph: Tina Fineberg/AP

It's been incubating for 25 years but Stephen King is finally ready to show the world the 1,000-plus page epic he first attempted writing in the 1980s. Under the Dome, in which an invisible force field seals off a Maine town from the world, is due to be published this November, his publishers have said.Weighing in at a whopping 1,120 pages, Under the Dome is a return for the bestselling author to the arm-breaking heft of his classic novels The Stand and It. King told an audience at the Library of Congress in Washington DC last year that he'd first had the idea for the book 25 years ago, and made a stab at writing it. "I tried this once before when I was a lot younger, but the project was just too big for me and I let it go, I let it slide," he said. "But it was a terrific idea and it never entirely left my mind. It just kinda stayed there and hung out, and every now and then it would say write me, and eventually I did."

Set in the town of Chester's Mills, Maine, "on an entirely normal, beautiful fall day", inhabitants suddenly find that the town has been sealed off by an invisible force field. "Planes crash into it and fall from the sky in flaming wreckage, a gardener's hand is severed as 'the dome' comes down on it, people running errands in the neighbouring town are divided from their families, and cars explode on impact," King revealed on his website. "No one can fathom what this barrier is, where it came from, and when – or if – it will go away."Characters in the cast of more than 100 include Dale Barbara, a Gulf veteran and now a cook, the town's newspaper owner Julia Shumway, a physician's assistant at the hospital and three children. They're up against an evil politician, Big Jim Rennie – who's desperate to hold onto power and will stop at nothing, even murder – and his son, who in classic King style, "is keeping a horrible secret in a dark pantry". Meanwhile, time under the Dome is running out.

King, the author of more than 50 books, has said that the new novel "deals with some of the same issues that The Stand does, but in a more allegorical way"."Since it's over a thousand pages long, I sure hope people like it," he said earlier this year in his regular column for Entertainment Weekly.

http://www.guardian.co.uk/books/2009/apr/03/stephen-king-under-dome

'Supersize' lions roamed Britain
By Natalie Hancock
BBC News, Oxford

Giant lions were roaming around Britain, Europe and North America up to 13,000 years ago, scientists from Oxford University have found.

Remains of giant cats previously discovered were thought to be a species of jaguar or tiger but after DNA analysis they were proved to be lions.

They were 25% bigger than the species of African lion living today, and had longer legs to chase their prey.

They would have lived in icy tundra with mammoth and sabretooth tigers.

It is thought these animals would hunt over longer distances, and their longer legs would help them chase down their prey as opposed to the modern-day species which tends to ambush its victims.

The Oxford team analysed DNA from fossils and other remains gathered from Germany to Siberia, and Alaska to Wyoming.

Dr Ross Barnett, who conducted the research at Oxford University's department of Zoology, said: "These ancient lions were like a super-sized version of today's lions and, in the Americas, with longer legs adapted for endurance running.

"What our genetic evidence shows is that these ancient extinct lions and the lions of today were very closely related.

" **The extinction is a big question that remains unresolved** "
Dr Ross Barnett

"Cave art also suggests that they formed prides, although the males in the pictures would not have had manes and they are depicted very realistically."

Lions appear to have been very important to early man with many depictions of them in their cave paintings, as in seen in the pre-historic cave complex at Chauvet in France.

Other archaeological finds in Germany include figurines which are half man, half lion, leading to the theory that lions may even have been worshipped by ancient humans.

The team found that these remains from the Pleistocene Epoch (1.8 million years ago to 10,000 years ago) could be divided into two groups: the American Lion which lived in North America, and the Cave Lion which lived in northern Europe, Russia, Alaska and the Yukon.

These ancient cats would have lived in an environment that was more like an icy tundra and would have shared their habitat with herds of other large animals such as mammoth, woolly rhino, sabre tooth tigers and giant deer.

About 13,000 years ago these species died out in a mass extinction. Figuring out the reason behind this, Dr Barnett said, was one of the last great scientific mysteries.

He said: "There are a couple of different schools of thought. It could have been climate change or something to do with humans. Humans could have been killing off their prey or killing the lions themselves.

"The extinction is a big question that remains unresolved. More research and more advanced genetic analysis may help answer it."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/england/oxfordshire/7974948.stm

Published: 2009/04/01 16:10:57 GMT

Sleep problems linked to suicide

Adults who suffer chronic sleep problems may be more likely to try to commit suicide, US research suggests.

Doctors are being warned to be vigilant if a patient reports disturbed sleep - even if they have no history of mental health problems.

The more types of sleep disturbances people had, the more likely they were to have thoughts of killing themselves, or actually try to do so.

The study will be presented at a World Psychiatric Association meeting.

" **This study reinforces the fact that good sleep is vital for good physical, mental and emotional health** "
Dr Neil Stanley Norfolk and Norwich University Hospital

The World Health Organization estimates that about 877,000 people worldwide die by suicide every year. For every death up to 40 suicide attempts are made.

Scientists have consistently linked sleep disturbances to an increased risk of suicidal behaviour in people with psychiatric disorders and in adolescents.

But it has been unclear whether the association also exists in the general adult population.

Sleep disturbance

A University of Michigan team examined the relationship over one year between sleep problems, and suicidal behaviour in 5,692 Americans. During the course of the year 2.6% of the sample had suicidal thoughts, and 0.5% were recorded as making a suicide attempt.

INSOMNIA
- On any given night one in three people will be struggling with insomnia
- Women twice as likely to be affected
- 10% of people have clinical insomnia
- Can be treated with techniques such as cognitive behaviour therapy

They looked at three types of sleep problems - difficulty falling asleep, difficulty staying asleep and waking at least two hours earlier than desired.

The researchers took account of factors such as substance abuse, depression, anxiety disorder, and physical illness, as well as social factors such as marriage and financial status.

People with two or more symptoms of insomnia were 2.6 times more likely to report a suicide attempt than those whose sleep was not disturbed.

Early morning waking was the single trait most strongly linked to suicidal behaviour.

Lead researcher Dr Marcin Wojnar said: "The presence of sleep problems should alert doctors to assess such patients for a heightened risk of suicide even if they don't have a psychiatric condition.

"Our findings also raise the possibility that addressing sleep problems could reduce the risk of suicidal behaviours."

Underlying link

Dr Wojnar said it was possible that sleep disorders and suicidal thoughts were both the manifestation of a troubled psyche, or that poor sleep drove people to thoughts of suicide.

" **Most people with insomnia manage the effects very well** "
Dr Daniel Freeman Institute of Psychiatry at King's College London

But he also suggested there could be an underlying physiological link between the two which was not clear.

Experts have suggested that a lack of sleep might affect the way the brain works, leading to poor judgement and less ability to control impulses.

It is also suspected that both sleep disorders and suicidal thoughts might be linked to an imbalance in the chemical serotonin, which plays a key role in regulating mood.

Dr Daniel Freeman, of the Institute of Psychiatry at King's College London, said the study showed that insomnia was very common, and could have a significant effect on psychological well-being.

He said: "It is very plausible that suicidal thoughts, which happen when we are depressed and find it hard to think our way out of our problems, have been linked to insomnia.

"However it needs to be remembered that insomnia is very common and suicidal thoughts less so. Most people with insomnia manage the effects very well.

"Insomnia only triggers severe problems for people with a pre-existing vulnerability."

Sleep important

Dr Neil Stanley, a sleep expert at Norfolk and Norwich University Hospital, said: "This study reinforces the fact that good sleep is vital for good physical, mental and emotional health.

"Poor sleep has long been linked with an increased risk of depression, but this study suggests that the increased risk of suicidal behaviour is not necessarily linked to depression and thus can affect those that doctors might not feel are at risk.

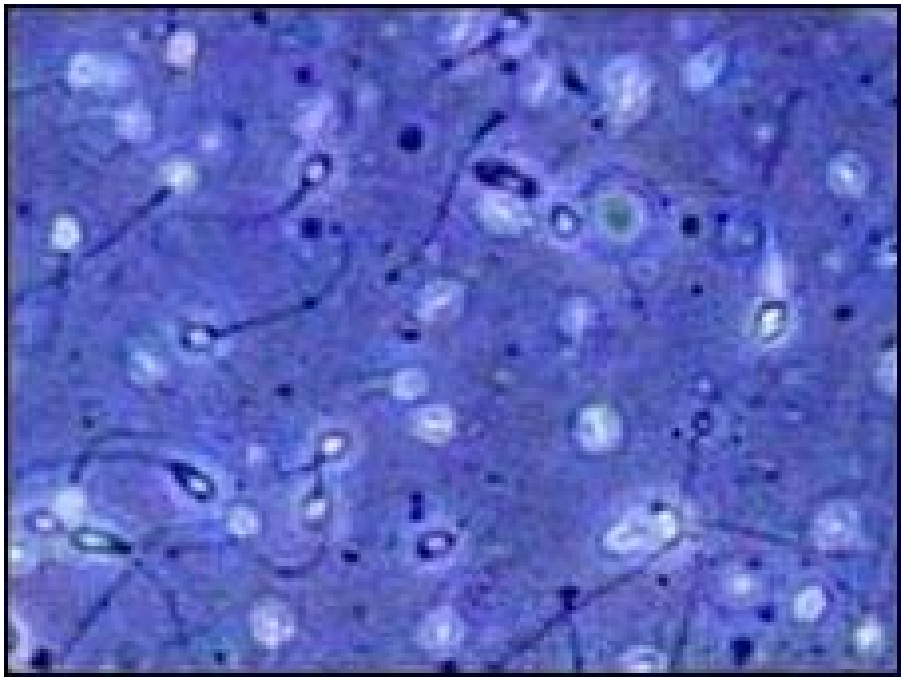
"It is another demonstration of the importance, both as an individual and as a society, of getting good sleep."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7972646.stm

Published: 2009/03/31 23:00:22 GMT

Gene defect clue to male pill

A male contraceptive pill could be a step closer after US researchers identified a gene flaw linked to male infertility.



The study of Iranian families found mutations in the CATSPER1 gene which controls a protein determining sperm movement.

Researchers say the finding could lead to treatments for infertile men - and potentially to a new contraceptive.

Condoms or a vasectomy are still the only male contraceptive choices.

UK researchers from the Medical Research Council Reproductive Biology Unit in have previously carried out surveys showing that men would be willing to take a contraceptive pill if one was available.

Hyperactive

In this study, the researchers were looking at a population with high rates of disease-causing gene mutations to investigate genetic causes of deafness.

However, while they were collecting genetic information, the scientists discovered that two families had different DNA mutations in the CATSPER1 gene.

The affected men's infertility was diagnosed using standard semen analysis. There were no other identifiable causes for their fertility problems.

" **This may also provide a new target for a revolutionary male contraceptive** "
Dr Allan Pacey, University of Sheffield

Both mutations would likely lead to either a much shortened, non-working version of the protein the gene controls, or no protein at all.

Neither mutation was found in the DNA of 576 Iranian individuals who were also screened.

Tests on mice have previously found CATSPER1 mutations cause infertility because they affect sperm "hyperactivation" - the ability to move with the required energy and speed to enter the female egg during fertilisation.

Dr Michael Hildebrand, who led the research, said: "We have identified CATSPER1 as a gene that is involved in non-syndromic male infertility in humans, a finding which could lead to future infertility therapies that replace the gene or the protein.

He added: "Identification of targets such as the CATSPER1 gene that are involved in the fertility process and are specific for sperm - potentially minimising side effects of a drug targeting the protein's function - provide new targets for a pharmacological male contraceptive."

'Much work to be done'

A potential approach is to target CATSPER1 is immunocontraception, where antibodies are developed that bind to a targeted protein and block its function.

But the researchers stress that immunocontraception is still in the early stages of development and that, in order to be useful, it will need to be proven effective, safe and reversible.

Dr Allan Pacey, senior lecturer in andrology at the University of Sheffield, said: "Hyperactivation is important both to get sperm to move along the oviduct toward the egg and also in giving them sufficient power and thrust to be able to fertilise it.

"The fact that this study now suggests similar CATSPER mutations may also occurred in humans could explain why some men are unable to father a child naturally, in spite of having apparently normal semen quality."

But he added: "The authors are correct that this may also provide a new target for a revolutionary male contraceptive, although there is much work to be done in order to prove that approach would be both effective and safe."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7979722.stm

Published: 2009/04/03 09:25:12 GMT

Robo-scientist's first findings

By Victoria Gill
Science reporter, BBC News

Scientists have created an ideal colleague - a robot that performs hundreds of repetitive experiments.

The robot, called Adam, is the first machine to have independently "discovered new scientific knowledge".

It has already identified the role of several genes in yeast cells, and is able to plan further experiments to test its own hypotheses.

The UK-based team that built Adam at Aberystwyth University describes the breakthrough in the journal Science.

Ross King from the department of computer science at Aberystwyth University, and who led the team, told BBC News that he envisaged a future when human scientists' time would be "freed up to do more advanced experiments".

Robotic colleagues, he said, could carry out the more mundane and time-consuming tasks.

"Adam is a prototype but, in 10-20 years, I think machines like this could be commonly used in laboratories," said Professor King.

Robotic planning

Adam can carry out up to 1,000 experiments each day, and was designed to investigate the function of genes in yeast cells - it has worked out the role of 12 of these genes.

Biologists use the yeast cells to investigate biological systems because they are simple and easy to study.

"When you sequence the yeast genome - the 6,000 different genes contained in yeast - you know what all the component parts are, but you don't know what they do," explained Professor King.

" **Robots express scientific findings in a much clearer form than humans** "
Professor Ross King Aberystwyth University

The robot was able to work out the role of the genes by observing yeast cells as they grew.

It used existing information about the function of known genes to make predictions about the role an unknown gene might play in the cell's growth.

It then tested this by looking at a strain of yeast from which that gene had been removed.

"It's like a car," Professor King said. "If you remove one component from the engine, then drive the car to see how it performs, you can find out what that particular component does."

Expensive assistant

Duc Pham from the Manufacturing Engineering Centre at Cardiff University described the robot scientist as "a clever application of robotics and computer software".

But, he added, "it's more like a junior lab assistant" than a scientist. "It will be a long time before computers can replace human scientists."

Professor King agreed that the robot was in its early stages of development.

"If you spent all of the money we've spent on Adam on employing human biologists, Adam probably wouldn't turn out to be the cost-effective option," he said.

"But that was the case with the first car. Initially, the investment in the technology wasn't as cost-effective as sticking with horses."

He also pointed out that his robotic associate is able to express scientific findings in a clearer way than humans.

"It expresses its conclusions in logic," he said. "Human language, with all its nuances, may not be the best way to communicate scientific findings."

The same team is developing another, more advanced robot scientist called Eve, which is designed to screen new drugs.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7979113.stm

Published: 2009/04/02 19:23:09 GMT

Brain scan 'could diagnose PTSD'

Scientists say they are moving ever closer to being able to diagnose Post Traumatic Stress Disorder (PTSD) using a brain scanner.

Research to be presented to the World Psychiatric Association congress in Florence suggests differences in the brain activity of PTSD sufferers.

Over 40 US soldiers who had served in Iraq or Afghanistan were tested - about half of whom had a diagnosis of PTSD.

Their brains were examined with an MRI scanner as they performed memory tests.

The term PTSD is used to describe a range of psychological symptoms people may experience following a traumatic, usually life-threatening, event. It is seen most commonly in those who have been on active service.

Researchers at Duke University in the US presented 42 soldiers, both male and female, with photographs of three similar faces.

They were then showed pictures of a combat scene, a non-combat scene - such as as man playing a trombone for instance - or a digitally scrambled picture.

Finally, they were shown a photograph of a face again and asked whether they had just seen it.

Driven to distraction

While watching the part of the brain associated with paying attention, researchers noted the group without PTSD was far more distracted by the pictures of combat scenes.

" **It is not actually hard to diagnose PTSD - all you need is a decent mental health professional** "
Professor Simon Wessely King's Centre for Military Health Research

Those with PTSD were distracted by both the combat and non-combat pictures and performed more poorly in the memory test of faces which followed.

"This sensitivity to neutral information is consistent with the PTSD symptom of hypervigilance, where those afflicted are on high alert for threats and are more distracted by not only threatening situations that remind them of the trauma, but also by benign situations," said Dr Rajendra Morey, an assistant professor of psychiatry at Duke University.

"This has not been seen at the brain level before. If further research confirms this preliminary finding, this pattern could be useful in distinguishing the PTSD brain."

But experts in the UK said it was hard at this stage to see much practical use there was in being able to identify PTSD on a brain scanner.

"It is not actually hard to diagnose PTSD - all you need is a decent mental health professional," said Professor Simon Wessely, director of the King's Centre for Military Health Research.

"The real challenge is to persuade people to come forward for help.

"Neuroscience is clearly going to help us understand the neural substrates underlying symptoms, but as long as soldiers continue to believe that admitting to psychological distress is not what a soldier should do, most will never get near an MRI scanner."

Neil Greenberg, a senior lecturer in military psychiatry, said he could not see any therapeutic benefit in using a scanner to diagnose.

But he said: "There's a possible use from a medico-legal perspective, if someone wants to prove definitively that this is a condition they have.

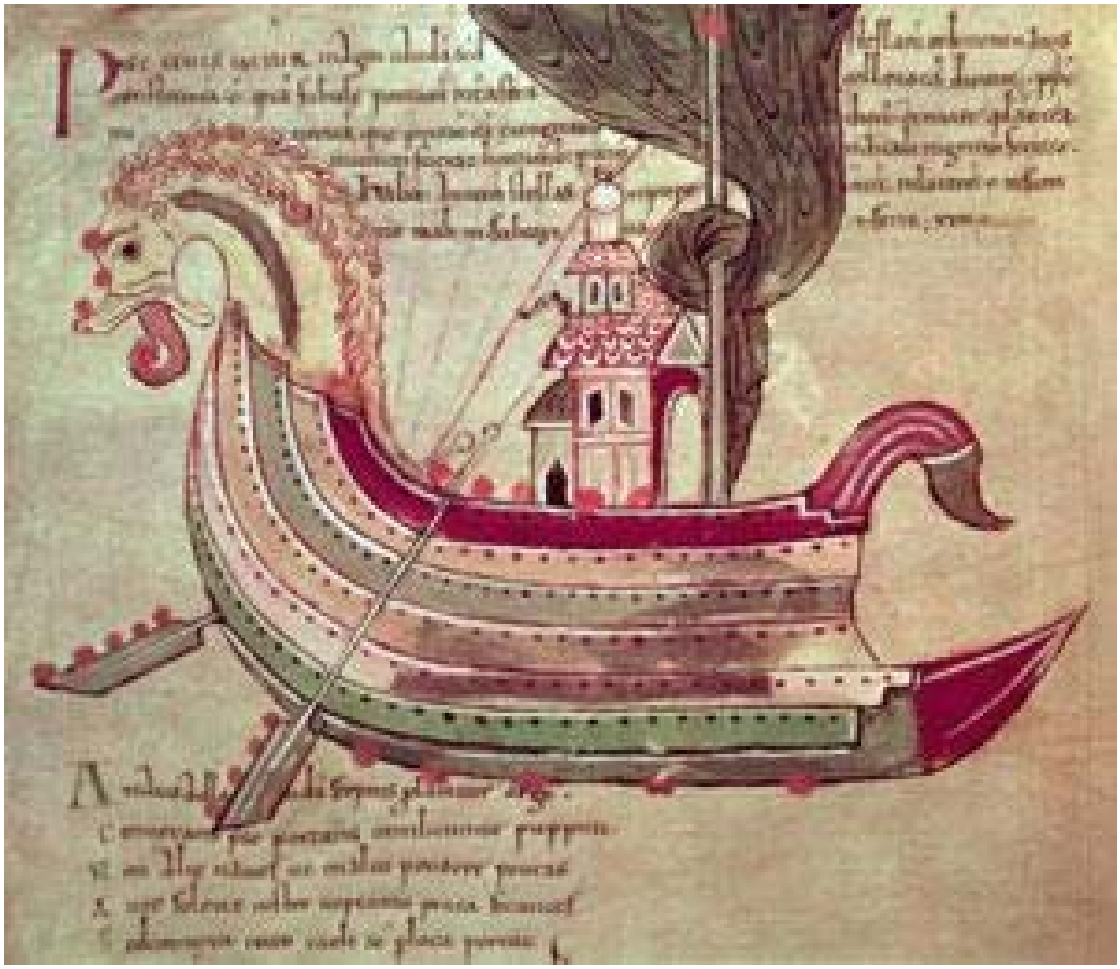
"And it's also feasible that it could be used against those who are avoiding military duties because they say they have PTSD."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7977144.stm

Published: 2009/04/02 23:05:47 GMT

Sagas reveal Vikings were 'first oceanographers'

- 24 March 2009 by **Eric Scigliano**



When Hallstein son of Thorolf Mostbeard found a suitable homestead on Iceland, he sacrificed to Thor, imploring the god to provide the ceremonial high seat posts he needed to complete his great hall. Evidently Thor heard: a mighty log washed ashore, big enough to supply seat posts for all the settlers round about. Years earlier, when Hallstein's father and other Norse pioneers sailed for Iceland, they had found themselves in the opposite fix. They had brought seat posts from home but needed a good place to settle. As they approached Iceland, they tossed their precious posts overboard and followed them to the places Thor supposedly chose for them. But the two prayers had something in common: the same sound ocean science underlay them both.

OLD Kveldulf knew it was time to get out of Norway. He had pushed his luck by refusing to swear allegiance to Harald Tanglehair - a king not to be trifled with. When the king slew his son Thorolf, Kveldulf went berserk. He and his surviving son Skallagrim ambushed two of the king's emissaries, killing them and 50 companions, and fled to sea.

Luckily, safer shores awaited them. This was the 9th century and Norsemen had lately begun to settle Iceland, a thousand kilometres to the west. As they sailed, though, father and son's ships became separated. Exhausted by his killing spree, Kveldulf felt his strength slipping away, as the Norse sagas tell us often happens to berserkers when they come down. When he felt he was close to death he instructed his companions to "make me a coffin, and put me overboard" that he might "come to Iceland and take

land there", and to tell his son "that if he reaches Iceland and I am there already, to make himself a home as close as possible to the place where I have come ashore". They obeyed, and later chanced upon the coffin washed up in a creek entering the firth called Borgarfjord. Skallagrim dutifully built his farmstead there and prospered.

Strange as his last wish might sound, Kveldulf was not merely exercising an old man's whim. He was following what was already a hallowed tradition among Norse explorers, a tradition that made oceanographers of Kveldulf and his fellow Vikings.

The practice goes back to the first recorded Norse settler in Iceland: Ingolf Arnarson, who fled Norway in 874 after a killing. As Ingolf approached the island, he threw his *öndvegissúlur*, his high seat posts, overboard. This was no frivolous gesture; these pillars, often carved with an image of the god Thor, framed the high seat in a Norse great hall where the master of the house sat, and were infused with totemic power and family symbolism. But Ingolf had no intention of losing his, any more than Kveldulf had of being lost. He landed on Iceland's south coast and sent his slaves westward to find the posts. Where they found them, he made his home - at Reykjavik, Iceland's capital to this day.

As more fugitives and emigrants followed Ingolf, seat posts and other precious wooden objects flew off the longboats. Bjorn Ketilson, who was also fleeing King Harald's wrath, found his posts - and settled - where the steep walls of Breidafjord opened onto an appealing beach. His sister Unn the Deep-Minded, shipwrecked at Vikrarskeid, overwintered with her brother and then found her seat posts at the head of Hvammsfjord, near today's village of Hvamm. Hasteinn Atlason jettisoned his *setstokkar*, the partition beam from his old hall, and followed it to his new home.

What prompted the Vikings to risk their precious heirlooms this way? The tale of Thorolf Mostbeard, recounted in the *Eyrbyggja* saga, offers one explanation. Thorolf, a "great friend" of Thor, was obliged to flee after he sheltered Bjorn Ketilson from King Harald. He made a sacrifice and asked Thor what he should do. Sail for Iceland, the thunder god replied. Cast your seat posts upon the waters and follow where I take them. Thorolf obeyed and, where the posts washed up, he built a great temple dedicated to Thor and declared the site a sanctuary where killing and defecation were strictly forbidden. Alas, one faction among his successors refused to observe the second of these prohibitions, and the faithful non-defecators drove them off in a fierce onslaught.

Cast your seat posts upon the waters and follow where I take them, replied Thor

For a millennium after these accounts were recorded, they lay buried in the sagas. Then, in 1962, in an otherwise conventional doctoral dissertation on the waters around Iceland, a young oceanographer called Unsteinn Stefansson re-examined the tales. The jettisoned posts, he wrote, were the "drift bottles" of their day, markers that helped the settlers discern the currents around Iceland.

Stefansson's insight might likewise have been filed and forgotten, except that soon afterwards he visited the University of Washington in Seattle and presented a leather-bound copy of his dissertation to oceanographer Cliff Barnes. Barnes had a particular interest in North Atlantic drifters: during the second world war he had helped allied convoys thread the safest route between the icebergs and German U-boats by tracking the icebergs that calved off Greenland.

In the 1980s, Barnes was incapacitated by Alzheimer's and his protégé Curt Ebbesmeyer inherited his papers. Ebbesmeyer (with whom I've written a book, the forthcoming *Flotsametrics and the Floating World*) came across Stefansson's dissertation and decided to follow the clues he had left. Delving further into the sagas and the minutiae of Icelandic geography, he plotted the drift routes of Kveldulf's coffin and sundry seat posts and reached a surprising conclusion.

The Icelanders knew well what treasures the currents could carry. They collected sea beans, floating seeds from tropical America widely believed to bring good luck, and washed-up logs from Siberia and the

Americas. Such wash-ups can be vital to those who live on islands with limited supplies of timber. Even on the relatively lush Hawaiian islands, Polynesian kings needed drift logs from America's west coast to build their giant war canoes. The esteem in which such flotsam was held is evident from the account of one 19th-century missionary to Hawaii, Titus Coan. He wrote how a native assistant helping to translate a Pauline epistle stumbled over the word "virtue" until he found a Hawaiian equivalent - "a stick of Oregon pine".

Driftwood was needed even more on nearly treeless Iceland and the washed-up seat posts marked beaches where it accumulates. "Wood follows wood," says Ebbesmeyer. Other valuable flotsam, such as beached whales, concentrated there and marine mammals also took advantage of the currents to haul out. Kveldulf's son Skallagrim found that the firth where his father's coffin washed up offered "seal-hunting in plenty, and good fishing".

Thor's instructions were "sound practical oceanography", says Ebbesmeyer. After plotting their jetsam's arcing drifts around southern and western Iceland, he believes the Vikings deduced that a current circled the entire island, the first recorded discovery of an oceanic gyre. "I'd have to call the Vikings the first oceanographers."

The idea is so practical that Ebbesmeyer thinks the Norsemen probably practised the same sort of oceanographic observation in Norway, although he hasn't found any evidence. He hopes others will follow the trail Stefansson began when he dared to open his dissertation with data derived from ancient tales generally dismissed as legend. "It was brave of him," says Ebbesmeyer. "Even anthropologists did not take the sagas seriously. They did not believe the sagas when they said that Vikings had reached America. Then the discovery of the Viking settlement at l'Anse aux Meadows changed all that. We need to listen to the sagas more carefully."

Perhaps future discoveries of far-floating seat posts will pique rather more interest. So many eddies spin off the currents circling Iceland that Ebbesmeyer thinks most jettisoned artefacts would have been borne away from the island to Norway, to North America and, via the Norwegian and North Atlantic Currents, to the Arctic, where some may have lain a thousand years encased in ice. Now the Arctic is thawing. Perhaps Thor's drifters will emerge to beckon future emigrants - refugees from a baking planet rather than a vengeful king - to new homes in the once-frozen north.

http://www.newscientist.com/article/mg20127001.500-sagas-reveal-vikings-were-first-oceanographers.html?full=true

Homeless book peddler confronts tangled epilogue in Harvard Square

Final pages (Boston Globe) Almost Banned in Harvard Square Booksellers may be coming to a close as proprietor Ken O'Brien hits a roadblock. Video by Mark Wilson; produced by Chona Camomot, Globe Staff
By Bella English
Globe Staff / March 31, 2009

Larry Millman was browsing at one of his favorite places in Cambridge and ended up with a handful of used books, including "Lingua ex Machina: Reconciling Darwin and Chomsky with the Human Brain."

"A little light reading for the bathroom," he quipped as he forked over $5 for the book and a couple of others. Millman, an author, is a steady customer at Almost Banned in Harvard Square Booksellers, a sidewalk bookstall run by a homeless man.

But the Massachusetts Avenue stand is closing today, and with it goes one more quirky piece of Harvard Square. Ken O'Brien, who has sold or given away tens of thousands of books since opening nearly three years ago, is giving away the last of his stash.

O'Brien, the first and only homeless person to belong to the Harvard Square Business Association, said he is tired of fighting City Hall.

His story is a long, involved one that includes getting arrested twice, obtaining various permits, and being moved onto subway grates by the Cambridge superintendent of streets, only to have the MBTA say he couldn't set up on its property. When he tried to open a book business in a nearby church, he found he couldn't get liability insurance. When he tried to get a tax identification number, he said, "they wanted all sorts of paperwork" that he couldn't provide, especially since he had a half-dozen other homeless people working for him on commission. Now his peddler's permit has lapsed, and he said he has grown weary of filling out forms.

"It's the paperwork that killed me," O'Brien said. Decades of living on the streets have weathered his face beyond his 55 years. He says he ran a similar business in New York and was never hassled.

The city of Cambridge says it has been working with O'Brien and that the only problem now is that he hasn't applied for a new permit.

O'Brien, who grew up a few blocks away from his bookstall, stuck his thumb out at age 17 and spent the next 35 years riding the roads and rails around the country. "I came home to retire," he said, "and the books would have been my retirement."

His books came from several sources, most notably a place in Rhode Island that would deliver 1,000-pound boxes of books to him for free. O'Brien sold the books for $2 each, putting the excess in a storage unit he rented. But each winter, when it became too cold to work outside, he started giving the books away - "hoping that people would remember me in the spring." In the winter, he'd get by on what he'd saved, with occasional panhandling.

As he speaks, a woman in an sport utility vehicle pulls up to the curb and asks if he would like several bags of books. He thanks her and begins putting them on the shelves.

His family, as he calls it, consists of "Frenchie," or Earlene French, his longtime girlfriend; along with Charlie, an 11-year-old black and white cat; and Penny, a 6-year-old German short-haired pointer he rescued from a puppy mill. The animals, which sit or lie patiently atop the "mobile home" O'Brien fashioned for them, attract as much attention from passersby as the books. At night he drapes a tarp over the bookstall area, and the four of them share sleeping bags to keep warm.

O'Brien's legal problems began shortly after he set up shop in June 2006. After he was arrested, the Department of Public Works said he needed a sidewalk obstruction permit that would cost $1,000. O'Brien took it to court, and a judge ruled that he needed only a peddler's permit. But when he went back to his bookselling, he was arrested again.

That's when a judge appointed Cambridge lawyer Daniel Beck to take his case. Beck recalls that city officials were using an antiquated law against O'Brien. Because he was selling only books - printed matter protected by the First Amendment - District Court Judge Severlin Singleton III deemed it a constitutionally protected activity. "They found this obscure law about peddlers with which to charge him," he said. "It's the first, last, and only time I've ever seen it used."

O'Brien says he then helped draft the first peddler's permit in Cambridge in decades. Superintendent of Streets William Dwyer inspected his spot, in front of J. August Co. clothing store, drew a map, and assigned O'Brien a few yards down, on the MBTA grates. When the city finally gave him a business certificate, it was good only for a few months - not the four years allowed by the state, says O'Brien. Then the MBTA told him to move.

But Cambridge City Solicitor Donald Drisdell says the city tried to work with O'Brien after the court ruling. The ordinance barred peddlers from Harvard Square because the streets were narrow and congested at the time the law was written, Drisdell says. Though O'Brien obtained permits for 2006 and 2007, he refused to get one for 2008, Drisdell says. "Our position is that anyone who wants to set up on a sidewalk has to get a permit from the city and the city will work with them. . . . He has indicated his refusal to do that."

Though O'Brien and French had earned enough money from the books to rent an apartment last summer, they became homeless again in February when their hopes for expanding the business hit a snag.

The plan was to start several bookstands on wheels that would support 15 to 20 other homeless people.

In the square, the couple are known by other homeless adults and runaways as "Mom" and "Pop" because of their propensity to share an extra blanket, food, or a few bucks.

Though several customers expressed anger and sadness at his imminent departure, O'Brien doesn't want anyone feeling sorry for him.

He's got a plan. He'll apply for Social Security insurance, pitch a tent in a park for the spring and summer, then head for Arizona with his "family" in the fall. "We'll try to get some llamas, and we'll walk into the mountains," he said.

But their longtime customers are still dismayed.

"I come by here every day, and it redeems my visit to a part of Cambridge that is becoming increasingly colorless, faceless, and franchised," Millman said. "I think it's a terrible sign of the times and one less reason for me to visit Harvard Square."■

http://www.boston.com/news/local/massachusetts/articles/2009/03/31/bookstall_owner_plans_to_shut_down_fixture_in_harvard_square/?page=full

Virus battery could 'power cars'

Viruses have been used to help build batteries that may one day power cars and all types of electronic devices.

The speed and relatively cheap cost of manufacturing virus batteries could prove attractive to industry.

Professor Angela Belcher, who led the research team, said: "Our material is powerful enough to be able to be used in a car battery."

The team from MIT in the US is now working on higher power batteries.

Scientists at MIT used the viruses to build both the positively and negatively charged ends of a battery, the cathode and anode, the journal Science reports.

A battery typically has four key components - the anode and cathode, an electrolyte that flows between them, and a separator to keep the anode and cathode apart.

Essentially, a battery turns chemical energy into electrochemical energy when an electron flow passes from the negative end to the positive end through a conductive chemical, the electrolyte.

Researchers constructed a lithium-ion battery, similar to those used in millions of devices, but one which uses genetically engineered viruses to create the negatively charged anode and positively charged cathode.

The virus is a so-called common bacteriophage which infects bacteria and is harmless to humans.

Three years ago the MIT scientists manipulated genes inside a virus that coaxed the particles to grow and self-assemble to form a nanowire anode one-tenth the width of a human hair.

The microbes are encouraged to collect exotic materials - cobalt oxide and gold - and because the particles are negatively charged, they can be formed into a dense, virus-loaded film which acts as an anode and "grows" on a polymer separator.

Researchers, including MIT Professor Gerbrand Ceder and Associate Professor Michael Strano, have now developed a highly powerful cathode.

The work was more difficult because the material had to be highly conductive in order to be effective and most candidate materials for cathodes are highly insulating.

The virus was coaxed into binding with iron phosphate and then carbon nanotubes to create a highly conductive material.

The batteries have the same energy capacity and power performance as rechargeable batteries used to power plug-in hybrid cars.

The prototype battery is currently the size of a coin but the scientists believe it can be scaled and be used to create flexible batteries that can take the shape of their container, which is perfect for mobile or small devices.

The scientists have also been able to create micro-batteries which could be used to power a future generation of tiny devices.

"The advantage of using genetics is that things can be made better and better," explained Professor Belcher.

"You are not stuck with a particular material; you have selection and evolution on your side because it can be genetically engineered."

The researchers are now looking for better materials to work with the viruses to create a next-generation battery, which is even higher powered.

"Scale is the issue," admitted Professor Belcher. "But we are not going to scale until we have the right material. We believe this is possible and has commercial implications otherwise we would not be researching in this area."

Currently, the virus battery can only be charged and discharged about 100 times before it begins to lose its capacity to store a charge, but Professor Belcher said "we expect them to be able to go much longer".

The process to build the batteries uses no harmful or toxic materials and so is attractive from an environmental point of view.

Professor Belcher said: "To us, the environmental aspects are very important.

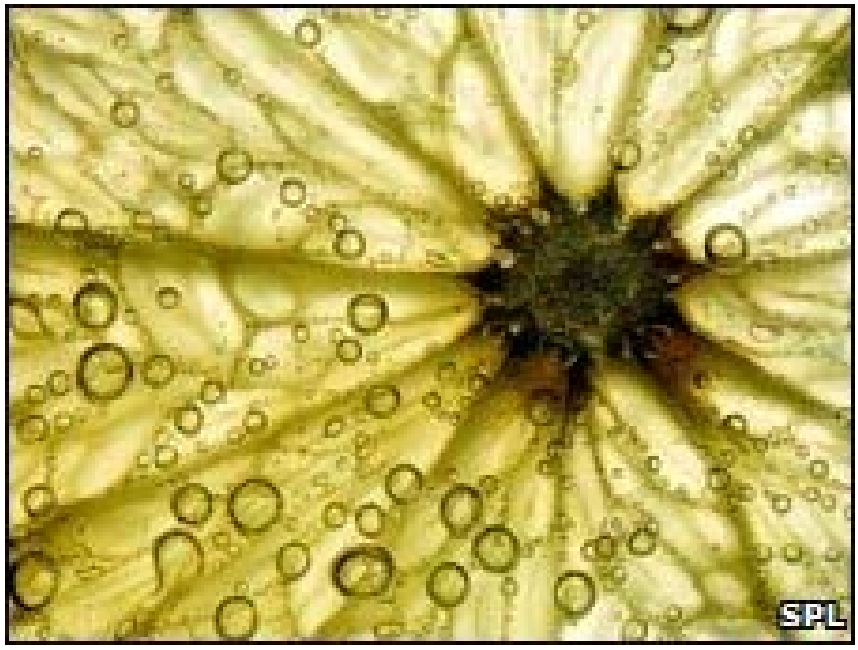
"Put simply, we can't do anything that kills our organisms."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7977585.stm

Published: 2009/04/02 19:20:21 GMT

Grapefruit diet 'put leg at risk'

A woman who went on an intense grapefruit-based diet developed a blood clot in her leg and risked losing the limb, US doctors have reported.



The unusual case, written up in the Lancet medical journal, occurred in Washington state in November last year.

Medics concluded grapefruit had affected the way the 42-year-old's body processed her contraceptive pill.

A UK expert stressed this was an unusual case, but said extreme diets may have "unpredictable consequences".

" **Three days of grapefruit for breakfast may well have tipped the balance** "
Dr Lucinda Grande, Providence St Peter Hospital

In November 2008, the woman came to the casualty department of the Providence St Peter Hospital in Olympia, Washington state.

The day before, she had gone on a long car journey, after which she felt pain radiating from her lower back down to her left ankle.

When she arrived at the hospital she was experiencing difficulty walking, shortness of breath, and light-headedness.

By the next day her left leg had turned purple.

The woman was generally in good health but was slightly overweight and had decided to diet.

Three days before falling ill, she had begun a crash diet which included eating 225g of grapefruit each morning, after rarely eating the fruit in the past.

When doctors examined her, an ultrasound scan confirmed the woman had a large blood clot within the veins of her left leg, which stretched from her hip down to her calf and she was deemed to be at risk of losing her leg because of gangrene.

The woman was given clot-busting treatment and had a stent, a kind of tube, fitted in order to widen her vein.

Fruit block

The doctors treating her said a number of risk factors had contributed to the woman developing the clot.

She had an inherited disorder which increased her risk, as did being on the combined Pill. Being immobile in a car probably also contributed to the clot forming.

Writing in the Lancet, the authors led by Dr Lucinda Grande, called it a "constellation of potential risk factors".

But they added: "The increased [oestrogen] serum concentration due to her three days of grapefruit for breakfast may well have tipped the balance."

They suggest the fruit blocked the action of a key enzyme that normally breaks down the form of oestrogen in her contraceptive.

Dr Trevor Baglin, a consultant haematologist at Addenbrooke's NHS Trust in Cambridge, said: "From this case study it appears as if the grapefruit enhanced the thrombotic effect of the contraceptive pill in the presence of a genetic predisposition.

"However, it is worth pointing out that this is a single case study and a very unusual case at that.

"I would suggest that any extreme diets should be avoided because they can have unpredictable consequences."

A spokesman for the Florida Department of Citrus - an executive agency of Florida government which markets, researches and regulates the state's citrus industry, said: "The Lancet report looks to be inconsistent with published scientific studies which indicate grapefruit does not cause a clinically significant interaction with oral contraceptives.

"We are aware of no validated evidence that grapefruit affects oral contraceptives, and they are generally considered to be safe to consume with grapefruit."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7978418.stm

Published: 2009/04/02 23:05:56 GMT

Realities of boozing are tough to swallow

- 31 March 2009 by **Andy Coghlan**

The days of binging on cheap alcohol may be numbered (Image: Sierak'i/Jacquemart/Rex Features)

HORROR of horrors: The cost of booze is going up. Whatever you're used to paying for your favourite tipple, prepare to pay more. The days of cheap alcohol are numbered and, apparently, it is for our own good.

In wealthy nations all over the world, momentum is building for big hikes in the cost of alcohol. The rationale is to stop us all drinking to the point where we make other people's lives hell by vandalising property, urinating and vomiting in the street, attacking people including members of our own family, and causing death and injury by driving under the influence. In other words, the goal is to stamp out what England's Chief Medical Officer Liam Donaldson last week dubbed "passive drinking" - the damage done to innocent bystanders and society in general when people drink too much.

The passive drinking concept is borrowed from "passive smoking". It is accepted almost everywhere that damage from passive smoking is real, and measures to curb it - taxing cigarettes heavily and banning smoking in public places, for example - have wide public support. Can a similar concept be applied to alcohol? And can the problem of passive drinking become as widely accepted as passive smoking, as hoped for by the World Health Organization, which last year began drafting a global plan to tackle alcohol abuse?

Tackling passive drinking will be an interesting experiment in social engineering. According to Donaldson, the way to do it is to raise the price of alcohol and limit its availability, however much resentment this may cause among the drinking classes. Donaldson proposed that the minimum price of a unit of alcohol (about as much as in half a pint of beer or a small glass of wine) should be raised to 50 pence.

Other countries are grasping the nettle too. The Scottish government is considering imposing a minimum price of 40 pence per unit of alcohol and banning cheap drink promotions such as two-for-one offers and "women drink free all night". Last year, Australia slapped a hefty tax on alcopops in a bid to reduce heavy drinking among teenagers. And in North America there is much discussion about banning happy hours and similar promotions.

Such measures, however, are politically unpopular. Perhaps not surprisingly in a nation that loves its booze, Donaldson's proposals found little support other than plaudits from health and anti-drinking groups. Some commentators billed them as an attack on freedom; one even called Donaldson a "health

fascist". Even his boss, the prime minister, Gordon Brown, was lukewarm about the idea, saying that a price hike would unfairly penalise moderate drinkers.

Nevertheless there is a real problem to be addressed here. In his 2008 annual report, launched on 16 March and entitled *On The State of Public Health*, Donaldson lays bare the shocking toll from passive drinking in England. The list includes 125,000 instances of alcohol-fuelled domestic violence; 2 million victims of alcohol-related violence; 39,000 sexual assaults; 1.3 million children adversely affected by family drinking; 6000 babies born annually with fetal alcohol syndrome; 660 children killed or injured in alcohol-linked road crashes; 7000 non-drinkers injured by drink-drivers; and 560 fatalities due to drink-driving. There were also 1.25 million recorded instances of alcohol-related vandalism. Binge drinking has made city centres no-go areas for many. A survey of 30,000 adults in the north of England found that 45 per cent avoided town centres at night for fear of meeting drunks.

So what is to be done? Some commentators argue that courts should pass harsher sentences on those who commit alcohol-related offences, but that does not get to the heart of the problem. Like it or not, the best way to cut alcohol consumption across the board is to raise its price and limit its availability. As pointed out by the Scottish Department of Health in its document *Changing Scotland's Relationship With Alcohol: A framework for action*, alcohol is much more affordable than it was in 1980. This is one reason why consumption has risen by 19 per cent since then.

This magazine has previously pointed out plenty of evidence that raising the price and restricting availability are the two most powerful tools available to governments to drive down consumption (*New Scientist*, 20 April 2008, p 4).

More recent research led by Petra Meier and her colleagues at the University of Sheffield, UK, showed a clear link between price and consumption. If a minimum price per unit of 30 pence were imposed, consumption would drop by 0.6 per cent. Raise it to 45 pence and it falls by 4.5 per cent. Meier calculates that a price of 40 pence per unit would lead to an overall drop in consumption of 2.6 per cent, with problem drinkers cutting back the most.

Making 50 pence the minimum charge for a unit of alcohol would undoubtedly hit drinkers in their pockets, pushing up the price of a bottle of wine to at least £4.50, a bottle of whisky to £15 and a six-pack of premium lager to £7.50. But consider what it would achieve. Coupled with tightened licensing laws and a ban on cheap drinks promotions in bars and supermarkets, price hikes could prevent 3393 deaths per year in England alone, reduce hospital admissions by 100,000 and prevent 300,000 "sick days" taken off work due to hangovers.

Setting a minimum cost for alcohol would hit drinkers in the pocket, but consider what it would achieve

Far from being health fascists, those who advocate minimum alcohol prices are champions for those whose lives are blighted by alcohol-fuelled disorder, violence and abuse. We should salute them for using the best evidence available to tackle the scourge of passive drinking.

Personally speaking, I will weep into my pint if minimum prices are imposed, but it's a price that I, for one, am willing to pay for the common good.

Andy Coghlan is a New Scientist reporter

http://www.newscientist.com/article/mg20127015.900-realities-of-boozing-are-tough-to-swallow.html?DCMP=OTC-rss&nsref=online-news

Poverty Goes Straight to the Brain

By Brandon Keim ✉March 30, 2009 | 4:00:00 PMCategories: Brain and Behavior, Education

Growing up poor isn't merely hard on kids. It might also be bad for their brains. A long-term study of cognitive development in lower- and middle-class students found strong links between childhood poverty, physiological stress and adult memory.

The findings support a neurobiological hypothesis for why impoverished children consistently fare worse than their middle-class counterparts in school, and eventually in life.

"Chronically elevated physiological stress is a plausible model for how poverty could get into the brain and eventually interfere with achievement," wrote Cornell University child-development researchers Gary Evans and Michelle Schamberg in a paper published Monday in the *Proceedings of the National Academy of Sciences*.

For decades, education researchers have documented the disproportionately low academic performance of poor children and teenagers living in poverty. Called the achievement gap, its proposed sociological explanations are many. Compared to well-off kids, poor children tend to go to ill-equipped and ill-taught schools, have fewer educational resources at home, eat low-nutrition food, and have less access to health care.

At the same time, scientists have studied the cognitive abilities of poor children, and the neurobiological effects of stress on laboratory animals. They've found that, on average, socioeconomic status predicts a battery of key mental abilities, with deficits showing up in kindergarten and continuing through middle

school. Scientists also found that hormones produced in response to stress literally wear down the brains of animals.

Evans and Schamberg's findings pull the pieces of the puzzle together, and the implications are disturbing. Sociological explanations for the achievement gap are likely correct, but they may be incomplete. In addition to poverty's many social obstacles, it may pose a biological obstacle, too.

"A plausible contributor to the income-achievement gap is working-memory impairment in lower-income adults caused by stress-related damage to the brain during childhood," they wrote.

To test their hypothesis, Evans and Schamberg analyzed the results of their earlier, long-term study of stress in 195 poor and middle-class Caucasian students, half male and half female. In that study, which found a direct link between poverty and stress, students' blood pressure and stress hormones were measured at 9 and 13 years old. At 17, their memory was tested.

Given a sequence of items to remember, teenagers who grew up in poverty remembered an average of 8.5 items. Those who were well-off during childhood remembered an average of 9.44 items. So-called working memory is considered a reliable indicator of reading, language and problem-solving ability — capacities critical for adult success.

When Evans and Schamberg controlled for birth weight, maternal education, parental marital status and parenting styles, the effect remained. When they mathematically adjusted for youthful stress levels, the difference disappeared.

In lab animals, stress hormones and high blood pressure are associated with reduced cell connectivity and smaller volumes in the prefrontal cortex and hippocampus. It's in these brain regions that working memory is centered. Evans and Schamberg didn't scan their human subjects' brains, but the test results suggest that the same basic mechanisms operate in kids.

"Brain structures change with stress and are affected by early-life stress in animal models," said Rockefeller University neuroendocrinologist Bruce McEwen. "Now there are beginnings of work on our own species. The Evans paper is an important step in that direction."
McEwen also noted that, at least in animals, the effects of stress produce changes in genes that are then passed from parent to child. Poverty's effects could be hereditary.

The findings, though compelling, still need to be replicated and refined. "They're not really saying which causal events were stressful. They're just measuring biological markers of stress," said Kim Noble, a University of Pennsylvania psychobiologist who studies the relationship between child poverty and cognition. Other mental consequences of poverty also need to be measured. "I think that different cognitive outcomes have different causes," said Noble. "Something like working memory might be more associated with stress, whereas language might be associated with hours spent reading to your children."

But Noble still said the study "was very well-done. They have an impressive data set." And though some details remain incomplete, she said, evidence of connections between poverty and neurobiology are strong enough to justify real-world testing."Policy changes that affect environments that might affect cognitive development and brain change — that's the ultimate future of the field," she said.

Citation: "Childhood poverty, chronic stress, and adult working memory." By Gary W. Evans and Michelle A. Schamberg. Proceedings of the National Academy of Sciences, Vol. 106 No. 13, March 30, 2009.

Brandon Keim's Twitter stream and Del.icio.us feed; Wired Science on Facebook.

http://blog.wired.com/wiredscience/2009/03/poordevelopment.html

Mapping the Cultural Buzz: How Cool Is That?

By MELENA RYZIK

Apologies to residents of the Lower East Side; Williamsburg, Brooklyn; and other hipster-centric neighborhoods. You are not as cool as you think, at least according to a new study that seeks to measure what it calls "the geography of buzz."

The research, presented in late March at the annual meeting of the Association of American Geographers, locates hot spots based on the frequency and draw of cultural happenings: film and television screenings, concerts, fashion shows, gallery and theater openings. The buzziest areas in New York, it finds, are around Lincoln and Rockefeller Centers, and down Broadway from Times Square into SoHo. In Los Angeles the cool stuff happens in Beverly Hills and Hollywood, along the Sunset Strip, not in trendy Silver Lake or Echo Park.

