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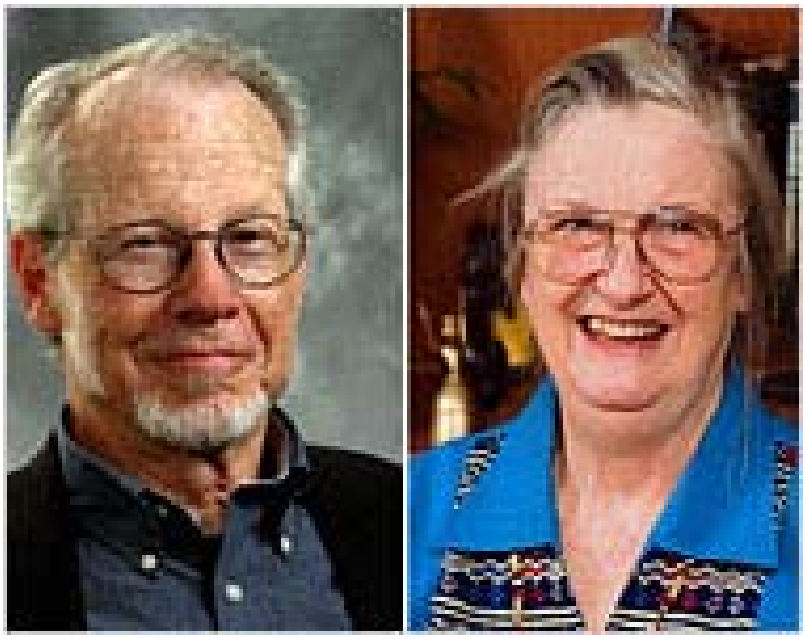
Two Americans Share Nobel in Economics
By LOUIS UCHITELLE



In a departure from prevailing economic theory, the Nobel Memorial Prize in Economic Science was awarded Monday to two social scientists for their work in demonstrating that business people, including competitors, often develop implicit relationships that supplement and resolve problems that arise from free-market competition.

The prize committee cited Elinor Ostrom of Indiana University "for her analysis of economic governance, especially the commons," and Oliver E. Williamson of the University of California, Berkeley, "for his analysis of economic governance, especially the boundaries of the firm."

Ms. Ostrom becomes the first woman to win the prize for economics. Her background is in political science, not economics.

"It is part of the merging of the social sciences," Robert Shiller, an economist at Yale, said of Monday's awards. "Economics has been too isolated and these awards today are a sign of the greater enlightenment going around. We were too stuck on efficient markets and it was derailing our thinking."

The prize committee, in making the awards, seemed to be influenced by the credit crisis and the severe recession that in the minds of many mainstream economists has highlighted the shortcomings of a unregulated marketplace, in which "economic actors," left to their own devices, will act in their own self-interests and in doing so, will enhance everyone's well-being.

The committee, in effect, said that theory was too simplistic and ignored the unstated relationships and behaviors that develop among companies that are competitors but find ways to resolve common problems. "Both scholars have greatly enhanced our understanding of non-market institutions" other than government, the committee said.

"Basically there is a common understanding that develops even among competitors when they are dealing with each other," Mr. Shiller said, adding "when people make business contact, even competitors, they can't anticipate everything, so an element of trust comes in."

That is what the Nobel committee recognized, he said, in citing Mr. Williamson and Ms. Ostrom.

In its announcement, the committee said Ms. Ostrom "has challenged the conventional wisdom that common property is poorly managed and should be either regulated by central authorities or privatized. Based on numerous studies of user-managed fish stocks, pastures, woods, lakes, and groundwater basins, Ostrom concludes that the outcomes are, more often than not, better than predicted by standard theories."

Mr. Williamson's research, the committee said, found that "when market competition is limited, firms are better suited for conflict resolution than markets."