The aim of the study, called "The Geography of Buzz," said Elizabeth Currid, one of its authors, was "to be able to quantify and understand, visually and spatially, how this creative cultural scene really worked." To find out, Ms. Currid, an assistant professor in the School of Policy, Planning and Development at the University of Southern California in Los Angeles, and her co-author, Sarah Williams, the director of the Spatial Information Design Lab at Columbia University's Graduate School of Architecture, Planning and Preservation, mined thousands of photographs from Getty Images that chronicled flashy parties and smaller affairs on both coasts for a year, beginning in March 2006. It was not a culturally comprehensive data set, the researchers admit, but a wide-ranging one. And because the photos were for sale, they had to be of events that people found inherently interesting, "a good proxy for 'buzz-worthy' social contexts," they write. You had to be there, but where exactly was there? And why was it there?

The answers were both obvious and not, a Möbius strip connecting infrastructure (Broadway shows need Broadway theaters, after all), media (photographers need to cover Broadway openings) and the bandwagon nature of popular culture. Buzz, as marketers eagerly attest, feeds on itself, even, apparently, at the building level. A related exhibition opens on Tuesday at Studio-X in the West Village, just south of Houston Street, an area not quite buzzy enough to rank.

The study follows in the wake of urban theorists like Richard Florida (Ms. Currid calls him a mentor), who have emphasized the importance of the creative class to civic development.

"We had social scientists, economists, geographers all talk about it being so important," Ms. Currid said. "It matters in the fashion industry, it matters in high tech. The places that produce these cultural innovations matter. We have sort of this idea — 'Oh, Bungalow 8 matters,' but what do we even mean by that?"

Ms. Currid became interested in assessing social scenes when doing research for her 2007 book, "The Warhol Economy: How Fashion, Art & Music Drive New York City." For the buzz project, snapshots from more than 6,000 events — 300,000 photos in all — were categorized according to event type, controlled for overly celebrity-driven occasions and geo-tagged at the street level, an unusually detailed drilling down, Ms. Williams said. (Socioeconomic data typically follow ZIP codes or broad census tracts.)

The researchers quickly found clusters around celebrated locations: the Kodak Theater, where the Oscars are held, for example, or Times Square. "Certain places do become iconic, and they become the branded spaces to do that stuff," Ms. Currid said. "It's hard to start a new opera house or a new theater district if you already have a Carnegie Hall or a Lincoln Center."

The allure trickled down to the blocks nearby, Ms. Currid said, pointing to the nightclub district in West Chelsea, which started with Bungalow 8. "Why wouldn't they want to be near the places that already were the places to be?" she asked. "It makes a lot of economic and social sense."

That the buzzy locales weren't associated with the artistic underground was a quirk of the data set — there were not enough events in Brooklyn to be statistically significant — and of timing. "If we took a snapshot two years from now, the Lower East Side would become a much larger place in how we understand New York," Ms. Currid said.

But mostly the data helped show the continued dominance of the mainstream news media as a cultural gatekeeper, and the never-ending cycle of buzz in the creative world.

"There's an economy of scale," Ms. Currid said. "The media goes to places where they know they can take pictures that sell. And the people in these fields show up because the media is there."

Distribution to a far-flung audience helps cement an area's reputation as a Very Important Place. "We argue that those not conventionally involved in city development (paparazzi, marketers, media) have unintentionally played a significant role in the establishment of buzz and desirability hubs within a city," Ms. Williams and Ms. Currid write in the study.

Whether their research can be used to manufacture interest — hold your party at a certain space, and boom, buzz! — or help city planners harness social convergence to create artist-friendly neighborhoods remains to be seen. (Ms. Currid and Ms. Williams next hope to map economic indicators like real-estate values against their cultural buzz-o-meter.)

For Ms. Williams the geo-tagging represents a new wave of information that can be culled from sites like Flickr and Twitter. "We're going to see more research that's using these types of finer-grained data sets, what I call data shadows, the traces that we leave behind as we go through the city," she said. "They're going to be important in uncovering what makes cities so dynamic."

Ms. Currid added: "People talk about the end of place and how everything is really digital. In fact, buzz is created in places, and this data tells us how this happens."

But even after their explicit study of where to find buzz, Ms. Currid and Ms. Williams did not come away with a better understanding of how to define it. Rather, like pornography, you know it when you see it.

"As vague a term as 'buzz' is, it's so socially and economically important for cultural goods," Ms. Currid said. "Artists become hot because so many people show up for their gallery opening, people want to wear designers because X celebrity is wearing them, people want to go to movies because lots of people are going to them and talking about them. Even though it's like, 'What the heck does that mean?,' it means something."

http://www.nytimes.com/2009/04/07/arts/design/07buzz.html?_r=1&th&emc=th

ArtBabble Site Opens Window to World of Museums

By KATE TAYLOR

For old television shows, there's Hulu. For college lectures, there's iTunes U. And now, for videos about art, there's ArtBabble, a Web site created by the Indianapolis Museum of Art that offers videos from sources including the Museum of Modern Art and the PBS series "Art:21."

In the last few years, as museums have tried to take advantage of the Internet to connect with young audiences, they have produced an increasing number of online videos, from artist interviews and time-lapse shots of exhibition installations to short profiles of curators, art handlers, and even museum guards. Most institutions feature these videos on their own Web sites, as well as uploading them to sites like YouTube or blip.tv. But until now, there has been no dedicated place on the Web for art videos.
ArtBabble (artbabble.org), which goes live to the public on Tuesday, is intended to change that. For the roll-out the Indianapolis museum invited a handful of institutions, including the New York Public Library, the Smithsonian American Art Museum, the Los Angeles County Museum of Art and the San Francisco Museum of Modern Art, to take part. In the long run, it hopes to add more institutions, so that ArtBabble becomes "the destination for art content online," Daniel Incandela, the director of new media at the Indianapolis museum, said in an interview.
On sites like YouTube, an artist interview can get lost among the "music videos, blooper videos, and sort of more viral, edgier content," Mr. Incandela added. There is also no easy way to browse content from multiple museums, and, until recently, videos weren't available in high definition.
On ArtBabble the majority of videos are in high definition. The design of the home page is clean and is clearly meant to draw in nonspecialists, with speech bubbles featuring punchy quotations that, when clicked on, jump to the relevant videos. (A mock dictionary entry defines "ArtBabble" as "a place where everyone is invited to join an open, ongoing discussion — no art degree required.")
The most unusual feature of the site is the "notes" that accompany each video. The notes run down a window to the right of the screen, offering links to related material on the Web. For example, in an interview with the artist Robert Irwin, when Mr. Irwin mentions the sculptors Mark di Suvero and Richard Serra, the notes offer links to the Wikipedia entries for each artist. A reference to the gardens that Mr. Irwin designed at the Getty Center in Los Angeles provides links to the Getty Center's Web site (getty.edu) and a YouTube video of the gardens. Representatives of several of the partner institutions said that they were most excited about the notes feature and its potential.

"We can give an online viewer the opportunity to take countless tangents," said Joshua Greenberg, director of digital strategy at the New York Public Library. "It fits the core premise of librarianship, that it's not just about putting something in someone's hands but contextualizing it."
The hosting fees and other expenses of ArtBabble are being covered by the Indianapolis museum, with the help of a $50,000 grant from the Ball Brothers Foundation. (ArtBabble is free to users.) If the site becomes popular, the museum will look for corporate sponsorship, the museum's director, Maxwell Anderson, said.
Mr. Anderson said the goal behind ArtBabble, and the museum's own video production, is to allow visitors to "experience the life of museums," whether through employee profiles, studio visits with artists or videos of conservators restoring objects. The advantage of making the new video site a collaborative one was obvious, he said: "The strength and potency of this as a shared site is much greater than one museum at a time."
The Indianapolis museum has been a pioneer in using the Internet to provide greater transparency about museum operations. A section of its Web site (imamuseum.org) called the Dashboard offers current information about the value of the museum's endowment, the number of visitors and its average daily energy consumption. The museum also recently created an online database of works it has deaccessioned.
Mr. Incandela acknowledged that the ultimate success of ArtBabble will depend, at least partly, on what other institutions the Indianapolis museum persuades to join.
Internationally, one museum that has devoted substantial resources to producing videos is the Tate. In collaboration with British Telecom, the Tate has put hundreds of videos on its Web site, tate.org.uk, from studio visits with Jeff Koons and Gilbert & George to archival interview footage with Francis Bacon.
Reached by phone, Will Gompertz, the director of Tate Media, the branch of the museum that oversees its video production, said that he had not previously heard of ArtBabble, but based on a description, he thought it was a great idea.
"Tate would be delighted" to put its videos on a site like ArtBabble, Mr. Gompertz said, adding, "Nothing in this new world can be achieved alone."

http://www.nytimes.com/2009/04/07/arts/design/07babb.html?ref=design

Tracing a Roman Ruler's Life and Legacy

By RODERICK CONWAY MORRIS

ROME — Julius Caesar lent his name to monarchs — both the titles czar and kaiser derive from it — for the best part of two millennia. He himself did not aspire to kingship, but to the title of divinity, something he achieved shortly before his assassination on the Ides of March 44 B.C.

As the recognized descendants of the goddess Venus and the Trojan prince Aeneas, Caesar's family occupied a stratospheric position in Rome's republican social hierarchy, but at the time of Julius's birth in 100 B.C., family members had done nothing of note in living memory. He himself achieved little until he was in his late thirties.

The rest was to be history, as is demonstrated in "Caesar: The man, the deeds, the myth," curated by Giovanni Gentili, which triumphantly manages to deliver on all three of its subtitles at the Chiostro del Bramante.

In the first rooms, the viewer encounters Caesar and other leading protagonists of his age — Cicero, Crassus, Lepidus — in the form of portrait busts, which acquired new levels of expressiveness during this period. Surprisingly, there are only two certain surviving portraits of the man himself, the "Chiaramonti Caesar" from the Vatican (part of the exhibition, which runs through May 3) and the "Green Caesar" (now in Berlin). The latter takes its name from the rare green marble in which it is carved from a quarry in Egypt, where it was probably commissioned by Caesar's adopted son, the future emperor Augustus, who was to make his benefactor's legacy, financial and political, into a form of government that was to endure until the fall of Constantinople in 1453.

Caesar won a number of significant victories during his career, all noted here, but it was his conquest of Gaul (and Britain) that guaranteed his military immortality. Far from being a "just war," even by Roman standards, the Gallic Wars were acts of aggression, pursued by their initiator primarily for personal glory and booty. According to the ancient author Plutarch, the conflict cost over a million Gaul lives, with a further million sold into slavery, while vast tracts of the region were devastated.

The Gauls were formidable warriors, one of them represented here by a uniquely intact statue from the 1st century B.C, the "Vachères Warrior," from the Provençal Alps, wearing chainmail (an invention of Celtic metalworkers). But Gaul as a country was a Roman concept, its lands inhabited by diverse tribes who were often at war with each other, a fact that left them fatally vulnerable to the more disciplined, technologically advanced and better commanded Romans, even though it is reckoned that Caesar's legions — who, according to their general "could storm the heavens" — never numbered more than 50,000 men.

Despite the turbulence of the period and renewed civil war scattered across the Roman empire — sparked by Caesar's unauthorized crossing of the Rubicon with his forces returning from Gaul — this was a most productive era artistically, reflected in the opulent range of art and artifacts displayed here.

The defeats of the fabulously rich Mithradates, king of Pontus in Asia Minor, brought vast quantities of finely wrought objects in the form of booty. And Rome's involvement with Egypt fueled an outbreak of Egyptomania and the import of a host of luxury goods from that region. The cutting of jewels, hard stones and cameos reached new levels of sophistication, creating stunningly beautiful pieces. There are excellent examples of these here, along with the finely fashioned silver that would have adorned the table of wealthy men such as Caesar, including the famous Arcisate Treasure from the British Museum.

A collector of jewels and cameos, Caesar displayed them in cabinets in the Temple of Venus that he built in his new forum, part of his grand plan to transform the center of Rome. The temple's statue of his divine forebear, modeled in that traditional Roman material terracotta and based on a celebrated marble Venus Genitrix by the 5th-century Greek master Callimachus, has not survived, but a precious 2nd century A.D. copy from the Louvre is on show here.

The extent of Caesar's influence on imperial Rome's town plan is sometimes underestimated. The exhibition elucidates the lasting impact Caesar had on the architecture of the city (as does Paolo Liveri's essay in the catalogue). But his grandest engineering scheme — to divert the Tiber to expand the the city center, which would have meant that the river would now flow past the edge of St. Peter's Square — remained on the drawing board

Notable among other achievements on display is Caesar's role as a lawmaker, illustrated by an impressive bronze slab setting out his municipal legislation (unearthed near Herculaneum), and his reform of the calendar in the year before his death, which 1,600 years later was only 11 days out, requiring minor Gregorian tinkering to put it back on course.

One of the most persistent myths regarding Julius Caesar was that a large bronze globe on top of one of the city's Egyptian obelisks contained his funerary ashes. It was peppered with dents in 1527 when, during the sack of Rome, mercenary arquebusiers used it for target practice. Replaced with a cross when Pope Sixtus V moved the obelisk to the center of St. Peter's Square, it has now been loaned by the Capitoline Museums.

In the Middle Ages, Caesar was less prominent than other classical figures, such as Alexander the Great and the Roman general Scipio Africanus. It was during the Renaissance that his fame was revived, a process that culminated with Shakespeare's "Julius Caesar." The development of Caesar's image in illuminated books, painting, sculpture and other media is traced in the last sections of the exhibition.

Some of the finest artworks date to the early days of Caesar's rediscovery. The Florentine sculptor Desiderio da Settignano's mid-15th century high-relief profile (from the Louvre) is an imaginative, extraordinarily refined study of the mature ruler. Mantegna's "The Triumphs of Caesar," a series of huge canvases painted in Mantua in the 1480s and '90s, unprecedented in their tumultuous re-evocation of Caesar's Rome, are represented here by copies from Prague produced by Rubens's studio.

It was Caesar who put Cleopatra on the throne of Egypt, she bore him a child and spent two years in Rome, where she became an instant fashion icon. The tragic Egyptian queen continued to cast a spell over painters and sculptors throughout the following centuries, as illustrated by a series of works here.

At the Paris Salon of 1874 she achieved a kind of Orientalist apotheosis in the splendid "Death of Cleopatra" by Jean-André Rixens which, despite its bold eroticism, was bought by the French state. And in the age of cinema, a succession of screen goddesses has continued to upstage the once deified Roman emperor.

http://www.nytimes.com/2009/04/07/arts/07iht-caesar.html?ref=design

I Dream the Clothing Electric

By JORI FINKEL

San Francisco

THE crew installing the new exhibition at the Yerba Buena Center for the Arts here had all the usual tools of the trade: ladders and dollies, levelers and tape measures, hammers and screw guns. But the artist featured in the show, the Chicago sculptor Nick Cave (not to be confused with the Australian musician of the same name), had one unusual request.

"Could someone bring me a hairbrush?" he asked.
He was using his fingertips to smooth the surface of one of his newest pieces: a mannequin cloaked head to toe with a pelt of dyed human hair. The front featured bright pink spots against a dark brown background; the back, pink and purple zebra-style stripes.
"The hair creates an animal sensibility," said Mr. Cave, who is himself bald, with a trim gray goatee. "You know it's hair, but you don't know where it comes from. It's seductive but also a bit scary."
So is a video of Mr. Cave, an Alvin Ailey-trained dancer, completely covered by the pelt. In the video he throws the electric-colored hair back and forth in a highly stylized, percussive, tribal-looking dance.
Over the last decade Mr. Cave has become known for making colorful, extravagant sculptures with this kind of double life: they can stand alone in galleries as visually compelling art objects, or they can be worn by dancers as vehicles for sound and movement. He calls them Soundsuits.
Some Soundsuits, like a bouquet of metal toys and tops perched on top of a bodysuit made of crocheted hot pads, make a clanking commotion. Others, like the Soundsuits made of human hair (bought already dyed from a wholesaler in New York), tend to fall in the quiet, whispery range. All come to life in performance.
Yerba Buena's director, Kenneth Foster, who described his institution as "deeply multidisciplinary," called Mr. Cave a natural choice for the center for that reason. "So many visual artists cross over in a way that the performance world would be aghast at," he said. "Nick is one of the rare artists as strong in his secondary field as he is in his home art form."

The current exhibition, which runs through July 5, features 40 Soundsuits, along with related photographs, videos and sculptures, prompting Mr. Cave to call it his most complete show to date. It is also his first survey on the West Coast, and will travel to the Fowler Museum at the University of California, Los Angeles, in 2010.

He said he called the show "Meet Me at the Center of the Earth" — and planted a globe sculpture at the center of the main gallery — because he hopes the fruits of his imagination will help bring strangers together, if only to compare their perplexed responses. "I've been a voyeur at other shows of mine in the past, and I've seen complete strangers talking to each other," he said. "They were saying, 'What is that?' Or, 'I remember when my mother made doilies like that.' "

Mr. Cave, 50, credits his own mother with kick-starting his career by responding so enthusiastically to his very earliest artworks, like handmade birthday cards. It also helped, he said, that he was raised in central Missouri without much money.

"When you're raised by a single mother with six brothers and lots of hand-me-downs, you have to figure out how to make those clothes your own," he said. "That's how I started off, using things around the house." (He apparently took after his oldest brother Jack, a Chicago designer. As he installed his show, Mr. Cave wore a Gaultier shirt paired with one of his brother's designs: a pair of long shorts made of conservative gray fabric with a flashy sport stripe running down the sides.)

He learned to sew at the Kansas City Art Institute, where he was a 1982 graduate. He described his first garment as "very flamboyant pants and shirt with a harlequin sensibility." He said textiles immediately interested him for their expressive potential.

But then so did dance. During college he began studying dance through an Alvin Ailey program, training in Kansas City during the year and New York one summer. "I was always interested in movement," he said, "but I knew I didn't want to devote myself exclusively to dance. I wanted to bridge dance and art."

It wasn't until 1992, after he had obtained a master's degree at Cranbrook Academy of Art in Michigan and landed a job teaching at the School of the Art Institute of Chicago (where he is director of the graduate fashion program), that he took a major step in that direction. He made his first Soundsuit out of twigs."It was a very hard year for me because of everything that came out of the Rodney King beating," he said. "I started thinking about myself more and more as a black man — as someone who was discarded, devalued, viewed as less than."

One day, sitting on a bench in Grant Park in Chicago, he saw twigs on the ground in a new light: they looked forsaken too. He gathered them by the armful and cut them into three-inch sticks. He drilled holes through the sticks, so he could wire them to an undergarment of his own creation, completely covering the fabric.

As soon as the twig sculpture was finished, he said, he realized that he could wear it as a second skin: "I put it on and jumped around and was just amazed. It made this fabulous rustling sound. And because it was so heavy, I had to stand very erect, and that alone brought the idea of dance back into my head."

The twig Soundsuit, now in a private collection, was the first of hundreds. With the help of several assistants he has made suits out of everything from sisal ("It looked like porcupine quills") to hundreds of plastic buttons topped by an abacus ("I saw it as a face guard"), one of many flea-market discoveries. Beads, sequins and feathers — always sewn, never glued — are also favorite materials.

Some Soundsuits are made for performance; others go straight into the gallery system, mainly through the Jack Shainman Gallery in New York (where Soundsuits this winter sold for $45,000 each). Some are durable; others more fragile. But all, based on the human body, look as if they could easily spring into motion. The potential for dance is implicit in all of them.

The Soundsuits also explore themes of costuming and masquerading. Mr. Cave said he discovered this identity-altering power early on. "When I was inside a suit, you couldn't tell if I was a woman or man; if I was black, red, green or orange; from Haiti or South Africa," he said. "I was no longer Nick. I was a shaman of sorts."

The extravagant ornamentation, colors and textures also connect the Soundsuits to tribal cultures. For instance in fashioning a piece out of doilies, he said, "I might be thinking about Kuba cloths, Haitian voodoo flags or Tibetan textiles." Still, the suits remain open to many other associations. Kate Eilertsen, the former Yerba Buena curator who oversaw the exhibition, talked about their resurrection of "traditional craft forms like macramé and crocheting," while the New York curator Dan Cameron, in an essay for the show's catalog, cites the "social sculpture" of the artist Joseph Beuys, the legacy of the drag queen Leigh Bowery in the London underground performance scene and the ornate costumes of African-American Mardi Gras Indians in New Orleans.

"I think he's picked up the threads of these — I wouldn't say outlaw but slightly marginalized — traditions and pulled them into the front and center of museum culture," said Mr. Cameron. He also praised the way Mr. Cave connects "static objects in a museum space with human movement," comparing him in this respect to the sculptor-filmmaker Matthew Barney.

The Yerba Buena show highlights the performance potential of Mr. Cave's work through a gallery of video projections, documenting the suits in action. The museum has also commissioned Ronald K. Brown, the New York choreographer, to stage performances using Soundsuits in its galleries from May 28 to 31.

Mr. Brown has one element in mind already. He plans to use a vigorous dance style from Senegal called Sabar to breathe rather explosive life into the suits. "I want to use that style," he said, "because the arms and legs are very expressive. The legs extend so far from the body."

Mr. Cave is not collaborating on these dances, but he is curious to attend them to see how the suits behave. He imagines this will inform his own long-term plan to choreograph an ambitious performance by 90 dancers wearing Soundsuits. Encouraged by a conversation with Chicago's mayor, Richard M. Daley, who saw his show at the Chicago Cultural Center a few years ago, he hopes to stage this extravaganza in 2012 in Millennium Park there. "More and more I'm thinking of using the Soundsuits as a kind of orchestra. You could take three or five and record a concert," he said. "Or you could take 90 Soundsuits and make a full symphony out of them."

http://www.nytimes.com/2009/04/05/arts/design/05fink.html?ref=design

When All You Have Left Is Your Pride

By BENEDICT CAREY

Look around you. On the train platform, at the bus stop, in the car pool lane: these days someone there is probably faking it, maintaining a job routine without having a job to go to.

The Wall Street type in suspenders, with his bulging briefcase; the woman in pearls, thumbing her BlackBerry; the builder in his work boots and tool belt — they could all be headed for the same coffee shop, or bar, for the day.

“I have a new client, a laid-off lawyer, who’s commuting in every day — to his Starbucks,” said Robert C. Chope, a professor of counseling at San Francisco State University and president of the employment division of the American Counseling Association. “He gets dressed up, meets with colleagues, networks; he calls it his Western White House. I have encouraged him to keep his routine.”

The fine art of keeping up appearances may seem shallow and deceitful, the very embodiment of denial. But many psychologists beg to differ.

To the extent that it sustains good habits and reflects personal pride, they say, this kind of play-acting can be an extremely effective social strategy, especially in uncertain times.

"If showing pride in these kinds of situations was always maladaptive, then why would people do it so often?" said David DeSteno, a psychologist at Northeastern University in Boston. "But people do, of course, and we are finding that pride is centrally important not just for surviving physical danger but for thriving in difficult social circumstances, in ways that are not at all obvious."

For most of its existence, the field of psychology ignored pride as a fundamental social emotion. It was thought to be too marginal, too individually variable, compared with basic visceral expressions of fear, disgust, sadness or joy. Moreover, it can mean different things in different cultures.

But recent research by Jessica L. Tracy of the University of British Columbia and Richard W. Robins of the University of California, Davis, has shown that the expressions associated with pride in Western society — most commonly a slight smile and head tilt, with hands on the hips or raised high — are nearly identical across cultures. Children first experience pride about age 2 ½, studies suggest, and recognize it by age 4.

It's not a simple matter of imitation, either. In a 2008 study, Dr. Tracy and David Matsumoto, a psychologist at San Francisco State, analyzed spontaneous responses to winning or losing a judo match during the 2004 Olympic and Paralympic games. They found that expressions of pride after a victory were similar for athletes from 37 nations, including for 53 blind competitors, many of them blind from birth.

"It's a self-conscious emotion, reflecting how you feel about yourself, and it has this important social component," Dr. Tracy said. "It's the strongest status signal we know of among the emotions; stronger than a happy expression, contentment, anything."

In one continuing experiment, Dr. Tracy, along with Azim Shariff, a doctoral student at British Columbia, have found that people tend to associate an expression of pride with high status — even when they know that the person wearing it is low on the ladder. In their study, participants impulsively assigned higher status to a prideful water boy than to a team captain who looked ashamed.

The implications of this are hard to exaggerate. Researchers tend to split pride into at least two broad categories. So-called authentic pride flows from real accomplishments, like raising a difficult child, starting a company or rebuilding an engine. Hubristic pride, as Dr. Tracy calls it, is closer to arrogance or narcissism, pride without substantial foundation. The act of putting on a good face may draw on elements of both.

But no one can tell the difference from the outside. Expressions of pride, whatever their source, look the same. "So as long as you're a decent actor, and people don't know too much about your situation, all systems are go," said Lisa A. Williams, a doctoral candidate in psychology at Northeastern University.

The various flavors of pride may even feel similar on the inside, when the stakes are high enough. "She was always scrupulous about keeping up appearances to herself," wrote Edith Wharton of her tragic heroine Lily Bart in "The House of Mirth." "Her personal fastidiousness had a moral equivalent, and when she made a tour of inspection in her own mind there were certain closed doors she did not open." If you believe it, so will they.

A feeling of pride, when it's convincing, acts something like an emotional magnet. In a recent study, Ms. Williams and Dr. DeSteno of Northeastern had a group of 62 undergraduates take tests supposedly measuring their spatial I.Q. The patterns flashed by too fast for anyone to truly know how well they did.

The researchers manipulated the amount of pride each participant felt in his or her score. They either said nothing about the score; remarked, in a matter-of-fact tone, that it was one of the best scores they had seen; or gushed that the person's performance was wonderful, about as good as they had ever seen.

The participants then sat down in a group to solve similar puzzles. Sure enough, the students who had been warmly encouraged reported feeling more pride than the others. But they also struck their partners in the group exercise as being both more dominant and more likable than those who did not have the inner glow of self-approval. The participants, whether they had been buttered up or not, were completely unaware of this effect on the group dynamics.

“We wondered at the beginning whether these people were going to come across as arrogant jerks,” Dr. DeSteno said. “Well, no, just the opposite; they were seen as dominant but also likable. That’s not a combination we expected.”

Therapists say that in time, people usually do better when they come clean. “In some ways it’s easier to do this now, with so many people out of work,” said Michael C. Lazarchick, an employment counselor in southern New Jersey. “You may very well find out that others are going through the same thing, or something like it — ‘Oh yeah, I just took a big cut in pay.’ ”

But in the short term, projecting pride may do more than help manage others’ impressions. Psychologists have found that wearing a sad or happy face can have a top-down effect on how a person feels: Smile and you may feel fleetingly happier. The same most likely is true for an expression of pride. In a 2008 study, the Northeastern researchers found that inducing a feeling of pride in people solving spatial puzzles motivated them to try harder when they tackled the next round.

Pride, in short, begets perseverance. All of which may explain why, when the repo man is at the door, people so often remind themselves that they still have theirs, and that it’s worth something. Because they do, and because it is.

However much pride may go before a fall, it may be far more useful after one.

http://www.nytimes.com/2009/04/07/health/07mind.html?th&emc=th

A Soak Extracts DNA and Leaves an Old Bug Intact

By HENRY FOUNTAIN

Old DNA can be a great tool for studying evolution, diversity and other subjects, but getting hold of the stuff can be tricky. When the old organisms are small insects, retrieving a bit of DNA can mean destroying all or parts of them.

Now a team of scientists has shown that it's possible to extract DNA from nearly 200-year-old insect specimens without ruining them. They give the bugs a good soak.

Eske Willerslev and Philip Francis Thomsen of the University of Copenhagen and colleagues used a solution called a digestion buffer, the recipe for which had been previously developed. Twenty museum beetle specimens dating from as far back as 1820 were immersed in the solution for about 16 hours, then removed and dried, their exoskeletons and other features intact. Nucleic acids in the remaining solution were purified.

In a paper in the online open-access journal PLoS ONE, the researchers report that all 20 specimens produced usable mitochondrial DNA sequences. It's thought that the digestion buffer gets inside the exoskeletons through the mouth, respiratory holes and other anatomical features, and through holes made when the specimens were pinned for display.

The technique was less useful with much more ancient beetle remains — those frozen in permafrost for tens of thousands of years. Only 3 of 14 samples produced usable DNA. But the researchers had more success with nonfrozen sediments from a cave that weren't quite as ancient — 1,800 to 3,000 years old. They obtained DNA sequences from a beetle and a moth or butterfly.

http://www.nytimes.com/2009/04/07/science/07obdna.html?ref=science

Brain Researchers Open Door to Editing Memory

By BENEDICT CAREY

Suppose scientists could erase certain memories by tinkering with a single substance in the brain. Could make you forget a chronic fear, a traumatic loss, even a bad habit.

Researchers in Brooklyn have recently accomplished comparable feats, with a single dose of an experimental drug delivered to areas of the brain critical for holding specific types of memory, like emotional associations, spatial knowledge or motor skills.

The drug blocks the activity of a substance that the brain apparently needs to retain much of its learned information. And if enhanced, the substance could help ward off dementias and other memory problems.

So far, the research has been done only on animals. But scientists say this memory system is likely to work almost identically in people.

The discovery of such an apparently critical memory molecule, and its many potential uses, are part of the buzz surrounding a field that, in just the past few years, has made the seemingly impossible suddenly probable: neuroscience, the study of the brain.

“If this molecule is as important as it appears to be, you can see the possible implications,” said Dr. Todd C. Sacktor, a 52-year-old neuroscientist who leads the team at the SUNY Downstate Medical Center, in Brooklyn, which demonstrated its effect on memory. “For trauma. For addiction, which is a learned behavior. Ultimately for improving memory and learning.”

Artists and writers have led the exploration of identity, consciousness and memory for centuries. Yet even as scientists sent men to the moon and spacecraft to Saturn and submarines to the ocean floor, the

instrument responsible for such feats, the human mind, remained almost entirely dark, a vast and mostly uncharted universe as mysterious as the New World was to explorers of the past.

Now neuroscience, a field that barely existed a generation ago, is racing ahead, attracting billions of dollars in new financing and throngs of researchers. The National Institutes of Health last year spent $5.2 billion, nearly 20 percent of its total budget, on brain-related projects, according to the Society for Neuroscience.

Endowments like the Wellcome Trust and the Kavli Foundation have poured in hundreds of millions of dollars more, establishing institutes at universities around the world, including Columbia and Yale.

The influx of money, talent and technology means that scientists are at last finding real answers about the brain — and raising questions, both scientific and ethical, more quickly than anyone can answer them.

Millions of people might be tempted to erase a severely painful memory, for instance — but what if, in the process, they lost other, personally important memories that were somehow related? Would a treatment that "cleared" the learned habits of addiction only tempt people to experiment more widely?

And perhaps even more important, when scientists find a drug to strengthen memory, will everyone feel compelled to use it?

The stakes, and the wide-open opportunities possible in brain science, will only accelerate the pace of discovery.

"In this field we are merely at the foothills of an enormous mountain range," said Dr. Eric R. Kandel, a neuroscientist at Columbia, "and unlike in other areas of science, it is still possible for an individual or small group to make important contributions, without any great expenditure or some enormous lab."

Dr. Sacktor is one of hundreds of researchers trying to answer a question that has dumbfounded thinkers since the beginning of modern inquiry: How on earth can a clump of tissue possibly capture and store everything — poems, emotional reactions, locations of favorite bars, distant childhood scenes? The idea that experience leaves some trace in the brain goes back at least to Plato's Theaetetus metaphor of a stamp on wax, and in 1904 the German scholar Richard Semon gave that ghostly trace a name: the engram.

What could that engram actually be?

The answer, previous research suggests, is that brain cells activated by an experience keep one another on biological speed-dial, like a group of people joined in common witness of some striking event. Call on one and word quickly goes out to the larger network of cells, each apparently adding some detail, sight, sound, smell. The brain appears to retain a memory by growing thicker, or more efficient, communication lines between these cells.

The billion-dollar question is how?

In the decades since this process was described in the 1960s and 1970s, scientists have found scores of molecules that play some role in the process. But for years the field struggled to pinpoint the purpose each one serves. The problem was not that such substances were so hard to find — on the contrary.

In a 1999 paper in the journal Nature Neuroscience, two of the most prominent researchers in brain science, Dr. Jeff W. Lichtman and Joshua R. Sanes of Harvard, listed 117 molecules that were somehow involved when one cell creates a lasting speed-dial connection with a neighbor, a process known as "long-term potentiation."

They did not see that these findings were necessarily clarifying the picture of how memories are formed. But an oddball substance right there on their own list, it turned out, had unusual properties.

A Helpful Nudge

"You know, my dad was the one who told me to look at this molecule — he was a scientist too, my dad, he's dead now but he had these instincts — so anyway that's how it all started," Dr. Sacktor was saying. He was driving from his home in Yonkers to his laboratory in the East Flatbush neighborhood of Brooklyn, with three quiches and bag of bagels bouncing in the back seat. Lunch for the lab.

The father's advice led the son, eventually, to a substance called PKMzeta. In a series of studies, Dr. Sacktor's lab found that this molecule was present and activated in cells precisely when they were put on speed-dial by a neighboring neuron.

In fact, the PKMzeta molecules appeared to herd themselves, like Army Rangers occupying a small peninsula, into precisely the fingerlike connections among brain cells that were strengthened. And they stayed there, indefinitely, like biological sentries.

In short: PKMzeta, a wallflower in the great swimming party of chemicals that erupts when one cell stimulates another, looked as if it might be the one that kept the speed-dial function turned on.

"After that," Dr. Sacktor said, "we began to focus solely on PKMzeta to see how critical it really was to behavior."

Running a lab is something like fielding a weekend soccer team. Players come and go, from Europe, India, Asia, Grand Rapids. You move players around, depending on their skills. And you bring lunch, because doctoral students logging 12-hour days in a yellowing shotgun lab in East Flatbush need to eat.

"People think that state schools like ours are low-key, laid back, and they're right, we are," said Robert K. S. Wong, chairman of the physiology and pharmacology department at SUNY Downstate, who brought Dr. Sacktor with him from Columbia. "You have less pressure to apply for grants, and you can take more time, I think, to work out your ideas."

To find out what, if anything, PKMzeta meant for living, breathing animals, Dr. Sacktor walked a flight downstairs to the lab of André A. Fenton, also of SUNY Downstate, who studies spatial memory in mice and rats.

Dr. Fenton had already devised a clever way to teach animals strong memories for where things are located. He teaches them to move around a small chamber to avoid a mild electric shock to their feet. Once the animals learn, they do not forget. Placed back in the chamber a day later, even a month later, they quickly remember how to avoid the shock and do so.

But when injected — directly into their brain — with a drug called ZIP that interferes with PKMzeta, they are back to square one, almost immediately. "When we first saw this happen, I had grad students throwing their hands up in the air, yelling," Dr. Fenton said. "Well, we needed a lot more than that" one study.

They now have it. Dr. Fenton's lab repeated the experiment, in various ways; so has a consortium of memory researchers, each using a different method. Researchers led by Yadin Dudai at the Weizmann Institute of Science in Israel found that one dose of ZIP even made rats forget a strong disgust they had developed for a taste that had made them sick — three months earlier.

A Conscience Blocker?

"This possibility of memory editing has enormous possibilities and raises huge ethical issues," said Dr. Steven E. Hyman, a neurobiologist at Harvard. "On the one hand, you can imagine a scenario in which a person enters a setting which elicits traumatic memories, but now has a drug that weakens those memories as they come up. Or, in the case of addiction, a drug that weakens the associations that stir craving."

Researchers have already tried to blunt painful memories and addictive urges using existing drugs; blocking PKMzeta could potentially be far more effective.

Yet any such drug, Dr. Hyman and others argue, could be misused to erase or block memories of bad behavior, even of crimes. If traumatic memories are like malicious stalkers, then troubling memories — and a healthy dread of them — form the foundation of a moral conscience.

For those studying the biology of memory, the properties of PKMzeta promise something grander still: the prospect of retooling the engram factory itself. By 2050 more than 100 million people worldwide will have Alzheimer's disease or other dementias, scientists estimate, and far more will struggle with age-related memory decline.

"This is really the biggest target, and we have some ideas of how you might try to do it, for instance to get cells to make more PKMzeta," Dr. Sacktor said. "But these are only ideas at this stage."

A substance that improved memory would immediately raise larger social concerns, as well. "We know that people already use smart drugs and performance enhancers of all kinds, so a substance that actually improved memory could lead to an arms race," Dr. Hyman said.

Many questions in the science remain. For instance, can PKMzeta really link a network of neurons for a lifetime? If so, how? Most molecules live for no more than weeks at a time.

And how does it work with the many other substances that appear to be important in creating a memory?

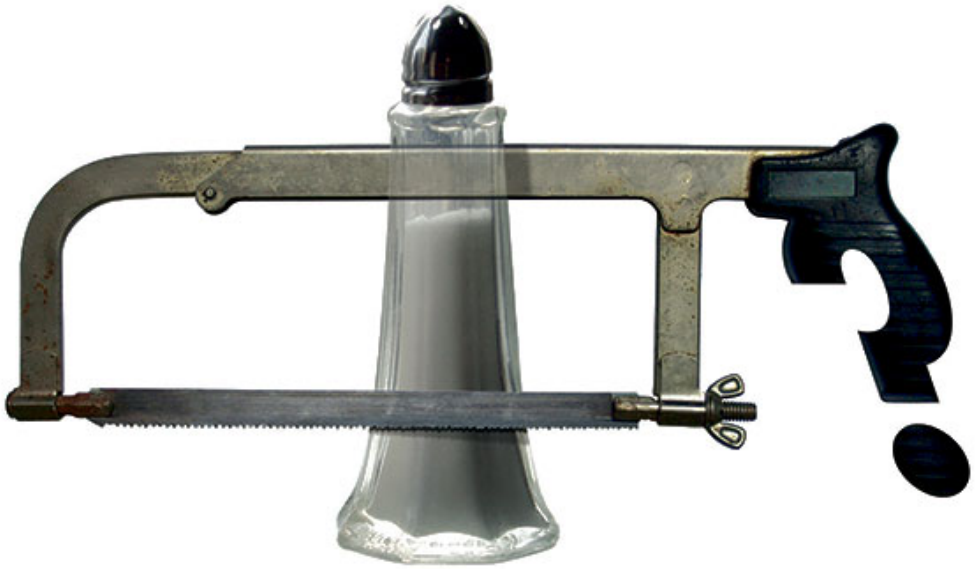
"There is not going to be one, single memory molecule, the system is just not that simple," said Thomas J. Carew, a neuroscientist at the University of California, Irvine, and president of the Society for Neuroscience. "There are going to be many molecules involved, in different kinds of memories, all along the process of learning, storage and retrieval."

Yet as scientists begin to climb out of the dark foothills and into the dim light, they are now poised to alter the understanding of human nature in ways artists and writers have not.

http://www.nytimes.com/2009/04/06/health/research/06brain.html?ref=science

Public Policy That Makes Test Subjects of Us All

By JOHN TIERNEY



Suppose you wanted to test the effects of halving the amount of salt in people's diets. If you were an academic researcher, you'd have to persuade your institutional review board that you had considered the risks and obtained informed consent from the participants.

You might, for instance, take note of a recent clinical trial in which heart patients put on a restricted-sodium diet fared worse than those on a normal diet. In light of new research suggesting that eating salt improves mood and combats depression, you might be alert for psychological effects of the new diet. You might worry that people would react to less-salty food by eating more of it, a trend you could monitor by comparing them with a control group.

But if you are the mayor of New York, no such constraints apply. You can simply announce, as Michael Bloomberg did, that the city is starting a "nationwide initiative" to pressure the food industry and restaurant chains to cut salt intake by half over the next decade. Why bother with consent forms when you can automatically enroll everyone in the experiment?

And why bother with a control group when you already know the experiment's outcome? The city's health commissioner, Thomas R. Frieden, has enumerated the results. If the food industry follows the city's wishes, the health department's Web site announces, "that action will lower health care costs and prevent 150,000 premature deaths every year."

But that prediction is based on an estimate based on extrapolations based on assumptions that have yet to be demonstrated despite a half-century of efforts. No one knows how people would react to less-salty food, much less what would happen to their health.

Dr. Frieden has justified the new policy by pointing to the "compelling evidence" for the link between salt and blood pressure. It's true that lowering salt has been shown to lower blood pressure on average, but that doesn't mean it has been demonstrated to improve your health, for a couple of reasons.

First, a reduced-salt diet doesn't lower everyone's blood pressure. Some individuals' blood pressure can actually rise in response to less salt, and most people aren't affected much either way. The more notable drop in blood pressure tends to occur in some — but by no means all — people with hypertension, a condition that affects more than a quarter of American adults.

Second, even though lower blood pressure correlates with less heart disease, scientists haven't demonstrated that eating less salt leads to better health and longer life. The results from observational studies have too often been inconclusive and contradictory. After reviewing the literature for the Cochrane Collaboration in 2003, researchers from Copenhagen University concluded that "there is little evidence for long-term benefit from reducing salt intake."

A similar conclusion was reached in 2006 by Norman K. Hollenberg of Harvard Medical School. While it might make sense for some individuals to change their diets, he wrote, "the available evidence shows that the influence of salt intake is too inconsistent and generally too small to mandate policy decisions at the community level."

In the past year, researchers led by Salvatore Paterna of the University of Palermo have reported one of the most rigorous experiments so far: a randomized clinical trial of heart patients who were put on different diets. Those on a low-sodium diet were more likely to be rehospitalized and to die, results that prompted the researchers to ask, "Is sodium an old enemy or a new friend?"

Those results, while hardly a reason for you to start eating more salt, are a reminder that salt affects a great deal more than blood pressure. Lowering it can cause problems with blood flow to the kidneys and insulin resistance, which can increase the risk of strokes and heart attacks.

Salt deprivation might also darken your mood, according to recent research by Alan Kim Johnson and colleagues at the University of Iowa. After analyzing the behavior and brain chemistry of salt-deprived rats, the psychologists found that salt, like chocolate and cocaine, affected reward circuitry in the brain, and that salt-deprived rats exhibited anhedonia, a symptom of depression characterized by the inability to enjoy normally pleasurable activities.

Dr. Frieden has predicted that people "won't notice the difference" if salt is gradually reduced, but how can he be sure? What if they respond by eating more food, or a different mix of foods and stimulants? What if the food industry turns to salt substitutes that cause new health problems? "We have no way of knowing the health effects of eating less salt, yet we're supposed to forge ahead with this new policy that affects the whole population," said Michael Alderman, an expert in hypertension at the Albert Einstein College of Medicine. Like other critics, he has compared the antisalt campaign to the campaign against fat that began several decades ago.

That antifat campaign, like the antisalt campaign, was endorsed by prominent groups and federal agencies before the campaigners' theory was tested in rigorous trials. It too seemed quite logical — in theory. But in practice the results were dismal, as demonstrated eventually by clinical trials and by the expanding waistlines of Americans. People followed the advice in the "food pyramid" to reduce the percentage of fat in the diet, but they got more obese, perhaps because they ate so many other ingredients in foods with "low fat" labels.

You might think that experience would inspire caution among public health officials, but instead they seem to be gaining confidence. When Dr. Frieden and Mr. Bloomberg decided several years ago that trans fats were dangerous, they didn't simply issue a warning or a set of voluntary guidelines. They insisted on outlawing trans fats in New York's restaurants.

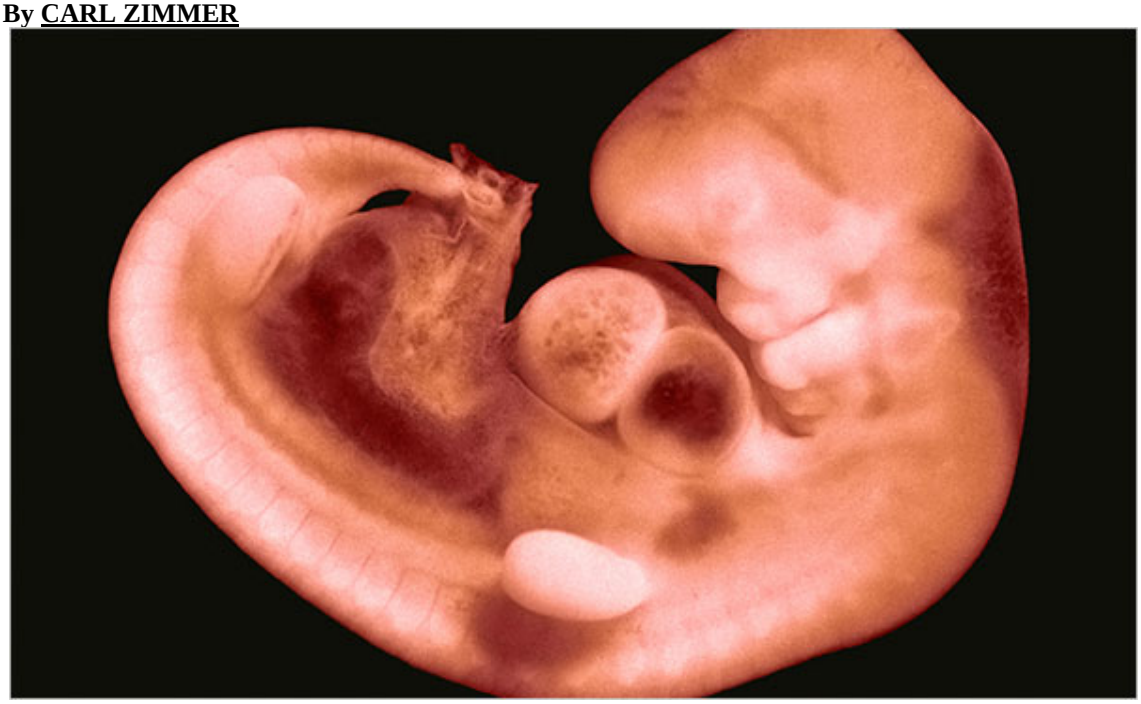
At the time, it seemed extraordinary for a city to be forbidding its diners to order a legal food product, particularly given the scientific uncertainties about trans fats and the possible harms resulting from the ban (see TierneyLab at nytimes.com/tierneylab).

But that local restaurant policy now seems fairly modest by comparison with Mr. Bloomberg's and Dr. Frieden's plans for salt. Soon, wherever you live, wherever you eat, you could be part of their experiment.

http://www.nytimes.com/2009/04/07/science/07tier.html?ref=science

From Developing Limbs, Insights That May Explain Much Else

By CARL ZIMMER



For its first four weeks, a human embryo looks like a crumpled tube. But around its twenty-seventh day of development, four buds bulge from its sides. Over the next few days, the buds grow like tulips, stretching out into flattened stalks and blooming into crowns of fingers and toes. Inside these developing limbs, bones condense. Muscle cells, tendons, blood vessels and nerves all find their respective places. The embryo now has hands with thumbs to suck, legs ready to deliver a kick.

For developmental biologists, the development of limbs captures all that is marvelous about embryos: how a few cells can give rise to complicated anatomy. In fact, biologists understand the development of the limb much better than any other part of the body.

They have been experimenting on developing limbs for almost a century, and today they are figuring out how limb-building genes are organized into a network that almost always manages to build the same structures with the same shape.

In studying limb development, biologists are learning how the diversity of limbs — from bird wings to whale flippers — evolved. They are also getting clues that may someday make it possible to regenerate tendons or even entire limbs. But for many experts on limb development, their most important discoveries are how the rules for limb-building also apply to other parts of the embryo.

“The lessons learned in the limb give you insights into how you build a face, or how you build a heart,” said Clifford Tabin, a developmental biologist at Harvard Medical School.

For centuries doctors and naturalists observed how embryos developed, but it was not until the early 1900s that developmental biologists ran experiments to understand the forces at work.

“This was an era of slice and dice,” wrote Neil Shubin, a University of Chicago biologist, in his 2008 book “Your Inner Fish.” Developmental biologists would snip out pieces of embryos or graft parts together and watch how the development of the embryo was altered.

Limbs proved to be the easiest part of an embryo to study. “The limb is totally external, it’s easy to work with, and it’s totally expendable,” Dr. Tabin said. “No matter what you do to it, the embryo is going to be fine. Having a heart matters a lot to an embryo. But having a limb doesn’t.”

Chickens became a favorite animal for developmental biologists who studied limbs. “You actually break the eggshell and make a window, and you can cover it with tape afterwards,” said Cheryll Tickle of the University of Bath. “The embryo will continue to develop, and you can find out what happens later on.”

In the 1940s, a Johns Hopkins University biologist, John Saunders, discovered through some slicing and dicing that there were two parts of the limb bud that had mysterious powers over the entire limb's fate. One of those parts was a translucent ridge that formed along the outer edge, where the fingers eventually form. If Dr. Saunders clipped off the ridge, the entire limb stopped developing. If he grafted a second ridge onto a limb bud, it grew into two arms.
That patch of tissue was called the apical ectoderm ridge.
Dr. Saunders also discovered a zone on the lower edge of the limb bud, around the place where the pinky would later develop. It somehow sent signals across the limb bud, telling the cells where they were along the pinky-to-thumb axis of the hand and thus which digit to become, and it became known as the zone of polarizing activity.
When Dr. Saunders grafted an extra zone to the thumb side of a limb bud, he produced a second set of digits, arranged in a mirror image to the normal ones.
Five decades later, biologists began to pinpoint the signals that these special parts of the limb bud send out.
In 1993, for example, Dr. Tickle and her colleagues discovered that the ridge produces a growth-stimulating molecule called, descriptively, fibroblast growth factor. A limb bud could still grow without its ridge, they found, if they implanted in it a microscopic bead soaked with this growth factor.
In 1993, Dr. Tabin and his colleagues discovered another signaling chemical of major importance in the limb. Geneticists had a little more fun naming the protein, calling it sonic hedgehog, after a video game character.
Over the past 16 years, Dr. Tabin, Dr. Tickle and other researchers have identified more of the crucial limb-building proteins and the genes that carry the instructions to make them.
"We know most of the genes now, so it's really a system where we can look at more complex things," said Rolf Zeller of the University of Basel in Switzerland. "We're trying to understand how these different genes work together."
Limb development researchers have found that the first steps take place while an embryo is still a crumpled tube. Along the length of an embryo's flanks, a series of segments forms. Each segment produces chemical signals. And at the places where the shoulders and the hips will be, the signals tell the outer cells to grow rapidly and form little pockets, into which other cells stream.
As the pocket grows, it forms the necessary ridge, which sends out other signals telling the cells just underneath it to multiply. As the limb bud grows, the ridge moves away from the cells at its base, which receive fewer growth factors. Without that stimulation, the cells grow more slowly and begin to develop into cells that produce cartilage. They form clumps that will eventually turn into limb bones.
Meanwhile, cells near what will become the pinky start making sonic hedgehog. That molecule spreads across about half the limb bud, to where the middle finger will later form.
Cells that produce sonic hedgehog are exposed to the protein the longest. The neighboring cells become separated as the limb bud grows, and so they are only briefly bathed in it.
Some experiments suggest that being exposed for a long time turns limb bud cells into pinkies. No time exposed to sonic hedgehog turns them into thumbs.
Each part of the limb knows what it should develop into thanks to sets of genes, each laying down the coordinates in one of three dimensions, and all working together. It turns out, for example, that the cells in the ridge can function only if the limb bud can make sonic hedgehog. Dr. Zeller and his colleagues have discovered why: sonic hedgehog switches on a gene in nearby cells called gremlin. Gremlin, in turn, inhibits a protein called BMP4 (for bone morphogenetic protein). At high enough levels, BMP4, can shut down the production of the growth factor in the ridge. So by keeping BMP4 levels low, sonic hedgehog lets the ridge continue to function.
Once the limb has reached the right proportions, it must quickly stop growing. Experiments carried out by Dr. Tabin and his colleagues point to the brake on limb development. The limb bud gets so big that the gremlin-producing cells drift farther and farther away from the cells that make sonic hedgehog. As their supply of sonic hedgehog drops, the cells cannot make gremlin proteins. The level of BMP4 rises , and it shuts down the ridge. Without the ridge's help, the limb bud can no longer make sonic hedgehog. In other words, all the crucial genes for the development of the limb shut one another off.
Today, researchers still have much left to learn about the development of limbs. "Your knuckle and your humerus are the same size when they first form," Dr. Tabin said. "Why does the humerus grow so much bigger than the knuckle? We don't know."

Dr. Tickle and other researchers are screening all the genes that are active in limb bud cells to find those that are essential for the development of limbs. She is optimistic that before long scientists will chart the entire path by which limb buds develop into fully formed limbs. “It’s just a question of having enough people plugging away at it,” she said.
Dr. Tabin shares that optimism. “It’s definitely clear that we’re going to get there,” he said. “We’re going to understand it from beginning to end.”
But Dr. Tabin argues that long before scientists find the complete pattern of limb growth, they will discover many important insights. It is now clear, for example, that genes involved in making limbs (like BMP4) are important for building other parts of the body as well.
“Within an embryo the same molecules are used over and over again,” Dr. Tabin said. “No one would have expected there would have been so few signals used to form an embryo. If you have a signal that says make a heart, you wouldn’t expect it to make a limb. But that’s exactly what you find.”
Deciphering the development of limbs may also lead to treatments for injuries and birth defects. In the near term, scientists are searching for the signals that cause tendons to develop and attach to bones. The signals might be able to cause cells in a dish to form extra tendon tissue, as well, which could be surgically implanted in arms or legs.
Eventually, it may even be possible to apply the right signals that can turn stem cells into limb buds and, ultimately, full-blown arms and legs.
“I’m optimistic it’s going to happen,” Dr. Tabin said. “If you can get the initial conditions right and the cells know what they’re supposed to do, you can turn them loose. It’s a self-organizing system. You don’t have to come back in and say you’ve got to split the muscle in two here. That will happen by itself.”

http://www.nytimes.com/2009/04/07/science/07limb.html?ref=science

Empire State Building Plans Environmental Retrofit

By MIREYA NAVARRO

Once the world's tallest building, the Empire State Building is striving for another milestone: It is going green.

Owners of the New York City landmark announced on Monday that they will be beginning a renovation this summer expected to reduce the skyscraper's energy use by 38 percent a year by 2013, at an annual savings of $4.4 million. The retrofit project will add $20 million to the $500 million building makeover already under way that aims to attract larger corporate occupants at higher rents.

Although the retrofit was specifically designed for the Art Deco office building at 34th Street and Fifth Avenue and its enormous features — 102 stories, 2.6 million square feet, 6,500 windows and 73 elevators — the energy-efficiency improvements are meant to serve as a model for other office buildings around the world, said Anthony E. Malkin, president of Wien & Malkin, which supervises the building on behalf of the owners, the Malkin family and the Helmsley estate.

He said upfront costs are often a deterrent for retrofitting older buildings, but the energy savings for the building , built in 1931, are expected to pay back those costs in only about three years.

"People associate greening with expense and compromise," Mr. Malkin said. "We're trying to prove: no compromise and payback."

Mr. Malkin announced the details of the project at a news conference attended by Mayor Michael R. Bloomberg, who has made sustainability a theme of his administration, and former President Bill Clinton, whose Clinton Climate Initiative program, which works with cities to develop large scale energy efficiency programs, helped facilitate the project.

People involved with the retrofit said the Empire State Building can offer an example of how older buildings can retrofit to the highest energy standards and effectively cut down their greenhouse gas emissions, a contributor to global warming. The largest share of New York City's greenhouse gas emissions, 78 percent, comes from the city's buildings, with commercial buildings contributing 25 percent, mostly from the use of electricity and natural gas.

By reducing energy use, the retrofit plan envisions cutting down the pollution the Empire State Building produces by 105,000 metric tons of carbon dioxide emissions a year, although the number of emissions currently emitted was not immediately available.

"They're showing the rest of the city that existing buildings, no matter how tall they are, no matter how old they are, can take steps to significantly reduce their energy consumption," Mr. Bloomberg said.

The largest energy guzzlers at the Empire State Building are lighting, cooling and heating, said Paul Rode, a project executive with Johnson Controls, the retrofit designer. The building has 302 office tenants but is occupied by about 13,000 people a day, including visitors to the observatories on the 86th and 102nd floors that are open to the public 18 hours a day, seven days a week.

The designers said that about half the reduction in energy use will be achieved in the first two years of the project as they retrofit the double hung operable windows, insulate behind radiators and rebuild chillers in the cooling plant in the basement.

To avoid transportation-related pollution, the windows will be redone on site, by adding a layer of coated film between two glass panes to increase insulation. at a rate of 50 windows a day.

In all, the retrofit consists of eight projects, including upgrades to the electrical and ventilation systems and installation of sophisticated electronic instrumentation.

The biggest challenge in planning the project, Mr. Rode said, was to figure out what was behind the walls and the ceilings of the 78-year-old skyscraper — in the absence of original drawings and specifications. "It took a lot of investigative work," Mr. Rode said.

The plan also calls for tenants' involvement in monitoring their own energy use in their offices through a Web-based dashboard accessible from their computers, which keeps track of how much energy is being used and where.

Some tenants are already ahead of their landlord. Skanska, a Swedish construction company that took over the 32nd floor in November with 80 employees, renovated its 24,400 square feet of office space to green standards like daylight sensors to conserve energy and dual-flush toilets to avoid wasting water. The company, which says it has cut its electric bill by one-third with the improvements, is seeking platinum certification, the highest level awarded by the United States Green Building Council, which certifies buildings and commercial interiors for energy, water efficiency and other green features.

The federal Environmental Protection Agency rates buildings for energy efficiency under its Energy Star program, and 6,200 commercial and institutional buildings have earned the label by achieving 30 to 40 percent greater efficiency than their peers. The Empire State Building is expected to fall in the top 10 percent of Energy Star office buildings when its renovation is completed, the project designers said.

While the energy-saving improvements will be substantial, no one visiting the building is very likely to notice them — most involve slight changes or will be hidden in the building's innards. The night lighting that makes the building a distinctive part of the city's skyline represents a small draw of energy during off-peak hours and will continue without changes, Mr. Malkin said.

He said the green features will be highlighted for visitors as an educational tool, and tenants may also see a mark-up on rents because of the desirability of green features.

Jacques Catafago, president of the Empire State Building Tenants Association, called making the building more energy-efficient "a laudable effort" but said that rent increases were a concern. Mr. Catafago, a lawyer whose firm has been in the building since 1990, said that "34th Street is not 57th Street — the rents are very reasonable here."

But Mr. Malkin said he was looking at the larger goal.

"If we don't change our unsustainable practices and the amount of energy we consume, if we don't make our city more efficient, we're toast," he said. "We won't be able to avoid the sort of changes that would spell a reduced quality of life."

http://www.nytimes.com/2009/04/07/science/earth/07empire.html?ref=science

Scratching Relieves Itch by Quieting Nerve Cells

By BENEDICT CAREY

As common as it is, scratching to relieve an itch has long been considered a biological mystery: Are cells at the surface of the skin somehow fatigued, in need of outside stimulation? Or is the impulse, and its relief, centered in the brain?

Perhaps neither one, a new study suggests. Neuroscientists at the University of Minnesota report that specialized cells in the spinal cord appear to be critically involved in producing the sensation of itch and the feeling of relief after the application of fingernails, at least in healthy individuals. The study appears in the current issue of the journal Nature Neuroscience.

"It's as if there's a little brain in there that creates this state in which scratching — which normally excites pain cells — instead inhibits them," said Glenn J. Giesler, a co-author of the study. The same cells that register the itch also are sensitive to pain.

"It's a very important study; itching is a major problem for millions of patients," said Dr. Gil Yosipovitch, a dermatologist at the Wake Forest University School of Medicine and founder of the International Forum for the Study of Itch.

Dr. Yosipovitch cautioned that the findings may not apply to the sort of chronic itch that plagues people with atopic eczema, H.I.V. or chronic kidney problems. "But this is the kind of work that should help open this area up to more research."

In the study, led a postdoctoral student, Steve Davidson, researchers isolated in monkeys cellular connections that run from the surface of the foot to the spinal cord and then to the thalamus, a clearinghouse for sensations in the brain, down through the spinal cord to the surface of the foot. They induced the sensation by injecting histamines under the skin.

The scientists took single-cell recordings in an area at the base of the spinal cord, in the lower back, in so-called spinothalamic neurons. These cells are sprinkled throughout the spinal cord. Most are sensitive to

pain, and some to both pain and itch. The cells apparently detected the injection and began firing immediately afterward. And when the researchers scratched the itchy skin on the monkeys' feet, it quieted the cells' activity.

"It's the first time I've ever seen a noxious stimulus — the scratching — stop the firing of cells," Dr. Giesler said. His co-authors, along with Mr. Davidson, were Xijing Zhang, Sergey G. Khasabov and Donald A. Simone.

Scientists argue that itching is most likely related to grooming, and evolved to protect animals against some toxic plants, as well as insects, along with the diseases they can transmit, like malaria, yellow fever and river blindness. But the biology of itch has been a mystery, and neglected for years by researchers, who have been far more focused on pain.

Some 50 diseases leave people in a misery of itching which usually cannot be treated. Studies among kidney disease patients and psychiatric inpatients have found that itch is among the top complaints. And when it is severe it keeps people up at night, often worsening their condition.

The new study suggests that itch, like pain, may be a "gated" system in which signals from other nerve cells can interfere with or moderate the sensation. Scratching the skin near, but not directly on, the spot that itches often provides relief, just as rubbing an aching limb can reduce pain. Perceptions in the brain, too, probably moderate the urge to scratch: some chronic, compulsive cases of itching suggest that the brain is not properly reading the effect of outside signals at all but is instead acting on a mistaken internal representation of what is happening to the skin.

As with some kinds of pain, subtle reminders of an itching sensation can get people scratching, often without being entirely aware of it.

"I give lectures about itching," Dr. Giesler said, "and I'll stand up there in front of a whole roomful of people, show a few slides and pretty soon I'll look out and 90 percent of the audience is scratching."

Like yawning, itching also seems to be contagious, which suggests a significant top-down influence from the brain.

Dr. Yosipovitch said there was a long way to go before doctors could expect treatments. For one thing, the miserable, chronic itch common in many medical problems most likely involves other mechanisms in addition to those identified in the study. And the brain may be critically involved in escalating itch, in ways that are not yet understood. "But as a clinician, I feel excited about the finding," he said. "It's a sign that this field is really evolving."

http://www.nytimes.com/2009/04/07/health/07itch.html?_r=1&ref=science

Radiologist Adds a Human Touch: Photos

By DINA KRAFT

JERUSALEM —When Dr. Yehonatan N. Turner began his residency in radiology, he was frustrated that the CT scans he analyzed revealed nothing about the patients behind them — only their internal organs. So to make things personal, he imagined each patient was his father.

But then he had a better idea: attach a photograph of the actual patient to each file.

“I was looking for a way to make each case feel unique and less abstract,” said Dr. Turner, 36, now a third-year resident at Shaare Zedek Medical Center here. “I thought having a photo of the patient would help me relate in a deeper way.”

Dr. Turner’s hunch turned into an unusual medical study. Its preliminary findings, presented in Chicago last December at a conference of the Radiological Society of North America, suggested that when a digital photograph was attached to a patient’s file, radiologists provided longer, more meticulous reports. And they said they felt more connected to the patients, whom they seldom meet face to face.

In the digital age, adding a photo to a file is a simple procedure, and the study’s authors say they hope it becomes a standard procedure — not just for radiologists but also for pathologists and other doctors who rarely have contact with patients.

Radiologists spend most of their working hours in darkened rooms with large, high-resolution computer screens where they read and analyze dozens of scans and X-rays each day.

The process can feel mechanical and detached. But Dr. Jonathan Halevy, the director of Shaare Zedek, says that “when there is a picture, your attitude and approach changes — the human aspect is inserted.”

Important clues to patients’ conditions can sometimes be seen in their faces. Clicking through photos of patients who participated in the study, Dr. Turner pointed to an older man with a bruiselike hematoma around the eyes — a possible sign of brain injury. Paleness or jaundice might indicate various kinds of organ problems.

In the initial study, a group of Shaare Zedek radiologists rotated through three groupings, reviewing more than 300 files of patients who had agreed to have their pictures taken.

In the first group, radiologists received a photo of the patient along with the file; after three months they reviewed the same file, this time without the picture. In the second group, they interpreted the patient's file without a photo, and three months later were presented with the same file, this time with a photo. A control group interpreted scans without photos.

The researchers found that the radiologists' reports were significantly more thorough in all cases when a photograph was attached to a patient's scan. Reports were longer, more recommendations made, summaries usually included and more incidental findings recorded.

In a questionnaire that was also part of the study, the radiologists said that the photos helped them relate better to the patients and that they themselves felt "more like physicians."

Dr. James H. Thrall, radiologist in chief at Massachusetts General Hospital and chairman of the American College of Radiology, said attaching photos to patient files could prove difficult in the United States. Privacy rules might require patient consent each time a photo was used.

Still, he added in an e-mail message, "if further investigation supports the concept it could be done."

Dr. Thrall also expressed concern that if patient photos eventually do become part of standard protocol, their effectiveness as a tool for better medicine might dull over time — though he added, "That is just a hypothesis to be tested."

Dr. Turner cautions that the research is still preliminary and that more study is needed. He is seeking other medical centers to take part in an expanded study.

Such research, he said, might be a way to test theories about facial features and the body. Some practitioners of alternative medicine, for example, say the distances between features can indicate physical conditions.

Dr. Turner was accepted to both film school and medical school, and he was drawn to radiology as the most visual field in medicine. He said his interest in the power of faces was piqued by his reading of the French philosopher Emmanuel Levinas.

He included a quotation from Levinas in his presentation of the research to his American colleagues in Chicago: "Among all the organs of the body, the face is the one which stays most naked. ... In front of the face of the other, silence is impossible."

http://www.nytimes.com/2009/04/07/health/07pati.html?ref=science

From Medical School to Middle Age

By PAULINE W. CHEN, M.D.

The view through scopes — colonoscopes, arthroscopes and laparoscopes, to name a few — routinely aids physicians in narrowing diagnoses and arriving at a plan of care. But none is as illuminating as the one doctors refer to as the "retrospectoscope," the scope of hindsight. The retrospectoscope brings startling clarity to the most mysterious disease processes: difficult decisions become brilliant choices, minor missteps turn into devastating errors, and the best of intentions can transform into deep regret and persistent what-if's.

Tonight and next Tuesday, PBS shines the retrospectoscope on doctors as "Nova" airs "Doctors' Diaries," the most recent installment of a 22-year chronicle about seven former Harvard medical school students.

Producer Michael S. Barnes began following the students in 1987. He chose them in part because they represented different aspects of the entering class, and because they appeared to Mr. Barnes to be "good characters." Ultimately he filmed over 700 hours of classes, clinical encounters, interviews and personal moments outside of school. While the first installment, titled "M.D. — The Making of a Doctor," ran soon after the students' graduation in 1991, subsequent installments included footage from their years of residency training and early practice. This latest update catches up with them more than two decades after they began medical school, now middle aged and mid-career.

Much of this two-part installment reviews highlights from their early years. We witness the shock of dissecting a human body, the awkward experience of learning how to do a pelvic exam, the mind-numbing exhaustion of internship.

When first aired in the early 1990s, these clips were raw and thought-provoking; but there is now something vaguely nostalgic about watching medical students and residents from that time. Animal print tops and bulging shoulder pads on the women date the film footage, but so do the discussions about specialty choices, which have since become skewed toward fields like dermatology and anesthesia, and residency work hours, which no longer routinely surpass 110 hours per week.

Nonetheless, the difficulty and profound awkwardness of becoming a doctor, of reconciling youthful ideals about compassionate care with unforgiving clinical demands, remains as poignant as ever. In one segment, a student breaks down in tears as she witnesses her patient die on the operating room table. The head surgeon listens intently, acknowledging her grief, then gently reminds her that as doctors they still must go to help the family understand what has happened. “I know that,” she says, obviously struggling. “But it’s so hard to watch.”

The series, too, becomes harder to watch as it hurtles toward the present and begins focusing less on medicine and more on life itself. While a clearer timeline might have been helpful — some clips have subtext that gives the viewer a sense of time and place; others don’t — there’s no missing the fact that medicine has influenced all seven doctors in ways that none of them might have imagined 22 years earlier. Two of the doctors who displayed great maturity and precocious bedside skills as medical students make the decision to no longer see patients. Four of the doctors become separated or divorced from the spouses they met or married in medical school or training.

One of the doctors, now a psychiatrist, discusses the process of undergoing intensive psychoanalysis himself. “There’s a painful moment of realization when you understand that you are still going to be yourself when you come out of it," he says, summarizing what viewers are seeing on screen. "I, like many people, had a fantasy that I was going to be a new person, a different person. Life remains a challenge.” Theirs has become a journey of not only professional actualization but also painful self-realization.

These last views offered by the retrospectoscope are tinged with sadness, the kind of regret that inevitably comes with nearly 20/20 hindsight. Each doctor goes on to address the question: Would you do it over again? And it’s uncomfortable watching these once voluble or spontaneous young students now pause and offer the measured responses of middle age.

But what leaves the viewer, and any future doctor who might watch the series, with hope is the surprising lack of regret each expresses regarding his or her choice to become a doctor. Their work today reflects a broad range of deeply committed and patient-centered work — caring for the underserved; doing clinical and basic science research that will ultimately affect patients’ lives; traveling to Third World countries to offer care; running a nonprofit that helps to fund community service projects here and abroad. It is work that transcends the challenges of their personal lives and far surpasses the quality of what they might have ever offered patients earlier on in their careers.

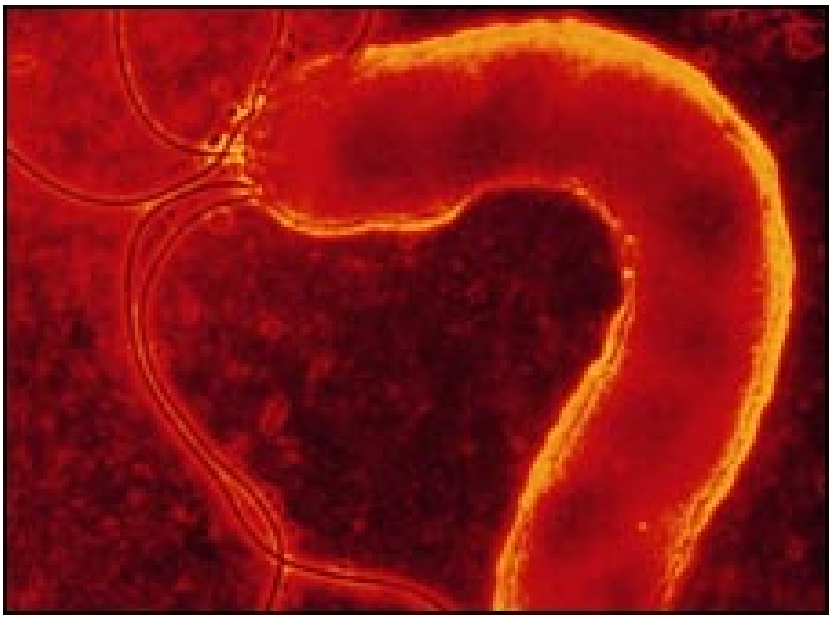
The doctor who wept in the operating room, for example, talks about her young daughter who has said she wants to follow her mother’s footsteps: “I have mixed feelings about it, knowing how hard it was for me and how strenuous it is, and how much you sacrifice.” But then, for a moment, that familiar look of wonder returns to her eyes, and the viewer clearly sees a glimmer of the young student she once was. “On the other hand,” she says, smiling, “it’s just an incredible gift being a physician.”

Despite the arduous journey exposed by this particular retrospectoscope, you cannot help but feel at the end that these former students have become precisely the kind of doctor you might want. And the kind of doctors that they set out to be.

http://www.nytimes.com/2009/04/07/health/07chen.html?ref=health

Baby broccoli 'controls gut bug'

Eating a daily portion of broccoli sprouts could help tame the H. pylori bacteria, linked to stomach ulcers and even cancer, research suggests.



The study in Cancer Prevention Research of 50 people in Japan found eating 2.5 ounces of broccoli sprouts each day for two months may confer some protection.

They contain sulforaphane, previously found to act as an antibiotic.

UK experts said while sprouts may have an effect on the bug, they were likely to make "no difference" to cancer risk.

" **This small study shows that eating broccoli sprouts might reduce levels of H. pylori infection** "
Nell Barrie, Cancer Research UK

In the study, an international team of scientists gave half the group a daily portion of broccoli sprouts and the rest alfalfa sprouts, which do not contain sulforaphane.

In those who ate broccoli sprouts, levels of a marker of H. pylori in human stools called HpSA was cut by over 40%.

There was no HpSA level change in those who ate alfalfa sprouts.

In people who ate broccoli sprouts, HpSA levels had returned to pre-treatment levels eight weeks after people stopped eating them.

The researchers say this suggests that although the sprouts can dampen down H. pylori, they do not eradicate it.

Sprout smoothies

Dr Jed Fahey, of Johns Hopkins University in the US who led the study, said: "The fact that the levels of infection and inflammation were reduced suggests the likelihood of getting gastritis and ulcers and cancer is probably reduced."

It was Dr Fahey who discovered the sprouts contained sulforaphane early this decade. He is a co-founder of a company licensed by The Johns Hopkins University to produce broccoli sprouts. A portion of the proceeds is used to help support cancer research.

His team also carried out tests on mice infected with H. pylori, giving them broccoli-sprout smoothies for eight weeks.

The number of H. pylori bacteria in the mice's stomachs fell significantly - but did not change in infected mice that only drank plain water.

A second group of H. pylori-infected mice were genetically engineered to lack the Nrf2 gene that activates protective enzymes.

They failed to respond in the same way to the sprout-smoothie diet.

Nell Barrie of Cancer Research UK said: "This small study shows that eating broccoli sprouts might reduce levels of H. pylori infection.

"We know that H. pylori is a major risk factor for stomach cancer but only three in a 100 people with the infection will develop the disease, so there are clearly other factors at work.

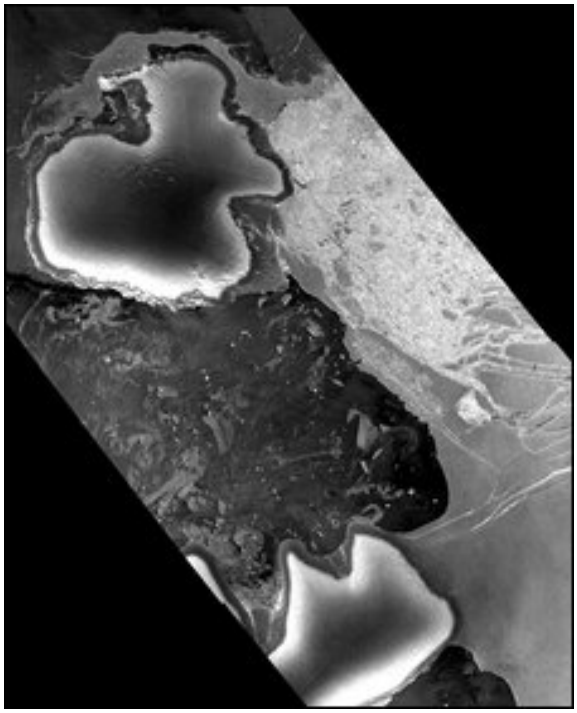
"This means we can't conclude that eating broccoli sprouts makes any real difference to the chance of getting stomach cancer. "

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7981095.stm

Published: 2009/04/06 05:09:39 GMT

Ice bridge ruptures in Antarctic

An ice bridge linking a shelf of ice the size of Jamaica to two islands in Antarctica has snapped.



Scientists say the collapse could mean the Wilkins Ice Shelf is on the brink of breaking away, and provides further evidence of rapid change in the region.

Sited on the western side of the Antarctic Peninsula, the Wilkins shelf has been retreating since the 1990s.

Researchers regarded the ice bridge as an important barrier, holding the remnant shelf structure in place.

Its removal will allow ice to move more freely between Charcot and Latady islands, into the open ocean.

European Space Agency satellite pictures had indicated last week that cracks were starting to appear in the bridge. Newly created icebergs were seen to be floating in the sea on the western side of the peninsula, which juts up from the continent towards South America's southern tip.

Professor David Vaughan is a glaciologist with the British Antarctic Survey who planted a GPS tracker on the ice bridge in January to monitor its movement.

He said the breaking of the bridge had been expected for some weeks and much of the ice shelf behind was likely to follow.

"We know that [the Wilkins Ice Shelf] has been completely or very stable since the 1930s and then it started to retreat in the late 1990s. But we suspect that it's been stable for a very much longer period than that," he told BBC News.

"The fact that it's retreating and now has lost connection with one of its islands is really a strong indication that the warming on the Antarctic is having an effect on yet another ice shelf."

While the break-up will have no direct impact on sea level because the ice is floating, it heightens concerns over the impact of climate change on this part of Antarctica.

Over the past 50 years, the peninsula has been one of the fastest warming places on the planet.

Many of its ice shelves have retreated in that time and six of them have collapsed completely (Prince Gustav Channel, Larsen Inlet, Larsen A, Larsen B, Wordie, Muller and the Jones Ice Shelf).

Separate research shows that when ice shelves are removed, the glaciers and landed ice behind them start to move towards the ocean more rapidly. It is this ice which can raise sea levels, but by how much is a matter of ongoing scientific debate.

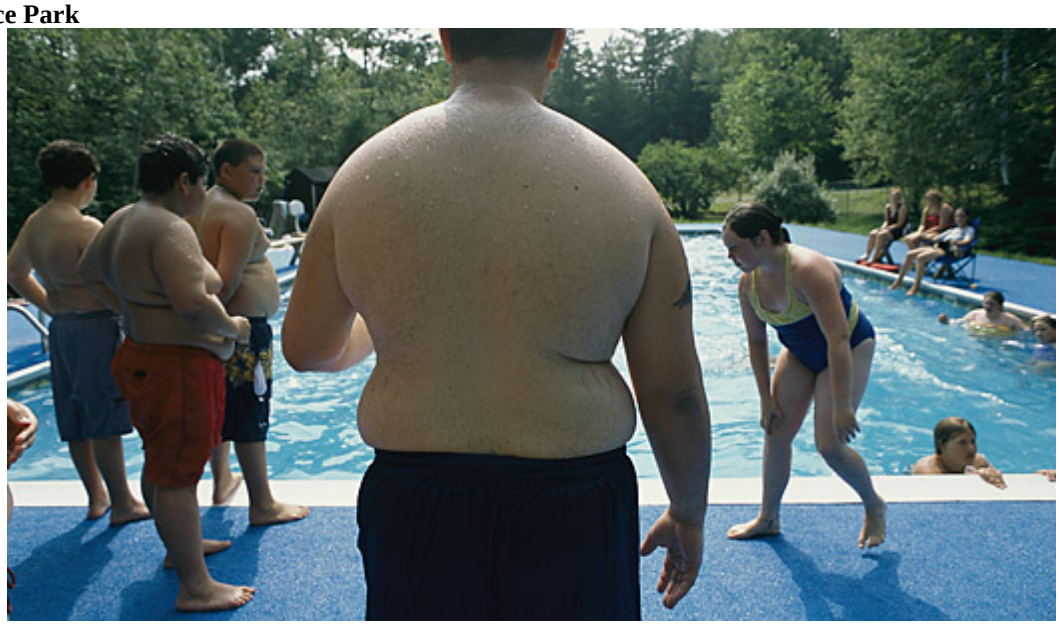
Such acceleration effects were not included by the UN's Intergovernmental Panel on Climate Change (IPCC) when it made its latest projections on likely future sea level rise. Its 2007 assessment said ice dynamics were poorly understood.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7984054.stm

Published: 2009/04/05 07:13:59 GMT

Kids Who Lack Self-Control More Prone to Obesity Later

By Alice Park



Children are impulsive. Any parent knows that from experience — they want everything they see, and they want it *right now*. That's not necessarily a bad thing; grabby curiosity is what spurs kids to explore their world and learn new things.

But that same self-indulgence may also be helping to drive children to obesity. That's the conclusion of a group of researchers who studied the relationship between self-control and weight gain in youngsters enrolled in a government study. In two papers published this week in the *Archives of Pediatrics and Adolescent Medicine*, scientists found that preschool-age children who had trouble with self-control and the ability to delay gratification gained more weight by the time they were preteens than those who were better at regulating their behavior. (See nine kid foods to avoid.)

It's not a revolutionary finding, but it represents some new thinking among researchers about how to tackle the burgeoning obesity epidemic, particularly among children. In the same journal, the first national survey of childhood obesity to include American Indian and Asian ethnic groups found that 18% of four-year-olds in the U.S. are obese, or in the 95th percentile of body mass index (BMI), a ratio of weight and height. That rate is almost doubled among American Indian children, at 31%.

"We think a lot about obesity interventions, about prevention and focusing on eating healthy and exercising more," says Dr. Julie Lumeng, a pediatrician at the University of Michigan and an author of one of the current papers on children's behavior and weight. "But all of us, including doctors, are struggling because those interventions are not wildly successful."

The two studies on self-control may explain why. The authors argue that applying well-known theories of child development to improve self-control in kids may help prevent later overeating and weight gain. Both trials analyzed data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (SECCYD), a long-term study of more than 1,300 children begun in 1989 at 10 sites across the U.S. SECCYD's mission is to unpack the factors that influence child development and behavior, from parenting choices to social and environmental influences. (See pictures of what makes you eat more food.)

In one study, Lori Francis at Pennsylvania State University analyzed data collected on 1,000 children, who participated in two different self-regulation tasks, one at age 3 and the other at age 5, and were

followed until age 12. In the first task, designed to measure self-control, the three-year-olds were left alone in a room with a bunch of toys — one of which was a known favorite — for 150 seconds. They were instructed to play with the other toys, but not to touch the favored one. If the children were able to wait 75 seconds or more before touching the favorite plaything, researchers scored them as having high self-control. Children who went for the forbidden toy within 75 seconds were labeled as having low self-control.

In the second part of the study, Francis' team looked at the same children two years later, at age 5. This time, the kids were tested on whether they could resist temptation and delay gratification with food. Each child was asked to pick his favorite among M&Ms, animal crackers or pretzels, and was then placed in a room with two piles of the snack — one large pile, one small. Before leaving the room, the experimenter told children they could eat from the smaller pile at any time, but if they wanted to eat from the larger pile, they had to wait until the experimenter returned. Kids who waited the 210 seconds before the researcher came back scored high on self-control, while those who couldn't wait to eat from the smaller snack pile scored low.

Francis found that the children who scored lower on both tasks were 30% heavier by the time they were 12, compared with kids who were better able to control their impulses. Not only did low-scoring kids gain more weight, but they gained it faster, showing the most rapid increases in BMI over the nine years of the study's follow-up. (Read TIME's 2008 cover story "Our Super-Sized Kids.")

In a second study, Lumeng found a similar association between the inability to delay gratification in four-year-olds (again with favorite foods) and weight gain by age 11. Of the 805 children in the study, 47% had trouble with self-restraint; those kids were 30% more likely to be overweight seven years later, compared with other children in the study. The findings suggest that learning self-control may be an important way for children manage their weight — a logical theory, familiar to anyone who has struggled with self-discipline and impulse-regulation to keep from packing on the pounds. The findings also suggest that treatments for obesity may not be doing enough to encourage responsibility early on among individuals and families. (See pictures of what people around the world eat.)

"There is an emerging understanding that all of the classic concepts in child development have not been brought to bear on the obesity epidemic," says Lumeng. "There needs to be more bringing together of child development and obesity research to find more practical ways of addressing the obesity problem. We can't stay theoretical for much longer."

There are ways to improve children's self-control when it comes to food, such as mindfulness techniques that train kids to stop and think about whether they are hungry before instinctively reaching for snacks. If impulse-control is too difficult for some kids, say experts, parents can remove temptations by limiting access to favorite treats and restricting eating to preset snack and meal times.

Taken together, these studies highlight the fact that old habits die hard: Any efforts to strengthen self-control, not just in eating but in all behaviors, must begin early, researchers say. "I think you can be trained to exhibit more self-control," says Dr. Ari Brown, a fellow of the American Academy of Pediatrics in Austin, Tex. "But it's harder to do the older you get. As pediatricians, we have the chance to help parents create a lifestyle early on so you don't have to go through behavior modification or a weight loss program to learn healthier eating habits. I think this information is most important for new parents, with infants."

http://www.time.com/time/health/article/0,8599,1889942,00.html

Why Fever Helps Autism: A New Theory

By Jeffrey Kluger

The autism wars go on and on, and the debates go round and round. Is the number of afflicted kids climbing or are we just overdiagnosing the condition? If mercury in vaccines isn't the culprit (the metal has been removed from nearly all of them), then it must be environmental toxins. But if that's so, why aren't we all showing symptoms?

Too often, what's lost in all the finger-pointing over what's to blame for the problem is the salient question of how to fix it. A paper just published in the journal *Brain Research Reviews* is taking a stab at that, suggesting a brand-new strategy — one that focuses on a very particular part of the brain. (See pictures of a school for autistic students.)

The brain region that drew the attention of the authors is known as the locus coeruleus, a small knot of neurons located in the brain stem. Not a lot of high-order processing goes on so deep in the brain's basement, but the locus coeruleus does govern the release of the neurotransmitter noradrenaline, which is critical in triggering arousal or alarm, as in the famed fight-or-flight response. Arousal also plays a role in our ability to pay attention — you can't deal with the lion trying to eat you, after all, if you don't focus on it first. And attention, in turn, plays a critical role in such complex functions as responding to environmental cues and smoothly switching your concentration from one task to another. Those are abilities kids with autism lack. (Read a TIME cover story on autism and vaccines.)

Certainly, many other parts of the brain govern concentration and attention, but the locus coeruleus does one other thing too: it regulates fever. Generations of parents of autistic kids have reported that when their child runs a fever, the symptoms of autism seem to abate. When the fever goes down, the symptoms return. In 2007, a paper in the journal *Pediatrics* reported on that phenomenon and confirmed that, yes, the parents' observations are right. What no one had done before, at least not formally, was tie it to the locus coeruleus — that is, until Drs. Dominick Purpura and Mark Mehler of the Albert Einstein College of Medicine published the idea this week.

"It wasn't an experiment; it was more of a eureka moment," says Purpura. "We came to the conclusion that there could only be one system that would both ameliorate the effects of autism and govern fever."

It's not often that a mere flash of insight — as opposed to a formal, controlled study — commands much space in a medical journal, and Purpura and Mehler readily concede that a good deal of empiricism will

have to be applied to their theory before it can become anything more than that. Still, they're convinced that the idea deserves attention. If the locus coeruleus is indeed malfunctioning in autism, the problem could involve hundreds or even thousands of genes. The researchers are careful to avoid the shooting war over what damaged those genes, suggesting that environment and toxic chemicals — but not vaccines — may have a role. They also, tellingly, think stress is involved.

Stress is thought to have a significant impact on the ability of the locus coeruleus to regulate noradrenaline properly, and Mehler and Purpura cite an improbable 2008 study published in the *Journal of Autism and Developmental Disorders* showing that mothers who lived through a hurricane during their pregnancy — particularly at the mid-gestational point — had a greater likelihood of giving birth to an autistic child than other women. "What would be involved here would be the mother's level of [the stress hormone] cortisol," says Purpura. "Between fetus and mother, the placenta acts as a very good barrier for maternal cortisol, except when the stress is extreme."

In theory, that blast of stress chemistry could alter the development of the fetal locus coeruleus, though Purpura is quick to point out that the study showing how cortisol can make it through the placenta was conducted in animals, not humans. Nonetheless, one day after their article in *Brain Research Reviews* was published, the journal *Psychoneuroendocrinology* published a study linking cortisol imbalance to Asperger's syndrome, a condition along the autism spectrum.

The question is, How can any of this be used to help autistic kids? Nobody recommends inducing fevers to kick-start the locus coeruleus, since that could lead to all manner of side effects and other ills. Instead, Mehler and Purpura believe the likeliest answer is in medications that target noradrenaline brain receptors. "First, we should look at the signaling pathways in the region of the brain involved," Purpura says. "Then we could look at treating the receptor sites with some kind of pharmacotherapy." For once, the step that's missing from a proposal is the one that involves shouting about what's to blame.

http://www.time.com/time/health/article/0,8599,1889436,00.html

Politics Without the Media?

By: Lee Drutman

When Sarah Palin made a big deal of wanting to speak directly to the American people during the 2008 campaign, she echoed a common preference among politicians. Most political leaders would generally like to get out their messages without a media that often adds its own twist to the story. And more and more, they actually are trying to do so: Some are putting up their own videos on YouTube.com; others are now sending out their own Twitter feeds.

Though it's unclear how much of this self-generated content actually reaches voters, it poses an interesting question: How might our politics be different if, say, we got our political information directly from politicians instead of the media?
According to a new study, one consequence might be that citizens would feel better about the political process. They'd be less cynical; they'd think politics was more representative. At least, that's what Brian J. Fogarty, a professor of political science at the University of Missouri, St. Louis, and Jennifer Wolak, a professor of political science at the University of Colorado, Boulder found. Their study is published in the January issue of American Politics Research.

To assess how people might respond to political information when they read it as news as opposed to when they get it directly from politicians, they had one group read a news article and one group read dueling editorials from prominent political leaders on one of three issues — affirmative action, drilling in the Arctic National Wildlife Refuge (ANWR), and stem cell research. In each test, the article and the editorials contained the same information and perspectives.

The two groups were then asked to respond. "Do you feel that the views presented in the article reflect the opinion of ordinary Americans?" Of those who got the news directly from politicians, roughly 45 percent said yes, the views were representative of ordinary Americans. Of those who read the news articles, meanwhile, only 16 percent found the views representative. (The results were generally consistent across the three issues). That adds up to a pretty sizeable difference, given that both groups were presented with the same information.

The two groups were also asked whether or not they thought the policy debate was balanced or whether it was biased, either in favor of the liberal or conservative perspective. Of those getting their info directly from the politicians on ANWR and affirmative action, 64 percent and 63 percent, respectively, said that the policy debate was balanced. But only 39 percent and 44 percent, respectively, said the debate was balanced after reading the news articles. On stem cells, the results was closer - 46 percent found balance after reading the editorials, compared to 39 percent after seeing the politicians' briefs.

Why would the participants react so differently to the same information?"It's hard to know exactly what's going on inside citizens," Wolak said. "But there's speculation why people react more negatively to media accounts. It could be a reaction to the way media does things, how the conflict is framed, emphasizing politics as a game."

But both scholars were quick to say that just because respondents found the politicians more representative and less biased, this is far from an argument for getting rid of political reporting."In a world where there's no media and only direct communication, that's a totalitarian state," said Fogarty. "There's nobody to filter the information. ... People might view media as biased, they might hate it, but they need it."

But while a sometimes adversarial and confrontational media can turn many people off, perhaps the only thing worse would be to have no media at all.

"It's a very typical view of American citizens," explains Wolak. "People hate a number of things about government, but at the same time people love the American system and wouldn't change the Constitution. People have a lot of mixed feelings about politics."

Fogarty and Wolak were also interested in what people learned from the different sources. Does reaching out directly to citizens help politicians to get their message across better? As it turned out, respondents found politicians only slightly more convincing when they presented their arguments directly. And they reported learning about the same from both news articles and politicians on stem cells and affirmative action, but a little more from politicians on ANWR (perhaps because it was a topic they generally knew less about to start with).And finally, the big question: Did they change their opinion at all? About half of the people reported at least some change in their perspective after reading more about stem cells and the environment. Those who had read the politicians' editorials were slightly more likely to report a change (49 percent to 42 percent on stem cells, and 57 percent to 53 percent on ANWR). But nobody changed their opinion on affirmative action after reading the news report, and only 3 percent changed their opinion after hearing the politicians. (Likely this was because it was an issue people felt they already knew a good deal about.)

"I was surprised to find that politicians aren't more influential on their own," said Wolak. "Politicians who are clamoring to get media attention by appearing on YouTube or Jay Leno — they're not communicating differently than they would be through the media. We find when they go out on their own they are not more persuasive or more informative."Still, Fogarty thinks that politicians who wish to improve their favorability ratings could be a bit more entrepreneurial in their communications strategies.

"If I were a politician and I read this study, I'd try to do a lot more on the Internet and take a way more interactive approach," said Fogarty. "It seems as though people do respond to that in a better way. The problem is getting people tuned into the information, and that's a critical problem for all politicians."

And that, of course, is where the press comes in — as the way for politicians to get their message out, since most people get their political news, after all, from the media, which they tend to distrust and think is biased. But then again, we wouldn't want to have it any other way, would we?

http://www.miller-mccune.com/politics/politics-without-the-media-1060

Preventing Cyberbullying Remains Terra Incognita

By: John Greenya

Here's the bad news: Bullying in the United State is not declining, and even worse, cyberbullying is increasing. Like all generalizations, that one limps a bit, but the sad fact is that according to the latest research, this time-dishonored practice of bigger and older kids mistreating smaller and younger kids (two more generalizations) has not decreased, and the incidence of cyberbullying (a form of bullying done online) is showing a decided uptick.The concern resonates in Washington, D.C., where Rep. Linda Sanchez, a California Democrat, last week introduced federal anti-cyberbulling legislation. When she introduced the same bill last May, Sanchez said, "Without a federal law making cyberbullying a crime, cyberbullies are going unpunished."But there is also good news: a huge increase in the awareness factor (and the number and quality of anti-bullying programs) thanks to the efforts of schools, parents, communities and students themselves.

One new research effort is the book *Bullying Beyond the Schoolyard: Preventing and Responding to Cyberbullying* by Justin W. Patchin and Sameer Hinduja, criminologists at the University of Wisconsin-Eau Claire and Florida Atlantic University, respectively.Their joint research effort (which led to the book) met with such great interest that they've had to take their show on the road, traveling across the country to teach parents and educators how to guard their kids' online safety. They've also set up an online clearinghouse to provide additional information on the subject, which they define as "willful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices."

"I would probably agree with the thesis" that bullying has not decreased and cyberbullying has increased, Patchin told Miller-McCune.com, "but it's more accurate to say that we are finding out about more incidents of bullying and maybe cyberbullying as well. The research we've done over the last five or six years has certainly shown an increase in trend in cyberbullying, but it's also shown that more and more kids are coming forward, so we're finding out about more of them."

Hinduja, Patchin's co-author, said their book "shows the need to recognize that online bullying is a problem that has real ramifications — emotionally, psychologically and even physical ramifications when we're talking about suicide — and that there are various sorts of real-world things that schools, as well as parents, can do to prevent and respond to this situation."

And why the increase in cyberbullying? "Because," he said, "more and more kids are getting access to technology and starting at a younger and younger age. I talk to elementary school kids, and they're all

about Webkinz and Club Penguin. They're just super-familiar with social networking sites, and they're definitely interacting with other kids online, which provides the opportunity for harassment and mistreatment and doing harm."That said, all is not doom and gloom on either the bullying or the cyberbullying front. According to Tonja Nansel, an investigator with the National Institute of Child Health and Human Development's Prevention Research Branch, "Some of the recent data I've seen is rather encouraging. While it does show that in most English-speaking countries bullying has either stayed the same or increased, in the United States, bullying among boys has decreased.
"But it also shows that cyberbullying has increased. And, unfortunately, you don't need a lot of cyber-bullying for it to have an effect — one or two events can have waves of repercussions and lasting effects."
As Catherine Hill, senior researcher at the American Association of University Women — who has been studying harassment, including bullying and cyberbullying — put it, "Cyberbullying gives people a longer arm to reach into other peoples' lives."

As to whether or not the increase in anti-bullying programs over the last five to 10 years has proven to be effective, Patchin said, "There are increasingly better programs to deal with bullying, yet we still don't have a good sense of whether or not they're effective or to what degree they're effective. As for cyberbullying, we're studying the problem and getting a clearer picture of what's going on, but we don't have a good sense of what would work to stop or prevent it."
Hill points out that while a majority of the states now have bullying and cyber-bullying laws, there is little research on their effectiveness. And Patchin, whose doctorate is in criminal justice, has reservations about these efforts.
"I'm skeptical about them; I really don't want to criminalize this behavior. I think there is a role for both the federal and state governments in terms of educating local school districts about what cyber-bullying is and what they can do about it, and providing resources to help them prevent and respond to online aggression. But criminalization doesn't seem to me to be the best approach."
Asked to name effective anti-bullying and cyberbullying programs, the experts interviewed for this article most often mentioned the award-winning Olweus Bullying Prevention Program. Based on the groundbreaking research of Norwegian psychologist Dan Olweus in the 1970s, today the program he developed in 1982 is administered by Hazelden, the well-known treatment center in Minnesota, and Clemson University.
Sue Thomas, a manager for business development in Hazelden's publishing division, said "36 states now have laws that require schools to do something about bullying, which is relatively new and a positive step. In addition, there are lots of strong, effective programs around the country that have been proven to work in reducing bullying. A lot of elementary schools that use the Olweus Bullying Prevention Program have seen a 50 percent reduction in bullying within the first year, and within two years on the secondary level."As Ryan Blitstein explained in an earlier Miller-McCune.com article, Olweus "begins with the creation of a committee to oversee the anti-bullying campaign and an anonymous student questionnaire assessing the level of bullying in the school. Teachers and administrators are then trained to deal with bullying, and students and parents are taught about the problem. The school establishes anti-bullying rules, and school staff conducts 'interventions' with bullies and their victims."And it's not a panacea — it's pricey for one thing, and since it's school-based, it only reaches so far.(Also cited by several sources as a successful program is the Ophelia Project, which was founded 12 years ago in Pennsylvania by veteran teacher Susan Wellman.) While Thomas, like the other foot soldiers in the anti-bullying wars, is well aware that bullying is an age-old problem, she feels progress has been made and that even more is possible, given greater awareness and effort on the part of all concerned. Nonetheless, she is particularly saddened by the rise in cyberbullying, which can be even more of a problem for its victims because "it happens 24/7. It's often done anonymously, so kids don't even know who is bullying them. And if it is going on at home, then home is no longer a safe environment. So that's a challenge for the kids. One of the challenges for schools is to figure out what legal rights they have to address it."
"To be honest," said Hinduja, "I think bullying is always going to be a problem. We're always going to have people with different perspectives and from different backgrounds, and we're always going to have peer conflict and harassment. The big-picture goal is to cultivate empathy to make sure that kids are more careful and understand that just because they say it online doesn't mean it doesn't hurt. So we need to pique their consciences so that they're constantly thinking about the issue, and that they watch what they say when they're making these statements."

http://www.miller-mccune.com/culture_society/preventing-cyberbullying-terra-incognita-1106

Is White the New Green?

By: Sam Kornell

In early January, Hashem Akbari sent federal officials a rather improbable sounding proposal. An Iranian-born nuclear engineer who, for the last three decades, has worked as a scientist at the Lawrence Berkeley National Laboratory, Akbari would like to see $3 billion of the economic stimulus package directed toward painting white or a light color as many of the nation's roofs, and as much of its pavement, as possible — all with the goal of directing more solar radiation into space.

Akbari, along with Surabi Menon, another LBNL scientist, and Arthur Rosenfeld, a former LBNL scientist and now a California Energy Commission board member, claim that painting urban surfaces in warm parts of the world white or a light color could offset the carbon emissions of all 600 million of the world's cars for 18 to 20 years — at a savings equivalent to at least $1 trillion worth of CO2 reductions.

This is not a hoax: Akbari, Menon and Rosenfeld are three of the country's leading experts in their field, and their study published in the journal *Climatic Change* is backed by years of carefully calculated data.

It has long been known that white-roofed buildings stay cooler in hot weather. Blinding confirmation of this can be found in the streets of Andalusia in Spain, or the Greek Islands.

It turns out that they cool the air outside of their walls, too. On a typical summer day, Los Angeles is 5 degrees warmer than surrounding areas, and studies have consistently shown that by far the largest factor in this discrepancy is the absorption of solar heat by dark roofs and pavement — a phenomenon known as the "urban heat island" effect.

In 1985, Akbari and his colleagues began attempting to quantify how much "cool" roofs and pavement might improve urban air quality (hotter weather equals dirtier air), while cutting down on the need for air-conditioning. Then, five years ago, it occurred to them that cooling urban areas might also mitigate climate change.