Ms. Ostrom, 76, was born in Los Angeles, and received her Ph.D. in political science in 1965 from the University of California, Los Angeles. She is the Arthur F. Bentley professor of political science at Indiana University, Bloomington. She is also co-director of the Workshop in Political Theory and Policy Analysis. Mr. Williamson, 77, was born in Superior, Wis., and received his Ph.D. in economics in 1963 from Carnegie Mellon University in Pittsburgh. He is the Edgar F. Kaiser professor emeritus of business, economics and law and a professor at the graduate school of business at the University of California, Berkeley.

The economics prize was created in 1969 by the Swedish central bank in honor of Alfred Nobel, the inventor of dynamite who established the awards for achievements in physics, chemistry, medicine, peace and literature in his will in 1896.

The winners will share 10 million Swedish kronor ($1.4 million), and each receive a gold medal and diploma from the Swedish king on Dec. 10, which is the anniversary of Nobel's death in 1896.

Last year's winner was Paul Krugman, a professor at Princeton and an Op-Ed page columnist for The New York Times. Mr. Krugman won the prize for his research that explained patterns of trade among countries, as well as what goods are produced where and why.

http://www.nytimes.com/2009/10/13/business/economy/13nobel.html?hp

Shining a Light on Better Headlamps

Drivers aren't singing the blues so much about high-intensity headlights these days, but a smarter version of them might really light up their driving lives.

- By: Michael Haederle | September 24, 2009

It would be best if we could always use high beams that somehow stay out of the eyes of other drivers. New technology may make that possible.Adrian Keith

You have seen them. Those piercing blue-white headlights from oncoming cars seem to bore into your skull like an icy dagger, threatening to blind you.

OK, maybe that's a slight exaggeration. But nearly 6,000 people were so bothered by the glare from "high-intensity discharge" (HID) headlamps when they first appeared about a decade ago that they complained to the National Highway Traffic Safety Administration, which commissioned research to figure out what was going on.

That started John Bullough down a path that some day soon could yield "smart" headlamps capable of adjusting themselves to shield oncoming drivers from glare while improving road visibility at night.

Bullough, a senior research scientist at Rensselaer Polytechnic Institute's Lighting Research Center, has studied the elements of headlamp glare, ranging from how high the lights are mounted, to their intrinsic brightness and whether they're aimed properly. It turns out this familiar technology is kind of complicated.

"Glare from any type of headlight — it doesn't matter what kind it is - is going to reduce your ability to see," Bullough says. "If there's an oncoming car, no matter what kind of headlights those are, you're going to see worse when those headlights are there than when they're not there. The light scatters in our eyes, and it's almost like looking through a foggy window inside our eyes."

When the tungsten-halogen headlamps now standard on U.S. cars and trucks were introduced a generation ago, they were whiter, brighter and more energy efficient than their predecessors — and they caused a spate of complaints, Bullough says. "Within a few years everyone had these headlamps and what seemed to happen was they no longer were unique, and people stopped complaining about them."

HID bulbs are brighter still, longer-lived, more energy efficient and noticeably bluer than halogen lamps. They have safety advantages, too.

"The HID headlamps tend to produce more light in the peripheral region below the horizontal," he says. "They may help you see things that are not necessarily right on the road, but if there are pedestrians or other hazards close to the road, you can actually respond to those more quickly."

But does a blue-hued HID headlamp actually cause more glare?

"What we found is for the same amount of light at your eye, it didn't really matter what color the light was," Bullough says. "It affected your visibility about equally. The other thing we found is when headlamps are aimed properly, you get about the same amount of light in your eyes from a halogen headlight as you do from an HID headlight."

Average headlamp heights have increased as people have turned to SUVs and pickup trucks, which sit higher off the road. Their headlamps — whether halogen or HID — often point straight into the eyes of other drivers, he says.

Meanwhile, nearly two-thirds of cars have misaimed headlamps. A random survey of 100 cars found 62 percent had at least one headlamp that was either too high (worsening glare for other drivers) or too low (providing insufficient illumination down the road), he says.

European cars with HID lamps are required to have auto-leveling systems, but U.S. regulations are lax, Bullough says. "If our headlamps were aimed more properly, that would go a long way toward reducing a lot of the problems we're experiencing with headlamp glare," he says.