As the greenhouse effect intensifies, one of the most dangerous consequences is a decrease in the earth's

albedo — the degree to which it reflects solar radiation. Antarctic ice, for example, acts like a giant mirror, reflecting the heat of the sun back into space; as the ice melts, the earth absorbs more heat, leading to more global warming — a self-perpetuating process scientists call a feedback loop.

The idea of "geo-engineering" the world to make it bounce more of the sun's heat back into space has been around for years, but until Akbari and his colleagues decided to look into it, no one had attempted to quantify how much atmospheric cooling might be achieved by, as it were, painting the town white.

In 2004, they began running the numbers, and when they finished they were incredulous.

"When we did the calculations, initially we couldn't believe the results," Akbari said. "So we re-checked the numbers in different ways." Again, he said, the results were unambiguous: Every 100 square feet of roof area turned from a dark color to white is equivalent to offsetting the emission of one ton of heat-trapping, atmospheric CO2.

To get an idea of what this means, consider that in a single year, the average American is responsible for about 20 tons of CO2 emissions. Per capita, Americans have the largest carbon footprint of any nationality in the world, and all of the activities that make this so — driving our cars, using our electrical appliances, buying consumer products — adds up to the equivalent, atmospherically speaking, of 2,000 square feet of white roof.

In all, Akbari, Menon and Rosenfeld estimate that permanently retrofitting roofs and pavement in tropical and temperate regions of the world would offset 44 gigatons of CO2 emissions. It takes about a year and a half for the entire world to cook up 44 gigatons of CO2.

The scale of such mitigation, in proportion to its cost, is unrivaled among technology-based climate solutions. "This is not trivial a number," said Stephen Schneider, the co-director of Stanford's Center for Environmental Science and Policy, and the editor of *Climatic Change*.

Schneider emphasized that the plan would offset, not eliminate, the necessity of reducing carbon emissions, but he said that as singular greenhouse mitigation strategies come, the LBNL study is elegant, simple and profoundly cheap.
It's also well timed. Akbari pointed out that by his and his colleagues' calculations, the plan could save Americans $2 billion annually in unspent air conditioning, even after taking into account the increased need for heating in winter. Moreover, he argued, it dovetails with the president's economic and environmental goals.
The Obama administration has made it clear that it wants a substantial portion of the stimulus package to go toward creating a greener economy, but that desire has to be balanced against the imperative to immediately circulate cash and create jobs. Painting or resurfacing roofs or pavement, Akbari said, would nicely fulfill both objectives. The technology exists and is readily available, and since a substantial portion of the country's home and commercial real-estate owners are going to need to re-roof at some point in the near future anyway, it's about as shovel-ready as any proposal currently on the table.

Akbari has thus far not heard back from the government, but he's holding out hope that his funding proposal will be folded into the energy-efficiency provision of the stimulus package.
"I don't see why it shouldn't be," he said. "It will be lucrative for the government and for business owners, and it will create jobs and offset carbon emissions."

However, he noted that the attraction of urban cooling is unlikely to fade anytime in the foreseeable future — indeed, with 70 percent of the world's population projected to live in cities by 2040, it should only increase. He makes a convincing case.
As Schneider said, "It's a clever idea that has no obvious side effects and gives us good bang for our buck."

http://www.miller-mccune.com/science_environment/is-white-the-new-green-1117

Salazar: Wind Power Can Replace 3,000 Coal Plants

By AP / WAYNE PARRY

(ATLANTIC CITY, N.J.) — Windmills off the East Coast could generate enough electricity to replace most, if not all, the coal-fired power plants in the United States, Interior Secretary Ken Salazar said Monday.

The secretary spoke at a public hearing in Atlantic City on how the nation's offshore areas can be tapped to meet America's energy needs. "The idea that wind energy has the potential to replace most of our coal-burning power today is a very real possibility," he said. "It is not technology that is pie-in-the sky; it is here and now." (See the top 10 green ideas of 2008.)

Offshore energy production, however, might not be limited to wind power, Salazar said. A moratorium on offshore oil drilling has expired, and President Barack Obama and Congress must decide whether to allow drilling off the East Coast. "We know there are some people who want us to close the door on that," he said. "We need to look at all forms of energy as we move forward into a new energy frontier."

Salazar said ocean winds along the East Coast can generate 1 million megawatts of power, roughly the equivalent of 3,000 medium-sized coal-fired power plants. That's nearly five times more than currently exist in the United States, according to the Energy Information Administration, the statistical arm of the Energy Department.

Salazar could not estimate how many windmills might be needed to generate 1 million megawatts of power, saying it would depend on their size, and how near or far from the coast they were located.

Monday's hearing was hosted by Salazar and is the first of four to be held around the country to discuss how energy resources including oil, gas, wind and waves should be utilized as the new administration formulates its energy policy. It was held at the Atlantic City Convention Center, whose roof-mounted solar energy panels are the largest in the nation.

In 2007, the Outer Continental Shelf, a zone extending roughly three to 200 miles from shore, accounted for 14 percent of the nation's natural gas production, and 27 percent of its oil production.

Salazar said it is essential that the nation fully exploit renewable energy resources to reduce its reliance on imported oil.

By buying oil from countries hostile to the United States, "we have, in my opinion, been funding both sides in the war on terrorism," he said.

Environmentalists are urging the Obama administration to bar oil and gas drilling off the East Coast, and invest heavily in wind, solar and other energy technology. "This is a defining moment, whether we're going to have a clean energy future or continue to rely on oil drilling," said Jeff Tittel, New Jersey director of the Sierra Club. "Right now the government is fossil-foolish, and we need to change that."

U.S. Sen. Robert Menendez, D-N.J., said offshore drilling should not be allowed, citing the economic cost of a spill. "The risks are great, the rewards are less," he said. "It perpetuates our reliance on oil. Frankly, we simply just don't want it." (See pictures of the world's most polluted places.)

But Skip Hobbs, a petroleum geologist from New Canaan, Conn., said oil and gas drilling has been shown to be safe. "We should recognize that as a practical matter, fossil fuel will rule for another generation," he said.

Rep. Rob Bishop, R-Utah, said the nation needs to drill more, saying "it can be done intelligently."

"We need to start looking at the self-inflicted energy dependence we have because we refuse to develop our domestic energy industry," he said.

New Jersey is tripling the amount of wind power it plans to use by 2020 to 3,000 megawatts. That would be 13 percent of New Jersey's total energy, enough to power between 800,000 to just under 1 million homes.

In October, Garden State Offshore Energy, a joint venture of PSE&G Renewable Generation and Deepwater Wind, was chosen to build a $1 billion, 345 megawatt wind farm in the ocean about 16 miles southeast of Atlantic City. That plant would be able to power about 125,000 homes.

In Atlantic City, the local utilities authority has a wind farm consisting of five windmills that generate 7.5 megawatts, enough energy to power approximately 2,500 homes.

Rhode Island Gov. Gov. Don Carcieri, a Republican, said renewable energy's appeal crosses partisan lines. "There is a sense of urgency that we get this moving and get it right," he said. "There is a national emergency right now; the dependence on oil and natural gas has gone on for too long."

http://www.time.com/time/health/article/0,8599,1889659,00.html

Bone-repairing stem cell jab hope

By Michelle Roberts
BBC News health reporter in Oxford

Doctors may soon be able to patch up damaged bones and joints anywhere in the body with a simple shot in the arm.

A team at Keele University is testing injectible stem cells that they say they can control with a magnet.

Once injected these immature cells can be guided to precisely where their help is needed and encouraged to grow new cartilage and bone, work on mice shows.

The aim is to treat patients with injuries and arthritis the UK National Stem Cell Network conference heard.

" **The ultimate aim is to repair cartilage and bone** "
Professor Alicia El Haj Keele University

Professor Alicia El Haj, working with Professor John Dobson, also of Keele University, says the technology, patented by Magnecell, could be tested in humans within five years.

It would provide a way to treat disease without invasive surgery or powerful drugs.

The injection would use the patient's own stem cells, harvested from their bone marrow.

These mesenchymal cells would be treated in the lab to give them a coating of minute magnetic particles.

Use in scans

These same magnetic nanoparticles are already approved in the US where they are routinely used as an agent to make MRI scans clearer to read.

Targeted magnetic fields could then move the cells around the body to the desired place and switch them into action without the need for drugs or other biochemical triggers.

Professor Al Haj said: "The ultimate aim is to repair cartilage and bone. We have been able to grow new bone in mice. Now we will look at whether we can repair damaged sites in goats.

"We should be able to move to human trials within five years."

Professor Jon Tobias of the Bone Research Society said: "Stem cells capable of regenerating diseased bones and joints can now been isolated and grown up outside the body, but the difficulty is in getting them to exactly the right place.

"The technique developed by the team at Keele University, in which small magnetic particles are introduced into cells in the laboratory, represents an interesting approach to this problem, by raising the prospect of using magnets outside the body to manoeuvre cells into position."

Meanwhile, experts at the University of Southampton, led by Professor Richard Oreffo, have treated four patients with hip joint problems using stem cell therapy.

The technique combines the patients own bone marrow stem cells with donor bone cells to patch-repair damaged bones that would otherwise need treatment with metal plates and pins.

They say it is only a matter of years before their method could be used routinely to treat some of the 60,000 people who fracture a hip in the UK each year.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7985142.stm

Published: 2009/04/06 12:39:55 GMT

Early warning clue for dementia

Heightened activity in an area of the brain that deals with memory may give a subtle early warning of dementia decades later, UK research suggests.

It was known that carrying a rogue version of a gene called ApoE4 raised the risk of Alzheimer's disease.

Now researchers have linked the same mutation with raised activity in an area of the brain called the hippocampus in people as young as 20.

The study appears in Proceedings of the National Academy of Science.

" **These are exciting first steps towards a tantalising prospect: a simple test that will be able to distinguish who will go on to develop Alzheimer's** "
Dr Clare Mackay University of Oxford

The researchers, from Oxford University and Imperial College London, believe over-activity in the hippocampus may effectively wear it out, raising the risk of dementia in later life.

They hope their work could be a first step towards developing a simple method to identify people at increased risk of developing dementia.

They could then potentially be offered early treatment and lifestyle advice.

Carrying one copy of the rogue ApoE4 gene raises the risk of Alzheimer's by up to four times the normal, two copies by up to 10 times.

But not everyone with the rogue gene will develop the condition.

The latest study used scans to compare brain activity in 36 volunteers aged 20 to 35.

In those who carried the rogue gene activity in the hippocampus was consistently raised, even at rest.

Researcher Dr Clare Mackay said: "These are exciting first steps towards a tantalising prospect: a simple test that will be able to distinguish who will go on to develop Alzheimer's."

Caution urged

Dr Peter Nestor, a neuroscientist at the University of Cambridge, said: "The findings of this study are of considerable interest but should not be over-interpreted to mean that Alzheimer's disease is already starting to develop in this young, healthy group of volunteers.

"Whether or not the differences seen in those with ApoE4 can offer a clue to what makes some brains more likely to develop Alzheimer's is a challenge for future studies."

Rebecca Wood, of the Alzheimer's Research Trust, said the research was a "significant development".

"It takes us a step closer to accurately predicting who will develop Alzheimer's before any symptoms become apparent.

"However, we are not yet at that stage; those with the ApoE4 genetic variant - while at a statistically higher risk of developing the disease than others - will still not develop Alzheimer's in most cases.

"The causes of Alzheimer's are complex - both genetic and environmental - and if we can understand these better, we can enhance efforts to help people lower their risks."

Professor Clive Ballard, director of research at the Alzheimer's Society, said: "This study paves the way for further research that could help us understand how brain function in younger adults may contribute to the development of Alzheimer's disease later in life."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7986289.stm

Published: 2009/04/06 23:26:32 GMT

Gravity satellite feels the force

By Jonathan Amos
Science reporter, BBC News

Europe's innovative Goce satellite has switched on the super-sensitive instrument that will make ultra-fine measurements of Earth's gravity.

The sophisticated gradiometer will feel the subtle variations in Earth's tug as it sweeps around the globe.

The spacecraft has also fired up the British-built engine that will help maintain its orbit.

Goce needs tiny but continuous levels of thrust to keep it stable and prevent it from falling out of the sky.

European Space Agency (Esa) mission manager Rune Floberghagen said all systems on the spacecraft had now been activated following the launch from Russia last month.

"The big news today is that the gradiometer is fully working; all its accelerometers have survived the launch and they are producing meaningful data," he told BBC News.

"Now we must learn to drive our super-satellite."

To acquire its data, Goce carries a set of six state-of-the-art high-sensitivity accelerometers. These have been arranged in pairs and sit across the three axes of the spacecraft.

As Goce "bumps" through Earth's gravity field, the accelerometers will sense fantastically small disturbances - as small as one part in 10,000,000,000,000 of the gravity experienced at the Earth's surface.

This exquisite measurement capability meant some very fragile mechanisms had to be built into the gradiometer, and developing these delicate technologies so they could also survive the intense shaking experienced at launch proved to be one of the major design challenges of the mission.

Monday's switch-on will be seen as vindication of the extraordinary engineering work on the gradiometer and its accelerometers, led by the Thales Alenia Space and Onera companies (France).

"This was a pivotal moment in the mission, for sure," said Dr Floberghagen.

"What's very important in this first phase is that we see some consistency between the measurements from the six sensors onboard; and we do see that, which is all very exciting. But still, we need to characterise each one of these very precise sensors, and that process is not over."

The other major milestone in the commissioning of Goce has been the successful start-up of its electric propulsion system.

Built by UK technology firm Qinetiq, the T5 ion engine is a critical part of the mission. The satellite flies so low in order to get a good gravity signal that it actually brushes through the top of the atmosphere.

Without the constant force applied from the T5 unit, the drag on Goce would rapidly pull it out of orbit. But the engine's presence is also integral to the acquisition of the gravity data itself.

The buffeting from air molecules would ordinarily upset Goce's gradiometer instrument, so the British engine is designed to throttle up and down to counteract this disturbance and leave a clean signal.

ELECTRIC PROPULSION ON GOCE
- Satellite carries two engines; one is back-up in case of failure
- T5 unit draws power from solar panels stuck side of spacecraft
- Electrons are stripped off xenon atoms to give them charge
- An electric field then hurls the xenon ions through rear nozzle
- Xenon exits at speeds in excess of 40,000m/s to provide thrust
- Amount of thrust is moderated by gradiometer information

The levels and range of thrust needed, however, are tiny - a continuously variable force of anywhere between one and 20 millinewtons during the science phase of the mission.

This is similar to the force a postcard will exert when laid down on a surface.

Put another way, you would need to strap together 650 million Goce spacecraft to achieve the same amount of thrust as Europe's mighty Ariane rocket at launch.

Commissioning last week saw both T5 "chains" (there are two engines; one is a back-up) perform precisely to specification.

The levels of thrust delivered were shown to be within 10 micronewtons of what was being demanded at any one time. The drive is also very straight, with the spacecraft deviating offline by only 0.6 of a degree.

"You work on these things for so many years that you should be cold and confident that it will all work, but there's always a risk that it won't," Neil Wallace, who leads the Qinetiq electric propulsion team, told BBC News.

"One of the tests we did was to demand a thrust ramp, from one to 20 millinewtons, as quickly as possible. This is one of the most critical requirements and the most difficult to achieve, and both chains did it perfectly."

The T5 was then switched off to allow controllers to concentrate on the gradiometer's behaviour.

"The other reason was to let the spacecraft's orbit decay. All the time we are thrusting, Goce is going up. We did one orbit at 8.3mN and we went up by 150m."

Goce was placed initially by its Rockot launcher in an orbit some 283km above the Earth. Spacecraft operators are allowing it to fall by between 150m to 200m a day.

It is now just above 275km and will continue to drop to its target science altitude of 263km.

By then, the satellite will have been put in a "closed loop" mode whereby the gradiometer and the engine will be working in tandem to fly a stable path and gather the gravity data.

Scientists will use Goce to help them construct high-resolution maps of the geoid, which, simply put, is an idealised globe with a surface of constant gravity.

Geoid information has many applications but perhaps the biggest knowledge gains will come in the study of ocean behaviour.

Understanding better how gravity pulls water - and therefore heat - around the globe will improve computer models that try to forecast climate change.

GRAVITY FIELD AND STEADY-STATE OCEAN CIRCULATION EXPLORER

1. Goce senses tiny variations in the pull of gravity over Earth
2. The data is used to construct an idealised surface, or geoid
3. It traces gravity of equal 'potential'; balls won't roll on its 'slopes'
4. It is the shape the oceans would take without winds and currents
5. So, comparing sea level and geoid data reveals ocean behaviour
6. Gravity changes can betray magma movements under volcanoes
7. A precise geoid underpins a universal height system for the world
8. Gravity data can also reveal how much mass is lost by ice sheets

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7986406.stm

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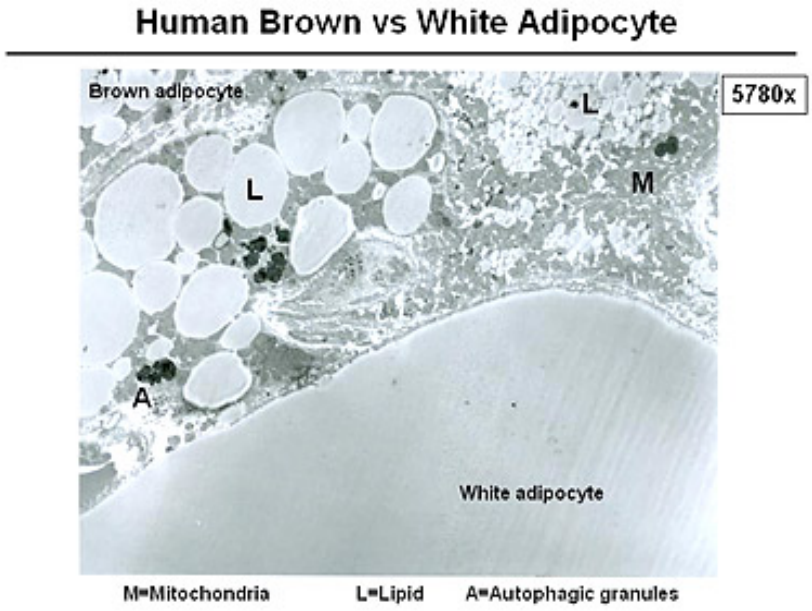
Brown Fat: A Fat That Helps You Lose Weight?

By Alice Park



For most people, fat is a burden. It doesn't really matter whether it appears as cellulite on our thighs or cholesterol in our veins — we just don't want it.

But it turns out that our bodies also make a unique form of fat tissue that behaves remarkably unlike any other: rather than storing excess energy, this fat actually burns through it.

It's called brown fat (as opposed to the more familiar white fat that hangs over belt buckles and swings from the backs of arms), and a series of papers published in the *New England Journal of Medicine* confirm for the first time that healthy adults have stores of this adipose tissue, which researchers hope to study further as a potential new weight-loss treatment.

Until now, only rodents and human newborns have been known to have any significant deposits of brown fat, so called because of its abnormally high concentration of dark-colored mitochondria, the engines that sustain cell activity. The primary purpose of brown fat is to regulate body temperature: the mitochondria-packed cells are designed to burn high quantities of sugar, the body's fuel, and release that energy as heat — a mechanism that newborns, fresh from the warm confines of the womb, rely on to keep them toasty.

As people age, however, the body becomes more adept at regulating temperature, so brown-fat stores shrink and white fat starts to emerge. (From a biological perspective, brown fat is also highly inefficient, since cells don't need heat to run; rather, they use ATP, another chemical produced by mitochondria.) Adults with appreciable amounts of brown fat are usually those who have certain types of cancer or hyperthyroidism, conditions that stimulate the growth of brown fat. (Read an article about how kids who lack self-control are more likely to gain weight.)

But Dr. Sven Enerbäck at the University of Göteborg in Sweden has shown, using the latest imaging technologies, that healthy adults retain a sizable amount of brown fat in the front and back of the neck. (That was a surprise, since in rodents, the depots tend to be along the back, around the shoulder blades.) Enerbäck and his team studied five patients and confirmed, using genetic analysis, that the cells around the neck were indeed brown fat.

In a sense, scientists have known this for years. While scanning patients with positron emission tomography (PET), an imaging technique often used on cancer patients to detect the spread of tumors, scientists have long noted the excess activity of brown-fat cells in their images. They just didn't realize what they were looking at.

Since PET picks up glucose-burning activity in cells, hot spots on PET scans of cancer patients generally indicate actively growing tumors. But after doing biopsies, doctors found that hot spots in the neck of most of their patients weren't cancerous at all. These turned out to be brown-fat deposits.

"We set forth to actually pinpoint whether the PET glucose-uptake areas corresponded to true brown-fat tissue, and I think we more or less proved the case," says Enerbäck, who found that those mystery cells in the neck expressed the same proteins as brown fat.

Identifying the presence of brown fat is one thing, but activating it to burn more glucose is another. Two studies in the *New England Journal of Medicine*, including Enerbäck's, confirmed that brown-fat cells become more active in the cold — that is, when study participants needed to boost their body temperature. Enerbäck saw increased activity when he plunged one foot of each volunteer into an ice bath while in the scanner. In a separate study, scientists at Maastricht University Medical Center in the Netherlands also saw upticks in brown-fat activity in subjects who had been chilling in a 16 C (61 F) room for two hours. (PET technicians have also long known that putting patients in warmer rooms tends to keep that bothersome extra activity from showing up on their images.)

But before we all turn our thermostats down or consider joining the Polar Bear Club, can brown fat actually cause weight loss? Brown fat may indeed shift the balance of calorie intake and expenditure — allowing a person to burn more calories with the same amount of consumption — without the chore of going to the gym or sweating through a workout. "We have very few interventions aimed at increasing energy expenditure," says Dr. Franceso Celi, a clinician at the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health. "And here we have a tissue that works exactly with the purpose of burning energy." On the basis of animal models, researchers calculate that 50 g of brown fat — less than what the scientists in the current series of papers documented in their volunteers — could burn about 20% of an average person's daily caloric intake.

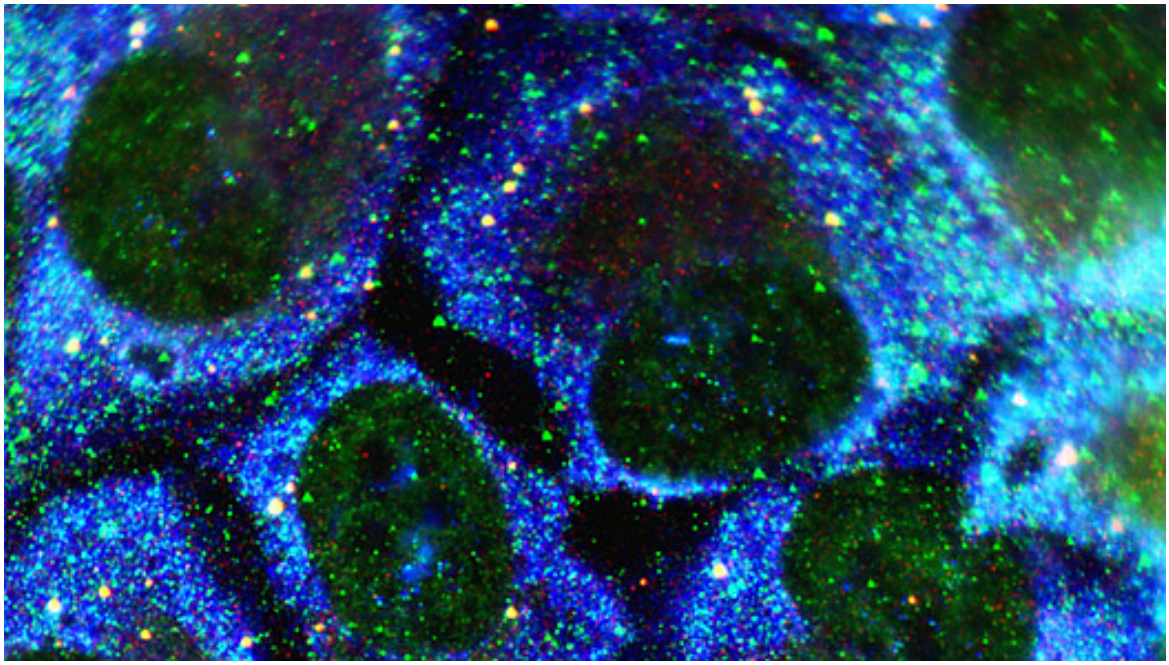
In a third study in the *New England Journal of Medicine*, researchers found that leaner people tended to have more brown-fat deposits than overweight or obese individuals. Interestingly, women were twice as likely as men to have active brown fat, according to the study, conducted by Dr. Ronald Kahn and his colleagues at the Joslin Diabetes Center, Massachusetts General Hospital, Beth Israel Deaconess Medical Center, and Brigham and Women's Hospital.

Still, the findings don't necessarily mean that activating brown fat leads to a trimmer waist. For one thing, the body is especially good at maintaining equilibrium, which is why a boost in calorie-burning can often trigger a hunger signal and prompt people to eat more to make up for the loss. And even if drug companies could find a way to activate brown fat safely, that excess activity could throw off other metabolic systems and damage your health. After all, the people who have the most active brown fat so far are those with cancer and hyperthyroidism.

http://www.time.com/time/health/article/0,8599,1890175,00.html

Experimental Prostate-Cancer Drug Shows Promise

By Bryan Walsh



An experimental drug for advanced prostate cancer has shown preliminary success in the first and second phases of clinical trials, shrinking tumors in the lab and reducing signs of the disease in patients with drug-resistant cancer, according to a report published in the April 10 issue of the journal *Science*.

Prostate cancer, which kills 29,000 men in the U.S. each year, is a tenacious disease in advanced stages. The treatment of cancer that has metastasized beyond the prostate involves drugs that block male hormones, the androgens testosterone and dihydrotestosterone, which feed tumor growth. Antiandrogen drugs, like bicalutamide, work by binding to the androgen receptors on prostate-cancer cells, chemically preventing the hormones from interacting with the tumor. Over time, however, cancer cells become resistant to the drugs as the number of androgen receptors on the cells increases, and in a cruel twist, the drugs somehow begin to stimulate the cancer instead of suppressing it.

Some researchers think the solution is to avoid involving androgen receptors altogether. But Charles Sawyers, a cancer researcher at the Howard Hughes Medical Institute (HHMI), isn't convinced — and he has an alternative. In the new *Science* paper, co-authored by Sawyers and other researchers at HHMI, the University of California, Los Angeles, and a host of other institutions, data suggest that a new chemical compound may sidestep the problem of resistance. When used to treat mouse tumors that were derived from drug-resistant prostate-cancer cells, the compound led to dramatic shrinkage, which has researchers hoping for a similar effect in humans. "The compounds are working extremely well in our models," says Sawyers. "We think this might be able to deal with the resistance question." (Read "Prostate Exams: When Are They Necessary?")

Researchers in Sawyers' lab began with a chemical that showed promise in attaching to the androgen receptor on cancer cells. Then the scientists, like composers writing variations on a theme, synthesized nearly 200 versions of the drug and screened each one on prostate-cancer cells that had been engineered to be drug-resistant. In the end, two molecules — RD162 and MDV3100 — fit the experimental criteria, binding to the receptor site without stimulating cancer-cell growth. Both chemical compounds were then tested in mice. "They caused the tumors to shrink significantly," says Sawyers.

Unlike typical antiandrogen cancer drugs, the new compounds appeared to work by more effectively blocking the androgen receptors on the cancer-cell surface, even when the total number of receptors on the cells was high, as is the case in resistance.

The drug company Medivation, for which Sawyers is a paid consultant, chose MDV3100 to test in a clinical trial. In initial studies, 30 patients who had drug-resistant prostate cancer were given doses of MDV3100. Twenty-two showed a sustained reduction in their blood levels of prostate-specific antigen, or PSA, a protein that is elevated in the presence of prostate cancer; in 13 of those 22, the decline was more than 50%. That Phase 2 trial is ongoing, but the drug has shown enough promise to prompt the Food and Drug Administration to grant Medivation permission for a large-scale Phase 3 clinical trial of 1,200 patients with resistant prostate cancer, which will determine the drug's impact on survival rates.

That trial — needed before MDV3100 can be approved for use in humans — will take several years. In the meantime, there are still questions to be explored, including why the drug had little effect in eight of the subjects in the early clinical trial. Sawyers' team is working on an answer. It's possible that the drug may have to be given in larger doses to some patients or that some prostate cancers may mutate to the point where antiandrogen drugs are simply ineffective. "There could be changes that are preventing the drug from binding," he says. "It's a bit like trying to hit a moving target." But for now, MDV3100 offers some potential as better ammunition.

http://www.time.com/time/health/article/0,8599,1889998,00.html

MONTICELLO
Jefferson's Blind Spots and Ideals, in Brick and Mortar

By EDWARD ROTHSTEIN

CHARLOTTESVILLE, Va. — Stand in the garden of Monticello here and look back at the home Thomas Jefferson designed, a view made famous by the United States nickel, and you get some hint of how this founding father thought about the new nation taking shape around him. The building invokes reason, proportion and balance, but you stand on a man-made plateau that seems to hover in space, open to the sweep of clouds and the distant mountains. Veneration for antiquity and revolutionary daring are brought together. The home's allusions to ancient Greece and Rome and to the Renaissance are poised on the brink of a New World.

It is a strange sensation. And with a new visitors center just down the slope of this "small hill" (the meaning of "Monticello" in Italian), including the requisite amenities of a cafe and shop along with an education center and 5,200 square feet of exhibitions about Jefferson's ideas and practices, you can start to put this vista in a larger perspective. It helps too if you combine a Monticello visit (which 450,000 people make every year) with a trip to Lynchburg, Va., once a three-day journey by coach, now a mere hour and a half by car.
That is where, in 1806, as Monticello neared completion, Jefferson began to build Poplar Forest, a more private retreat: a modest octagonal home with a skylight-topped central room shaped in a perfect cube. And let us detour here for a moment. Poplar Forest seeks the same stylistic resonances as Monticello, though in a more intimate context, its geometric core and extravagantly tall windows opening onto rolling fields and hills. "When finished," Jefferson wrote of this building in 1812, "it will be the best dwelling house in the state, except that of Monticello; perhaps preferable to that, as more proportioned to the faculties of a private citizen."
In recent years, after being rescued from generations of owners and their modifications, Poplar Forest has been straining for attention, welcoming just 20,000 visitors a year. Now celebrating the 200th anniversary of Jefferson's first extended stay there, it is displaying an ever-expanding yet refined restoration that began more than 20 years ago. It affords a chance to see Jefferson's thoughts about space, stripped of all

ornament and furnishing. We see bare brick and plaster, the walls' inner supports for arched windows, the skylights and surrounding panoramic views that in early America must have been a revelation.
Its elegance is as stunning as its impracticalities, its form creating less a place for living than one for contemplation (which is why so many of the home's owners, over the years, were compelled to make modifications). Restored to original form, the house reflects an ideal, lightly compromised. It seems an echo of Monticello's larger, more polished expression of that ideal.
These two homes and the four exhibitions inside the $43 million visitors center that opens on Wednesday provide an unusual sense of the tensions within Jefferson's capacious genius, which embraced agriculture and architecture, political philosophy and engineering. The center's architects, Ayers/Saint/Gross Architects and Planners, wisely give their subject pride of place and refuse to compete with Monticello itself, instead creating a low-lying quadrangle around a central garden courtyard.
In the exhibitions, Monticello's chief curator, Susan R. Stein, along with her staff, have shaped a series of thematic explorations that suggest just how often Jefferson seems to have lived at a strange crossroads between the real world and his envisioned ideals. An ideal might be a home that resonates with the glories of antiquity and the beauties of geometric order, or it might be a nation founded on abstract and inalienable rights to life, liberty and the pursuit of happiness. Both might be beyond perfect achievement yet still provide compelling models, requiring compromise but also inspiring transformation and aspiration.
That seems to be the way Jefferson saw it as well. He was never done with either home. And in each, compromises were required. Poplar Forest's glorious central room — a communal dining room into which a narrow entrance corridor leads — didn't allow easy access to the kitchens, which had to be reached through a bedroom. The geometry and the extraordinary sense of light and air had a cost.
Monticello, as one exhibition here deftly demonstrates by tracing its evolution and construction, is really Monticello II, a re-envisioning of the entire home, whose main structure was already in place when Jefferson went to Europe in 1784 and had his eyes opened to new possibilities in design. In 1796 he began expanding and reshaping the home. He called Monticello his "essay in architecture," and you get the sense that he meant "essay" with its French overtones of something attempted, experimented with, transformed. That is the subject of another exhibition here, which explores Jefferson's use of Monticello as a social and intellectual laboratory, a realm for experimentation in farming and design.
As for national and ethical ideals, here the tension with the real is more intense, as the drubbing Jefferson's reputation has taken in recent decades shows. After all, Jefferson laid down the foundations of the new country in the Declaration of Independence and codified its vocabulary of equality and liberty, but we know too that just over the edge of Monticello's plateau was a village of more than 100 enslaved workers, who helped build this house and serve its elaborate meals; one of them — Sally Hemings — probably bore Jefferson's children. And, as at Poplar Forest, staff archaeologists have uncovered the relics of slave quarters and slave life that even for that modest retreat were extensive.
Such matters were once adduced as proof of Jeffersonian hypocrisy or as an argument about his inflated stature. Now they are part of our understanding, showing the real-world shortcomings against which Jefferson's ideals sharply jabbed. He may disappoint us, but his vision is so powerful it ends up inspiring anyway. We don't ignore the contradictions, which were, of course, not his alone; they simply show us how much was required to overcome them.
An important aspect of the new exhibitions here is that the lives of black slaves are inseparable from accounts of Monticello's domestic life. Jefferson kept such meticulous records, and archaeological finds have been so extensive, that slaves can be described as named individuals with particular responsibilities and family connections; here, as at Poplar Forest, it is clear that some slaves earned money and possessed a small number of precious objects.
In the exhibition about the building of Monticello, we also learn that there were four stonecutters used, two of them "free white workmen" and two enslaved, and that 14 white carpenters were used along with eight black slaves. This attention to enslaved life is not inserted in the exhibition to diminish the nature of Jefferson's achievements, but to illuminate his world.
At times this theme can have disproportionate emphasis. The imaginative Griffin Discovery Room for children, for example, in which reproductions of objects associated with Jefferson are touchable, too fully divides its attentions between slave life and Jefferson's life. Elsewhere we miss what used to be taken for granted: a straightforward portrayal of Jefferson's own life, family and travels. (Much of this narrative has to be pieced together from interactive screen displays.)

And when reaching the core of Jefferson's ideas and achievements here, there is a tendency to rely too heavily on the latest innovations in museum display (as created by Small Design Firm).
In one gallery, when you step onto an array of thematic ideas on the floor (like religion, government, science or reason), Jefferson's words relating to the chosen theme playfully assemble themselves on a screen. In another, an ambitious multimedia wall of 21 flat-panel screens with seven touch screens gives a capsule history of Jefferson's impact on what he called "the boisterous sea of liberty," with images, quotations and facts cascading into an account of the birth of a nation and the influence of Jefferson's ideas.
That exhibit overwhelms at first; it takes time to comprehend the sweep of the story without being distracted by the sweep of sensations. The approach also submerges the intellectual power of the narrative; you have to work to piece things together, an unfortunate byproduct of the desire to speak in the video vernacular. But Jefferson's political ideals are best understood through argument and language rather than image.
Still, if you come to these galleries with the history in mind, their energy can be intoxicating; you sense the scale of Jefferson's accomplishment and influence even if you don't always absorb the detail.
At any rate, as Jefferson wrote, "the boisterous sea of liberty is never without a wave." Which is another way of saying that there is no ideal without the messiness of the real. But what a great thing it is to imagine that ideal! And then to keep coming so close!
Monticello, 931 Thomas Jefferson Parkway, Charlottesville, Va., is open year-round. More information: monticello.org or (434) 984-9822. Poplar Forest is open April through November. More information: poplarforest.org or (434) 525-1806.

http://www.nytimes.com/2009/04/10/arts/design/10mont.html?_r=1&th&emc=th

'THE GENERATIONAL: YOUNGER THAN JESUS'
Young Artists, Caught in the Act

By HOLLAND COTTER

The sweet bird of youth, alert as a robin, hungry as a gull, alights once again in Manhattan with the inauguration of "The Generational: Younger Than Jesus" at the New Museum, the latest local survey of contemporary art — this one a triennial — to challenge the pre-eminence of the Whitney Biennial.

The show is large, buzzy, international in scope and age-specific. As the title implies, only artists 33 or younger were considered for inclusion, a restriction that could be ruled age-ist in a court of law, but it's business as usual for a museum ever conscious of its clientele.
Big-statement surveys generate big expectations: they will tell us what and who is hot, important, exciting. What we get in this case is a serious, carefully considered show, but one that, apart from a few magnetic stand-alone entries — a killer video by Cyprien Gaillard, an animation by Wojciech Bakowski, a madcap Ryan Trecartin installation — feels awfully sedate and buttoned-down for a youthfest. Kids R Us it ain't, but that's O.K.
Youthfulness doesn't carry quite the cachet in the art world that it did a decade or so ago. The routine of dealers hustling talent straight from the classroom has made exhibitions of 20-somethings the wearying norm. Nor does "international' have much glamour any more. Art fairs have seen to that.
So it's no surprise to find that, even with the introduction of some new names, "Younger Than Jesus" feels familiar, like a more-substantial-than- average version of a weekend gallery hop in Chelsea and the Lower East Side, right down to the token Asian and African imports.
The show was put together very fast; in a year. The initial selection was done Facebook-style, with the curatorial groundwork outsourced to 150 art world experts — artists, critics and teachers — who submitted names of artists for consideration. Three New Museum curators — Lauren Cornell, Massimiliano Gioni and Laura Hoptman — made the final cut of the 50 artists, with the critic Brian Sholis assigned to create a resource center to supplement the show. (It's on the museum's fifth floor and well worth a visit.)
Most international surveys are assembled this way. The positive difference in this case is that all the sources are credited by name, and the runner-up artists — nearly 500 — are included in a book called "Younger Than Jesus: Artist Directory," a kind of exhibition in print, and a terrific idea.
The exhibition catalog is also a compendium, mostly of musings from the popular press on Generation Y, or the Millennials, with each curator contributing necessarily impressionistic profiles of a generation still very much in formation.

Characteristics assigned to these artists include having a second-nature relationship to digital media; a preference for sentiment over irony; an aesthetic interest in reorganizing existing materials rather than trying to invent from scratch; and so on.

A brief glance at the show makes one thing clear: most of its participants are committed multitaskers. The artists Tala Madani, born in Iran, and Jakub Julian Ziolkowski, from Poland, do oil-on-canvas pictures of a conventional sort; Emre Huner, from Turkey, combines painting with animation; the German-born artist Kerstin Brätsch uses hers as performance aids; and the New York artist Josh Smith treats his like prints, churning out dozens of pictures at a time and stacking them for distribution.

Ryan Trecartin uses paint cosmetically, as an extreme form of makeup. Applying it directly to the body, he transforms himself and the other performers in his videos into frenetically walking, talking surrealist abstractions. Born in Texas in 1981, Mr. Trecartin is probably the best-known artist in the show, though with his extroverted, look-at-me spirit, among the least representative.

He's certainly one of the most versatile. A blogosphere baby, a child of the chat room, a YouTube native, he shifts effortlessly among realities while pushing sculpture, film, performance, music and language — so much language — through digital scramblers and mixers. There is some danger of his motormouth wizardry sliding into shtick, but right now it's mesmerizing.

Some of the more interesting pieces in the show share its hyped-up mode. A rapid-fire video by the Armenian artist Tigran Khachatryan alternates scenes from Sergei Eisenstein's "Battleship Potemkin" and clips of skateboard catastrophes to rethink the concept of revolution. A short, impressive film by the Israeli artist Keren Cytter has characters spitting out malign non sequiturs in the quick, jerky sequences.

In a live audiotaped performance, the British artist Tris Vonna-Michell begins telling a story at a leisurely pace, then gradually accelerates the delivery until the words turn into a coloratura stream of leaps and repeats, all the while holding the narrative thread. The burst of applause that greets him at the end is fully earned.

The show has a generous amount of performance, some of it, as in that case, recorded. Two male models in space-age bikinis wordlessly rearrange chunks of black abstract sculpture in a film by the Polish artist Anna Molska. In a video by the British artist James Richards, a speech instructor delivers a soundless lesson in lip reading.

Live performance has a particular chic at present, and the show has some of that too. The most spectacular example, Liz Glynn's "24 Hour Roman Reconstruction Project, or, Building Rome in a Day," came and went before the opening. With a team of collaborators and a ton of cardboard, this American artist erected a model of the Eternal City in the museum's lobby, then destroyed it, in one dusk-to-dusk marathon. A video of the whole process is on view.

Two other performances are continuing and almost invisible. The Chinese artist Chu Yun has hired women to sleep, one at a time and with the aid of medication, on a bed in the center of a gallery for the run of the show. The British conceptualist Ryan Gander has asked that whatever museum guard is on duty in the museum's fourth-floor gallery wear a white Adidas track suit marked with embroidered spots of blood, fake evidence of a story of violence that we can invent.

The Millennials appear to be a story-loving breed. There are lots of narratives, implied or spelled out. There is Mr. Vonna-Michell's, of course, and the scripted but inscrutable emergencies in Mr. Trecartin's videos. Katerina Seda, a Czech artist, filmed her depression-crippled grandmother making drawings of household items, thereby regaining an interest in life. Both the film and the drawings are on view, crucial components of a family drama.

Through collages of newspaper and magazine clips, the artist Matt Keegan documents the tangled politics of the America he grew up in as a child in the 1980s, when President Ronald Reagan and AIDS shared the news. With the wise omniscience that marks much of his work, he seems to be asking how we keep the lessons learned from this particular history alive and usable.

Emily Roysdon, a founder of the feminist collective LTTR (Lesbians to the Rescue), asks similar questions more directly, out loud. Her silkscreens-on-wheels are movable props for impromptu speeches, by her or by anyone moved to give one. Like certain other young American artists — Ms. Cornell writes about them in her astute essay — Ms. Roysdon makes art and activism one thing: you make history by living it, saying it, giving it form.

Those forms are pretty awesome in the extraordinary video by Mr. Gaillard, a French artist born in 1980. His three-part visual essay in aestheticized violence opens with a slowly building fight-club clash between two crowds of young men; continues with a fireworks display over a French housing block

minutes before it is demolished; and concludes with a jittery flight above Soviet-era apartment towers that stand, crushingly huge and blank, in a bleak Russian landscape.

More often in this show, though, history is internalized, a state of mind, half-hallucinated, as it is in the animated film by Mr. Bakowski, an artist from Poland, who accompanied his flickering watercolor images of toilets, tired feet, detached sexual organs, rotted fruit and faded flowers with a half-whispered litany of spoken phrases. The results are reminiscent of William Kentridge's films on South Africa, but also suggested a string of diary jottings that end with a prayer: "Dead Angel God Mother, Care for us Dear Queen. If only there was no evil, illnesses and cripples."

The apocalyptic tone of this piece, and of Mr. Gaillard's, was sounded in an earlier exhibition, "After Nature," which Mr. Gioni organized last summer and is still the best thing the museum has done since its move to the Bowery. It drew its power primarily from its imaginative generational mix of artists, with undervalued figures like William Christenberry and Nancy Graves at one end of the spectrum, 30-something figures like Klara Liden and Tino Sehgal on the other.

The two younger artists, both Millennials, are hot market properties, probably too hot for this conspicuously low-key group show (though both appear in the "Artist Directory"). Mr. Christenberry, born in 1936, and Ms. Graves, who died in her 50s in 1995, are underappreciated figures, with long-developing, multifaceted careers. It was the combination of new and old that made "After Nature" work, gave it a psychological unity and resistant texture, lifted it above business as usual.

"Younger Than Jesus" doesn't have a comparable sense of unity, texture or lift. It is, despite its promise of freshness, business as usual. Its strengths are individual and episodic, with too much work, particularly photography, making too little impact. But my point is that beyond quibbles about choices of individual works, it raises the question of whether any mainstream museum show designed to be a running update exclusively on the work of young artists can rise above being a preapproved market survey. Removed from a larger generational context, can such a survey ever become a story, part of a larger history? (The same question applies to museum exhibitions that leave young artists out of the picture.) I'm asking. It's a complicated subject. I don't know the answer.

In any case, a generational challenge has already been taken up elsewhere. A small commercial gallery called BLT, on the Bowery across from the New Museum, has announced that its May exhibition will consist exclusively of artists born before 1927. Louise Bourgeois, Lucian Freud and Ellsworth Kelly will be among the participants. The show will be called "Wiser Than God."

"The Generational: Younger Than Jesus" remains through June 14 at the New Museum, 235 Bowery, at Prince Street, Lower East Side; (212) 219-1222 or newmuseum.org

http://www.nytimes.com/2009/04/10/arts/design/10trie.html?ref=design

Just a King for His Time: Executions, Wives, Divorces and Bad Diets

By CHARLES McGRATH

THE Henry VIII whom Dickens called "one of the most detestable villains who ever drew breath" and a "big burly, noisy, smelly, small-eyed, large-faced, double-chinned, swinish-looking fellow," is not much in evidence at an exhibition called "Vivat Rex!," at the Grolier Club in Manhattan. Nor is Charles Laughton's gluttonous lecher, nor the moody, gym-buffed horndog played by Jonathan Rhys Meyers in "The Tudors," the third season of which is in progress on Showtime. The Henry of this exhibition, commemorating the anniversary of his accession to the throne 500 years ago this month, is a scholar, a diplomat, a politician, a zealous churchman and altogether a shrewd operator.

The wives and the children get relatively short shrift here. So for the most part does Henry's taste for high living, though some space is devoted to his palaces, and an extensive manuscript list of gifts he gave or received includes a "brase of greyhoundes" and a "night cap with cheynes & buttons of golde."
Rather than a tyrant, Henry emerges as a mercurial, paradoxical figure: a doting father who banished his children, a loyal friend who turned on his supporters with no warning, a scholar and lover of learning who tore down monasteries and their libraries. Most of all here, he is less a lech than a pragmatist in need of an heir.
The exhibition does include Cornelis Metsys's engraving of the aged and bloated Henry, which renders him as a Tudor version of Jabba the Hutt. (The catalog points out that contrary to myth, Henry never suffered from syphilis. His apothecary bills, which still survive, make no mention of mercury, the preferred treatment then. What killed Henry was probably just bad diet and a lack of exercise.)
But then no one looks particularly good in this exhibition, unless it's Anne of Cleves, Henry's fourth wife, in a 19th-century engraving (based on a flattering portrait by Holbein) that gives little suggestion of why he found her so unattractive that he didn't consummate the marriage.
Henry's father, Henry VII, who died at 52, is cadaverous in an engraving at the front of Francis Bacon's history of his reign. Cardinal Wolsey is bug-eyed and jowly in an aquatint based on a 1526 portrait. And in a 17th-century engraving Will Sommers, the famous clown who was Henry's jester, bears a more than passing resemblance to Freddy Krueger.
Among the manuscripts on display are a letter written by Catherine of Aragon, Henry's first wife, complaining (in Spanish) about the "abominable litigation" between the king and herself and asserting that though she had first been married to Henry's brother Arthur, she "remained a maid and was a maid" at the time of her marriage to Henry.
And there is a letter from one of Henry's secretaries, written in Latin and partly in code, to Cardinal Wolsey, discussing negotiations with the pope over Henry's request for a divorce. It says in effect that the pope, imprisoned at the time by Catherine's nephew, the Emperor Charles V, found himself between a rock and a hard place.
But most of the items on display are books on loan from the Folger Shakespeare Library, the Houghton Library at Harvard and the Morgan Library & Museum, normally rival institutions but brought into temporary truce by the enterprise of the exhibition's curator, Arthur L. Schwarz. And in a way the unheralded star of the exhibition is print itself.
Henry's reign coincided with the advent of printed books, which contributed greatly to the spread of Protestantism, for example. A case devoted to Martin Luther, to attacks upon him (including one by Henry) and to Luther's responses documents what is in effect a war of words, a battle of tracts and pamphlets.
Books by Erasmus, Thomas More and Machiavelli are also featured — the kinds of texts a young prince would study while learning to think about the world. There is even Henry's schoolboy copy of Cicero, boldly inscribed in big, regal handwriting, "Thys Boke Is Myne Prynce Henry."
Later cases suggest that for their owners some books had almost talismanic power. In a prayer book presumably owned by a Protestant reformist, all the passages referring to indulgences have been crossed out, and so have several uses of the word "pope." In a fourth edition of the English Bible, published in 1541, after Thomas Cromwell had been executed for treason, Cromwell's coat of arms has been drilled right out of the frontispiece.
Type, dense and thick, in the old black-letter font, floods the cases here with an almost physical urgency. Books truly mattered back then, the viewer concludes. To modern eyes the print is often hard to read, but

many of the pages in this exhibition repay study. Here, for example, is a passage describing the jousts held in 1511 in honor of the birth of Prince Henry, who later died in infancy:
"After the kyng and hys compaignions had danced, he appoynted the ladyes, gentlewomen and the Ambassadours to take the letters of their garmentes, in token of liberalitte, which thyng the common people perceyuyng, ranee to the kyng, and stripped him unto his hosen and dublet, and all hys compaignions in likewise. Syr Thomas Kneuet stode on a stage, and for all his defence he lost his apparell."
There are scholars who believe that Henry underwent a profound personality change halfway through his reign, possibly the result of a jousting accident, and that he became more paranoid and despotic as time went on. Mr. Schwarz, the curator of the exhibition, sees Henry's reign as more of a piece and thinks of him not as a monster but simply asa a man of his time.
"Why do you have to turn Henry into a sex maniac?" he said in an interview at the Grolier the other day. "He had an obligation to himself and to England to protect the throne. He believed he needed a male heir. And he remained a devout man. His dislike of the pope was political, not religious."
He added: "Executions, annulments — those things all happened in continental Europe as well, but we happen to speak English, and so we focus on Henry."
In his lapel Mr. Schwarz wore a little crown pin in honor of Henry. At home, he said, he has a full-size crown that his wife gave him as a joke, but he doesn't bring it out for occasions as serious as a Grolier exhibition. Remarkably, in a field as specialized as Tudor studies, he is not a professional scholar but rather a retired municipal bond trader and amateur bibliophile.
In 1980, he explained, he was standing in a coat check line, and someone, noticing that he was carrying a volume of William Manchester's life of Churchill, came up to him and said he should read Jasper Ridley's biography of Henry VIII. He did, and ever since he has been living more or less full time in Tudor England.
He said, "If something happened after 1603, I don't really care."
"Vivat Rex! Commemorating the 500th Anniversary of the Accession of Henry VIII" continues through May 2 at the Grolier Club, 47 East 60th Street, Manhattan; (212) 838-6690, grolierclub.org.

http://www.nytimes.com/2009/04/10/arts/design/10henr.html?ref=design

'LIVING LINE'
Capturing the Outlines of an Exuberant Universe
By KEN JOHNSON

Tucked away on the third floor of the Metropolitan Museum of Art is a small red-walled gallery. If you've never been there, now is the time: it is occupied by an almost supernaturally beautiful exhibition of drawings by Indian miniaturists of the 17th, 18th and 19th centuries. The 40 small works in "Living Line: Selected Indian Drawings From the Subhash Kapoor Gift" were picked by John Guy, the museum's curator of South and Southeast Asian Art, from a collection of 58 pieces recently donated to the museum by Mr. Kapoor, owner of Art of the Past, a Madison Avenue gallery that specializes in Asian antiquities.

Most of the usual subjects of Indian miniature painting are represented: portraits of bearded, sword-bearing aristocrats and bejeweled women; little kings on horseback leading armies of little soldiers; hunting scenes; wild animals and mythic beasts fighting and chasing one another; lovers meeting in private rooms; gods, goddesses and demons ascending and descending. "Heroine Braving the Night" (around 1800) shows a lovely, richly dressed young woman menaced by snakes and demons in a forest with storm clouds gathering. Realized in perfectly controlled lines almost as fine as spider webbing, on a paperback-book-size page, it sucks you into a magical, parallel world of mystery, adventure and danger. At the other extreme "Tigers Hunting Boars and Deer" (around 1830) offers, on a horizontal page more than five feet wide, a bird's-eye view of striped cats romping all over a shrubby hillside in pursuit of their prey. Loosely but deftly executed with brush and ink, it turns representational action into a flattened field of swirling, abstract rhythms. Matisse would have loved it. Looking at the drawings, you may miss the vivid colors, eggshell surfaces, microscopic natural details and subtleties of light and texture that Indian paintings offer. But with the paint peeled off, as it were, something else is revealed: the extraordinarily lively play of mostly black ink lines on handmade paper. Not for nothing is the exhibition called "Living Line."

Elegant, bold, tapering, serpentine, razor sharp, gesturally spontaneous, exactingly precise: the lines are so varied and so skillfully rendered it's a wonder that drawing was rarely an end in itself for these artists. Finished drawings sometimes were kept as prototypes for paintings and as objects of connoisseurial delectation, but generally they served as the underlying, invisible foundation for paintings.

Among the most riveting pieces is a page from a sketchbook with images smaller than postage stamps, including tiny men on horseback, leaping boars and a spectral architecture outlined in the background. Dating from the late 18th century, it is attributed to Pandit Seu or to Manaku. Considering the sheer virtuosity displayed in this and other drawings, it is sad to think that the names of most of the artists are forgotten or not known for sure. India did not subscribe to the European cult of the genius celebrity; most artists were little more than servants for the rich and powerful nobility.

Indian art is based on well-worn conventions, but the collective spirit of this exhibition is anything but academic or dogmatic. There are moments of piety, as in the small, finely drawn, mid-18th-century image of a pilgrim praying before a pedestal bearing the footprints of Vishnu. There is an appreciation, too, for the underworld, as in "Mara Bringing Demons to Life" (Seu family, probably Manaku, mid-18th century), in which the demon Mara raises a half-dozen clownish fellow demons from a well or large caldron. Two drawings, one of an elephant grappling with a crocodile, the other of a lion similarly engaged, suggest a metaphysical view of a world in which different sorts of energies — mammalian and reptilian, male and female, angelic and demonic — are constantly contending.

Sexual love has its honored place in the cosmic scheme, though it is not prominently featured in this exhibition. "Lovers Returning to a Palace" (late 18th century) is notable less for its eroticism than for the test patches of opaque watercolor scattered among its blue outlines.

Out of the fertile marriage of line and fantastic subject matter is born a psychological dimension of great breadth. Indian society may have been rigidly hierarchical, but its art was wildly pluralistic. It projects a universe of teeming multiplicity, embraces consciousness in all its contradictions and complexities. It is a joyful acceptance of the full range of human, subhuman and superhuman experience. You get a glimpse of that expansive, turbulent universe here. The art of drawing does not get much better than this.

"Living Line: Selected Indian Drawings From the Subhash Kapoor Gift" continues through Sept. 6 at the Metropolitan Museum of Art, 1000 Fifth Avenue; (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/04/10/arts/design/10line.html?ref=design

'NOBLE TOMBS AT MAWANGDUI'
How the Upper Crust Lived, and Died, in Early China

By KEN JOHNSON

They say you can't take it with you, but in certain times and places people thought otherwise, and they stocked the tombs of their most illustrious citizens with everything they would need in the next world: clothing, food, money, reading material, pets and even live servants. We don't know if this was helpful for the intended beneficiaries, but the effective preservation of much art and material culture has been a great boon for modern scholars of ancient civilizations.

A case in point is a small, interesting exhibition at the China Institute, "Noble Tombs at Mawangdui: Art and Life in the Changsha Kingdom, Third Century B.C.E. to First Century C.E."
Organized by Chen Jianming, director of the Hunan Provincial Museum, the show presents about 70 out of more than 3,000 objects excavated from three tombs discovered in the early 1970s in Hunan Province in southeastern China. Situated in a suburb of the modern city of Changsha, the tombs at Mawangdui belonged to three related nobles: the Marquis of Dai, his wife and their son. Because they had escaped the notice of plunderers and because of the unusually well-preserved state of their contents, the tombs are considered among the major archaeological discoveries of the 20th century.
Momentous as this sounds, the exhibition is not one of those astounding, blockbuster compendiums of shiny gold and bejeweled treasures. Most of the material, including samples of fabric, lacquer ware, lamps, grooming implements and wooden figurines, is more remarkable for historical than artistic reasons. Scholarly specialists will be most appreciative.
A tattered, padded gown shows the type of clothing favored by Lady Dai. As a note in the catalog explains, it has "a hem of brocade with pile circles — the earliest teased fabric discovered in the world so far." Several pieces of finely woven silk on display are also said to be among the earliest known examples of their kind.
Two fragmentary pages of writing are from one of the world's first books of advice for maintaining good health. It focuses on sexual concerns, and these two pages in particular address impotence in elderly men. Too bad they are not illustrated.
Also of historical note, but more visually arresting, is a small lance — the business end of a spear — made of translucent blue glass. The only glass lance to have been excavated in China, according to the catalog, it is of major importance to the study of Chinese glasswork.

The show's most artistically compelling attraction is a set of five wooden figurines representing musicians. The smoothly carved performers kneel before miniature stringed instruments in full-length robes and bowl-shaped hats. With their elegantly curved lines and nubby little hands, they call to mind the folksy Modernist sculptures of Elie Nadelman. A catalog entry explains that after the Spring and Autumn Period (770-476 B.C.), "it became a general practice to substitute figurines in place of living people in tombs of the deceased."

There is a lot of black and vermilion lacquer work in the show, including covered bowls, a ladle, trays, sets of dishes and large wine containers. Almost none of these objects display the kind of highly wrought finish and intricate construction you might associate with the finest lacquerware of more recent derivation, but they have a homely appeal, and their delicate, swirly and geometric patterns are rewarding to study. They also show what sort of domestic items a well-to-do family would possess for entertaining. The outstanding piece of lacquer work is a round, two-tiered box containing nine variously shaped smaller boxes placed in cavities carved out of the lower level. These glossy, brown and white containers held cosmetics, combs, needles and other articles for personal grooming used by Lady Dai, a k a Xin Zhui.

Because some of the objects found in the tombs were too fragile to travel, they appear here in the form of modern reproductions. There is a beautiful, richly lacquered copy of one of a set of nesting coffins and a re-creation of a T-shaped painting that lay face down on the innermost coffin. In a fascinating catalog essay, the Harvard University art historian Eugene Wang explains that the complex iconography covering the coffin and the painting was supposed to guide the dead person's soul through progressive stages of the afterlife.

In a more down-to-earth vein, Yu Yanjiao of the Hunan Provincial Museum observes in another essay that one reason the Mawangdui excavation caused such a worldwide stir among archaeologists was the extraordinary state of preservation of Xin Zhui's body, which unfortunately is not in the exhibition. Ms. Yu notes that as a result of preservation techniques that amaze modern scientists, "her outer body is intact and moist; her subcutaneous tissues are soft and elastic; her joints are movable; her eyebrows and the hair in her nose survive; the tympanic membrane of her left ear remains intact; the loops and whorls on her fingers and toes are clear; her inner organs, connective tissues, muscle tissue, bone tissue, and cartilage are all fairly well preserved." Not bad for a 2,000-year-old lady.

"Noble Tombs at Mawangdui: Art and Life in the Changsha Kingdom, Third Century B.C.E. to First Century C.E." continues through June 7 at the China Institute, 125 East 65th Street, Manhattan; (212) 744-8181, chinainstitute.org.

http://www.nytimes.com/2009/04/10/arts/design/10tomb.html?ref=design

Industrial Sleek (a Park Runs Through It)

By NICOLAI OUROUSSOFF

It would be easy to dismiss the new Standard Hotel in the meatpacking district as a final shout-out to the age of excess. The entire area, whose trendy shops and cafes must still contend with the occasional whiff of rotten meat, reflects a development culture run amok.

Well, that would be a mistake. The boutique hotel, designed by Polshek Partnership, is serious architecture. The first of a string of projects linked to the development of the High Line, a park being built on a segment of abandoned elevated rail tracks, the new building's muscular form is strong enough to stand up to both its tacky neighbors and the area's older industrial structures. Its location, on Washington Street at West 13th Street, exploits the clash of scales that has always been a gripping aspect of the city's character.

In short, it is the kind of straightforward, thoughtfully conceived building that is all too rare in the city today.

Part of this is due to its stunning position. The partially open hotel — 19 floors and 337 rooms — is the only new building that rises directly over the elevated park. The towering structure is supported on massive concrete pillars, while a ground-floor restaurant and garden cafe are tucked underneath the High Line's hefty steel frame.

I admit to some mixed feelings about the restaurant. Clad in recycled brick, it's meant to reflect the neighborhood's old identity as the city's meat market. A slick black metal canopy is a spiffed-up version of the decrepit canopies that once lined the neighborhood's sidewalks, without the beef carcasses. The garden's brick paving and industrial light fixtures look quaintly European. Over all the effect feels about as genuine as a Hollywood back lot.

Still, Polshek smartly plays up the contrast between these spaces and the tough brick, concrete and steel structures that surround it. From the garden cafe people can look up at the High Line's gorgeous steel underbelly. One of the most enticing fire stairs runs down the side of a concrete leg supporting the hotel, crashing down on the restaurant's roof before tumbling out on the sidewalk.

Polshek was also careful to segregate the various entries — to the hotel, restaurant and a lounge that will open this summer on the 18th floor — so that hotel guests won't feel as though they are trapped in an entertainment hell for 20-somethings. (The Standard's owner, André Balazs, is negotiating with the city

to create a more direct connection between the hotel and the High Line, which would significantly diminish this effect as well as compromise the park's public quality.)

It's only once you get off the ground, however, that you appreciate the design's true flair. The hotel is set at a slight angle to the High Line (part of which is to open in June), creating a delicious tension as its deck passes underneath. The building bends slightly near the center, giving it a more streamlined appearance in the skyline and orienting the rooms toward the most spectacular views. To the southwest the facade is angled toward a sweeping view across the Hudson River to the Statue of Liberty. To the northeast, guests look out across jagged rooftops to the Empire State Building.

This sense of floating within the city is reinforced by the arrangement of some of the rooms. The rectangular ones on the south side of the building are laid out with their long side along floor-to-ceiling windows. The effect is to bring you up closer to the glass, so that you feel as though you were suspended in midair, with the city just underneath your feet. (Mr. Balazs confessed to an instant of vertigo when he first stepped into one of these rooms.)

These are simple but powerful moves. And they are a reminder that enveloping a structure in a flamboyant wrapper is not always the most effective way to create lasting architecture. In the wrong hands, too much creative freedom can be outright dangerous.

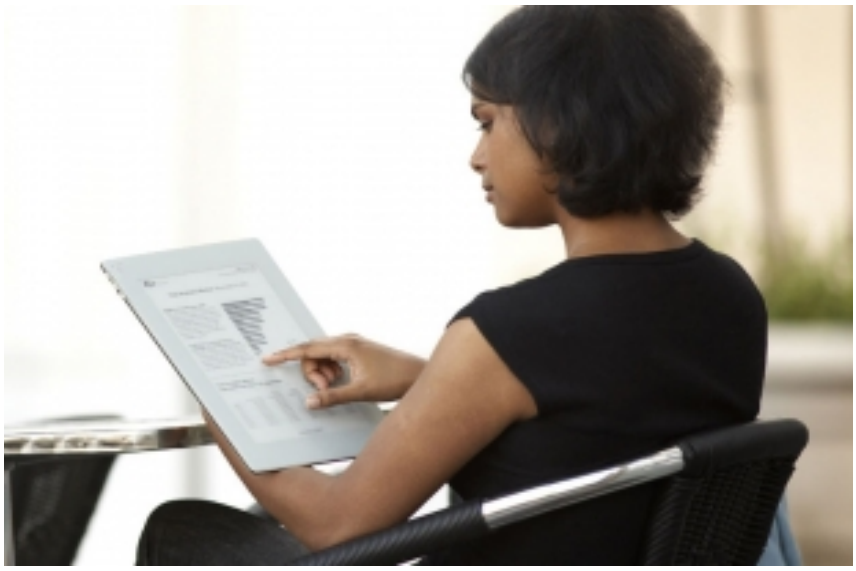
With the Standard Hotel, Polshek Partnership joins a handful of other midlevel firms that are beginning to find the right balance between innovation and restraint. These include the designers of the Bank of America building in Midtown and 1 Madison Park, two projects under construction that suggest a revival of the kind of smart, sleek and confident architecture popularized by architects as diverse as Morris Lapidus and Gordon Bunshaft in the 1950s and '60s. Those architects didn't want to start a revolution; they wanted to make glamorous buildings.

Whether this trend will survive the current financial climate, of course, is another matter.

http://www.nytimes.com/2009/04/09/arts/design/09pols.html?ref=design

Toy Story: Are Those 5,000 Magazines in Your Messenger Bag, Or Are You Just Happy to See Me?

By Gillian Reagan
March 31, 2009 | 1:07 p.m



Eight months ago, after more than 14 years working as a digital-media business developer at News Corp., Daren Benzi left his job and joined a relatively unknown company called Plastic Logic, based in the same neighborhood as Google's headquarters in Silicon Valley. The company is building what they hope will be a Kindle killer—the first mobile digital reader made specifically for newspapers and magazines.

"The demand for our product is overwhelming," Mr. Benzi told *The Observer* by phone from his home office in New Jersey. As Plastic Logic's vice president of business development, Mr. Benzi spends only about a week a month in Mountain View, Calif., at Plastic Logic's U.S. headquarters, using the rest of his time to take meetings in Manhattan, trying to woo publishers to partner with the company.

So far, the *Financial Times*, *USA Today* and digital publishers like Zinio—which converts print magazines from *Cosmopolitan* and *InStyle* to *Mother Jones* and *The Economist* into digital formats—have, among others, partnered with Plastic Logic. "I see a lot of companies who want to be with us tomorrow," Mr. Benzi said.
Current e-reader products on the market weren't made with print media in mind—they were made for books. Sure, the "Kindle store" currently offers e-friendly formats for newspapers and magazines, but the Amazon Kindle and Sony Reader have hokey black-and-white screens that seem to replicate the inside of a book.

Apple's iPhone has free, handy apps, such as Stanza and eReader, to compete with expensive digital readers, but those palm-size screens don't provide enough room for the visual experiences magazines will need to appeal to readers and advertisers—those full-page, color pictures, "charticles" and information graphics, not to mention leggy models splayed across two-page spreads.

"We've worked closely with our magazine partnerships, our newspaper partnerships, to make sure we're building something that they would publish to," Mr. Benzi said. "It doesn't mean books aren't important to us, because they are. But we are able to go to magazine and newspaper companies with a different type of reader for them."

Plastic Logic is developing an e-reader with a display that is about 8.5 inches wide and 10.7 inches long—the same size as most magazines and nearly twice the size of the Kindle screen (and more than

four times the size of iPhone and Blackberry interfaces—where many of us skim our *New York Times* headlines in the morning).

Their prototype is made out of plastic, so it's lightweight, and thinner than a pad of paper. Mr. Benzi said the company's "secret sauce" is its flexible screen, which can feel a bit like a magazine and has an added bonus of making the device nearly unbreakable.

Plastic Logic plans to release a product on the market by 2010. Once they perfect the actual product's look, Plastic Logic would include some kind of "content store" similar to what is available on the Kindle. Users could subscribe to publications, and new issues would update automatically—and they could download their own Word documents, Excel spreadsheets and PDFs onto the device, too. Currently, the reader incorporates black-and-white display technology from Cambridge-based company E Ink, just like the Kindle.

But color screens are "on our road map," Mr. Benzi told *The Observer*. "We'll either get there with E Ink or another way. The one thing we have noticed with publishers, even though they know it's on our road map, is they say as soon as I get there [with color screens], they'll come with me."

The success of the product may also depend on a larger market shift. Amazon, which is notoriously tight-lipped, hasn't released official sales numbers for the Kindle, but Citi analyst Mark Mahaney guesses that Amazon is selling anywhere from 190,000 to 500,000 devices, in their first-year rate. Kindle's numbers aren't exactly on fire—yet.

About 376,000 iPods were sold during their first year on the market, 2001. In his 2005 book, *The Cult of iPod*, Leander Kahney described how the iPod became an icon—not only by redefining Apple as a leader in product design, but also by creating a culture around digital music that no other device maker could compete with. "More than a computer, a car, or a fancy pair of shoes, it's part of your makeup, your personality," he wrote. "What's on it—the music—tells who you are. Music is deep in your heart and soul."

Perhaps magazines and newspapers can cling to their cultural and personal relevance with an e-reader. How many of us still keep old issues of the magazines that defined our teenagehood—like *Sassy*, the precursor to *Jane*, or *Spy* magazine—not only for their content, but for the advertisements, which are a pop-culture time capsule of their own? The Web is a great platform for specific articles displayed on a page, and some Web whizzes are working on better visual experiences to mimic browsing an entire, themed issue of a magazine or newspaper. That's key for branding and advertisers. On a digital reader in the right size, readers will experience the same colorful, image-heavy design experience that they see in the print editions—without the added pains of lugging around a laptop.

So could the next digital reader be the "iPod of magazine publishing?" Will a tech toy save the media business?"I think [publishers] are kind of pissing in the wind," Mr. Kahney told *The Observer*. He said Apple "already has a device and it's called the iPhone."

But perhaps Apple's e-reader will come in a different form. A rumor in Mac-obsessed circles is that Mr. Jobs is working on his answer to the netbook, the slimmed-down version of laptops with smaller screens and reduced processors. Apple's version would "be like the Kindle but with a multi-touch screen, like a 9-inch iPod touch," Mr. Kahney said. That would mean a magazine-size, touch-sensitive, full-color tablet that would also have basic Internet, iChat, and Skype videoconferencing capabilities—the perfect environment for digital magazines and newspapers.Maybe a toy alone won't save print media. But certainly publishers must evolve those inky materials into digital products that work not only on the Web—but on the next Kindle killer, too. Mr. Jobs, we're waiting.

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http://www.observer.com/2009/media/toy-story-are-those-5000-magazines-your-messenger-bag-or-are-you-just-happy-see-me#

Lost in Fiction

Alexander McCall Smith on the intense personal relationships readers form with characters and the ways that complicates the lives of authors.

By ALEXANDER MCCALL SMITH

A few weeks ago, on a book tour of Australia, I found myself signing books in Sydney. As the line of readers moved, two young women presented copies of books for signature. These books were from a Scottish series I write, one featuring a heroine called Isabel Dalhousie. Isabel, who is in her early 40s, has a boyfriend considerably younger than she is -- by 14 years, in fact. As I signed their books, one of the women mentioned that she thought that this relationship between Isabel and Jamie, the younger man, was not a good idea at all.

Author P.D. James has said that traditional detective novels reassure us that we live in a moral universe.

I defended Isabel's choice. "Why shouldn't they be together?"

The answer came quickly. "Because it's not going to go anywhere."

"But I thought it was going rather well," I protested.

Again my reader lost no time in replying. "No, it isn't," she said emphatically.

That was me put in my place. After all, I was merely the author. As it happens, Isabel's relationship with Jamie had not been my idea in the first place, but had come about because at an earlier stage in the series I came under attack from a journalist -- another woman -- for not allowing Isabel to become romantically involved with Jamie. I had originally intended that their friendship be platonic, but had been told in the course of an interview with this journalist that I really had to allow something closer to develop. "Your readers will expect it," she said. "And it would be *so* empowering for them."

Not one to stand between my readers and their empowerment, I had decided to let Isabel develop a romantic liaison, only to be taken to task later by my Sydney critics for exactly this. This, and many other similar experiences, has made me think about the whole issue of the novelist's freedom -- and responsibility. The conclusion that I am increasingly drawn to is that the world of fiction and the world of real flesh-and-blood people are not quite as separate as one might imagine. Writing is a moral act: What you write has a real effect on others, often to a rather surprising extent.

The issue of reader expectations is one with which writers of crime or mystery fiction have long been familiar. The poet W.H. Auden is among many critics who have commented on how novels in this genre follow a classic pattern: First there is peace, then this peace is shattered by the occurrence of a crime, usually a murder. This leads to a search for the wrongdoer, his apprehension and punishment, and finally a return to peace. We need to see the moral balance restored, said Auden -- a view also expressed by P.D. James, one of the greatest crime writers of our times. According to James, the traditional detective novel reassures us that we live in a moral universe, one in which the detective is the agent of justice. In this respect, she suggests, the detective novel is really doing the work of the old-fashioned morality play.

Although the vast majority of mystery novels follow this well-established pattern, not all do. In some instances, we know all the way through exactly what the wrongdoer has done -- there is no mystery element here -- and the real questions are why he acted as he did and whether he is going to get away with it. If he does go unpunished, then the conventional pattern in such books is turned on its head.

From left to right: an image from an edition of the novel "Madame Bovary"; Richard Harris playing Albus Dumbledore in the Harry Potter series; a character from "The Struwwelpeter"; Jill Scott in "The No. 1 Ladies' Detective Agency"; Matt Damon in "The Talented Mr. Ripley"; and Greta Garbo as Anna Karenina.

Patricia Highsmith's Ripley books do just this. Tom Ripley, like many of Highsmith's characters, is a very credible sociopath, coldly capable of disposing of anybody who gets too close to his secrets. It is easy for him to kill, and the fact that he does so while living the haut-bourgeois life in an elegant French house adds to the fascination we have for him.

Of course we know that it all started with the murder of Dickie Greenleaf, and as we see his life unfold over the series of novels, we may cherish hopes that sooner or later Ripley's criminal past will catch up with him. But it does not, and after several novels I suspect that many readers are actually unwilling for that to happen. Why? Because we are fond of Ripley? That is hardly likely -- Tom Ripley may be charming and urbane, but he is not really very likeable.Perhaps we merely want his story to continue because we are enjoying it so much. If Ripley had been arrested, or disposed of by somebody he had crossed, then that would have been the end of the series, and that would have been a disappointment. As it happened, Ripley survived his creator, and is still presumably living in Belle Ombre, his house in France, awaiting some author to approach the Highsmith estate with a request to continue to record his dubious doings.

Of course a sociopath who gets away with it is unlikely to be tormented by guilt. For the nonsociopathic wrongdoer who goes unpunished by the law, authors often have an alternative form of punishment up their sleeve. Raskolnikov, the student-turned-murderer in Dostoevsky's "Crime and Punishment," initially gets away with his crime but then, tripped up by his conscience, eventually confesses to what he has done.

To be tortured by guilt is perhaps unpleasant enough to satisfy our desire that crimes be paid for, but in some cases the wrongdoer does not appear to suffer even that. Edgar Allan Poe's short story "The Cask of Amontillado" involves a particularly cruel murder -- the immuring of the victim in a cellar -- and 50 years later, when the perpetrator tells the story, he does not appear burdened by regret or guilt. That, of course, is how things sometimes are. The guilty and the unpopular get away with it in real life.Why is the writer

of detective fiction put under such pressure to deal out just desserts to wrongdoers? The truth is that for many of us fiction is in some sense real, and that what happens to fictional people is, in a curious way, happening in the real world.

We all remember being told as children: *It's just a story*. I recall being exposed as a boy to that most frightening of children's books, "The Struwwelpeter." This collection of dark stories includes such delights as the story of the scissor-wielding figure who would bound gleefully into a room and cut off the thumb of any unfortunate child sucking his thumb at the time. Freudians would find little difficulty in seeing this as being all about castration fears, but for me it was a simple matter of what might happen to you if you engaged in thumb-sucking. I really believed in him, and was suitably frightened.

Although we eventually learn to distinguish between the world of make-believe and the real world, I suspect that many of us continue to experience fictional characters and events as being, in some way, real. This is because the imaginative act of following a story involves a suspension of disbelief, as we enter into the world it creates. When Anthony Minghella showed me a moving scene that he had just filmed for the pilot of "The No. 1 Ladies' Detective Agency," I found myself weeping copiously, right there on the set. I felt rather embarrassed -- it was only a story, after all -- but he put a hand on my shoulder and said that was exactly what he had done over that particular scene.

Peter Lorre plays Raskolnikov in the 1935 film version of "Crime and Punishment." Although the character initially gets away with his crime, he does not go unpunished.For the author, this sense that the reader has of the reality of the story has serious implications for how characters are treated in novels. It is one of the jobs of fiction to report on the sorrows and tragedies of this world. This must be done, though, from a morally acceptable standpoint. A writer who told a story of, say, rape or genocide but did so from a neutral or, worse still, complicit position would be given very short shrift indeed. Readers and critics would be on to him in no time at all; indeed a book like that would be unlikely to be published at all. Why? If it is only a story, where is the harm?Stories have an effect in this world. They are part of our moral conversation as a society. They weigh in; they change the world because they become part of our cultural history. There never was an Anna Karenina or a Madame Bovary, even if there might have been models, but what happened to these characters has become part of the historical experience of women. When J.K. Rowling revealed in New York that Professor Dumbledore was gay, the announcement was widely welcomed. One would have thought that it would make no earthly difference to anything whether a fictional character had a particular sexual preference, but it did: People applauded and applauded. That must have been because they felt that this announcement had some significance for the real-life issue of accepting gay people fully.

It can be very inhibiting for an author if he or she knows that what happens in fiction is going to be taken so seriously. I write serial novels in newspapers and have learned the hard way that people will readily attribute the views expressed by characters to their authors. In one of my "Scotland Street" novels a character called Bruce, a rather narcissistic young man, made disparaging remarks about his hometown. Although these were not the views I hold about that particular town, I was roundly taken to task, with the local member of the Scottish Parliament suggesting that I should be forced to apologize to the offended citizens. I pointed out that these were the views of a fictional character, who was just the type to make such remarks. That did not help.In another novel, I had Isabel Dalhousie give up breastfeeding rather too quickly for the liking of the leader of a pro-breastfeeding organization. Again I was told that I should make a public apology to those who believed in persisting with breastfeeding. That sort of thing is quite alarming, and it is such people who need to be told, politely but firmly, that it is just a story.

Mind you, I still have my doubts as to the wisdom of creating scissor-men who cut off children's thumbs. Perhaps an apology is called for.

Alexander McCall Smith is the author of more than 60 books, including the "No. 1 Ladies' Detective Agency" series.

http://www.nytimes.com/2009/04/07/health/07mind.html?ref=science

Listening to the Earth's deepest secrets

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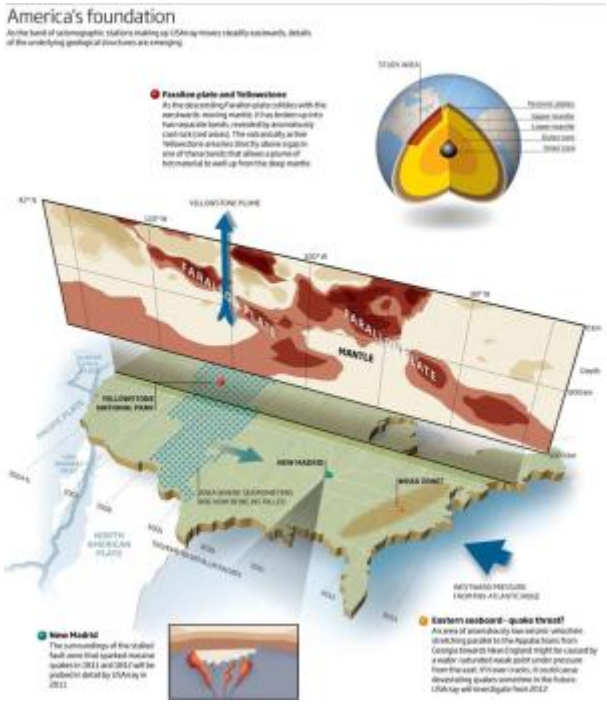


As the USArray moves east, details of America's rocky underbelly are emerging

GARY ANDERSON was not around to see a backhoe tear up the buffalo grass at his ranch near Akron, Colorado. But he was watching a few weeks later when the technicians came to dump instruments and insulation into their 2-metre-deep hole.

What they left behind didn't look like much: an anonymous mound of dirt and, a few paces away, a spindly metal framework supporting a solar panel. All Anderson knew was that he was helping to host some kind of science experiment. It wouldn't be any trouble, he'd been told, and it wouldn't disturb the cattle. After a couple of years the people who installed it would come and take it away again.

He had in fact become part of what is probably the most ambitious seismological project ever conducted. Its name is USArray and its aim is to run what amounts to an ultrasound scan over the 48 contiguous states of the US. Through the seismic shudders and murmurs that rack Earth's innards, it will build up an unprecedented 3D picture of what lies beneath North America.

It is a mammoth undertaking, during which USArray's scanner - a set of 400 transportable seismometers - will sweep all the way from the Pacific to the Atlantic. Having started off in California in 2004, it is now just east of the Rockies, covering a north-south swathe stretching from Montana's border with Canada down past El Paso on the Texas-Mexico border. By 2013, it should have reached the north-east coast, and its mission end.

Though not yet at the halfway stage, the project is already bringing the rocky underbelly of the US into unprecedented focus. Geologists are using this rich source of information to gain new understanding of the continent's tumultuous past - and what its future holds.

For something so fundamental, our idea of what lies beneath our feet is sketchy at best. It is only half a century since geologists firmed up the now standard theory of plate tectonics. This is the notion that Earth's uppermost layers are segmented like a jigsaw puzzle whose pieces - vast "plates" carrying whole continents or chunks of ocean - are constantly on the move. Where two plates collide, we now know, one often dives beneath the other. That process, known as subduction, can create forces strong enough to build up spectacular mountain ranges such as the still-growing Andes in South America or the Rocky mountains of the western US and Canada.

In the heat and pressure of the mantle beneath Earth's surface, the subducted rock deforms and slowly flows, circulating on timescales of millions of years. Eventually, it can force its way back to the surface, prising apart two plates at another tectonic weak point. The mid-Atlantic ridge, at the eastern edge of the North American plate, is a classic example of this process in action.

What we don't yet know is exactly what happens to the rock during its tour of Earth's interior. How does its path deep underground relate to features we can see on the surface? Is the diving of plates a smoothly flowing process or a messy, bitty, stop-start affair?

USArray will allow geologists to poke around under the hood, inspecting Earth's internal workings right down to where the mantle touches the iron-rich core 2900 kilometres below the surface - and perhaps even further down. "It is our version of the Hubble Space Telescope. With it, we'll be able to view Earth in a fundamentally different way," says Matthew Fouch, a geophysicist at Arizona State University in Tempe.

It is our Hubble Space Telescope - with it we can view Earth in a fundamentally new way
The combined effect of USArray's 400 seismic stations is to measure vertical and horizontal vibrations in the ground more comprehensively than ever before. Each one is housed in a dome-capped steel cylinder, similar in size to a basketball, which is buried sitting atop a 10-centimetre layer of concrete to prevent it floating to the surface in waterlogged ground. Solar panels above ground provide power, and from most sites cellular phone modems relay the seismometer data, which ends up at a coordinating centre in Seattle, Washington.

The stations are spaced roughly 70 kilometres apart in a more or less square grid. Each one remains in place for two years while stations are added further to the east. When its time is up, technicians dig it up and transport it eastwards to a new location at the front of the array. College students on vacation scout out future sites and contact potential hosts like Anderson. A total of 1624 sites is planned, covering all 48 states, and if you have land you think is suitable, the project even has a website where you can propose it. Remoteness and seclusion are musts: the seismometers are sensitive enough to pick up the rumble of pumps, wells, passing trucks, hydroelectric turbines and even the wind whipping off hilltop ridges.

Installation work snakes up and down the map with the seasons as technicians follow the best of the weather, installing stations in the colder north in summer and in the south in winter. Where the main array reveals regions of particular interest it can be augmented by a fleeter, more flexible array of over 2000 smaller stations providing short-term, high-density observations.

Keeping USArray moving is no small operation. "There were quite a few people who said it couldn't be done," says Robert Busby, who manages the array for the operating consortium, Incorporated Research Institutions for Seismology (IRIS), from an office in Falmouth, Massachusetts. "A few years ago, I was one of them." There is still the odd hitch: earlier this year, the solar panels of two stations in Idaho had to be dug out of 6 metres of snow, and on four occasions wayward bulldozers have decapitated the dirt-capped seismometers. Despite these mishaps, the average station is up and transmitting data 99 per cent of the time, Busby says.

Each station generates plots of sound waves arriving from all directions - the acoustic calling cards of earthquakes, volcanic eruptions and even storms and ocean waves crashing on distant shores. That might not sound like much, but used in combination the plots are a mine of information on what lies beneath Earth's surface. The way in which sound waves weaken, refract and twist within the Earth varies according to the temperature, pressure and composition of the rocks they pass through. By assessing how long it takes vibrations to travel from an earthquake or another source to the array's various seismometers, geophysicists can deduce the properties of the intervening material. If rocks transmit sound at speeds that are unusual for their depth, they immediately become interesting: it suggests that they originated somewhere else.

The kind of insight that this information can bring is illustrated by what we now know of the fate of the Farallon plate. The Farallon once underpinned an ocean to the west of America, but around 150 million years ago basalt bubbling up from the mantle drove a wedge between it and the Pacific plate further west, pushing it eastwards into the North American plate. It did not fare well in this encounter. Caught between emerging rock and a hard plate, it was forced underneath North America, raising up the Rockies in the process. Off the north-west coast of the US, in an area known as the Cascadia subduction zone, a last remnant of the Farallon, the Juan de Fuca plate, is still descending into the maw.

A mystery area on the US eastern seaboard could become a subduction zone, with frequent quakes

Smashing plates

Cool, dense rock transmits sound waves faster than hot material, and small seismic arrays have previously caught glimpses of subducted Farallon material that had yet to reach the temperature of the surrounding mantle. These anomalous sightings appeared at various locations and depths - 400 kilometres below the surface in the western US, and deeper into the mantle near the eastern seaboard - but the connection between these fragments has till now been tenuous.

USArray has helped fill in the gaps. It has revealed new fragments of the Farallon that fit together like pieces of a puzzle (see diagram) and shown that its death was far from clean (*Nature Geoscience*, vol 1, p 460). As the plate subducted, it seems to have broken up repeatedly as it encountered a solid wall of old, stable material - the core of the North American continent being pushed in the opposite direction by material welling up far away to the east at the mid-Atlantic ridge. One fragmented slab of subducted rock slopes from the west coast to a depth of 1500 kilometres beneath the Great Plains of the Midwest. Another remnant descends independently further to the east.

Cracks thousands of kilometres long discernible in this rock are changing geophysicists' understanding of the entire seismic process. "The Farallon plate has been torn apart along these zones," says Guust Nolet, one of the authors of the *Nature Geoscience* paper, now at the University of Nice in France. "It's very much against the standard textbook image of beautiful oceanic plates going down into the mantle all continuous." The finding might also shed light on one of the biggest mysteries of North American geology - the intense geothermal and volcanic activity around the Yellowstone National Park (see "A new plume").

Another surprise is emerging from data being analysed by Fouch at Arizona State University. His number-crunching seems to indicate that a large drip of dense material from the underside of the North American plate is slowly sinking into the mantle beneath Nevada. "We think of subducting plates as the only things that go down," says Fouch, but the Nevada finding indicates it's not that simple. Drips of dense material affect how heat flows in the Earth's interior, and their presence could help to explain how the locations of seismic faults and volcanic activity have changed over time.

As USArray rolls on from the geologically active western states, it will enter the more stable territory of the North American craton, the ancient core of the continent that has been largely untouched by the

convulsions of its peripheries. That could offer a look back further into the continent's past - as well as a glimpse into its future.

One area of focus will be the Reelfoot rift, a rent in Earth's fabric that extends some 200 kilometres south-west along the Mississippi valley, from New Madrid, Missouri, towards Memphis, Tennessee. More than 500 million years ago, rock began forcing its way up from the mantle beneath this area. Had it continued it might have created a new rift valley, and ultimately a new ocean.

It didn't. For reasons unknown, rifting failed, but that ancient drama still left its mark by creating the most seismically active area in the US east of the Rockies. Between December 1811 and February 1812, New Madrid was the scene of a succession of huge earthquakes, one of which was powerful enough to ring church bells in Boston, Massachusetts, more than 1500 kilometres away. The likelihood of a repeat event around New Madrid within the next 50 years has been estimated to be between 7 and 10 per cent; for a lesser, but still significant, quake the chances are between 25 and 40 per cent. As a result, the immediate region already boasts hundreds of seismometers, but further afield seismometer coverage is much sparser and knowledge of the risks correspondingly hazier.

USArray should change that - and not before time. By 2011, the array will be centred over the fault zone, and its northern end will be at the edge of the Great Lakes. "That should tell us something about how stresses could build up in a craton that looks otherwise stable," says geophysicist Suzan van der Lee of Northwestern University in Evanston, Illinois. We will then be able to say whether New Madrid is unique, or whether other parts of the central US look similar. "That scenario is a bit scarier," she says.

Nolet agrees that the data could be an eye-opener. "It may very well be possible there are other rift zones that are quiet right now but could come to life again," he says. USArray will provide only a snapshot in time, so will not predict when earthquakes will occur, but by telling us how the ground beneath us is structured, it might tell us which areas could be under stress, and which areas would be particularly vulnerable to shaking if an earthquake were to occur.

Over the far longer timescales on which geologists are accustomed to thinking, data from USArray may give us a hint of North America's long-term fate. According to van der Lee, an important clue may lie in a 300-kilometre-wide channel of anomalous material that runs to a depth of at least 660 kilometres along the US eastern seaboard. "Right now we have a fuzzy picture of this thing," says van der Lee. "We need USArray to get a sharper image."

She and her colleagues have raised the intriguing possibility that the mystery area is water-saturated rock that has risen from water-rich minerals held in the leading edge of the Farallon plate (*Earth and Planetary Science Letters*, vol 273, p 15). If so, it would represent a weak point in the otherwise firm undercarriage of the eastern US. As new material formed in the Mid-Atlantic Ridge continues to exert pressure on the North American plate from the east, it would be a natural point for a break to occur. Rather than continue to push, material would begin to subduct down along this weak line.

That could be as dramatic an event as the Farallon's subduction was in the opposite direction, triggering the formation of lava plains and volcanoes, and frequent, violent earthquakes. Within a few tens of millions of years, the relative tranquillity of the eastern US could be history.

Van der Lee speculates that these bursts of tectonic activity might be part of a larger see-saw pattern in the dynamics of some continents. Material subducting on one side of the continent could push watery rock in front of it, creating weak spots that ultimately help to trigger subduction on the opposite side.

No one who takes a long view of Earth's history would bet against such apocalyptic scenarios. Whether our descendants will be around to witness them is another matter. USArray's director, Robert Woodward, has his sights set on more immediate concerns. He wants to build on the array's success in the contiguous US and take it to Alaska in 2014 for either a five-year sweep of the state or a more focused study of particular areas of interest. "I think everywhere we take the instruments we'll learn something," he says, "Even if we're not 100 per cent sure what that is."

(Illustration by Joseba Elorza)

A new plume

The Yellowstone National Park in the Rockies is one of the favourite US destinations for visitors attracted by its wildlife, majestic scenery - and above all its spectacular geothermal features, such as the Old Faithful geyser. Two-thirds of the world's geysers lie within the park.

Geologists have known for some time that this unusual activity is the subdued signature of a "supervolcano" underneath Yellowstone, whose last outburst 640,000 years ago produced a crater a kilometre deep and blanketed the surrounding area in more than 2 metres of ash. But the source of that volcano's heat has remained a mystery.

Now USArray has allowed us to pinpoint it, according to Richard Allen, a geophysicist at the University of California, Berkeley. His analysis of USArray data shows that Yellowstone lies directly above one of the gaps in the descending Farallon plate, allowing hot rock to well up unhindered from at least 1000 kilometres down. The plume probably punched this hole some 17 million years ago, when it lay beneath what is now Oregon. Since then, the plume has stayed anchored deep beneath the surface, while the overlying North American plate has tracked west, pulling Yellowstone into place above it.

Evidence of such plumes of mantle rock are most commonly seen at the ocean floor in places like the mid-Atlantic ridge, where deep material wells up to create rifts that separate plates and give rise to new crust. While hints of plumes have been found beneath Germany and elsewhere, "this is the first time a continuous plume has been shown coming up from great depth beneath Yellowstone", Allen says.

It is not clear exactly how great that depth might be. But as USArray, which is currently passing over the region, moves on it should reveal more about the plume's roots and how heat is transported to the surface. That could help us to assess Yellowstone's past and what it might be capable of in the future - a mission given new impetus by a marked upsurge in seismic activity in Yellowstone in December 2008.

Rachel Courtland is a reporter for New Scientist based in Boston

http://www.newscientist.com/article/mg20227031.300-listening-to-the-earths-deepest-secrets.html?full=true&print=true

Evolution of Office Spaces Reflects Changing Attitudes Toward Work

By Cliff Kuang 03.23.09

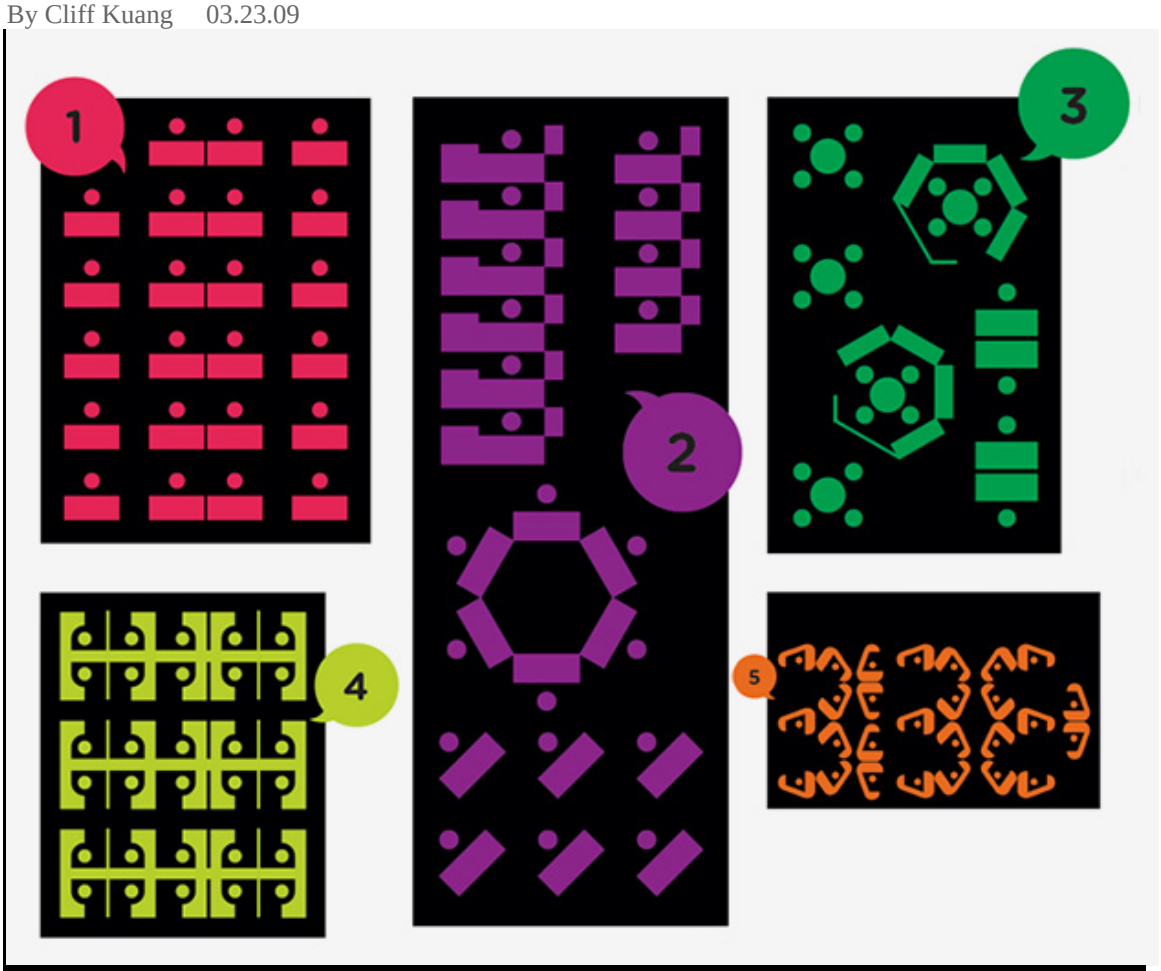


Illustration: Harry Campbell

PLAY

PREVIOUS: Mod That Table: High-End Furniture Goes Open Source
NEXT: Nomadic Geeks: Take Your Job and Shove It — Into an Airstream

Since the dawn of the white-collar age, office designs have cycled through competing demands: openness versus privacy, interaction versus autonomy. Here's a brief history of how seating arrangements have reflected our changing attitudes toward work.

1Taylorism (ca. 1904)

American engineer Frederick Taylor was obsessed with efficiency and oversight and is credited as one of the first people to actually design an office space. Taylor crowded workers together in a completely open environment while bosses looked on from private offices, much like on a factory floor.

2 Bürolandschaft (ca. 1960)

The German "office landscape" brought the socialist values of 1950s Europe to the workplace: Management was no longer cosseted in executive suites. Local arrangements might vary by function—

side-by-side workstations for clerks or pinwheel arrangements for designers, to make chatting easier—but the layout stayed undivided.

3 Action Office (1968)

Bürolandschaft inspired Herman Miller to create a product based on the new European workplace philosophy. Action was the first modular business furniture system, with low dividers and flexible work surfaces. It's still in production today and widely used. In fact, you probably know Action by its generic, more sinister name: cubicle.

4 Cube Farm (ca. 1980)

It's the cubicle concept taken to the extreme. As the ranks of middle managers swelled, a new class of employee was created: too important for a mere desk but too junior for a window seat. Facilities managers accommodated them in the cheapest way possible, with modular walls. The sea of cubicles was born.

Virtual Office (ca. 1994)

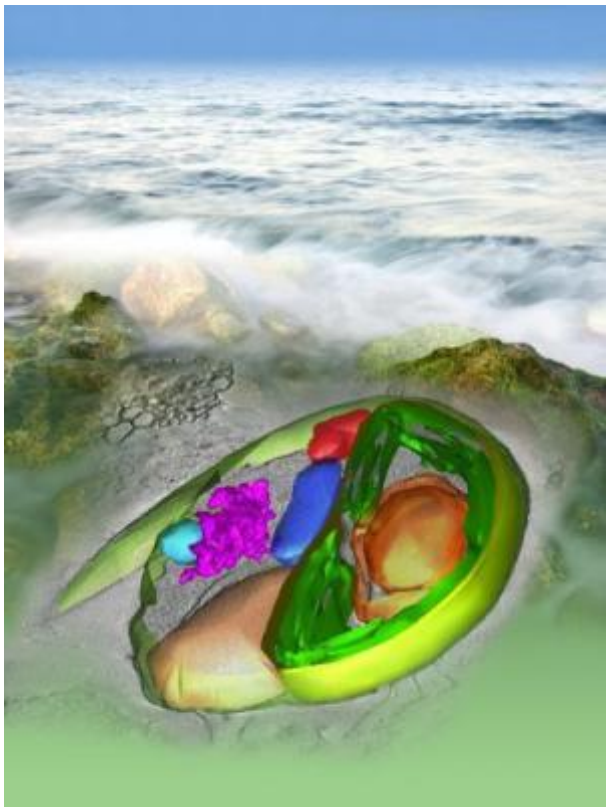
Ad agency TBWA\Chiat\Day's LA headquarters was a Frank Gehry masterpiece. But the interior, dreamed up by the company's CEO, was a fiasco. The virtual office had no personal desks; you grabbed a laptop in the morning and scrambled to claim a seat. Productivity nose-dived, and the firm quickly became a laughingstock.

5 Networking (present)

During the past decade, furniture designers have tried to part the sea of cubicles and encourage sociability—without going nuts. Knoll, for example, created systems with movable, semi-enclosed pods and connected desks whose shape separates work areas in lieu of dividers. Most recently, Vitra unveiled furniture in which privacy is suggested if not realized. Its large tables have low dividers that cordon off personal space but won't guard personal calls.

http://www.wired.com/culture/design/magazine/17-04/pl_design

Genes From Tiny Algae Shed Light On Big Role Managing Carbon In World's Oceans



In the foreground, a 3-D reconstruction of an electron tomographic slice (0.5 microns thick) of one of the smallest known eukaryotic algae, Micromonas. (Credit: 3-D reconstruction: A.Z. Worden, T. Deerinck, M. Terada, J. Obiyashi and M. Ellisman (MBARI and NCMIR). Background: Flavio Robles (Lawrence Berkeley National Laboratory).)

ScienceDaily (Apr. 10, 2009) — Scientists from two-dozen research organizations led by the U.S. Department of Energy (DOE) Joint Genome Institute (JGI) and the Monterey Bay Aquarium Research Institute (MBARI) have decoded genomes of two algal strains, highlighting the genes enabling them to capture carbon and maintain its delicate balance in the oceans. These findings, from a team led by Alexandra Z. Worden of MBARI and published in the April 10 edition of the journal *Science*, will illuminate cellular processes related to algae-derived biofuels being pursued by DOE scientists.

The study sampled two geographically diverse isolates of the photosynthetic algal genus *Micromonas*—one from the South Pacific, the other from the English Channel. The analysis identified approximately 10,000 genes in each, compressed into genomes totaling about 22 million nucleotides. "Yet, surprisingly, they are far more diverse than we originally thought," said Worden. "These two picoeukaryotes, often considered to be the same species, only share about 90 percent of their genes."To put this in perspective, humans and some primates have about 98 percent genes in common. Worden said that the algae's divergent gene complement may cause them to access and respond to the environment differently. "This also means that as the environment changes, these different populations will be subject to different effects, and we don't know whether they will respond in a similar fashion." She said that their apparently broad physiological range (exemplified by their expansive geographical range) may result in increased resilience as compared to closely related species, enabling them to survive environmental change better than organisms with a narrower geographic range. Testing the hypotheses developed through cataloging their respective inventory of genes, Worden said, will go a long way towards understanding their biology and ecology.Algae were blazing the pathway of photosynthesis long before plants colonized land—so the results bear significantly on terrestrial plant research as well.

"Genome sequencing of *Micromonas* and the subsequent comparative analysis with other algae previously sequenced by DOE JGI and Genoscope [France], have proven immensely powerful for elucidating the basic 'toolkit' of genes integral not only to the effective carbon cycling capabilities of green algae, but to those they have in common with land plants," said Eddy Rubin, DOE JGI Director.Tiny *Micromonas*, less than two microns in diameter, or roughly a 50th of the width of a human hair, are one of the few globally distributed marine algal species, thriving throughout the world's oceans from the tropics to the poles. They capture CO_2, sunlight, water, and nutrients and produce carbohydrates and oxygen. Their productivity—which provides food resources within marine food webs—as well as their knack for capturing carbon, and influencing the carbon flux that may have bearing on climate change, make these algae keen target of study.

"*Micromonas* is a representative of a well-sampled group of green algae with the largest number of sequenced genomes. With these four genomes in hand--two *Micromonas* and two *Ostreococcus*--we can observe patterns of genome organization as well as the diversity between different organisms in this group," said JGI's Igor Grigoriev, one of the senior authors of the paper.Embedded in the genetic code are clues about how photosynthesis transformed from a barren orb into the earth we know today."The *Micromonas* genomes encapsulate features that now appear to have been common to the ancestral algae that initiated the billion-year trajectory that led to the 'greening'—the rise of land plants—of the planet," said Worden. As highlighted in the Science article, comparing the strains to each other and in turn to the other characterized algal and plant genomes, will help to illustrate the dynamic nature of evolutionary processes and provide a springboard for unraveling the functional aspects of these and other phytoplankton populations.

Motility is another distinguishing aspect of the ecology of *Micromonas*. In the relatively viscous saltwater of the ocean, the flagellated *Micromonas* could give Michael Phelps a run for his money. Unlike other algae genera sequenced to date, these swift swimmers can cut through the water column at a rate of 50 body lengths per second, and are phototactic, meaning that they can swim towards the sunlight from which they derive their energy.In previous studies, Worden and her colleagues showed that picoeukaryotes such as *Micromonas* comprised, on average, only a quarter of the picophytoplankton cells in a Pacific Ocean sampling, but were responsible for three-quarters of the net carbon production. They were also shown to be subject to heavy grazing pressure; their lack of a cell wall may make them more digestible as prey. In this case carbon may be efficiently sequestered by the "biological pump," the suite of processes that enable the algae to capture atmospheric carbon and transport it from the ocean surface zones to the depths below.This research serves as a complement to field studies seeking to confirm emerging key players in global carbon fixation. "By understanding which genes a specific strain employs under certain conditions, we gain a view into the factors that influence the success of one group over another," Worden said. "We may then be able to develop models that could more effectively predict a range of possible future scenarios, that will result from current climate change." *Micromonas* may well serve as a bellwether for current and future ocean conditions, helping to guide appropriate decision making, which given the prevailing CO_2 trends, is urgently needed.

The genome sequencing of *Micromonas* was conducted under the auspices of the DOE JGI Community Sequencing Program (CSP), supported by the DOE Office of Science.

Journal reference:

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Adapted from materials provided by DOE/Joint Genome Institute.

http://www.sciencedaily.com/releases/2009/04/090409142240.htm

Renewable Energies: The Promise Of Organic Solar Cells

ScienceDaily (Apr. 10, 2009) — In the race to renewable energy, organic solar cells are now really starting to take off. They can be manufactured easily and cheaply, they have low environmental impact, and since they are compatible with flexible substrates, they could be used in many applications such as packaging, clothing, flexible screens, or for recharging cell phones and laptops.

Teams at the Laboratoire d'ingénierie moléculaire d'Angers in Angers (CNRS/Université d'Angers) and at the Laboratoire des matériaux, surfaces et procédés pour la catalyse in Strasbourg (CNRS/Université Strasbourg 1) have recently obtained record conversion efficiency with solar cells based on organic molecules.Photovoltaic solar energy works by transforming a fraction of solar radiation into electricity by means of solar cells, which are connected together to form a photovoltaic solar cell module. The solar cells currently on the market are made up of inorganic materials such as silicon.

A great deal of international research is aimed at developing solar cells made up of organic (carbon-compound based) semiconductors. Although their performance is still considerably lower than that of cells based on crystalline silicon (around 5% efficiency as compared with 15% for silicon cells), they present numerous advantages. Unlike crystalline silicon, which has to be produced at very high temperatures, they can be manufactured cheaply with low energy cost and environmental impact, arguments which are by no means insignificant when it comes to renewable energy.

Moreover, the fact that they are made using solution processes (for instance from inks or paints) makes it possible to cover large areas and flexible substrates such as films and fabrics.Organic solar cells are not intended to compete with silicon, but rather to be used for specific applications, such as packaging, clothing, flexible screens, and recharging cell phones and laptops. However, in the longer term, they could make a significant contribution to the photovoltaic conversion of solar energy, as long as there is major investment in research into new, more efficient and stable materials.Over the past ten years or so, most research has focused on developing organic cells in which the active light-absorbing material is made up of long conjugated polymer chains. Although these cells are the most efficient yet discovered, the use of polymers poses a certain number of problems: synthesis, purification, control of the molecular structure and mass, and the distribution of different lengths of chain (polydispersity).

In order to overcome these obstacles, Jean Roncali's team of researchers at the Laboratoire d'Ingénierie moléculaire in Angers (CNRS/Université d'Angers) has developed a novel approach based on replacing polymers by conjugated molecules with a clearly defined structure. Whereas the conversion efficiencies of the initial prototypes published in 2005 were of the order of 0.20%, a collaboration between the Angers team and Raymond Ziessel's team at the Laboratoire des matériaux, surfaces et procédés pour la catalyse in Strasbourg (CNRS/Université Strasbourg 1), supported by CNRS's Energy program, has recently succeeded in reaching conversion efficiencies of 1.70%, which are among the highest known for this type of cell until now.New classes of active material specifically adapted to such cells are currently being synthesized in these laboratories. In this way, the researchers are hoping to improve their results very rapidly. Industry will no doubt be keeping close watch on their progress.

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Adapted from materials provided by CNRS.

http://www.sciencedaily.com/releases/2009/04/090409151444.htm

Towards A Natural Pacemaker

The human heart's own natural pacemaker, the sinoatrial node, is extremely vulnerable to damage during a heart attack, often leaving the patient with a weak, slow or unreliable heartbeat. Instead of an electronic device to control the beat directly therapies to help raise the heart rate biologically could be a much better solution. (Credit: iStockphoto/Sebastian Kaulitzki)

ScienceDaily (Apr. 10, 2009) — Artificial heart pacemakers have saved and extended the lives of thousands of people, but they have their shortcomings – such as a fixed pulse rate and a limited life. Could a permanent biological solution be possible?

Richard Robinson and colleagues at New York's Columbia and Stony Brook Universities certainly think so, and their work published in *The Journal of Physiology* brings the dream a step closer to reality.

The body's own natural pacemaker, called the sinoatrial (SA) node, is extremely vulnerable to damage during a heart attack, often leaving the patient with a weak, slow or unreliable heartbeat. The heart has limited ability to recover from the damage, so the conventional approach is to fit an electronic device to monitor and control the beat directly.

Therapies to help raise the heart rate biologically could be a much better solution, but there are some major hurdles. The way electrical signals are generated in the SA node – and hence the heart rate – are far from simple. There are three separate electrical pathways between cells, called HCN or 'funny' channels (because of their complex behaviour), that could be involved.

Dr Robinson's work helps to shed light on the secrets of the HCN channels, but more importantly describes a cell culture they have developed that accurately mimics HCN function in whole mammalian hearts, making future research in the area far quicker and easier.

The researchers used their new cellular model to genetically 'rewire' two of the HCN channels. The resulting heart rate was very rapid with irregular pauses, just as has already been observed in dogs and mice.

It is early days – but the valuable new computer and cellular models are ideal for testing potential new drugs to influence heart rate and pave the way for new genetic biological pacemakers to be developed.

Dr Robinson commented that the new developments "will facilitate the development of practical biological pacemakers by allowing more complete and rapid assessment of individual channel mutations through combined culture and simulation studies prior to full testing in animal models."

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Adapted from materials provided by Wiley - Blackwell, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/04/090409104305.htm

Flame Retardants Concern To US Coastal Ecosystems, NOAA Reports

Sites were PBDEs were found in 2006-2008 survey. (Credit: NOAA)

ScienceDaily (Apr. 10, 2009) — NOAA scientists, in a first-of-its-kind report issued today, state that Polybrominated Diphenyl Ethers (PBDEs), chemicals commonly used in commercial goods as flame retardants since the 1970s, are found in all United States coastal waters and the Great Lakes, with elevated levels near urban and industrial centers.

The new findings are in contrast to analysis of samples as far back as 1996 that identified PBDEs in only a limited number of sites around the nation.

Based on data from NOAA's Mussel Watch Program, which has been monitoring coastal water contaminants for 24 years, the nationwide survey found that New York's Hudson Raritan Estuary had the highest overall concentrations of PBDEs, both in sediments and shellfish. Individual sites with the highest PBDE measurements were found in shellfish taken from Anaheim Bay, Calif., and four sites in the Hudson Raritan Estuary.

Watersheds that include the Southern California Bight, Puget Sound, the central and eastern Gulf of Mexico off the Tampa-St. Petersburg, Fla. coast, and Lake Michigan waters near Chicago and Gary, Ind. also were found to have high PBDE concentrations.

"This is a wake-up call for Americans concerned about the health of our coastal waters and their personal health," said John H. Dunnigan, NOAA assistant administrator of the National Ocean Service. "Scientific evidence strongly documents that these contaminants impact the food web and action is needed to reduce the threats posed to aquatic resources and human health."

PBDEs are man-made toxic chemicals used as flame retardants in a wide array of consumer products, including building materials, electronics, furnishings, motor vehicles, plastics, polyurethane foams and textiles since the 1970s. A growing body of research points to evidence that exposure to PBDEs may produce detrimental health effects in animals, including humans. Toxicological studies indicate that liver, thyroid and neurobehavioral development may be impaired by exposure to PBDEs. They are known to pass from mother to infant in breast milk.

Similar in chemical structure to polychlorinated biphenyls, or PCBs, they have raised concerns among scientists and regulators that their impacts on human health will prove comparable. PBDE production has been banned in a number of European and Asian countries. In the U.S., production of most PBDE mixtures has been voluntarily discontinued.

The NOAA Mussel Watch survey found that the highest concentrations of PBDEs in the U.S. coastal zone were measured at industrial and urban locations. Still, the chemicals have been detected in remote places far from major sources, providing evidence of atmospheric transport. Significant sources of PBDEs introduction into the environment include runoff and municipal waste incineration and sewage outflows. Other pathways include leaching from aging consumer products, land application of sewage sludge as bio-solids, industrial discharges and accidental spills.

NOAA and the Southern California Coastal Water Research Project have recently held meetings with representatives from the Environmental Protection Agency, U.S. Geological Survey, the National Institute of Standards and Technology, and the California State Water Resources Control Board to discuss water quality monitoring of emerging contaminants. NOAA's research and monitoring information found in this report will be used by relevant resource managers to better understand, assess and address the threats from PBDEs.

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

Adapted from materials provided by National Oceanic And Atmospheric Administration.

http://www.sciencedaily.com/releases/2009/04/090401112450.htm

Pre-surgical Stress Management Improves Mood, Quality Of Life

ScienceDaily (Apr. 10, 2009) — Brief stress management sessions prior to and immediately after surgery may have both short- and long-term benefit for men undergoing a radical prostatectomy for early-stage prostate cancer, according to research from The University of Texas M. D. Anderson Cancer Center.

The study, in the current issue of the J*ournal of Clinical Oncology*, is the first to examine the benefits of psychosocial intervention for prostate cancer patients prior to surgery. It found that men who participated in the sessions experienced less short-term mood disturbance and better long-term quality of life, compared to patients who had the procedure but did not have any behavioral intervention.

Most psychosocial interventions in cancer of any type have been studied after patients have completed surgery, explained Lorenzo Cohen, Ph.D., the study's senior author and professor in M. D. Anderson's Departments of Behavioral Science and General Oncology, and director of the Integrative Medicine Program.

"We know that for men with early-stage prostate cancer, the time when they are making treatment decisions is very stressful," said Cohen. "A radical prostatectomy is not without possible, very personal, consequences, including urinary incontinence and erectile dysfunction. Patients may also be worried about the uncertainty that the surgery will cure their cancer.

"From other areas of research, we know that going into a surgical setting overly stressed may increase a patient's recovery time. With this study, we wanted to intervene in the pre- and post-surgical setting and try to help relieve stress and minimize mood disturbance, such as depression, anxiety and distress, both in the short- and long-term."

For the randomized study, 159 early stage prostate cancer, radical prostatectomy patients were assigned to receive either: two 60-90 minute sessions of pre-surgical stress management intervention and brief booster sessions the morning of, and 48 hours following surgery; two 60-90 minute individual supportive attention sessions and boosters similar to the stress management group; or standard care. Assessments occurred before the sessions, one month before, one week before, and the morning of surgery, as well as six weeks, six and 12 months following surgery.

The stress management was based on aspects of cognitive behavioral therapy. Men in the stress management group met with a clinical psychologist and were taught simple behavioral techniques, including diaphragmatic breathing and relaxing guided imagery and cognitive therapy. Those in the supportive attention groups met with the same psychologist, but sessions were more general, and centered around open discussions. Patients in the standard care group did not receive any behavioral therapy.

For the stress management group, the men were exposed to an imagery experience of the day of surgery - all the sounds and sensations from pre-op, to the recovery room, to coming out of anesthesia - while they were in a relaxed state. They were then taught cognitive skills to work with negative thinking and realistic expectations - so that patients could better manage any unexpected side effects during their recovery or difficulty healing.

The researchers found that in terms of short-term effects, assessed at one week before and the morning of surgery, men in the stress management group had the lowest levels of mood disturbance followed by those in the supportive attention group, with patients in the no therapy group having the highest level, with the difference between the stress management and standard care groups being statistically significant.

During the long-term follow-up, assessed at six weeks, six and 12 months, patients in the stress management group reported a higher level of physical functioning and aspects of quality of life than

patients in the other two cohorts; the difference between the stress management and standard care groups was statistically significant.

The largest difference between the groups was at the 12-month follow-up, when the standard care group reported lower levels for physical functioning than those who received the stress management intervention. It's also interesting to note that at no point was there any statistical difference between the supportive attention and the other two groups, said Cohen.

Cohen and his team were surprised to see this level of difference in physical functioning during the long-term follow-up because the interventions in the pre- and peri-operative settings were so brief and mainly focused on aspects of stress management.

"We're trying to understand what is potentially associated with a patient's long-term quality of life and what was it that happened in the stress management group that resulted in a much better quality of life in the year post-surgery," Cohen said.

"Before we can suggest that stress management is useful prior to surgery for all men undergoing a radical prostatectomy, we need to better understand the mechanism behind our findings, as well as understand for whom this type of intervention will be the most useful," Cohen said. "However, that said, all diagnosed with cancer treatment should be encouraged to participate in any stress management program - be it mind-body, or cognitive in nature. We know that they are safe and may improve patients' well-being and help them adjust to a cancer diagnosis."

As a follow up, Cohen and his team are currently analyzing immune function and stress hormone levels from collected blood samples.

Prostate cancer is the leading cause of cancer in men. According to the American Cancer Society, in 2008, 186,320 were diagnosed with, and 28,660 died from the disease.

The research was supported, in part, by funds from the National Cancer Institute.

In addition to Cohen, other authors on the study include, from M. D. Anderson: Patricia Parker, Ph.D., Adoneca Fortier, Danielle Carr, Ph.D., all of the Department of Behavioral Science; Curtis Pettaway, M.D., Richard Babian, M.D., and Louis Pisters, M.D., all of the Department of Urology; Qi Wei, Department of Palliative Care and Rehabilitation Medicine; and from Baylor College of Medicine, Brian Miles, M.D., of the Department of Urology.

Adapted from materials provided by University of Texas M. D. Anderson Cancer Center.

http://www.sciencedaily.com/releases/2009/04/090406192439.htm

Research Could Lead To New Non-antibiotic Drugs To Counter Hospital Infections

When worms (Caenorhabditis elegans) ate the bacteria Pseudomonas aeruginosa that were raised on low levels of phosphates, unexpected large red spots appeared in their intestinal tracts. The worms then died, so researchers dubbed the condition "Red Death." They theorized that providing P. aeruginosa with phosphate would protect weakened or immunosuppressed hospital patients from this lethal pathogen. (Credit: John Alverdy, University of Chicago Medical Center)

ScienceDaily (Apr. 9, 2009) — Lack of an adequate amount of the mineral phosphate can turn a common bacterium into a killer, according to research to be published in the April 14, 2009, issue of the *Proceedings of the National Academies of Science*. The findings could lead to new drugs that would disarm the increasingly antibiotic-resistant pathogen rather than attempting to kill it.

Pseudomonas aeruginosa is one of the most serious hospital-acquired pathogens. A common cause of lung infections, it is also found in the intestinal tract of 20 percent of all Americans and 50 percent of hospitalized patients in the United States.

It is one of the hundreds of bacteria that colonize the human intestinal tract, usually causing no apparent harm. It might even be beneficial to its host. Once the host is weakened by an illness, surgical procedure or immunosuppressive drugs, however, *P. aeruginosa* can cause infection, inflammation, sepsis and death.

Why *P. aeruginosa* can suddenly turn on its host has eluded researchers—until now. Scientists have long known that after an operation or organ surgery, levels of inorganic phosphate fall. The authors of the PNAS paper, led by scientists at the University of Chicago, hypothesized that phosphate depletion in the stressed intestinal tract signals *P. aeruginosa* to become lethal.

To test this theory, they let worms (Caenorhabditis elegans) feed on "lawns" of *P. aeruginosa* and Escherichia coli grown in both low-phosphate and high-phosphate media. Only the worms that ate *P. aeruginosa* with low levels of phosphate died. The researchers dubbed the phenomenon "Red Death" since unexpected large red spots appeared on the worms before they died.

"These findings provide novel insight into the mechanisms by which *P. aeruginosa* is able to shift from indolent colonizer to a lethal pathogen when present in the intestinal tract of a stressed host," said Alexander Zaborin, lead author of the study and a research professional at the University of Chicago's Department of Surgery.

"It's almost as if the bacterium sense when to strike," said John Alverdy, corresponding author of the study and professor of surgery at the University of Chicago Medical Center. "That should come as no surprise since the bacteria are smart, having been around for 2 billion years."

Bacteria seek phosphate as an important nutrient, Alverdy explained. And rather than try to look for it in the blood steam of critically ill patients, where they would encounter armies of antibiotics and disease-fighting white blood cells, they find it inside organ tissues. This process damages and sometimes even kills their host.Experiments with mice showed that the harm caused when *P. aeruginosa* becomes activated to express lethal toxins inside the intestinal tract can be mitigated by providing excess phosphate.The research findings could lead to a pharmaceutical product that would restore healthy phosphate levels in the intestines of such stressed and compromised patients, Alverdy said."Antibiotics attempt to kill harmful bacteria, but in the process they often kill beneficial bacteria," said Olga Zaborina, an associate professor at the University of Chicago's Department of Surgery and another key researcher in this study. "A more sensible approach to fighting infectious diseases may be to try to understand the circumstances that provoke a microbe to cause harm in the first place and then find ways to pacify them without destroying them."

Containment on a case-by-case basis might be a more effective and longer-lasting strategy than a scorched earth policy, Alverdy said. Midway Pharmaceuticals, which Alverdy founded in 2005, is developing a pipeline of non-antibiotic compounds that contain or disarm specific bacteria.

Appreciation of the subtle mechanisms in pathogens that colonize the intestinal tract of critically ill patients has important implications for the design of phosphate-based compounds that might prevent *P. aeruginosa* and other pathogens from turning lethal, the researchers concluded.Despite the use of powerful antibiotics, *P. aeruginosa* remains a leading cause of sickness and death among hospitalized patients who have undergone surgery or have reduced immunity. If the bacterium attacks critical body organs such as the lungs, urinary tract and kidneys, it is likely to be fatal. *P. aeruginosa* thrives on moist surfaces, so it is often found on catheters, causing cross-hospital infections. It is also implicated in a common form of dermatitis associated with poor hygiene and inadequate maintenance of hot tubs. The PNAS paper is called "Red Death in Caenorhabditis elegans caused by Pseudomonas aeruginosa PA01." Other institutions contributing to this research are INRS-Institut Armand-Frappier; Centre for Biomolecular Sciences at the University of Nottingham; and the Computation Institute at the University of Chicago. The research was supported by grants from the National Institutes of Health, Charles B. Huggins, and the Royal Society.

COLOR FIGURE:

CAPTION: When worms (Caenorhabditis elegans) ate the bacteria Pseudomonas aeruginosa that were raised on low levels of phosphates, unexpected large red spots appeared in their intestinal tracts. The worms then died, so researchers dubbed the condition "Red Death." They theorized that providing *P. aeruginosa* with phosphate would protect weakened or immunosuppressed hospital patients from this lethal pathogen.

Image courtesy of John Alverdy, University of Chicago Medical Center

Journal reference:

1. Zaborin et al. **Red death in Caenorhabditis elegans caused by Pseudomonas aeruginosa PAO1**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0813199106

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

http://www.sciencedaily.com/releases/2009/04/090408145546.htm

Tropical Forest Seed Banks: A Blast From The Past

Amazon rain forest. A canopy of trees in the tropical forests of Barro Colorado Island (BCI), Panama. (Credit: Image courtesy of DOE/Lawrence Livermore National Laboratory)

ScienceDaily (Apr. 9, 2009) — Seeds of some tree species in the Panamanian tropical forest can survive for more than 30 years before germinating. That is 10 times longer than most field botanists had believed.

Using the Lab's Center for Accelerator Mass Spectrometry to measure the amount of carbon 14 in seeds of the trees *Croton billbergianus (Euphorbiaceae), Trema micrantha (Celtidaceae)* and *Zanthoxylum ekmannii (Rutaceae)*, Lawrence Livermore National Laboratory scientist Tom Brown and University of Illinois at Urbana-Champaign colleague James Dalling found that seeds survived in the soil for 38, 31 and 18 years, respectively.

Previous demographic studies of pioneer tree species showed that seed persistence (the ability to survive in soil, awaiting favorable conditions for germination) is short, lasting only for a few years at most.

But in the tropical forests of Barro Colorado Island (BCI), Panama, Brown and Dalling found the seeds of some pioneer trees remain viable for many years.

“This is part of nature that wasn't really what people in the field thought was going on,” Brown said. “It turns out these seeds in soil just a few centimeters below the surface can survive a lot longer than anyone ever thought was possible.”

To increase the probability of encountering “old” seeds, Brown and Dalling used data from a forest plot to target sites in the forest occupied 20 years previously by species they suspected were capable of long-term persistence.

After Dalling germinated seeds extracting from surface soil layers at these sites, Brown carbon dated samples taken from the seed coat. However, unlike carbon dating techniques used by archeologists to

estimate the age of objects from antiquity, he used a modern radiocarbon signal that is a consequence of atmospheric nuclear testing in the 1950s and early 1960s. The decline in radiocarbon concentration that has occurred since the test-ban treaty went into effect can be used as a signal to determine precisely when carbon became incorporated into plant tissue.

When disturbance kills canopy trees in tropical forest, light reaches the forest floor triggering the germination of seeds of pioneer tree species buried in the soil.

The age of these seeds, and thus the time that populations of pioneer species are able to survive between disturbance events, has long been open to question.

“This is a surprising result,” Dalling said. “Demographic models suggest that these species would not benefit from long persistence, and we doubted they would be able to survive anyway. Seeds dispersed onto the soil surface are prey to insect seed predators, and are exposed to an array of pathogens and decay organisms that proliferate in moist tropical soils.”

The results imply that buried seeds may be an important reservoir for genetic diversity in pioneer populations and may be as important as long distance dispersal in maintaining populations in fragmented habitats.

The research appears in the April edition of the journal, *The American Naturalist.*

Adapted from materials provided by DOE/Lawrence Livermore National Laboratory.

http://www.sciencedaily.com/releases/2009/04/090401164045.htm

Cognitive Behavior Therapy Helps Older Adults With Anxiety Reduce Worry, Improve Mental Health

ScienceDaily (Apr. 9, 2009) — Older adults with generalized anxiety disorder who received cognitive behavior therapy had greater improvement on measures of worry, depression and mental health than patients who received usual care, according to a new study.

Generalized anxiety disorder (GAD) is common in late life, with prevalence up to 7.3 percent in the community and 11.2 percent in primary care. Late-life anxiety predicts increased physical disability, memory difficulties and decreased quality of life, according to background information in the article. Late-life anxiety is usually treated with medication, but associated risks (e.g., falls, hip fractures, memory problems) with some drugs and patient fears of adverse effects limit their usefulness. Two previous studies suggested benefits of cognitive behavior therapy (CBT) in primary care for late-life GAD, but the studies were small and the conclusions were limited. Older adults most often seek treatment for GAD in primary care.

Melinda A. Stanley, Ph.D., of the Baylor College of Medicine, Houston, and colleagues conducted the first randomized clinical trial of CBT for late-life GAD in primary care to examine whether CBT would improve outcomes relative to enhanced usual care (EUC). The trial included 134 older adults (average age, 67 years) in two primary care settings, with treatment provided for 3 months.

Assessments were conducted at the beginning of the trial, posttreatment (3 months), and over 12 months of follow-up, with assessments at 6, 9, 12 and 15 months. Patients were randomized to either CBT (n = 70), which included education and awareness, relaxation training, cognitive therapy, problem-solving skills training and behavioral sleep management; or EUC (n = 64), in which patients were telephoned biweekly during the first 3 months of the study by the same therapists to provide support and ensure patient safety. Therapists reminded patients to call project staff if symptoms worsened.

Levels of anxiety, worry, depression and physical/mental health quality of life were measured via various tests or surveys. The researchers found that CBT, compared with EUC, significantly improved worry severity, depressive symptoms and general mental health. In intention-to-treat analyses, response rates defined according to worry severity were higher following CBT compared with EUC at 3 months (40.0 percent vs. 21.9 percent).

"This study is the first to suggest that CBT can be useful for managing worry and associated symptoms among older patients in primary care," the authors write. "This study paves the way for future research to test sustainable models of care in more demographically heterogeneous groups."

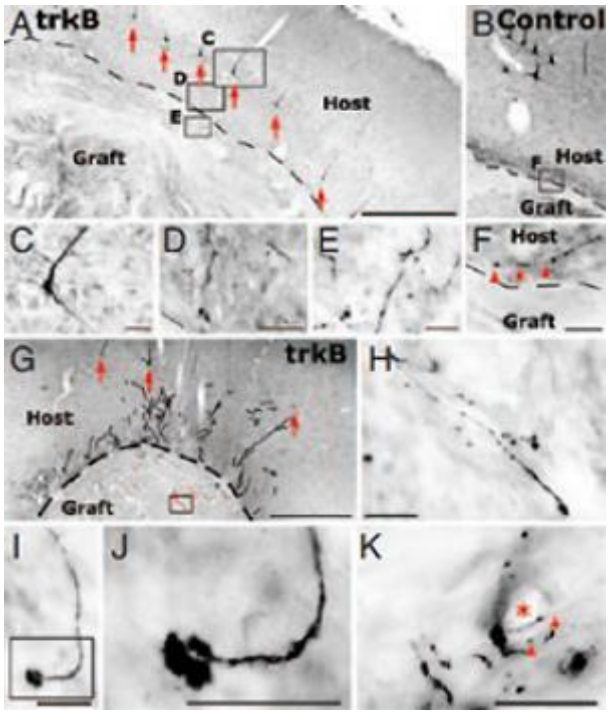
Journal reference:

1. Stanley et al. **Cognitive Behavior Therapy for Generalized Anxiety Disorder Among Older Adults in Primary Care: A Randomized Clinical Trial**. *JAMA The Journal of the American Medical Association*, 2009; 301 (14): 1460 DOI: 10.1001/jama.2009.458

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2009/04/090407174642.htm

Axons Necessary For Voluntary Movement Regenerated



Corticospinal axon regeneration into a BDNF-secreting graft. (Credit: Image courtesy of UC San Diego)

ScienceDaily (Apr. 9, 2009) — For the first time, researchers have clearly shown regeneration of a critical type of nerve fiber that travels between the brain and the spinal cord and which is required for voluntary movement. The regeneration was accomplished in a brain injury site in rats by scientists at the University of California, San Diego School of Medicine and is described in a study to be published in the April 6th early on-line edition of the *Proceedings of the National Academy of Sciences* (PNAS).

"This finding establishes a method for regenerating a system of nerve fibers called corticospinal motor axons. Restoring these axons is an essential step in one day enabling patients to regain voluntary movement after spinal cord injury," said Mark Tuszynski, MD, PhD, professor of neurosciences, director of the Center for Neural Repair at UC San Diego and neurologist at the Veterans Affairs San Diego Health System.

The corticospinal tract is a massive collection of nerve fibers called axons – long, slender projections of neurons that travel between the cerebral cortex of the brain and the spinal cord, carrying signals for movement from the brain to the body. Voluntary movement occurs through the activation of the upper motor neuron that resides in the frontal lobe of the brain and extends its axon down the spinal cord to the lower motor neuron. The lower motor neuron, in turn, sends its axon out to the muscle cells. In spinal cord injuries, the axons that run along the corticospinal tract are severed so that the lower motor neurons, below the site of injury, are disconnected from the brain.

"Previous spinal cord injury studies have shown regeneration of other nerve fiber systems that contribute to movement, but have not convincingly shown regeneration of the corticospinal system," said Tuszynski, theorizing this was due to a limited intrinsic ability of corticospinal neurons to turn on genes that allow regeneration after injury. He added that, without regeneration of corticospinal axons, it is questionable whether functional recovery would be attainable in humans.

The UC San Diego team achieved corticospinal regeneration by genetically engineering the injured neurons to over-express receptors for a type of nervous system growth factor called brain-derived

neurotrophic factor (BDNF). The growth factor was delivered to a brain lesion site in injured rats. There, the axons – because they now expressed trkB, the receptor for BDNF– were able to respond to the growth factor and regenerate into the injury site. In the absence of overexpression of trkB, no regeneration occurred.

Although functional recovery in the animals was not assessed, the new study shows for the first time that regeneration of the corticospinal system – which normally does not respond to treatment – can be achieved in a brain lesion site.

"The next step will be to try this in a spinal cord injury site, once we get the injured neurons to send the growth factor receptor all the way down the axon and into the spinal cord," said Tuszynski, adding that the UC San Diego research team is now working on this. "We will then assess whether regeneration of corticospinal nerve fibers will lead to functional recovery and restored movement in animal models."

This work builds on another study from Tuszynski's laboratory, published in the February 8, 2009 issue of Nature Medicine, which reported that BDNF also exhibits potential as a therapy for reducing brain cell loss in Alzheimer's disease.

The lead author of the study was Edmund R. Hollis II, PhD. Additional contributors to the article included Pouya Jamshidi, Karin Low and Armin Blesch of the UC San Diego Department of Neurosciences. Their work was supported by grants from the National Institutes of Health, the Veterans Administration, the Dr. Miriam and Sheldon G. Adelson Medical Research Foundation and the Bernard and Anne Spitzer Charitable Trust.

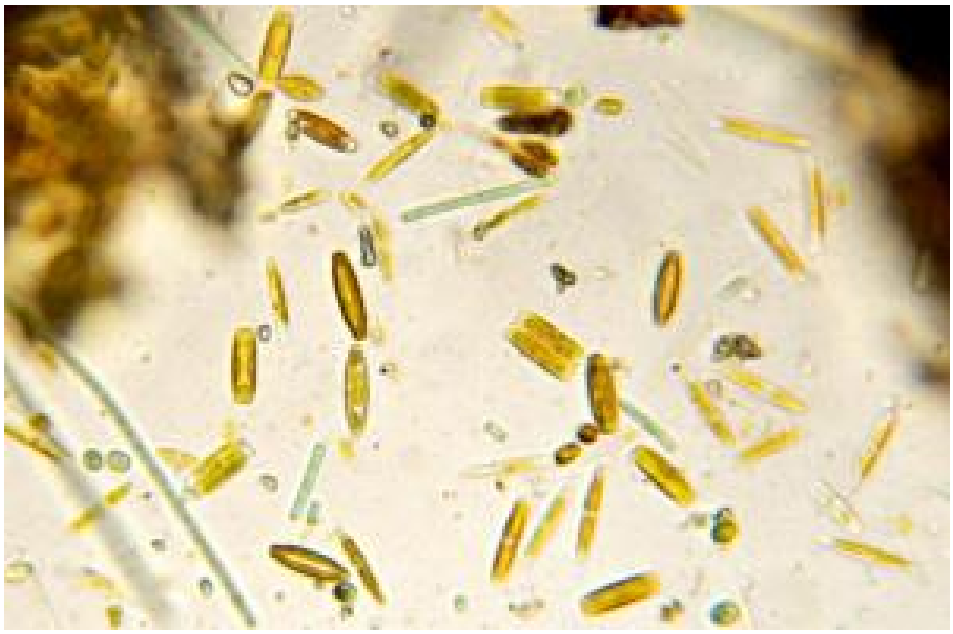
Journal reference:

1. Edmund R. Hollis II, Pouya Jamshidi, Karin Löw, Armin Blesch, Mark H. Tuszynski. **Induction of corticospinal regeneration by lentiviral trkB-induced Erk activation**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0810624106

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2009/04/090406192229.htm

Ancient Diatoms Lead To New Technology For Solar Energy



Diatoms occur in a variety of shapes. Each diatom is composed of one cell in a clear silica outer wall and is mobile. Each shape is a different species. (Credit: iStockphoto/Nancy Nehring)

ScienceDaily (Apr. 9, 2009) — Engineers at Oregon State University have discovered a way to use an ancient life form to create one of the newest technologies for solar energy, in systems that may be surprisingly simple to build compared to existing silicon-based solar cells.

The secret: diatoms.

These tiny, single-celled marine life forms have existed for at least 100 million years and are the basis for much of the life in the oceans, but they also have rigid shells that can be used to create order in a natural way at the extraordinarily small level of nanotechnology.

By using biology instead of conventional semiconductor manufacturing approaches, researchers at OSU and Portland State University have created a new way to make "dye-sensitized" solar cells, in which photons bounce around like they were in a pinball machine, striking these dyes and producing electricity. This technology may be slightly more expensive than some existing approaches to make dye-sensitized solar cells, but can potentially triple the electrical output.

"Most existing solar cell technology is based on silicon and is nearing the limits of what we may be able to accomplish with that," said Greg Rorrer, an OSU professor of chemical engineering. "There's an enormous opportunity to develop different types of solar energy technology, and it's likely that several forms will ultimately all find uses, depending on the situation."

Dye-sensitized technology, for instance, uses environmentally benign materials and works well in lower light conditions. And the new findings offer advances in manufacturing simplicity and efficiency.

"Dye-sensitized solar cells already exist," Rorrer said. "What's different in our approach are the steps we take to make these devices, and the potential improvements they offer."

The new system is based on living diatoms, which are extremely small, single-celled algae, which already have shells with the nanostructure that is needed. They are allowed to settle on a transparent conductive

glass surface, and then the living organic material is removed, leaving behind the tiny skeletons of the diatoms to form a template.

A biological agent is then used to precipitate soluble titanium into very tiny "nanoparticles" of titanium dioxide, creating a thin film that acts as the semiconductor for the dye-sensitized solar cell device. Steps that had been difficult to accomplish with conventional methods have been made easy through the use of these natural biological systems, using simple and inexpensive materials.

"Conventional thin-film, photo-synthesizing dyes also take photons from sunlight and transfer it to titanium dioxide, creating electricity," Rorrer said. "But in this system the photons bounce around more inside the pores of the diatom shell, making it more efficient."

The physics of this process, Rorrer said, are not fully understood – but it clearly works. More so than materials in a simple flat layer, the tiny holes in diatom shells appear to increase the interaction between photons and the dye to promote the conversion of light to electricity, and improve energy production in the process.

The insertion of nanoscale tinanium oxide layers into the diatom shell has been reported in ACS Nano, a publication of the American Chemical Society, and the Journal of Materials Research, a publication of the Materials Research Society. The integration of this material into a dye-sensitized solar cell device was also recently described at the fourth annual Greener Nanoscience Conference.

The work is supported by the National Science Foundation and the Safer Nanomaterials and Nanomanufacturing Initiative, a part of the Oregon Nanoscience and Microtechnologies Institute.

Diatoms are ancient, microscopic organisms that are found in the fossil record as far back as the time of the dinosaurs. They are a key part of the marine food chain and help cycle carbon dioxide from the atmosphere.

But in recent years their tiny, silica shells have attracted increasing attention as a way to create structure at the nano level. Nature is the engineer, not high tech tools. This is providing a more efficient, less costly way to produce some of the most advanced materials in the world.

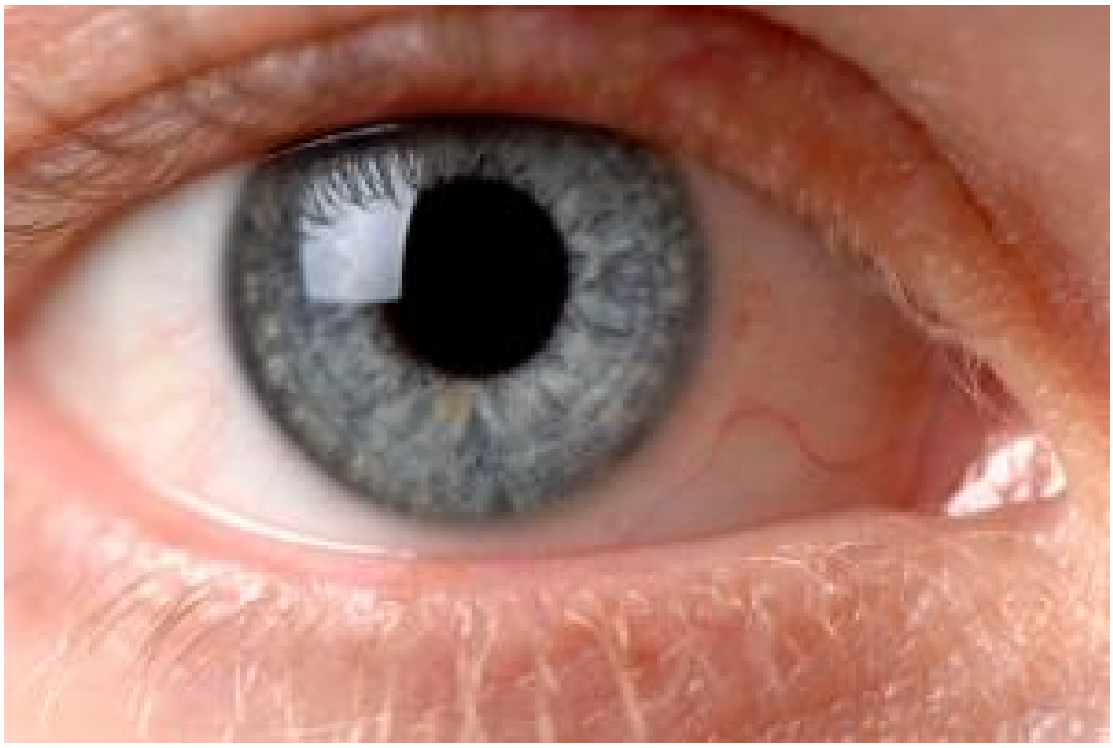
Journal reference:

1. Jeffryes et al. **Metabolic Insertion of Nanostructured TiO_2 into the Patterned Biosilica of the Diatom Pinnularia sp. by a Two-Stage Bioreactor Cultivation Process**. *ACS Nano*, 2008; 2 (10): 2103 DOI: 10.1021/nn800470x

Adapted from materials provided by Oregon State University.

http://www.sciencedaily.com/releases/2009/04/090408145556.htm

Stem Cell Therapy Makes Cloudy Corneas Clear



Stem cells collected from human corneas restore transparency and don't trigger a rejection response when injected into eyes that are scarred and hazy, according to experiments conducted in mice by researchers at the University of Pittsburgh School of Medicine. (Credit: iStockphoto/Eric Hood)

ScienceDaily (Apr. 9, 2009) — Stem cells collected from human corneas restore transparency and don't trigger a rejection response when injected into eyes that are scarred and hazy, according to experiments conducted in mice by researchers at the University of Pittsburgh School of Medicine. Their study will be published in the journal *Stem Cells* and appears online April 9.

The findings suggest that cell-based therapies might be an effective way to treat human corneal blindness and vision impairment due to the scarring that occurs after infection, trauma and other common eye problems, said senior investigator James L. Funderburgh, Ph.D., associate professor, Department of Ophthalmology. The Pitt corneal stem cells were able to remodel scar-like tissue back to normal.

"Our experiments indicate that after stem cell treatment, mouse eyes that initially had corneal defects looked no different than mouse eyes that had never been damaged," Dr. Funderburgh said.

The ability to grow millions of the cells in the lab could make it possible to create an off-the-shelf product, which would be especially useful in countries that have limited medical and surgical resources but a great burden of eye disease due to infections and trauma.

"Corneal scars are permanent, so the best available solution is corneal transplant," Dr. Funderburgh said. "Transplants have a high success rate, but they don't last forever. The current popularity of LASIK corrective eye surgery is expected to substantially reduce the availability of donor tissue because the procedure alters the cornea in a way that makes it unsuitable for transplantation."

A few years ago, Dr. Funderburgh and other University of Pittsburgh researchers identified stem cells in a layer of the cornea called the stroma, and they recently showed that even after many rounds of expansion in the lab, these cells continued to produce the biochemical components, or matrix, of the cornea. One

such protein is called lumican, which plays a critical role in giving the cornea the correct structure to make it transparent.

Mice that lack the ability to produce lumican develop opaque areas of their corneas comparable to the scar tissue that human eyes form in response to trauma and inflammation, Dr. Funderburgh said. But three months after the lumican-deficient mouse eyes were injected with human adult corneal stem cells, transparency was restored.

The cornea and its stromal stem cells themselves appear to be "immune privileged," meaning they don't trigger a significant immune response even when transplanted across species, as in the Pitt experiments.

"Several kinds of experiments indicated that the human cells were alive and making lumican, and that the tissue had rebuilt properly," Dr. Funderburgh noted.

In the next steps, the researchers intend to use the stem cells to treat lab animals that have corneal scars to see if they, too, can be repaired with stem cells. Under the auspices of UPMC Eye Center's recently established Center for Vision Restoration, they plan also to develop the necessary protocols to enable clinical testing of the cells.

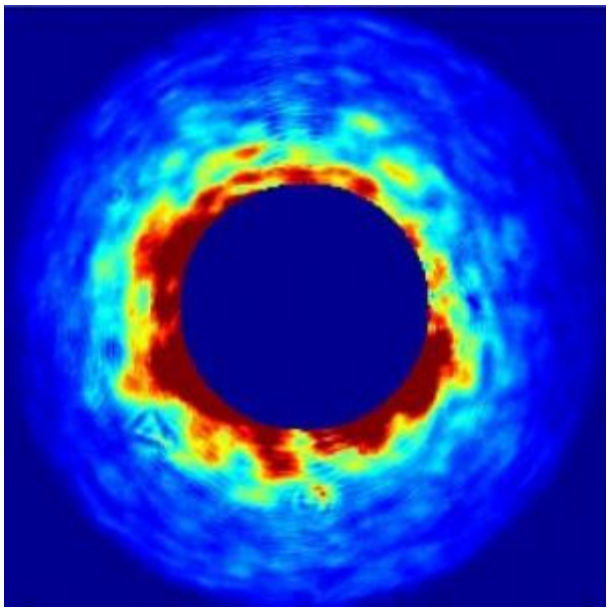
Other authors of the paper include Yiqin Du, M.D., Ph.D., and Martha L. Funderburgh, M.S.P.H., both of the University of Pittsburgh; Eric C. Carlson, Ph.D., and Eric Pearlman, Ph.D., both of Case Western Reserve University; David E. Birk, Ph.D., of the University of South Florida; Naxin Guo, M.D., Ph.D., of the University of Rochester; and Winston W-Y Kao, Ph.D., of the University of Cincinnati.

The research was supported by grants from the National Institutes of Health, the Eye and Ear Foundation (Pittsburgh), and an unrestricted grant from Research to Prevent Blindness, N.Y. Dr. Funderburgh holds the Jules and Doris Stein Professorship from Research to Prevent Blindness.

Adapted from materials provided by University of Pittsburgh Schools of the Health Sciences.

http://www.sciencedaily.com/releases/2009/04/090409103350.htm

Distinguishing Single Cells With Nothing But Light



IRAM scattering data from a single granulocyte. (Credit: Image courtesy of University of Rochester)

ScienceDaily (Apr. 9, 2009) — Researchers at the University of Rochester have developed a novel optical technique that permits rapid analysis of single human immune cells using only light.

Availability of such a technique means that immunologists and other cellular researchers may soon be able to observe the responses of individual cells to various stimuli, rather than relying on aggregate statistical data from large cell populations. Until now scientists have not had a non-invasive way to see how human cells, like T cells or cancer cells, activate individually and evolve over time.

As reported April 1 in a special biomedical issue of *Applied Optics*, this is the first time clear differences between two types of immune cells have been seen using a microscopy system that gathers chemical and structural information by combining two previously distinct optical techniques, according to senior author Andrew Berger, associate professor of optics at the University of Rochester.

Berger and his graduate student Zachary Smith are the first to integrate Raman and angular-scattering microscopy into a single system, which they call IRAM.

"Conceptually it's pretty straightforward—you shine a specified wavelength of light onto your sample and you get back a large number of peaks spread out like a rainbow," says Berger. "The peaks tell you how the molecules you're studying vibrate and together the vibrations give you the chemical information."

According to Smith, "Raman spectroscopy is essentially an easy way to get a fingerprint from the molecule."

Structural information is simultaneously gathered by examining the angles at which light incident on a sample is bumped off its original course.

Together the chemical and structural information provide the data needed to classify and distinguish between two different, single cells. Berger and Smith verified this by looking at single granulocytes—a type of white blood cell—and peripheral blood monocytes.

"One of the big plusses with our system is that it's a non-labeling approach for studying living cells," says Berger.

IRAM differs from most standard procedures where markers are inserted in, or attached to cells. If a marker sticks to one cell, and not the other, you can tell which cell is which on the basis of specific binding properties.

While markers are often adequate for studying cells at a single point in time, monitoring a cell over time as it changes is more problematic, since the marker can affect dynamic cell activities, like membrane transport. And internal markers actually involve punching holes in the membrane, damaging or killing the cell in the process.

"Our method uses only light to effectively reach inside the cell," says Smith. "We can classify internal differences in the cell without opening it up, attaching anything to it, or preparing it in any special way. It's really just flipping a switch."

Despite being relatively intense, the light used with IRAM does not harm or inhibit normal cell functionality. This is because the wavelength of the light can be precisely calibrated to minimize absorption by the cells. The near-infrared spectrum has proven particularly optimal for allowing almost all of the light to pass through the cells.

With the availability of a technique where making a measurement does not alter cellular activity, scientists will be able to better observe individual cell responses to stimuli, which Berger and Smith suspect may have far reaching implications for current understandings of cell activation and development.

"In the cell sensing community it's currently a pretty hot area to figure out how to analyze activation responses on a cell-by-cell basis," says Berger. "If individual information was available on top of existing ensemble data, you'd have a richer understanding of immune responses."

Perfecting IRAM has been a stepping stone process so far. Now that individual cells can be distinguished, Berger and Smith are actively investigating activation processes more explicitly. Preliminary IRAM experiments conducted on T cells have revealed perceivable differences between the initial resting state of a T cell and its state following an encounter with an invader.

The next step will be to use IRAM to gather data continuously so that scientists can effectively watch single cells undergo activation and react to stimuli in real-time. The ability to know not only about the aggregate responses of cells, but also be able to observe the earliest changes among individual cells, may be of profound importance in time-critical areas, such as cancer research and immunology.

"There's an obvious desire among cell researchers to be able to deliver a controlled stimulant to a single cell and then study its response over time," says Berger. "The clinical insights that might arise are currently in the realm of speculation. We won't know until we can do it—and now we can."

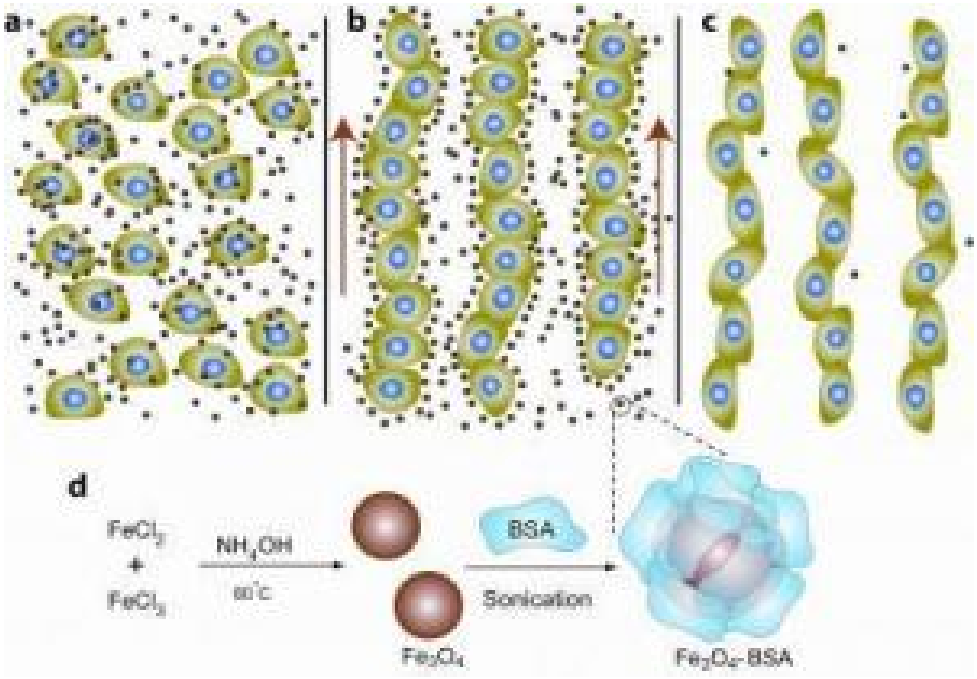
Journal reference:

1. Zachary J. Smith and Andrew J. Berger. **Validation of an integrated Raman- and angular-scattering microscopy system on heterogeneous bead mixtures and single human immune cells**. *Applied Optics*, 2009; 48 (10): D109 DOI: 10.1364/AO.48.00D109

Adapted from materials provided by University of Rochester.

http://www.sciencedaily.com/releases/2009/04/090401101854.htm

Magnetic Nano-'shepherds' Organize Cells



The process of forming cell chains using magnetic particles. (Credit: Duke University/Case Western Reserve University/University of Mass. Amherst)

ScienceDaily (Apr. 9, 2009) — The power of magnetism may address a major problem facing bioengineers as they try to create new tissue -- getting human cells to not only form structures, but to stimulate the growth of blood vessels to nourish that growth.

A multidisciplinary team of investigators from Duke University, Case Western Reserve University and the University of Massachusetts, Amherst created an environment where magnetic particles suspended within a specialized solution act like molecular sheep dogs. In response to external magnetic fields, the shepherds nudge free-floating human cells to form chains which could potentially be integrated into approaches for creating human tissues and organs.

The cells not only naturally adhere to each other upon contact, the researchers said, but the aligned cellular configurations may promote or accelerate the creation and growth of tiny blood vessels.

"We have developed an exciting way of using magnetism to manipulate human cells floating freely in a solution containing magnetic nanoparticles" said Randall Erb, fourth-year graduate student in the laboratory of Benjamin Yellen, assistant professor of Mechanical Engineering and Materials Science, at Duke University's Pratt School of Engineering. "This new cell assembly process holds much promise for tissue engineering research and offers a novel way to organize cells in an inexpensive, easily accessible way."

Melissa Krebs, third-year biomedical engineering graduate student at Case Western and Erb's sister, co-authored a paper appearing online in advance of the May publication of Nano Letters, a journal published by the American Chemical Society.

"The cells have receptors on their surfaces that have an affinity for other cells," Krebs said. "They become sticky and attach to each other. When endothelial cells get together in a linear fashion, as they did in our experiments, it may help them to organize into tiny tubules."

The iron-containing nanoparticles used by the researchers are suspended within a liquid known as a ferrofluid. One of the unique properties of these ferrofluids is that they become highly magnetized in the presence of external magnetism, which allows researchers to readily manipulate the chain formation by altering the strength of the magnetic field.

At the end of the process, the nanoparticles are simply washed away, leaving a linear chain of cells. That the cells remain alive, healthy and relatively unaltered without any harmful effects from the process is one of the major advances of the new approach over other strategies using magnetism.

"Others have tried using magnetic particles either within or on the surface of the cells," Erb said. "However, the iron in the nanoparticles can be toxic to cells. Also, the process of removing the nanoparticles afterward can be harmful to the cell and its function."

The key ingredient for these studies was the synthesis of non-toxic ferrofluids by colleagues Bappaditya Samanta and Vincent Rotello at the University of Massachusetts, who developed a method for coating the magnetic nanoparticles with bovine serum albumin (BSA), a protein derived from cow blood. BSA is a stable protein used in many experiments because it is biochemically inert. In these experiments, the BSA shielded the cells from the toxic iron.

"The other main benefit of our approach is that we are creating three-dimensional cell chains without any sophisticated techniques or equipment," Krebs said. "Any type of tissue we'd ultimately want to engineer will have to be three-dimensional."

For their experiments, the researchers used human umbilical vein endothelial cells. Others types of cells have also been used, and it appears to the researchers that this new approach can work with any type of cell.

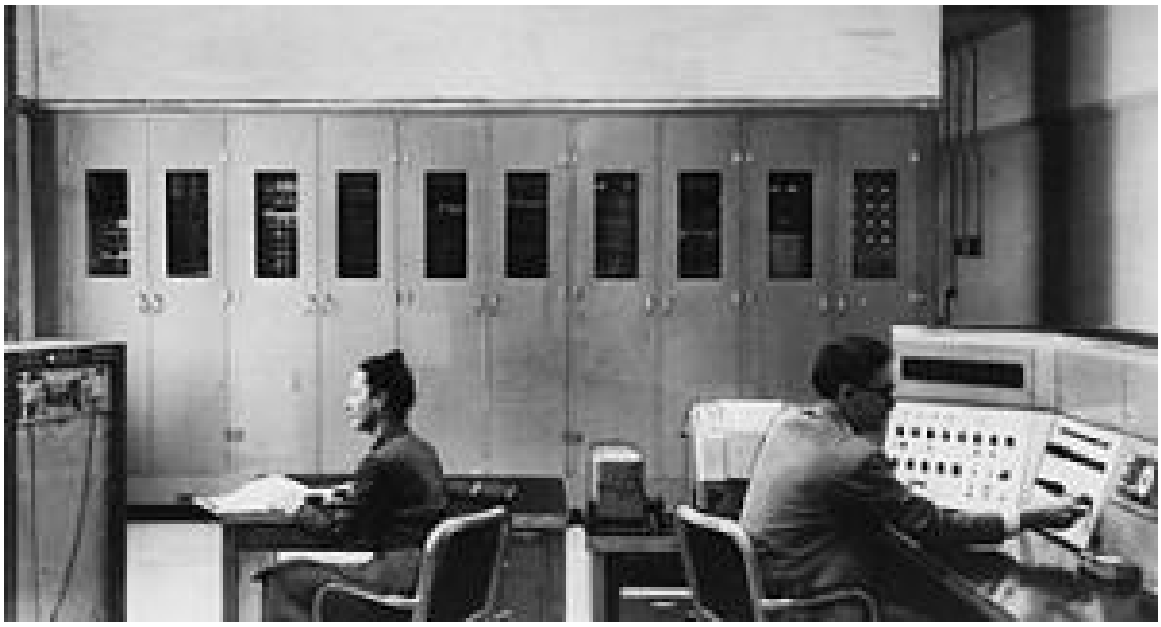
"While still in the early stages, we have shown that we can form oriented cellular structures," said Eben Alsberg, assistant professor of Biomedical Engineering and Orthopedic Surgery at Case Western and senior author of the paper. "The next step is to see if the spatial arrangement of these cells in three dimensions will promote vascular formation. A major hurdle in tissue engineering has been vascularization, and we hope that this technology may help to address the problem."

The research was supported by the National Institutes of Health, the National Science Foundation and Case Western.

Adapted from materials provided by Duke University.

http://www.sciencedaily.com/releases/2009/03/090331153018.htm

Quantum Computers Will Require Complex Software To Manage Errors



While rudimentary is a fair description of this early computer—the National Bureau of Standards' SEAC, built in 1950—prototype quantum computers have not even reached its level of sophistication. Theorists at NIST have demonstrated that quantum computer software will need to be more complex than some researchers had hoped, potentially slowing the devices' development, but also allowing scientists to focus on more promising development pathways. (Credit: NIST)

ScienceDaily (Apr. 9, 2009) — Highlighting another challenge to the development of quantum computers, theorists at the National Institute of Standards and Technology (NIST) have shown that a type of software operation, proposed as a solution to fundamental problems with the computers' hardware, will not function as some designers had hoped.

Quantum computers—if they can ever be realized—will employ effects associated with atomic physics to solve otherwise intractable problems. But the NIST team has proved that the software in question, widely studied due to its simplicity and robustness to noise, is insufficient for performing arbitrary computations. This means that any software the computers use will have to employ far more complex and resource-intensive solutions to ensure the devices function effectively.

Unlike a conventional computer's binary on-off switches, the building blocks of quantum computers, known as quantum bits, or "qubits," have the mind-bending ability to exist in both "on" and "off" states simultaneously due to the so-called "superposition" principle of quantum physics. Once harnessed, the superposition principle should allow quantum computers to extract patterns from the possible outputs of a huge number of computations without actually performing all of them. This ability to extract overall patterns makes the devices potentially valuable for tasks such as codebreaking.

One issue, though, is that prototype quantum processors are prone to errors caused, for example, by noise from stray electric or magnetic fields. Conventional computers can guard against errors using techniques such as repetition, where the information in each bit is copied several times and the copies are checked against one another as the calculation proceeds. But this sort of redundancy is impossible in a quantum computer, where the laws of the quantum world forbid such information cloning.

To improve the efficiency of error correction, researchers are designing quantum computing architectures so as to limit the spread of errors. One of the simplest and most effective ways of ensuring this is by creating software that never permits qubits to interact if their errors might compound one another.

Quantum software operations with this property are called “transversal encoded quantum gates.” NIST information theorist Bryan Eastin describes these gates as a solution both simple to employ and resistant to the noise of error-prone quantum processors. But the NIST team has proved mathematically that transversal gates cannot be used exclusively, meaning that more complex solutions for error management and correction must be employed.

Eastin says their result does not represent a setback to quantum computer development because researchers, unable to figure out how to employ transversal gates universally, have already developed other techniques for dealing with errors. “The findings could actually help move designers on to greener pastures,” he says. “There are some avenues of exploration that are less tempting now.”

Journal reference:

1. Eastin et al. **Restrictions on Transversal Encoded Quantum Gate Sets**. *Physical Review Letters*, 2009; 102 (11): 110502 DOI: 10.1103/PhysRevLett.102.110502

Adapted from materials provided by National Institute of Standards and Technology.

http://www.sciencedaily.com/releases/2009/04/090408140219.htm

Cheap And Efficient White Light LEDs With New Design

Light produced by a new type of light emitting diode (LED) made from inexpensive, plastic-like organic materials. (Credit: Photo by Ma Dongge)

ScienceDaily (Apr. 9, 2009) — Roughly 20 percent of the electricity consumed worldwide is used to light homes, businesses, and other private and public spaces. Though this consumption represents a large drain on resources, it also presents a tremendous opportunity for savings. Improving the efficiency of commercially available light bulbs -- even a little -- could translate into dramatically lower energy usage if implemented widely.

A group of scientists at the Chinese Academy of Sciences is reporting an important step towards that goal with their development of a new type of light emitting diode (LED) made from inexpensive, plastic like organic materials. Designed with a simplified "tandem" structure, it can produce twice as much light as a normal LED -- including the white light desired for home and office lighting.

"This work is important because it is the realization of rather high efficiency white emission by a tandem structure," says Dongge Ma (.cn), who led the research with his colleagues at the Changchun Institute of Applied Chemistry at the Chinese Academy of Sciences.

Found in everything from brake lights to computer displays, LEDs are more environmentally friendly and much more efficient than other types of light bulbs. Incandescent bulbs produce light by sending electricity through a thin metal filament that glows red hot. Only about five percent of the energy is turned into light, however. The rest is wasted as heat. Compact fluorescent bulbs, which send electricity through a gas inside a tube, tend to do much better. They typically turn 20 percent or more of the electricity pumped through them into light. But compact fluorescents also contain small amounts of mercury vapor, an environmental toxin.

LEDs on the other hand, are made from thin wafers of material flanked by electrodes. When an electric current is sent through the wafers, it liberates electrons from the atoms therein, leaving behind vacancies or "holes." When some of the wandering electrons and holes recombine, they create a parcel of light, or photon. These photons emerge from the side of the wafer as visible light. This turns 20 to 50 percent, or even more, of the input energy into light. LEDs also concentrate a lot of light in a small space.

Producing LEDs that can compete with traditional light bulbs for cost and efficiency is one thing. Making LEDs that consumers want to use to light their homes is quite another. One of the main barriers to the widespread use of LED lights is the light itself. LEDs can easily be manufactured to produce light of a single color -- like red -- with applications such as traffic lights and auto brake lights. Indoor lighting though, requires "natural" white light. This quality is measured by the color-rendering index (CRI), which assigns a value based on the light source's ability to reproduce the true color of the object being lit. For reading light, a CRI value of 70 or more is optimal. LEDs can produce white light by combining a mixture of blue, green, and red light, or by sending colored light through a filter or a thin layer of phosphors -- chemicals that glow with several colors when excited. However, these solutions increase costs. To reach a larger market, scientists would like to make inexpensive LEDs that can produce white light on their own.

The authors of this paper report important advances towards this goal. First, they built LEDs from organic, carbon-based materials, like plastic, rather than from more expensive semiconducting materials such as gallium, which also require more complicated manufacturing processes. Second, they demonstrated, for the first time, an organic white-light LED operating within only a single active layer, rather than several sophisticated layers. Moreover, by putting two of these single-layer LEDs together in a tandem unit, even higher efficiency is achieved. The authors report that their LED was able to achieve a CRI rating of nearly 70 -- almost good enough to read by. Progress in this area promises further reduction in the price of organic LEDs.

The work of Dongge Ma and colleagues was funded by the Hundreds Talents program of Chinese Academy of Sciences, the National Science Fund for Distinguished Young Scholars of China, the Foundation of Jilin Research Council, Foundation of Changchun Research Council, Science Fund for Creative Research Groups of NSFC, and the Ministry of Science and Technology of China.

Journal reference:

1. Qi Wang et al. **A high-performance tandem white organic LED combining highly effective white units and their interconnection layer**. *Journal of Applied Physics*, April 6, 2009; 105, 076101 (2009) DOI: 10.1063/1.3106051

Adapted from materials provided by American Institute of Physics, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/04/090407131115.htm

Waist Size Found To Be Predictor Of Heart Failure In Both Men And Women

Scientists have found that larger waist circumference is associated with increased risk of heart failure in middle-aged and older populations of men and women. (Credit: iStockphoto/Linda & Colin McKie)

ScienceDaily (Apr. 9, 2009) — Adding to the growing evidence that a person's waist size is an important indicator of heart health, a study led by investigators at Beth Israel Deaconess Medical Center (BIDMC) has found that larger waist circumference is associated with increased risk of heart failure in middle-aged and older populations of men and women.

The findings, published online in the April 7 Rapid Access Report of the journal *Circulation: Heart Failure*, showed that increased waist size was a predictor of heart failure even when measurements of body mass index (BMI) fell within the normal range.

"Currently, 66 percent of adults in the United States are overweight or obese," explains Emily Levitan, ScD, the study's first author and a Research Fellow in the Cardiovascular Epidemiology Research Unit at BIDMC. "Knowing that the prevalence of heart failure increased between 1989 and 1999, we wanted to better understand if and how this increase in obesity was contributing to these rising figures."

A life-threatening condition that develops when the heart can no longer pump enough blood to meet the body's needs, heart failure (also known as congestive heart failure) is usually caused by existing cardiac conditions, including high blood pressure and coronary artery disease. Heart failure is the leading cause of hospitalization among patients 65 and older, and is characterized by such symptoms as fatigue and weakness, difficulty walking, rapid or irregular heartbeat, and persistent cough or wheezing.

The researchers examined two Swedish population-based studies, the Swedish Mammography Cohort (made up of 36,873 women aged 48 to 83) and the Cohort of Swedish Men (43,487 men aged 45 to 79) who responded to questionnaires asking for information about their height, weight and waist circumference. Over a seven-year period between January 1998 and December 2004 the researchers reported 382 first-time heart-failure events among the women (including 357 hospital admissions and 25

deaths) and 718 first-time heart-failure events among men (accounting for 679 hospital admissions and 39 deaths.)

Their analysis found that based on the answers provided by the study participants, 34 percent of the women were overweight and 11 percent were obese, while 46 percent of the men were overweight and 10 percent were obese.

"By any measure – BMI, waist circumference, waist to hip ratio or waist to height ratio –our findings showed that excess body weight was associated with higher rates of heart failure," explains Levitan.

Further breakdown of the numbers showed that among the women with a BMI of 25 (within the normal range), a 10-centimeter higher waist measurement was associated with a 15 percent higher heart failure rate; women with a BMI of 30 had an 18 percent increased heart failure rate. In men with a BMI of 25, a 10-centimeter higher waist circumference was associated with a 16 percent higher heart failure rate; the rate increased to 18 percent when men's BMI increased to 30.

Furthermore, adds Levitan, among the men, each one-unit increase in BMI was associated with a four percent higher heart failure rate, no matter what the man's waist size. In women, she adds, BMI was only associated with increased heart failure rates among the subjects with the largest waists. Finally, the authors found that the association between BMI and heart-failure events declined with age, suggesting that the younger the person, the greater the impact of weight to heart health.

"This study reinforces the importance of maintaining a healthy weight," says Levitan. "Previous research has looked at various types of heart disease and related health issues, and no matter the particulars of the study, they've all been pretty consistent in determining that excess body weight increases a person's risk of heart disease."

Study coauthors include BIDMC investigators Murray A. Mittleman, MD, DrPH (senior author), Amy Z. Yang, BA and Alicja Wok, DrMedSci.

The study was supported by grants from the National Institutes of Health, the Swedish Research Council and the Swedish Foundation for International Cooperation in Research and Higher Education.

Adapted from materials provided by Beth Israel Deaconess Medical Center.

http://www.sciencedaily.com/releases/2009/04/090407174647.htm

New Link Between The Evolution Of Complex Life Forms On Earth And Nickel And Methane Gas

Banded iron formations like this from northern Michigan contain evidence of a drop in dissolved nickel in ancient oceans. (Credit: Image courtesy of Carnegie Institution)

ScienceDaily (Apr. 9, 2009) — The Earth's original atmosphere held very little oxygen. This began to change around 2.4 billion years ago when oxygen levels increased dramatically during what scientists call the "Great Oxidation Event." The cause of this event has puzzled scientists, but researchers writing in *Nature* have found indications in ancient sedimentary rocks that it may have been linked to a drop in the level of dissolved nickel in seawater.

"The Great Oxidation Event is what irreversibly changed surface environments on Earth and ultimately made advanced life possible," says research team member Dominic Papineau of the Carnegie Institution's Geophysical Laboratory. "It was a major turning point in the evolution of our planet, and we are getting closer to understanding how it occurred."

The researchers, led by Kurt Konhauser of the University of Alberta in Edmonton, analyzed the trace element composition of sedimentary rocks known as banded-iron formations, or BIFs, from dozens of different localities around the world, ranging in age from 3,800 to 550 million years. Banded iron formations are unique, water-laid deposits often found in extremely old rock strata that formed before the atmosphere or oceans contained abundant oxygen. As their name implies, they are made of alternating bands of iron and silicate minerals. They also contain minor amounts of nickel and other trace elements.

Nickel exists in today's oceans in trace amounts, but was up to 400 times more abundant in the Earth's primordial oceans. Methane-producing microorganisms, called methanogens, thrive in such environments, and the methane they released to the atmosphere might have prevented the buildup of oxygen gas, which would have reacted with the methane to produce carbon dioxide and water. A drop in nickel concentration would have led to a "nickel famine" for the methanogens, who rely on nickel-based

enzymes for key metabolic processes. Algae and other organisms that release oxygen during photosynthesis use different enzymes, and so would have been less affected by the nickel famine. As a result, atmospheric methane would have declined, and the conditions for the rise of oxygen would have been set in place.

The researchers found that nickel levels in the BIFs began dropping around 2.7 billion years ago and by 2.5 billion years ago was about half its earlier value. "The timing fits very well. The drop in nickel could have set the stage for the Great Oxidation Event," says Papineau. "And from what we know about living methanogens, lower levels of nickel would have severely cut back methane production."

What caused the drop in nickel? The researchers point to geologic changes that were occurring during the interval. During earlier phases of the Earth's history, while its mantle was extremely hot, lavas from volcanic eruptions would have been relatively high in nickel. Erosion would have washed the nickel into the sea, keeping levels high. But as the mantle cooled, and the chemistry of lavas changed, volcanoes spewed out less nickel, and less would have found its way to the sea.

"The nickel connection was not something anyone had considered before," says Papineau. "It's just a trace element in seawater, but our study indicates that it may have had a huge impact on the Earth's environment and on the history of life."

Dominic Papineau's research is supported by the NASA Exobiology and Evolutionary Biology Program and from the Fond québécois de la recherche sur la nature et les technologies.

Journal reference:

1. Konhauser et al. **Oceanic nickel depletion and a methanogen famine before the Great Oxidation Event**. *Nature*, 2009; 458 (7239): 750 DOI: 10.1038/nature07858

Adapted from materials provided by Carnegie Institution.

http://www.sciencedaily.com/releases/2009/04/090408145336.htm

Red In The Face? People Use The Color Of Your Skin To Judge How Healthy You Are

Scientists have shown that there is truth to the received wisdom that a "rosy" complexion denotes healthiness. (Credit: iStockphoto/Shawn Roberts)

ScienceDaily (Apr. 9, 2009) — People use the color of your skin to judge how healthy you are, according to researchers at the University of St Andrews.

Scientists in the School of Psychology have shown that there is truth to the received wisdom that a "rosy" complexion denotes healthiness, whilst a "green" or "pale" color indicates illness.

Lead researcher Ian Stephen worked with the University's Perception Lab to determine how face color is associated with healthy looks.

Several monkey species use redness in their faces or sexual skin to advertise their health status and to attract mates. The team was keen to discover whether similar mechanisms were at work in humans.

Ian Stephen said, "Parents and doctors know that when you get ill, you can end up looking pale. Our research goes further and shows that even young, healthy university students can benefit from a complexion reflecting more blood and more oxygen in the skin."

The team from the University of St Andrews first measured how skin color varies with the amount of blood and oxygen in the blood.

These measurements were used with computer graphics to allow research participants to change the color of the faces in the photographs to look as healthy as possible. The team found that, for all faces, participants added more oxygen rich blood color to improve the healthy appearance.

Stephen continued, "Our skin contains many tiny blood vessels that carry blood laden with oxygen to the skin cells, allowing them to "breathe", and allowing us to lose heat during exercise. People who are physically fit or have higher levels of sex hormones have more of these blood vessels and flush easier than people who are unhealthy, unfit, elderly or smokers. Physically fit people also have more oxygen in their blood than people who are unfit or have heart or lung illnesses."

Professor Dave Perrett, head of the Perception Lab commented, "Our evaluators all thought that bright red blood with lots of oxygen looked healthier than darker, slightly bluer blood with lower oxygen levels. It is remarkable is that people can see this subtle difference."

"This may explain why some people with very red faces do not look so healthy; the color of their blood may be wrong. So it's not just the amount of blood that's important; it's the type of blood that determines healthy looks".

The research shows that people use the color of the blood in your skin to judge how healthy you are.

"Since your attractiveness relies upon how healthy you look, you might be able to make yourself more attractive by being kind to your heart and lungs in doing more exercise or quitting smoking," concluded Ian Stephen.

Journal reference:

1. Stephen et al. **Skin Blood Perfusion and Oxygenation Colour Affect Perceived Human Health**. *PLoS ONE*, 2009; 4 (4): e5083 DOI: 10.1371/journal.pone.0005083

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

http://www.sciencedaily.com/releases/2009/03/090331201518.htm

Power Structure Of Bronze Age Societies Was Based On Social Networks

ScienceDaily (Apr. 9, 2009) — Archaeologist Magnus Artursson at the University of Gothenburg, Sweden, demonstrates in his thesis that societies during the Late Neolithic and Bronze Age had a significantly more varied and complex structure than was previously thought.

This power structure was based on social networks rather than on permanently established institutions. Society was organised into small and medium-sized chiefdoms that were typically involved in ongoing struggles for dominance between various powerful families.

Based on a discussion of previously-known and newly-discovered settlement material, the author of this thesis examines the development of society during the Late Neolithic and Bronze Age (2300 - 500 BC) from a community history perspective. Artursson also makes comparisons of the nature of grave and sacrificial material in order to create a more detailed picture of how societies looked and changed over time.

Generally, one can say that society during this entire period displayed a significantly more varied and complex structure than that which is generally deemed likely. This conclusion is based, inter alia, on a new view of the structure and organisation of communities. We can descry a clear social dimension in the material, which can be identified through differences in the sizes of houses and homesteads, as well as variations in community structure within and between various regions, which show that a hierarchy of communities existed in the area.

A clear correlation can also been noted between the centrality of an area and the way settlements look. Areas that, based on their central geographic location or their access to important raw materials, may have played a key role in the society of the time, show communities organised in forms ranging from relatively dense, village-like structures to isolated homesteads. In more peripheral areas, on the other hand, settlement patterns are of a more much dispersed nature, and consist mainly of scattered, village-like structures or isolated homesteads.

These results would clearly indicate that society had a hierarchical composition and structure throughout this period.

Especially in southern Scandinavia, the predominant organisational form had been relatively unstable, small and medium-sized chiefdoms, in which powerful families and groups who were in constant competition with each other vied for power. Repeated changes in dominance with more or less sweeping struggles for power characterised the organisation of society in the Late Neolithic and Early Bronze Age (2300 - 1100 BC), while development toward a more stabile situation, and the emergence of larger political entities in certain parts of the region can be observed during the Late Bronze Age (1100 - 500 BC). These larger political entities, however, were unable to maintain their local dominance for long periods, but were broken up in connection with the death of leaders, at which time internal and external struggles for power suddenly increased.

Adapted from materials provided by University of Gothenburg, via AlphaGalileo

http://www.sciencedaily.com/releases/2009/04/090407144947.htm

Charles Darwin's egg rediscovered

By Christine McGourty
Science Correspondent, BBC News

An egg collected by Charles Darwin during his voyage on HMS Beagle has been rediscovered at Cambridge University.

The small dark brown egg, with Darwin's name written on it, was found by a retired volunteer at the university's zoology museum.

It bears a large crack, caused after the great naturalist put it in a box that was too small for it.

The egg is the only one known to exist from Darwin's Beagle collection.

At one time it was thought there were a dozen or more.

It was spotted one day in February by volunteer Liz Wetton, who spends a day each week sorting eggs in the museum's collection.

She said: "It was an exhilarating experience. After working on the egg collections for 10 years this was a tremendous thing to happen."

It was the collections manager, Mathew Lowe, who first realised the importance of the specimen.

"There are so many historical treasures in the collection, Liz did not realise this was a new discovery," Mr Lowe told BBC News.

"To have rediscovered a Beagle specimen in the 200th year of Darwin's birth is special enough, but to have evidence that Darwin himself broke it is a wonderful twist."

Dr Mike Brooke, the museum's curator of ornithology, traced the specimen's origin in the notebook of Professor Alfred Newton, a friend of Darwin's and a professor of zoology in the late 19th Century.

Newton had written: "One egg, received through Frank Darwin, having been sent to me by his father who said he got it at Maldonado (Uruguay) and that it belonged to the Common Tinamou of those parts.

"The great man put it into too small a box and hence its unhappy state."

Darwin himself mistook the bird for a partridge at first. And in his notebooks from 1833, he wrote that the bird had a "high shrill chirp" and that its flesh was "most delicately white" when cooked.

The museum's director, Professor Michael Akam, said: "This find shows just how valuable the work of our loyal volunteers is to the museum".

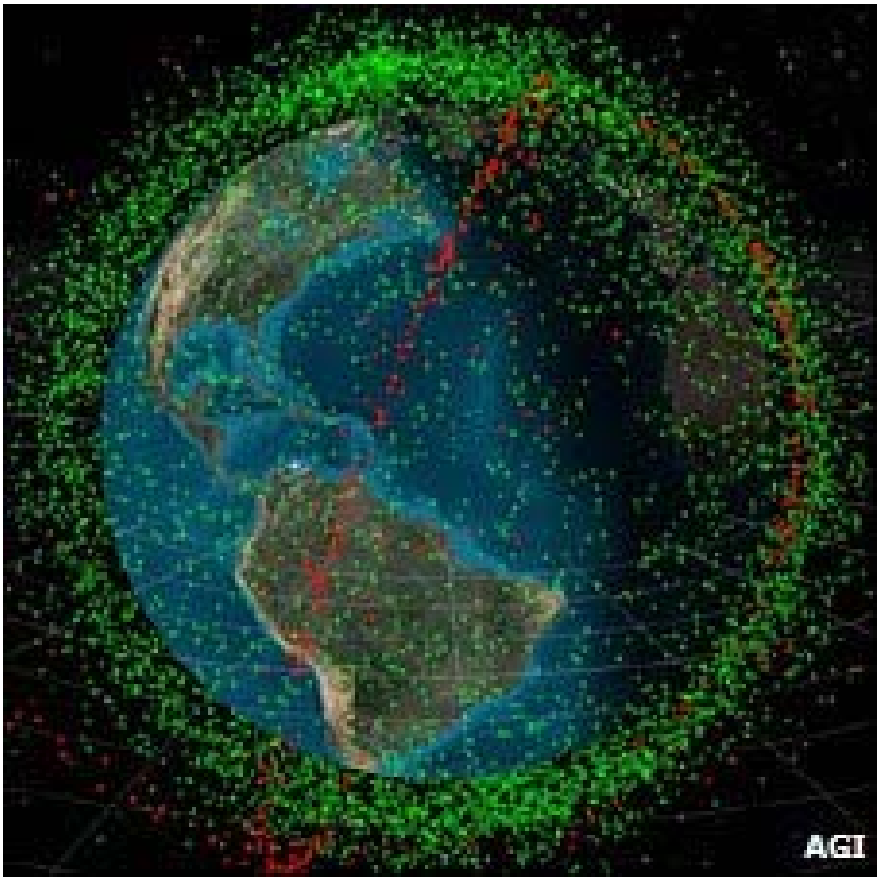
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7992911.stm

Published: 2009/04/10 01:25:59 GMT

Standing watch over a crowded space

By Paul Rincon
Science reporter, BBC News

On 10 February this year, a defunct Russian communications satellite crashed into an American commercial spacecraft, generating thousands of pieces of orbiting debris.



At the time, some observers put the odds of such an event occurring at millions, maybe billions, to one.

But experts had been warning for years that useable space was becoming crowded, boosting the possibility of a serious collision.

They have argued both for better monitoring of the space environment and for policies aimed at controlling the production of debris.

Over the past two years, a number of incidents have drawn attention to the problem of space debris.

" **We really have to understand the environment in which our space infrastructure operates** "
Jean-Jacques Dordain, director-general, Esa

In January 2007, China tested an anti-satellite weapons system by destroying one of its own spacecraft.

According to the US military, the A-sat test created 2,500 new pieces of debris which have been jeopardising satellites in the vicinity ever since.

In February 2008, the US used a sea-launched missile system to shoot down a wayward spy satellite loaded with fuel.

Then on 12 March this year, a close approach by a piece of debris measuring about 1cm (0.3in) forced the crew of the International Space Station (ISS) to shelter in their Russian Soyuz escape capsule.

Found wanting

There are thought to be some 18,000 objects larger than 10cm orbiting Earth, but millions more that are smaller.

Intact satellites share Earth's orbit with everything from spent rocket stages, tools lost on spacewalks and spacecraft wreckage to paint flakes and dust. They are the flotsam and jetsam of more than half a century of human activities in space.

At orbital speeds of 27,000km/h (17,000mph), even tiny pieces of debris can knock out a satellite or kill a spacewalker. And as the number of pieces of debris grows, so does the threat of collisions.

Satellite shielding is effective for objects below 1cm. But beyond that size collision avoidance - commanding the satellite to move out of the way of debris - may be the most prudent option.

America has the most sophisticated system for tracking objects in orbit. Its military operates 25 centres around the world to track objects in space; together they comprise the US Space Surveillance Network (SSN).

Until now, Europe has been largely dependent on the US for knowing what is going on in space. But European observers have for some time regarded this situation as inadequate.

Space-based systems, which provide accurate weather data, telecommunications and satellite-navigation services, play an increasingly vital role in Europe's economy.

Referring to the threats facing these space-based assets, Jean-Jacques Dordain, director-general of the European Space Agency (Esa) says: "We cannot continue to develop operational space infrastructure and ignore these other elements."

He added: "We really have to understand the environment in which our space infrastructure operates."

Thus, in November 2008, space ministers approved a 49.5-million-euro proposal to prepare the way for a European system which will stand watch over orbital debris, near-Earth objects (NEOs) and solar activity.

Together these phenomena could threaten lives and infrastructure in space and on the ground. An advanced capability to monitor such threats is known as Space Situational Awareness, or SSA.

Officials will spend three years assessing what Europe needs to develop its capabilities in space situational awareness. They will need to formulate a data security policy as well as consider what infrastructure has to be built from scratch and how existing sensors might contribute.

Radars are generally used to track objects in low-Earth orbit, while optical telescopes are often used to observe objects further away from the Earth. Electronic eavesdropping can be used to assess whether or not satellites are active - a discipline known as signals intelligence, or SIGINT.

"In 2010 and 2011, we will deploy and validate the preliminary elements of this system. This will hopefully allow us to deliver some precursor services," Nicolas Bobrinsky, proposal manager for Esa's SSA Preparatory Programme, told BBC News.

"It is not our aim to have a fully operational system by 2011, but one which will act as an 'advanced demonstrator'."

Gaele Winters, Esa's director of operations and infrastructure, adds: "There are member states in Europe with their own facilities. Esa also has some facilities. If you combine [those resources] in an intelligent way, you can reach a point where it is possible to deliver precursor services."

SPACE DEBRIS
- Comprises manmade "orbital debris" and "incident debris"
- Incident debris includes particles from short-period comets
- About 18,000 orbital debris objects larger than 10cm
- The number between 1cm and 10cm in size estimated at 200,000
- Number smaller than 1cm exceeds tens of millions
- Chinese anti-satellite test in 2007 created 2,500 new fragments
- A domino effect could create havoc for future space launches

These existing facilities might include France's GRAVES (The French acronym means large-scale system adapted for space monitoring) radar system, which can survey objects in low-Earth orbit up to distances of 2,000km, the Zimmerwald optical telescope observatory in Switzerland, and the Esa Space Debris Telescope in Tenerife, Spain.

These preliminary services should provide users with access to a catalogue detailing the orbits of functioning spacecraft and debris.

They should also alert satellite operators to potential collisions between their spacecraft and other objects in orbit.

In the event that a possible collision is identified, users could request a more detailed analysis of the objects' trajectories using a high power radar such as the Tracking and Imaging Radar (TIRA) in Wachtberg, Germany.

The fully fledged system is expected to provide many additional services. Richard Tremayne-Smith, a former head of space environment at the British National Space Centre (BNSC), told BBC News: "Space surveillance is one thing, but to get to space situational awareness you need more than either optical sensors for high altitudes and radar for low altitudes.

"You need details from satellite operators. Otherwise, you can only guess when they might carry out station-keeping with a satellite, or when they might do an impulse burn to change the orbit it is in."

Satellite operators overwhelmingly recognise the need for better data on the melee of objects whizzing over our heads.

The US already makes available data from its Space Surveillance Network on the internet. But this US Air Force data, known as two-line elements, is of relatively low quality, with satellite positions only accurate to within 20-30km (distances which are covered in 3-4 seconds at typical low Earth orbit velocities of 7.5 km/s).

Additional uncertainties are introduced when satellite orbits are extrapolated days or weeks ahead. This is because spacecraft are perturbed by drag, solar radiation pressure and the Earth's gravity field.

The more inaccurate the initial data on a satellite's position, the more inaccurate these predictions will be.

" **If you just leave things up there, the statistics show they will start banging into each other** "
Dr Stuart Eves, SSTL

In addition, for a satellite constellation in low-Earth orbit, two-line element data might throw up hundreds of potential collision alerts every day. Many satellite operators simply lack the financial resources to perform detailed analyses on each potential collision.

The US Air Force maintains a second, more precise database of information on the same orbital objects. But these more accurate data are deemed far too sensitive to share publicly - for fear the data could give away clues about the capabilities of US sensors.

However, keeping close tabs on all the junk up there is beyond even the resources of the US military. High accuracy surveillance is reserved only for a handful of high-value assets such as the space shuttle, the space station and multi-billion-dollar spy satellites.

In the longer-term, computer modelling work has identified a worrying effect called a "collision cascade", a kind of domino effect where collisions create more debris, which generates further collisions, creating even more debris.

"This is one of the reasons why the satellite operators and the community are quite deliberately trying to get their spacecraft down within 25 years from the end of the mission," says Stuart Eves, head of business development for military systems at Surrey Satellite Technology Limited (SSTL).

NEAR-EARTH OBJECTS (NEOS)

- NEOs are comets and asteroids which enter Earth's neighbourhood
- About 1,050 NEOs are classed as potentially hazardous to Earth
- An estimated 81% of NEOs bigger than 1km are catalogued
- Nasa wants to log objects as small as 140m (460ft) in diameter
- Tunguska object exploded with energy of 1,000 atomic bombs
- Asteroid Apophis has a 1 in 45,000 chance of striking Earth in 2036

"If you just leave things up there, the statistics show they will start banging into each other. Eventually, you reach the point where you can't sensibly launch satellites into the orbits you want because they'll get pounded to pieces."

Esa might be able to rely on existing facilities for its precursor services, but some sensors are not capable of providing the very high accuracy data required for the fully fledged SSA system.

Beyond 2011, officials acknowledge the need to build new state-of-the-art facilities to achieve high performance, including the ability to track objects down to 10cm in size.

But for true space situational awareness, it will also be necessary to track objects more frequently. This means monitoring the locations of satellites multiple times each day.

The Sapphire satellite, being built by SSTL for Canada's Department of National Defense will carry an optical telescope for tracking satellites in high orbits, especially geosynchronous orbit (GEO).

"The advantage of a space-based sensor is that it is above the clouds and is unaffected by the day/night cycle, so its tracking can be far more frequent," says Stuart Eves.

The requirements decided under the European preparatory programme will be submitted for approval by space ministers when next they meet in 2011. Esa is looking at a ten-year timeline for development of the full system.

But how the system should be governed in future and by whom is still to be resolved. Esa has been holding discussions with the European Union about its involvement - specifically whether the EU might assume a greater role in managing and funding SSA beyond 2011.

Esa has also been talking to Nasa and the US Department of Defense (DoD) about the potential for making the European and American networks interoperable, or compatible.

"In short, we are trying to put together, with the Americans, requirements for the European system and future upgrades of the US system to have a better, more reliable source of information for all of us," says Gaele Winters.

The European network must be able to function independently of that used by America, he says, adding: "There is a certain level of independence Europe wants to have in its ability to protect its own space assets. But… it also offers the opportunity to get more out of two systems."

Good to talk

Insiders say officials are determined to avoid a repeat of the dispute with America over Europe's Galileo satellite navigation system, due to be operational by 2013. Fuelled by US concerns that the European network could be used by hostile nations in attacks on American targets, the row was only resolved after lengthy negotiations.

Sources say that, in principle at least, there is a willingness on both sides to work together on SSA, though some in Europe remain wary of US intentions.

"Any endeavour by Europe to enhance space situational awareness will only increase our ability to conduct safe and responsible operations in space," a DoD official told the magazine Space News earlier this year.

"The United States supports international cooperation in SSA."

Britain, meanwhile, has joined the preparatory programme, contributing one million euros at the Esa ministerial meeting last November. But participation presents particular questions for the UK because of its "special relationship" with America.

The UK already has some privileged access to American data and some national users might not want to see the status quo shaken up. Nevertheless, some commentators recognise a need for Britain to have more control over the space surveillance data it gets.

A policy directing how the data will be used is also important for Europe's system, given the sensitivities over sharing information from military sensors.

Richard Tremayne-Smith comments: "I personally believe one thing that would have to be done is to have data anonymity. People will be quite glad to put things in as long as you can't trace things back and work out the power and capability of the sensor.

SPACE WEATHER

Many space weather phenomena relate to the activity of the Sun

Solar storms may occur a few times a week or a few times a day

Caused by bubbles of plasma erupting from Sun's atmosphere
Bubbles pack a punch equivalent to about 100 hurricanes
Also known as coronal mass ejections, or CMEs
Affect functioning of technology in space and on the ground
Solar activity monitored by Stereo and Soho satellites

"If you want to get as many people as possible to provide data, you want to give them a warm feeling that it's not going to be misused, or allowed to drift off to people who might use it for things they didn't want."

One way to address the issue, he said, might be to place a software application between the sensitive data and end users. Information provided by participating countries would be used to train this interface. Users would then obtain the answers they require without ever seeing details of the satellite positions.

Space debris was once the principal concern of space surveillance, but a different threat comes from near-Earth objects - the primordial rocks left over from the formation of the Solar System.

It has been difficult to find funding for facilities directed exclusively towards Neo discovery. But Mr Tremayne-Smith said existing ground and space telescopes used for astronomy or military activities are eminently suitable for logging asteroids and comets.

"The third big peak in discovery of near-Earth objects below the 1km size was with the US GEODSS system used for looking at satellites. The US military allowed those satellites to be used for NEO detection while they weren't being otherwise utilised," he explains.

Space weather is the third component of Esa's SSA programme. The bulk of this discipline is concerned with solar activity. Radiation from flares and coronal mass ejections (CMEs) on the Sun may launch X-rays and high energy particles towards Earth.

These phenomena can interfere with the operation of space systems, especially those beyond the protective screen of the Van Allen radiation belts surrounding Earth.

But officials acknowledge the potential threat from deliberate attempts to interfere with satellites.

In September 2005, a London-based radio station called Sowt al-Amel (Voice of Hope), began beaming into Libya via satellite with the aim of promoting political reform in the North African country.

Within minutes of Sowt al-Amel's first broadcast, a high-powered signal of garbled noise was unleashed on the satellite uplink, drowning out the dissident station. But in jamming the signal, several other broadcasters, among them CNN and BBC World, were also blocked out.

Esa is a civilian agency and is not mandated to deal with security matters. But Gaele Winters explains: "If you develop the system, it could contain additional capabilities.

He adds: "The first priority is to build ground-based infrastructure. But it is not to be excluded that later in the programme, space-based monitoring could take place.

"If there is a problem with our satellite, we would like to have the ability to analyse precisely what is wrong with it. One way of doing that is from the ground using telescopes. Another is to have a satellite in orbit which could approach the damaged satellite and carry out a close inspection to see what is happening."

In January, it was reported that the US DoD had commanded two covert inspection satellites to examine a failed US Air Force missile warning satellite in geosynchronous orbit.

Mr Winters says several organisations, including the European Defence Agency, are studying the SSA proposals and may come up with security-related requirements to be added to those being compiled by Esa.

He comments: "It could well be that in the future, the European Union will take a bigger role in managing and funding the development of this system because of these aspects that are outside the scope of Esa, but are inside the mandate of the EU."

Space situational awareness is also regarded as an important step towards the holy grail of space traffic management. A system analogous to that which currently governs the movements of aircraft is still some way off.

But Richard Tremayne-Smith thinks Europe should consider this objective in the design of its SSA programme.

He explains: "This is just a personal view, but if Europe does something, it should have a very ambitious target in the longer term that leapfrogs other capabilities and goes to what is really needed to do the job, rather than just getting to the current state of the art."

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7916582.stm

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Signs of earliest Scots unearthed

Archaeologists have discovered the earliest evidence of human beings ever found in Scotland.

The flints were unearthed in a ploughed field near Biggar in South Lanarkshire.

They are similar to tools known to have been used in the Netherlands and northern Germany 14,000 years ago, or 12,000 BC.

They were probably used by hunters to kill reindeer, mammoth and giant elk and to cut up prey and prepare their skins.

The discovery conjures up a picture of wandering groups of hunters making their way across dry land where the North Sea is now, after the end of the Ice Age.

The details are revealed in the latest edition of British Archaeology magazine.

The editor, Mike Pitts, said the finds were "the most northerly evidence for the earliest people in Britain".

Similar finds have been made in England, but they have mostly been south of the river Humber.

Up until now, the earliest evidence for humans in Scotland has come from sites such as Cramond, near Edinburgh.

Waste pits and discarded hazelnut shells found there have been dated to about 8,500 BC.

Tam Ward, from the Biggar Archaeology Group, which carried out the dig, said: "To push Scotland's human history back by nearly 4,000 years is remarkable.

"We didn't set out to do that," he added. "What we wanted to do was tell the story of the landscape."

He warned that "a lot of people won't believe this. Not until they see the hard evidence".

"But it'll be great fun proving them wrong. We've got the physical objects, so we can just put them down on the table and say argue with that".

At first the flints were thought to date from the Neolithic period - about 3,000 BC.

But their true significance was later realised by Torben Ballin, an expert in stone finds, and Alan Saville from the National Museums of Scotland.

Mr Saville told BBC Scotland: "There would have been a temporary camp site where the flints were found, so there's a faint possibility that there might be post holes and waste pits there."

He added that the chances of finding that evidence were "fairly slim, but we live in hope".

He said the diggers from Biggar were planning to go back to the site in the summer to explore it further.

Historic Scotland provided some funding for the work.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/glasgow_and_west/7992300.stm

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'Double whammy' malaria drug hope

A new "double whammy" malaria drug which works on its own and reverses resistance to other drugs is being developed by US researchers.

The drug contains a chemical which prevents the malaria parasite getting rid of a toxic by-product of feeding on red blood cells.

It also disables a genetic defence that prevents the existing drugs chloroquine and quinine working, Nature reports.

But the team says it could be at least 10 years before the drug is available.

There are around 250 million cases of malaria and 880,000 deaths worldwide each year.

Food

The drug, developed by Jane Kelly and colleagues at Portland State University, is called an acridone derivative.

It targets the way mosquitoes digest haemoglobin in red blood cells, from which they take amino acids as their food.

A substance called haem, a by-product of this process, is toxic to the malaria parasites, carried by mosquitoes, so they have to convert it into a pigment called haemozoin.

This drug prevents that conversion taking place, meaning the toxic pigment remains.

" **We would hope to make existing drugs like chloroquine and quinine useful again** "
Dr Michael Riscoe, Portland State University

It is the same effect as that of chloroquine and quinine.

But the researchers have found that, as well as working on its own, the acridone can restore and enhance the effectiveness of these other drugs too.

Malaraia parasites have developed a genetic mutation preventing chloroquine and quinine absorption, and expelling them from the parasite's body.

This new drug is able to disable that defence mechanism, allowing the chloroquine and quinine to do their job.

The researchers have successfully tested the compound in the lab and on mice, however they need to do more animal studies on the safety and effectiveness of the drug before they move on to human studies.

It is also relatively inexpensive to make and has so far appeared to be safe in tests.

'10 years'

Dr Mike Riscoe from Portland State University who worked on the study, said: "What we wanted was to design a molecule that would be of itself an antimalarial drug, but that would have the power to work together with drugs like chloroquine and quinine, even against parasites that were resistant to those drugs.

"We would hope to make existing drugs like chloroquine and quinine useful again, so combining those with this new one could help to combat the rising tide of drug resistance in this neglected disease.

But Dr Jane Kelly, who led the research, warned: "In the pharmaceutical industry, it can take 10 years and $1bn for a drug to be usable in humans, so we are still a long way away from that."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7987459.stm

Published: 2009/04/10 23:01:35 GMT

Scar-reducing drug shows promise

A drug designed to reduce scarring after surgery or injury has shown promising results in early human trials, UK researchers say.

Avotermin was tested in healthy volunteers with scars monitored over the period of a year.

The wounds injected with the treatment were less red, raised and visible than those treated with a dummy drug, The Lancet medical journal reported.

Further trials are now starting across Europe, the researchers said.

Early work on the drug was done at the University of Manchester before a spin-off biotechnology company - Renovo - was set up to develop it further.

" **What we know from our studies is you have to give the treatment when you close up the wound so if someone has had trauma it could be given within 48 hours of the injury** "
Professor Mark Ferguson

People taking part in three trials were given identical 1cm full thickness skin incisions on both arms and were given an injection of avotermin in one and placebo in the other when the wounds were made and then 24 hours later.

Doctors assessing the subsequent appearance of the scars on a 100-point scale did not know which wound was treated with which drug.

The studies, which were done to test safety and find the best dose in more than 200 people, found the scars treated with avotermin looked more like normal skin than the scars treated with placebo.

It comes after decades of research identifying that the active ingredient in the drug - a signalling protein in the body called TGF?3 - had anti-scarring properties.

Wound management

Study leader Professor Mark Ferguson, an expert in wound healing at the University of Manchester and co-founder and CEO of Renovo, said advanced clinical studies were underway.

"We're recruiting 350 patients who are undergoing scar revision operations where the bad scar is cut out and we inject one end of the new scar with the drug and one end with placebo," he said.

He argued that if proven to be successful, the treatment could be used in the early management of wounds from surgery and injury.

"What we know from our studies is you have to give the treatment when you close up the wound so if someone has had trauma it could be given within 48 hours of the injury," he said.

He added that some people had a tendency to scar worse that others.

"If you look at people who scar badly, with this drug they had an acceptable scar rather than an ugly scar and with people who scar well you end up with a scar that is almost unnoticeable."

Mr Brendan Eley, chief executive of The Healing Foundation, described TGF?3 as one of the "holy grails" of anti-scarring therapy.

"That the impact on scar formation is both structural and aesthetic is very promising," he said.

"What impact these therapies could have on patients with complicated and potentially disfiguring wounds - that's the exciting next step of this work which the clinical community will await with eager anticipation."

Mr Rajiv Grover, a consultant plastic surgeon and secretary of the British Association of Aesthetic Plastic Surgeons, agreed the results were promising but added that patients should not get their hopes up of the treatment being available any time soon.

"These are very controlled scars - the difficulty is the bad scars are not just a centimetre long with no tension in them."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7990588.stm

Published: 2009/04/10 07:54:10 GMT

Child dental work rise 'worrying'

Nearly 30,000 children a year attend hospital to have teeth pulled or be treated for decay, research has shown.

Researchers who analysed hospital data said it was "worrying" that the number of under-17s hospitalised for dental treatment had been rising since 1997.

They found children from poor areas were twice as likely to need treatment as those from more affluent families.

Experts said the findings, published in the British Dental Journal, highlighted a major public health issue.

It has led to criticism of Labour's policy relating to NHS dentists and calls by some for compulsory water fluoridation.

The data revealed there were 517,885 individual courses of dental treatment in NHS hospitals for children up to the age of 17 between 1997 and 2006.

The total number of children needing treatment was 470,113 and 80% of admissions involved extraction - in two-thirds of cases because of tooth decay.

" **It is a tragedy that social class remains such an accurate predictor of oral health** "
Peter Bateman British Dental Association

The peak age for children needing teeth taken out was five.

Prof David Moles, who led the study at Plymouth's Peninsula Dental School, said yearly rises in hospital admissions had come despite rates of tooth decay and infection remaining steady.

The reasons for this would have to be identified "in order to cut the number of admissions, improve dental care for children and ultimately reduce the financial burden to the NHS", he said.

Dr Paul Ashley, head of paediatric dentistry at University College London's Eastman Dental Institute, was the second author of the study.

He said: "Two aspects of the study are particularly worrying - the rise in the number of general anaesthetics being given to children, and the widening gulf in dental health between social classes."

He said general anaesthetics could be fatal to children.

Tooth decay is preventable through regular brushing and check-ups and Peter Bateman, chairman of the British Dental Association's salaried dentists committee, said: "It is a tragedy that social class remains such an accurate predictor of oral health.

"Water fluoridation, as the long-standing scheme in the West Midlands illustrates, has great potential to address this divide."

'Lack of access'

Liberal Democrat health spokesman, Norman Lamb, criticised the "appalling lack of access" to NHS dentists and called for a "radical overhaul" of the system.

He told BBC Radio 5Live: "One of the possible causes [of poor child dental health] is that children are not going to the dentist enough.

"We hear constantly about problems in accessing NHS dentists. It really demonstrates a failure of government policy that the situation is getting worse, not better."

Mr Lamb acknowledge that the research was based on figures pre-dating the 2006 introduction of new contracts for NHS dentists, which aimed to widen access.

But he said: "What we've seen since is the position getting even worse."

A Department of Health spokesman said the study's findings had been influenced by changes in 2001 to ensure anaesthesia was given in hospitals - rather than dental surgeries - for safety reasons.

"There has been no increase in tooth decay in the period covered, which pre-dates the new dental contract," the spokesman said.

"Preventative oral healthcare has actually improved substantially thanks to the new dental contract.

"Recent statistics from the World Health Organisation show that our 12-year olds have the healthiest teeth in Europe."

The government advised the NHS to consider introducing water fluoridation in some areas, where it was supported by communities, to address disparities in oral health, he added.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7993292.stm

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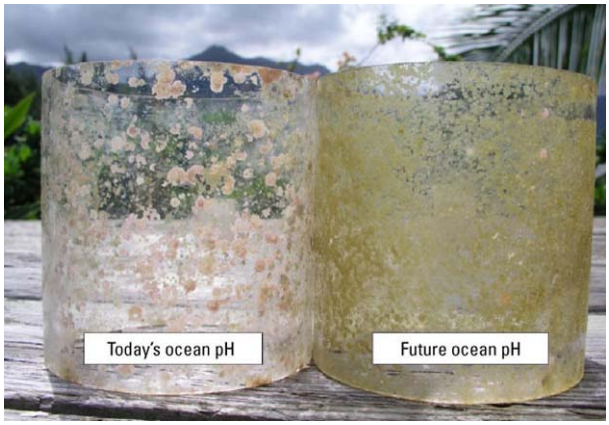
Riddles of an Acerbic Sea

By: David Richardson



Just a quarter of the carbon dioxide generated by burning fuels ends up being recycled through the biological processes of terrestrial plants and animals, according to the National Oceanic and Atmospheric Administration. Another quarter of this man-generated carbon dioxide floats aloft in the atmosphere, and the rest, NOAA says, ends up in the drink.

That amounts to 260 billion tons of carbon dioxide dissolved into the sea since the beginning of the industrial era — a good thing when it comes to reducing greenhouse gasses that warm the planet. But, it also lowers the pH of the normally alkaline ocean water moving it toward acidity, and that is not good for marine ecosystems.

In fact, at the recent Aspen Environment Forum, attendees labeled ocean acidification a "planet changer." And a 648-page draft bill on climate and energy introduced Tuesday in the House of Representatives includes language to "establish an integrated Federal program to assist natural resources to become more resilient and adapt to and withstand the impacts of climate change and ocean acidification."

Ilsa Kuffner, a marine biologist studying the impact of acidification on coral communities, said the cascade of impacts can lead all the way to the dining room table. North Pacific salmon, for instance, depend heavily upon calcifying snails, known as pteropods, for food. Under conditions of lowered pH, the snails have difficulty forming their shells, putting their survival in jeopardy.

New research from the University of California, San Diego's Victoria Fabry suggests their shells can fray after as little as two days' exposure to the more acidic seawater we can expect in the near future.

"Because pteropods are one of the North Pacific salmon's main prey, they lose that whole food resource when the pteropods suffer," Kuffner observed. The end result — we lose the salmon.

If losing the salmon would be a disaster, Kuffner said losing the coral reefs would be catastrophic. Coral reefs are major nurseries and sanctuaries for numerous fish and shellfish species, many of them economically important.

Kuffner said researchers have recorded a decline in ocean pH levels, which began falling at the outset of the industrial era, from a mean pH of 8.25 during pre-industrial times to 8.15 today. And because pH values are recorded on a logarithmic scale, these figures represent a 30 percent swing toward the acidic.

Experts say this rate of change is unprecedented in nature.

The Intergovernmental Panel on Climate Change warns that if man-made carbon emissions continue at current levels, the pH of Earth's ocean could fall to about 7.8 before the end of this century, rendering seawater 150 times more acidic than today.

Species such as corals and shellfish, which use calcium carbonate to form their shells and skeletons, will find themselves particularly vulnerable in this changing environment. Furthermore, Kuffner said there is evidence that the negative impacts of acidification are already being felt.

"It's not that the water is acidic and they're dissolving. It's more subtle than that," she said

Kuffner explained that when carbon dioxide comes into contact with seawater, a series of chemical reactions occur, which normally result in a chemical balance favorable to calcifying marine organisms.

"It's complex chemistry" and difficult to relate to a non-scientist, she added, noting that as a result this makes it harder to get broad public understanding of the issue. "It's much easier, for example, to explain and get the point across with respect to global warming because everybody can feel the temperature outside and has an intuitive understanding of temperature, whereas the concentration of carbonate ions in the ocean is a little more obscure and hard to identify with."

Here's how it works: "You have this equilibrium amongst the different types of carbon molecules. Carbonate ions, one of the building blocks of calcium carbonate, are the end result," Kuffner said. "As pH falls, the chemical equilibrium in the water shifts away from carbonate ions, making them less plentiful. When that carbonate ion is less available, then they (the organisms) calcify slower."

Kuffner said a colleague demonstrated the reaction in the lab using his motor scooter. He submerged one end of a rubber tube in an aquarium tank containing seawater, then attached the other end to the vehicle's exhaust pipe and started the engine. Kuffner says, "You could watch the pH readings from the water drop."

Experts say even if carbon emissions stopped tomorrow, residual excess carbon in the atmosphere would continue entering the oceans, and pH levels would continue their decline for some time. And the unaided rebound to pre-industrial pH levels could take thousands of years.

Winners and Losers

In 2005, Kuffner and a team of researchers from the U.S. Geologic Survey's Terrestrial, Freshwater and Marine Ecosystems Program began a series of experiments on the Hawaiian island of Oahu to study the ecological impact of acidification. They focused their work on a calcifying organism — crustose coralline algae — that's common from the tropics to the polar zones. According to the USGS, these algae provide the "cement" that hold the massive reef structures together, and they release chemical "cues" that encourage other reef life forms to set down roots in the colony.

They created a series of mesocosms (controlled natural environments) in tanks on the reefs and supplied them with seawater, Kuffner said, noting that flow-through compartments allowed free-floating organisms to settle naturally in the tanks. To simulate the changes anticipated during the current century, they added small amounts of hydrochloric acid to selected sections of these mesocosms. In each of the mesocosm sections, surfaces were provided on which organisms might settle, so they could be easily observed.

It was a unique experiment, she said, because "we weren't in control of what was coming in." The microbes, plankton, larvae, flora and fauna were left to organize themselves, more or less, naturally over several months.

At the conclusion of the study, the experimental surfaces were examined.

Not unnaturally, the acid treatment produced winners and losers. In the mesocosms reflecting current ocean conditions, numerous clusters of white granular calcifications indicated the presence of healthy communities of crust-forming algae (think crushed salt about the rim of an icy margarita — helps wash down the science). In contrast, these signs of calcifying algae were noticeably absent from the mesocosms challenged with acid where, unaffected by the lowered pH environment, algae communities of the fleshy variety — which do not utilize calcium carbonate — grew in abundance. These findings were reported last year in the journal *Nature Geoscience*.

Kuffner said the connection between lowered pH levels and the abundance of crust forming algae shows "a very simple linear relationship."

Further, she said the experiment demonstrates that lower pH alone can influence the mix of species in an ecosystem, in this case, by reducing the abundance of an important species of algae. These results leave "very little doubt" that before the end of the century "coral reef communities will look different from today."

"One of the things we don't know is will the organisms be able to adapt." That possibility is more likely, Kuffner said, for those organisms that reproduce quickly, and go through multiple generations in a year, but it takes time for selective pressure to bring about useful adaptations. For corals, even a century is short notice. "A single individual coral can live for over 1,000 years," leaving few opportunities for evolutionary adaptations to occur.

As vacationers converge on South Florida this winter, Kuffner will head to the reefs off the Keys, with plans to take core samples from the coral beds. "Corals, like trees, lay down annual growth bands as they mature," she said. The core samples will enable researchers to look back and "see how growth rates have changed" in response to environmental conditions in the past.

And that might have some predictive value in the face of the changes to come. "It's a retrospective and prospective approach," Kuffner said. "It's more of a long-term monitoring project, so it's going to be a little while before the payoff occurs."

http://www.miller-mccune.com/science_environment/riddles-of-an-acerbic-sea-1115

'Clean Coal' By Any Other Name

By: Emily Badger

A coalition of big-name environmental groups introduced earlier this year a grinning new pitchman for the "clean coal"-debunking crowd. This guy, with a disposition sunnier than even the brightest industry ads he has been designed to counter, wants to spray "clean coal" air freshener all over your living room.

"Is regular clean clean enough for your family?" he asks in a 30-second spot directed by the Coen brothers. "Not when you can have 'clean coal' clean!"

The whole scene seems, as it was surely intended, ridiculous. The coal industry is betting its future that it can solder the concepts "clean" and "coal" together, but its opponents have set on an equally powerful PR strategy: Repeat the phrase enough times — and pair it with swirling clouds of black smog — and it loses not only its meaning, but all logic.

"'Clean coal'," the narrator continues, "harnesses the awesome power of the word 'clean' to make it sound like the cleanest clean there is."

The commercial, produced by the recently launched Reality Coalition ("in reality, there's no such thing as 'clean coal'"), is part of a multimillion-dollar ad war. The coal industry, which last year created the American Coalition for Clean Coal Electricity, has been equally busy priming Americans over the indispensability of coal (about half of all the U.S,'s domestic electricity comes from it) and its evolution over time as clean-er than it once was ("emissions have been reduced by more than one-third" since 1970).

Cleaner than dirty is hardly clean. But then again, "There's no such thing as clean anything, in terms of the pure sense of the word," said Richard Axelbaum, director of the new Consortium for Clean Coal Utilization at Washington University in St. Louis. "Everything we do has an impact."

Even wind farms. The polarizing word "clean," and all the money that's being spent to redefine it from both sides, in fact, may be doing the most to confuse people. "Clean coal" refers not to a specific type of

coal, but to an emerging emissions-trapping technology. The Reality Coalition rightly points out that such a technology is not currently in use in the U.S., but even that group supports its immediate deployment. Al Gore has called for completely weaning the U.S. off coal within the next 10 years, but many environmental realists say that's just not possible.

"I think the world of Al Gore," said Sally Benson, director of the Global Climate and Energy Project at Stanford University. "But I don't think that was helpful at all."

As it turns out, the coal industry and many environmental advocates, including members of the Reality Coalition, want essentially the same thing: carbon capture and sequestration technology.

But getting it requires a debate over much more than just semantics.

Capturing the Elusive Carbon

CCS technology captures carbon dioxide emissions, liquefies it and injects it deep into the ground, back to where coal comes from in the first place. The process has four steps — capture, compression, transportation and storage - technology the U.S. possesses right now, as well as currently having enough capacity underground to store hundreds of years' worth of the liquefied carbon dioxide emissions, but the process has never been combined with the production of electricity on a commercial scale in the U.S. before.

"It is also perfectly true if we had to do this today, if we decided this was the only way we could survive, if we were willing to pay the cost, we could capture carbon dioxide today," Benson said. "We could absolutely do that."

George Peridas, a scientist with the Natural Resources Defense Council's Climate Center, explains that this is not like trying to teach a 1-year-old how to walk; this is more like going from jogging to running a marathon. The United States already has the basic skills.

Peridas says the NRDC joined the Reality Coalition, which also includes the League of Conservation Voters, the Sierra Club and the National Wildlife Federation, not because it doesn't believe the technology is viable, but because it doesn't trust the coal industry to use it.

"I feel no confidence that this industry is going to embrace carbon dioxide reduction technology when they've been extremely reluctant to adopt technology that's been around for years and years to scrub other pollutants," Peridas said, referring to grandfathering exemptions under the Clean Air Act addressing sulfur dioxide, nitrogen oxides and mercury pollution.

Peridas also criticized the industry's "two-faced" strategy of promoting cleaner coal through CCS while also lobbying against legislation that would mandate the technology's use. CCS would allow the coal industry to play a major role in a more efficient energy economy, but investing in the research and development and building of new plants will be costly — and, at first, not profitable.

Both Benson and Peridas believe the only way to motivate the industry to make the expensive shift will be through carbon-capping legislation.

"You don't do CCS for the fun of it or because you like capturing carbon dioxide to do it, but because you want to do something on the climate," Peridas said. "The only kind of world where CCS makes sense is a carbon-constrained world."

But emissions caps, the industry counters, must be "based upon a reasonable expectation of technology." Joe Lucas, ACCCE's vice president of communications, says the coalition believes in what it calls a process of "slow, stop and reverse."

You don't change directions on a 100-mph ocean liner by pulling a 180-degree turn, Lucas said.

"You slow the boat, eventually stop the boat, you change the direction of the boat, and then you accelerate in the other direction," he said. "We believe and support a mandatory federal program to manage carbon emissions that does exactly that."

At that rate, ACCCE projects the widespread use of CCS technology 10 to 15 years into the future.

Without carbon caps today, a planned CCS demonstration plant in Matoon, Ill., has been idling for the last year. FutureGen, a joint project of several utilities, was originally estimated at a cost of about $800 million, much of which was to come from the Department of Energy. In early 2008, the DOE under the Bush Administration pulled the funding as cost estimates for the project ballooned to $1.8 billion.

FutureGen appears likely to receive new funding under Barack Obama's stimulus bill, and the president has talked of investing more than $3 billion in several such "clean coal" demonstration facilities.

But another conflict exists. Sen. Tom Coburn, R-Okla., has called FutureGen "the biggest earmark in history" on a scale far greater than the widely mocked Bridge to Nowhere.

And this raises another question: Is a "clean coal" demonstration plant in Illinois pork for the locals or an essential investment for us all?

Pollution *Sans Frontières*
Outside of the United States, 1.6 billion people live without electricity, a fact often lost in America's domestic energy debate.

"It's not like they can't play Sudoku on their computer, they have no electricity," said Frank Clemente, a sociology professor at Penn State. An even larger group — nearly half the world's population — doesn't have adequate electricity.

"In that context, we need all the power that we can get, and to me that's the moral issue: to take people out of poverty," Clemente said. "This whole artificial argument over 'one fuel is better than another,' I think that's all political, emotional."

Clemente, who co-authored the National Coal Council's report *The Urgency of Sustainable Coal*, argues that we need to use every option with the least impact on the environment as possible, and coal with CCS technology is as good a solution as we have, for now.

Clemente also insists in this context that America's impact on the coal debate is minimal. China built more coal plants in 2007 than Great Britain ever built, and for every proposed plant endlessly debated and then shelved in America, China constructs another dozen. Americans are not used to hearing that their decisions don't matter, particularly on the topic of global climate change, but that is exactly what Clemente argues. "We're not important," he says, matter-of-factly.

The most important thing we could do, he says, is develop CCS technology and give it away to the rest of the world. America will remain a major consumer of the world's energy, but most of the new consumption — the consumption that will put exponential pressure on the environment as rural parts of China and India move from the Third World to the First — will lie elsewhere.

"Those countries want electricity. They don't care what Al Gore says, they don't care what the New York Times says — they could care less," Clemente said. "They see those as elitist groups that already have electricity, and these people are looking for electricity to get their kids clean water."

Axelbaum adds that the U.S. must develop an energy policy that we believe is also appropriate for the rest of the world. If we say we intend to go all-nuclear, we must accept that the rest of the world can do the same. Similarly, we can't build our energy policy on a resource that exists nowhere else.

The idea runs counter to the notion that we must wean ourselves off foreign dependence in favor of a

domestic solution.

"If you look at world stability, how to avoid world conflict," Axelbaum said, "we have to make sure everybody has a source of energy that is readily available to them that they don't have to fight for."

Coal isn't available everywhere, but it is distributed across the globe and in large concentrations in the U.S., China and Russia, among other places. It exists where the biggest users are, and never too far from many others. Specific geologies are required for underground sequestration, but those too exist in many countries, with a few exceptions such as Japan and South Korea.

In this global context, Al Gore's vision is noble, but so too are the goals of reducing poverty and conflict, two intersections of energy policy that rarely touch the Americans debating it.

The Good, Not the Perfect

For the coal industry, Clemente said, CCS is not a technology, it's the technology, and the industry has to start urgently treating it as such. For the rest of us, it's something else.

"I look at it as a bridging technology," Benson said, "a bridge from here to the future."

It is a mid-range climate-change solution to get this country through the next 50 years until it can learn how to make liquid fuels from solar power and store wind power when it's not windy outside.

The NRDC hasn't given up on that world in its embrace of CCS. It is merely melding environmentalism with realism at a juncture when the climate can ill afford saying no to any solution. It's a growing strategy embodied in movements like the U.S. Climate Action Partnership, which includes unlikely allies like the Environmental Defense Fund and Alcoa, and the Nature Conservancy and ConocoPhillips.

"We would love to do away with coal all together, but we realize it comes with significant economic and political challenges," Peridas said. "And from the point of view of a global warming campaign, I don't think it's a wise strategy to count on the complete abolition of coal use."

The Reality Coalition's TV spots don't entirely make that clear, but that is in part because the debate has shifted away from how to mitigate coal's emissions to whether or not we can call that process "clean."

Clemente likens the digression to any number of intractable standoffs in Washington between Democrats and Republicans.

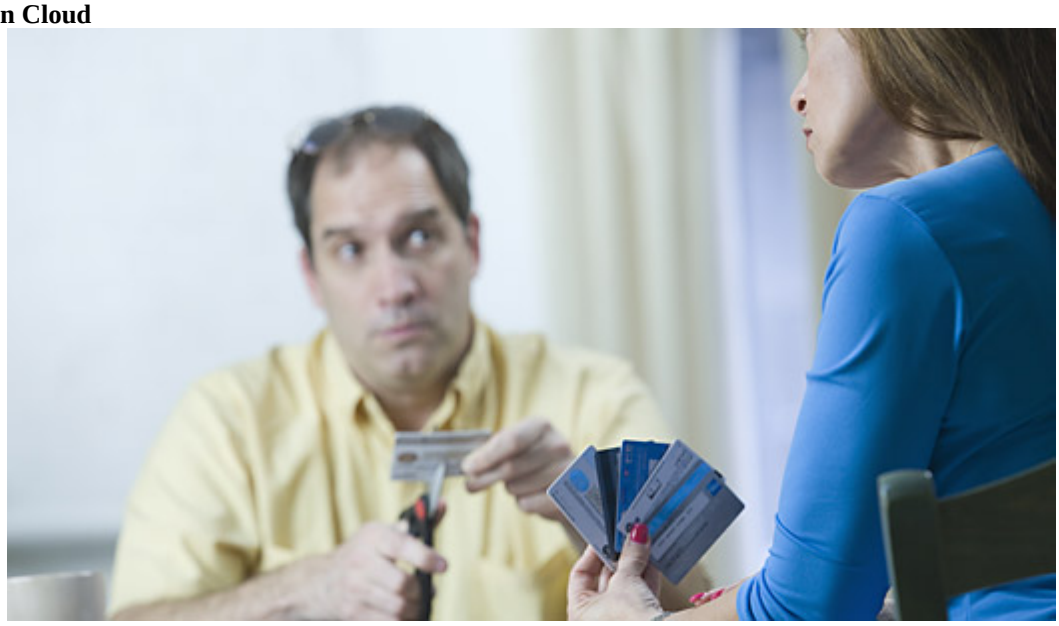
"They're so entrenched in their positions that they can't come to agreement on anything, and the same kind of thing is happening in the energy field," he said. "You have people who are totally opposed to renewables, then you have a whole group of people totally opposed to coal. You have extremists screaming on both sides."

If we could get through this next transition phase into a world where we use coal because we have to, but capture its emissions because we can, the screaming could ease. Until, of course, it comes time to get off coal all together, but that's a marketing war for another decade.

http://www.miller-mccune.com/science_environment/clean-coal-by-any-other-name-1084

Recession Psychology: We Will Spend Again

By John Cloud



The recession has demanded great self-control from many Americans. Even those who haven't lost everything are spending less. Middle-class consumers who used to splurge occasionally are trading Armani for the Gap, and cable subscriptions for library cards. That's understandable — fear begets caution — but will rich Americans, who are also cutting back, return to their extravagant ways?

There are at least two answers to this question. One is that Americans with money are the kids in the global candy store; they want everything, and they buy everything, laying waste to the environment and helping enact political policies that help the rich get even richer. In this model, rich Americans will never give up their God-given right to buy a hulking new six-burner range even if they never cook.

Another answer — one recently featured on TIME's cover — is that because this recession is so serious, everything after it could change. The rich might stop being so greedy, and some high-minded form of anticonsumerism might flourish. (See the best business deals of 2008.)

Social psychologists study this sort of question for a living, and unfortunately for the idealists, academic research shows that greed will never die and excess will never end. In fact, as the recession deepens — and as the rich hear more and more stories of once-secure Americans having to forgo everything from new clothes to basic health care — the wealthy will almost certainly start to spend again, and with renewed avidity. Why? Not because the rich are greedy but because they are human.

Social psychology research shows that we all share a universal trait: after periods of self-denial and self-control, we want to give in to our base desires. That's true even when we merely witness others having to cut back and go without.

A great deal of research in the last decade has shown how this process works. In 2000, psychologists Mark Muraven and Roy Baumeister published an influential paper in which they observed that self-control is like a muscle: it weakens after you use it. For example, say you exert self-control by avoiding strawberry shortcake and opting for asparagus instead. Now your self-control is enfeebled, so rather than turning to that Tolstoy novel you vowed to finish, you watch a *Simpsons* rerun instead. Your self-regulatory resources can also be expended by, for instance, taking a test or enduring a loss. Depleted self-control is why, after an unusually hard day at work, you give in to a third martini when you would normally stop at two.

A new study just published in the journal *Psychological Science* sheds more light on this phenomenon by showing how we respond when we watch others exercise self-control, as so many of us are watching fellow Americans cut back in the recession. The authors of the new study — psychologists Joshua Ackerman and John Bargh of Yale and social psychologists Noah Goldstein and Jenessa Shapiro of UCLA — wondered whether people's self-control might be drained vicariously, just by imagining others having to resist temptations.

Previous studies have shown that external behaviors can be contagious — for instance, seeing another person shake his foot can cause you to shake yours, even if you don't realize you're doing so. Also, test subjects who mentally simulate a person stubbing his toe often grimace and even feel a bit of phantom pain. So do these same principles apply to the act of self-control?

To answer the question, the authors of the new paper replicated an experiment from an important 2007 *Journal of Consumer Research* study. That paper (here's a PDF) found that people whose self-control had been depleted by taking a demanding test were willing to spend more on items like watches and cars than those who didn't take the test. The Yale and UCLA researchers changed the experiment by having their test subjects read a sad story before putting a value on the same consumer goods. In the story, a struggling waiter arrives at his fancy restaurant hungry, but he can't eat a single bite lest he be fired. Half the study participants merely read the story; the other half were instructed "to take the perspective of the [waiter]. That is, try to imagine yourself in his shoes."

Sure enough, those who imagined themselves in the waiter's shoes lost some of their self-control. They were willing to spend significantly more on the watches and cars than those who read the waiter's tale without being instructed to empathize.

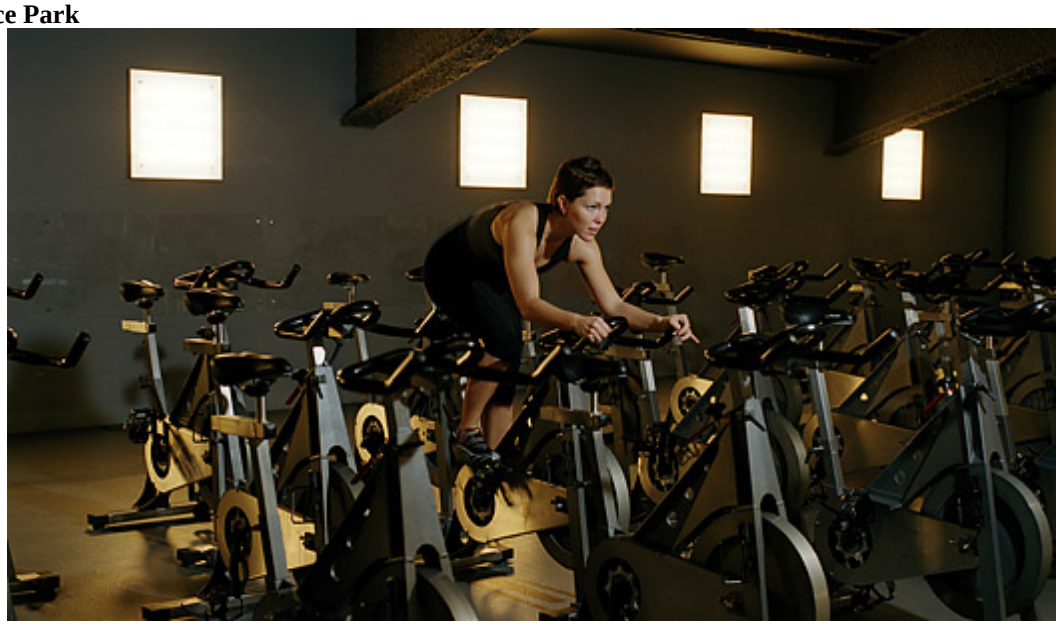
There may actually be a physiological as well as a psychological process at work here. A leading theory is that exercising self-control is so hard on your brain that, like physical exercise, it depletes glucose levels, making you feel weaker. It's possible that imagining someone who has to exert self-control, and feeling their misery, tricks your brain into believing that your own glucose levels have declined. As the study says, this trick would, "in effect, set one's internal fuel gauge to 'low' [even if] there is still plenty of fuel left in the tank."

The practical implication is that when Americans who are still fully employed really start to empathize with the pain of those who are struggling, they will feel weaker, and they will go out and start spending. Right now, fear may be overwhelming the empathy-glucose response. But at some point, the rich will give in and open their wallets again — not because they are especially greedy, but because they vicariously feel the pain of going without.

http://www.time.com/time/health/article/0,8599,1891236,00.html

Study: Energy Drinks Boost the Brain, Not Brawn

By Alice Park



The promise of energy drinks is pretty irresistible — push your body, work hard, sweat buckets, and if you need an extra boost, down a bottle or two of liquid fuel to drive you through the rest of your workout.

Makes sense, since the drinks provide your body with carbohydrates in the form of sugars — the fuel that cells and tissues like muscle need to keep working. But exercise experts say that despite what you may think, energy drinks have no effect at all on your tired muscles. Instead, when your energy is petering out, a swig of an energy drink works on the brain to keep you inspired and motivated to push on. (Read "China Says 'Keep Out' to Coca-Cola.")

Researchers at the University of Birmingham and Manchester Metropolitan University report in the *Journal of Physiology* that sugary energy drinks activate reward and pleasure regions in the brain, a boost that can translate to better performance — and one that does not occur with other artificially sweetened beverages. In the study, volunteers who got sugary energy drinks were able to complete a physical-training session 2% faster than those who got artificially sweetened drinks, and improved their mean power output as well.

"What we are suggesting is a central-governor model," says Ed Chambers, one of the study's co-authors and a researcher at the School of Sport and Exercise Sciences at the University of Birmingham. "Ultimately, the brain controls exercise performance by controlling the neural outflow to the exercising muscles."

Chambers decided to test this theory after a 2004 study found that energy drinks enhanced athletic performance even in short periods of physical activity. Intuitively, this makes sense, but physiologically, it doesn't. The human body is capable of generating enough fuel in the form of glucose to sustain itself, even in vigorous exercise, for about an hour. So in short periods of activity, energy drinks shouldn't have any effect on performance. Added carbs from drinks would be useful only after several hours of exertion, when the body starts to draw upon its stored glucose, known as glycogen, for energy. But the subjects in the study were showing improved times and greater power in sessions lasting 60 minutes or less. Were they experiencing a sugar rush from the beverages they were gulping?

To answer that question, Chambers gathered a couple of dozen competitive and recreational cyclists and put them on bikes in his lab. He asked one group to rinse with a sugar-based drink and another to rinse

with an artificially sweetened drink. Then he took a third group of volunteers, asked each of them to rinse with the same solutions, and put them through an MRI scanner to see whether their brain reacted similarly to the two beverages.

To his surprise, they did not. The sugar-drinking volunteers showed activity in the reward and pleasure centers of the brain, while those drinking the artificially sweetened beverages did not. Chambers suspects that it's this activation of the brain that explains the enhanced performance effect of sugary energy drinks during short workouts. This theory is supported by other studies in which researchers infused carbohydrate sugar solutions directly into the body intravenously — in those cases, subjects experienced no improvement in their physical performance.

Chambers' work supports the idea that the brain plays a critical role in pushing the body to achieve optimum performance. When the mouth tastes sugar, it may anticipate an influx of added fuel and therefore trigger the satisfaction and reward areas of the brain, in turn egging the body on to do more. At Loughborough University in Britain, Clyde Williams, emeritus professor of sports science, and his team found that distance runners on a treadmill selected faster running speeds after swishing with a sugared energy drink than with a placebo solution.

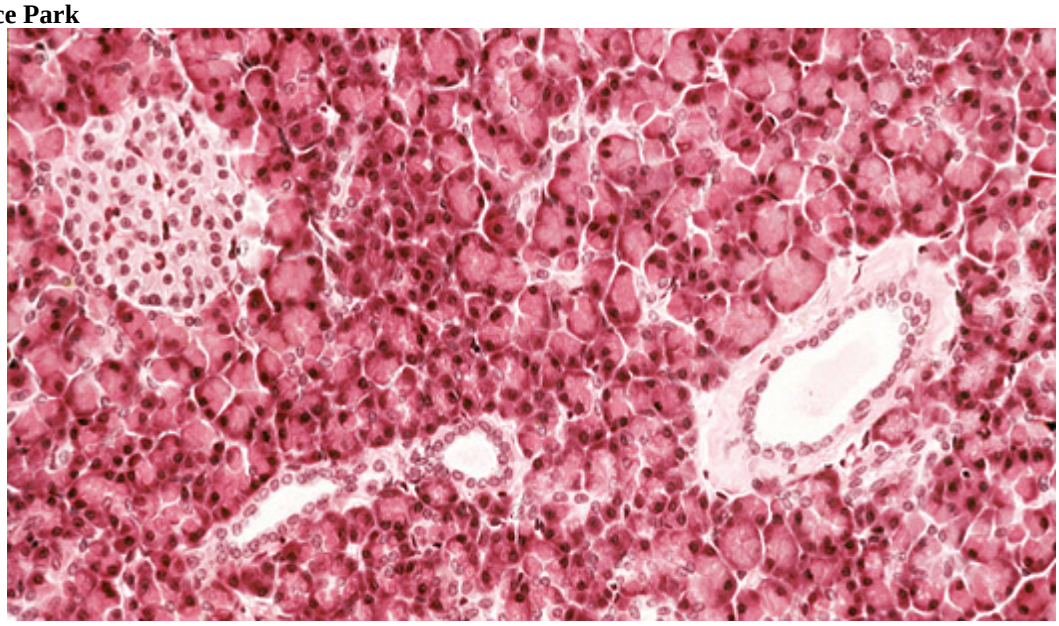
Other sports physiologists are currently studying how ingesting the sugared solution, as opposed to just rinsing with it, affects physical performance, and how the body responds to artificially sweetened drinks. The body may undergo a kind of metabolic letdown in anticipation of a sugar rush that never comes, which could affect performance. "In some ways, the body's reaction is to the 'promise' of an incoming carbohydrate load, so one wonders what happens when that promise is not fulfilled," says Williams.

So the next time you're pushing your body to its limits, remember that energy drinks could give you a boost — in mind as well as body.

http://www.time.com/time/health/article/0,8599,1891350,00.html

Stem Cells May Reverse Type 1 Diabetes

By Alice Park



Researchers have used injections of patients' own stem cells to reverse the course of type 1 diabetes, reports a research team from the University of São Paulo in Brazil and Northwestern University in Chicago.

The findings, published in the current issue of the *Journal of the American Medical Association*, exemplify the remarkable gains made by diabetes researchers, who are battling a continuously spreading disease that now affects nearly 8% of adults and children. (See the top 10 medical breakthroughs of 2008.)

The research team, led by Dr. Julio Voltarelli of the University of Sao Paulo, is the first to successfully treat type 1 diabetes patients with their own stem cells. The group first reported its initial achievement in 2007, with 15 type 1 diabetes patients who received their own stem cells and no longer needed insulin to control their blood sugar levels. In the new study, a follow-up of their previous work, Voltarelli and his colleagues detailed the same success with an additional eight patients, and also confirmed that in the majority of them, the stem cell transplant led to an appreciable repopulation of functioning insulin-producing beta cells in the pancreas.

"I wouldn't use the word cure," says Dr. Richard Burt, one of the co-authors from Northwestern University. "But it appears we changed the natural history of the disease. It's the first therapy for patients that leaves them treatment-free — no insulin, no immune suppression for almost five years."

The idea behind the transplant is simple. In type I diabetes, the patient's own immune system turns on the beta cells that produce insulin, the hormone that breaks down the glucose we eat in food. Eventually, the immune cells will virtually eliminate all of the body's beta cells, and glucose levels will start to climb. Researchers believe that the trigger for this attack lies somewhere within the immune cells, so one possible treatment for the disease may be to wipe out the entire existing immune system and replace it with a fresh one, derived from stem cells without this destructive trait. (See pictures from an X-Ray studio.)

That's the strategy that Voltarelli's team tested. First, they carefully extracted a population of immune stem cells from the bone marrow of each diabetes patient. Then each person was treated with radiation, similar to the regimen that cancer patients receive, in order to destroy the immune system. Afterward,

each patient received his own stem cells back by injection. The scientists traced blood levels of a protein, C-peptide, that beta cells produce, in order to confirm that whatever remaining beta cells the patient had were now able to grow again and repopulate the pancreas — and produce insulin. Sure enough, levels of C-peptide rose in 20 of the 23 patients; 12 were able to stay off insulin therapy for three years, and eight needed only intermittent help from insulin treatments during the five-year study period. On average, the patients remained free of insulin injections for 31 months.

That's a milestone in diabetes treatment. Type I diabetes patients are locked in a constant struggle to maintain their body's insulin levels. Since their beta cells no longer produce the hormone on their own, patients must supply it themselves with multiple injections throughout the day and night, or using an insulin pump that dispenses insulin automatically through a permanent tube under the skin. Voltarelli's stem cell strategy provides a life-changing alternative that would take the burden off the patient and put it back where it belongs, on the beta cells.

That's the theory. But some experts point out that, in practice, stem cell transplants are not always a home run. For one, transplantation is a grueling and toxic process in which a portion of the body's tissues — the immune system — is destroyed with dangerous radiation. Then, there is the question of timing. In most cases, patients with type 1 diabetes do not show symptoms of their disease — such as high blood sugar levels — until they have depleted their beta cell population considerably. Dr. David Nathan, director of the diabetes center at Massachusetts General Hospital, notes that at this point, there may not be enough beta cells remaining to seed a new population of insulin-growing cells, even with an infusion of stem cells to give them a more hospitable environment. "This study shows that it can work, but how long it will work is a question," he says. Previous studies have shown that after an immune cell transplant, beta cells vigorously produce insulin for about six months, and then start to die off, victims of the same immune attack that destroyed their predecessors.

Voltarelli's team, however, has managed to show that the stem cells can give long-lasting beta cells a chance to grow — at least ones that can produce insulin for about three years. Other researchers are pursuing intriguing new stem cell options, including stem cells that can be grown from a patient's own skin, which would eliminate the need for extracting immune stem cells from bone marrow. "Every door that we open leads to another door," says Burt. "All research is built by sitting on the shoulders of other studies. This trial is something that will contribute to and move the field of stem cell therapy forward." It is, as Burt says, a start.

http://www.time.com/time/health/article/0,8599,1891122,00.html

Ancient medicines were alcoholic

By Victoria Gill
Science reporter, BBC News

A team of researchers in the US has discovered traces of a medicinal alcoholic drink in bottles that are more than 5,000 years old.

The scientists extracted wine compounds and plant-derived ingredients from a jar taken from the tomb of one of the first pharaohs of Egypt, Scorpion I.

This is the earliest sample of a human-made medicine.

The researchers report their findings in the journal Proceedings of the National Academy of Sciences.

Patrick McGovern, professor of anthropology at the University of Pennsylvania, led the research.

The vessels that he and his team tested came from excavated tombs in southern Egypt - the earliest of which dates from 3150BC.

"This is the earliest Egyptian vessel ever found to have wine in it," Professor McGovern told BBC News.

"It shows that, by trial and error, humans were discovering remedies over 5,000 years ago, and that alcoholic beverages were a key part of the discovery process."

Designing medicine

The team used organic solvents to extract residues from inside the jars.

With extremely sensitive chemical techniques, they were then able to separate the different compounds within the residue.

The jars tested positive for tartaric acid - a reliable chemical marker for grape and wine in the Middle East.

The scientists also found compounds from a number of herbs, some of which have known medicinal properties, and from tree resin.

Professor McGovern pointed out that alcoholic drinks would have been ideal for dissolving these plant-derived substances.

"As well as adding flavour, these compounds were likely to have been used with a medicinal aim in mind," he said.

His team also tested residue from inside a later Egyptian jar, or amphora, dating from between the 4th and 6th Centuries.

He now wants to find out if some of the ancient remedies he found could be revived.

Professor McGovern has started a collaboration with researchers at the University of Pennsylvania's Abramson Cancer Center, testing compounds found in ancient fermented beverages from China, including the earliest chemically confirmed alcoholic beverage in the world, dated to 7000BC.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7992575.stm

Published: 2009/04/14 17:22:17 GMT

Ants inhabit 'world without sex'

By Victoria Gill
Science reporter, BBC News

An Amazonian ant has dispensed with sex and developed into an all-female species, researchers have found.

The ants reproduce via cloning - the queen ants copy themselves to produce genetically identical daughters.

This species - the first ever to be shown to reproduce entirely without sex - cultivates a garden of fungus, which also reproduces asexually.

The finding of the ants' "world without sex" is published in the journal Proceedings of the Royal Society B.

Anna Himler, the biologist from the University of Arizona who led the research, told BBC News that the team used a battery of tests to verify their findings.

Unusual evolution

By "fingerprinting" DNA of the ant species - *Mycocepurus smithii* - they found them all to be clones of the colony's queen.

And when they dissected the female insects, they found them to be physically incapable of mating, as an essential part of their reproductive system known as the "mussel organ" had degenerated.

" **This species has evolved its own unusual mode of reproduction** "
Anna Himler University of Arizona

Asexual reproduction of males from unfertilised eggs is a normal part of some insect reproduction, but asexual reproduction of females is "exceedingly rare in ants", wrote the researchers.

"In social insects, there are a number of different types of reproduction," explained Dr Himler. "But this species has evolved its own unusual mode."

She and her colleagues do not know exactly why this particular species has become fully asexual, and how long ago the phenomenon evolved.

They are carrying out further genetic experiments, which will enable them to estimate how long ago the evolutionary change occurred.

No sex please

There are advantages to life without sex, Dr Himler explained.

"It avoids the energetic cost of producing males, and doubles the number of reproductive females produced each generation from 50% to 100% of the offspring."

But combining genetic material in sexual reproduction gives future generations many more advantages.

"If we're more diverse, we're more resistant to parasites and disease," explained Laurent Keller, an expert in social insects from the University of Lausanne.

"In a colony of clones, if one ant is susceptible to a parasite, they will all be susceptible. So if you're asexual, you normally don't last very long.

"But in ants we're seeing more and more reports of unusual methods of reproduction," added Professor Keller, who was not involved in this study.

He also points out that social insects, like ants, may be particularly well suited to this type of reproduction because it enables the queen to control the caste and sex of all the offspring in her colony.

The first farmers

Dr Himler's interest in *Mycocepurus smithii* was originally sparked not by their unusually biased sex ratio, but by their ability to cultivate crops.

"Ants discovered farming long before we did - they have been cultivating fungus gardens for an estimated 80 million years.

"They collect plant material, insect faeces and even dead insects from the forest floor and feed it to their crops," she said.

Many different species of ant - including the famous leafcutter ants - cultivate fungi, relying on it for nutrition.

But this particular species is able to grow "a greater number of crops than other ant species", she explained.

"When we started to study this species more closely, we just weren't finding any males. That's when we started to look at them in a different way."

Since the fungus crop reproduces asexually, Dr Himler thinks it might give the ants some kind of advantage "not to operate under the usual constraints of sexual reproduction".

"There is certainly more work to be done in this system," she added. "We're quite excited about the direction this research might take us, and its implications."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7998931.stm

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Home births 'as safe as hospital'

The largest study of its kind has found that for low-risk women, giving birth at home is as safe as doing so in hospital with a midwife.

Research from the Netherlands - which has a high rate of home births - found no difference in death rates of either mothers or babies in 530,000 births.

Home births have long been debated amid concerns about their safety.

UK obstetricians welcomed the study - published in the journal BJOG - but said it may not apply universally.

The number of mothers giving birth at home in the UK has been rising since it dipped to a low in 1988. Of all births in England and Wales in 2006, 2.7% took place at home, the most recent figures from the Office for National Statistics showed.

The research was carried out in the Netherlands after figures showed the country had one of the highest rates in Europe of babies dying during or just after birth.

It was suggested that home births could be a factor, as Dutch women are able and encouraged to choose this option. One third do so.

But a comparison of "low-risk" women who planned to give birth at home with those who planned to give birth in hospital with a midwife found no difference in death or serious illness among either baby or mother.

"We found that for low-risk mothers at the start of their labour it is just as safe to deliver at home with a midwife as it is in hospital with a midwife," said Professor Simone Buitendijk of the TNO Institute for Applied Scientific Research.

"These results should strengthen policies that encourage low-risk women at the onset of labour to choose their own place of birth."

Hospital transfer

Low-risk women in the study were those who had no known complications - such as a baby in breech or one with a congenital abnormality, or a previous caesarean section.

Nearly a third of women who planned and started their labours at home ended up being transferred as complications arose - including for instance an abnormal fetal heart rate, or if the mother required more effective pain relief in the form of an epidural.

" **The NHS is simply not set up to meet the potential demand for home births** "
Louise Silverton Royal College of Midwives

But even when she needed to be transferred to the care of a doctor in a hospital, the risk to her or her baby was no higher than if she had started out her labour under the care of a midwife in hospital.

The researchers noted the importance of both highly-trained midwives who knew when to refer a home birth to hospital as well as rapid transportation.

While stressing the study was the most comprehensive yet into the safety of home births, they also acknowledged some caveats.

The group who chose to give birth in hospital rather than at home were more likely to be first-time mothers or of an ethnic minority background - the risk of complications is higher in both these groups.

The study did not compare the relative safety of home births against low-risk women who opted for doctor rather than midwife-led care. This is to be the subject of a future investigation.

Home option

But Professor Buitendijk said the study did have relevance for other countries like the UK with a highly developed health infrastructure and well-trained midwives.

" **Women need to be counselled on the unexpected emergencies which can arise during labour and can only be managed in a maternity hospital** "
RCOG

In the UK, the government has pledged to give all women the option of a home birth by the end of this year. At present just 2.7% of births in England and Wales take place at home, but there are considerable regional variations.

Louise Silverton, deputy general secretary of the Royal College of Midwives, said, the study was "a major step forward in showing that home is as safe as hospital, for low risk women giving birth when support services are in place.

"However, to begin providing more home births there has to be a seismic shift in the way maternity services are organised. The NHS is simply not set up to meet the potential demand for home births, because we are still in a culture where the vast majority of births are in hospital.

"There also has to be a major increase in the number of midwives because they are the people who will be in the homes delivering the babies."

The Royal College of Obstetricians and Gynaecologists (RCOG) said it supported home births "in cases of low-risk pregnancies provided the appropriate infrastructures and resources are present to support such a system.

But it added: "Women need to be counselled on the unexpected emergencies - such as cord prolapse, fetal heart rate abnormalities, undiagnosed breech, prolonged labour and postpartum haemorrhage - which can arise during labour and can only be managed in a maternity hospital.

"Such emergencies would always require the transfer of women by ambulance to the hospital as extra medical support is only present in hospital settings and would not be available to them when they deliver at home."

The Department of Health said that giving more mothers-to-be the opportunity to choose to give birth at home was one of its priority targets for 2009/10.

A spokesman said: "All Strategic Health Authorities (SHAs) have set out plans for implementing Maternity Matters to provide high-quality, safe maternity care for women and their babies."

Story from BBC NEWS:
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Homeopathy 'eases cancer therapy'

Some homeopathic medicines may ease the side-effects of cancer treatments without interfering in how they work, a scientific review has concluded.

The Cochrane Collaboration said, while there were few studies, it did appear that some effects of radiotherapy and chemotherapy could be alleviated.

It highlighted in particular calendula to prevent dermatitis, and what is known as Traummel S for mouth sores.

But it said further work was needed to confirm these findings.

Eight studies with a total of 664 participants were considered by the group, led by Dr Sosie Kassab, a specialist in complementary cancer therapies at the Royal London Homeopathic Hospital.

Three studies looked at preparations to counter the skin reactions of radiotherapy, but only one was deemed to be high quality.

This, from France, suggested that calendula - from marigolds - reduced acute dermatitis in breast cancer patients more effectively than the more conventional treatment trolamine. It involved 254 patients.

No interference

One of three studies on treating the side-effects of chemotherapy was deemed high quality.

This found that Traumeel S, a mixture which includes belladonna, arnica, St John's wort and echinacea, was effective in reducing stomatisis - painful mouth sores - when used as a mouthwash.

" **Overall, this new piece of evidence simply confirms plenty of previous research demonstrating the unproven nature of homeopathy** "
Edzard Ernst Peninsula Medical School

Two other studies of homeopathic treatments on menopausal symptoms brought on by cancer treatments were declared to be of high quality but did not provide any evidence that the treatments worked.

There was no evidence to show that any of these treatments interfered with cancer therapies, and indeed one study showed that radiotherapy was less frequently interrupted in the group receiving homeopathic care.

But the Cochrane team acknowledged: "The review found few studies, and most were small."

Edzard Ernst, professor of complementary medicine at the Peninsula Medical School, said there were "several problems with the body of evidence examined by this review.

"First, independent replications are lacking completely but would be necessary before we can accept any of these treatments in routine healthcare.

"Second, nobody doubts that undiluted remedies can have effects; and interestingly, the positive studies here seem to be on such medicines rather than on the highly diluted treatments which are a hallmark of homeopathy.

"In fact, the calendula cream found to be effective in one study is not diluted at all and thus it cannot, to all intents and purposes, be considered to be a typical homeopathic remedy.

"Finally, this review found hardly any high quality studies in the first place. So overall, this new piece of evidence simply confirms plenty of previous research demonstrating the unproven nature of homeopathy."

Story from BBC NEWS:
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