Still, he acknowledges, "blue light does create more discomfort for people. If it's bright enough, you almost feel like a painful sensation in your eyes. It seems that there's something about that blue color and the blue part of the spectrum of light that makes us more uncomfortable."

Dr. Martin Mainster, an ophthalmologist who teaches at the University of Kansas medical school, says the physiological basis for aversion to bright lights in the blue end of the spectrum is not well understood, although it is known that daily exposure to blue light is essential for the regulation of the body's circadian rhythms.

Mainster, who in 2003 published a paper titled, "Why HID headlights bother older drivers," in the *British Journal of Ophthalmology*, points out that not all drivers are the same in the face of bright headlamps. As we age, the clear lens that helps to focus light on the retina in the rear of the eye develops imperfections and starts to yellow, Mainster says. That causes more light-scattering inside the eye, softening the contrast needed to see detail clearly.

Mainster wrote the paper when one his patients crashed into a parked car after being blinded by brilliant HID lights. "I was incensed with the B.S. that the manufacturers were coming up with. They said, 'The lights are a little bluer, so they're novel, so people stare at them and get dazzled. There's no problem with them — it's all an illusion.'"

But if brighter lights tend to disorient older drivers, from a highway safety standpoint, they provide superior visibility.

Bullough's NHTSA-funded research found that high beams illuminate more of the road and provide much more time to stop than low beams — indeed, he says, people shouldn't drive faster than 35 or 40 miles an hour with their low beams because of their limited scope. It would be best if we could always use high beams that somehow stay out of the eyes of other drivers, he says.

New technology just might make that possible.

There are already vehicle-based sensors that can track an oncoming vehicle, says Bullough, who belongs to the Transportation Lighting Alliance, a consortium of auto and lighting manufacturers interested in developing adaptive headlamps. A variety of approaches could be used to obscure the few degrees of the light beam that reaches the other driver's face (one involves a matrix of LED bulbs that could be selectively illuminated or dimmed).

From the oncoming driver's perspective, "It just looks like fairly dim, low-beam headlights," he says. "But in actuality, the person who's driving will have a full high beam in front of them, except in that small area where an oncoming car is located."

Bullough tested a prototype of this "prime beam" system to see whether drivers liked it and found that reducing light in an angular area of about 3 degrees was sufficient to cut glare without hampering visibility.

"What we came up with was not so much the technology as the recipe," says Bullough, who will present his NHTSA research this month at the International Symposium on Automotive Lighting at the Technische Universität Darmstadt. "It probably could be implemented within two or three years."

Bullough likes to imagine a world where smart headlamps have become the norm. For starters, he says, we wouldn't need as much expensive highway lighting, which means our energy needs would decrease. Moreover, light pollution would be cut because you would only illuminate what you need to.

"This really does have the potential to be a transforming kind of thing," he says. "It's not something that's going to happen overnight. There's a cost involved in having a system that can detect where an oncoming driver is. However we get there, we should think about it."

http://www.miller-mccune.com/business_economics/shining-a-light-on-better-headlamps-1452?utm_source=Newsletter76&utm_medium=email&utm_content=0929&utm_campaign=newsletters

Vacant Homes Give Habitat a Leg Up

Famed for building homes for the poor from scratch, Habitat for Humanity sees a silver lining to thousands of foreclosed homes available for a pittance.

- By: Pam Kelley | September 25, 2009

Habitat for Humanity is refurbishing foreclosed-on homes for the poor.Habitat for Humanity

Shanta Brown, a nursing assistant in Charlotte, N.C., walked through her soon-to-be home in August, pointing out favorite features — the living room's vaulted ceiling, two full baths and new black countertops she chose for durability.

In a few minutes, Brown would stand outside the front door and cut a ribbon, dedicating the first house in Habitat for Humanity Charlotte's ambitious new effort to rehab homes in neighborhoods decimated by foreclosures.

Across the country, Habitat chapters are doing the same — buying vacant, foreclosed-on homes at rock-bottom prices. For most, that's a big departure from their longstanding model of using volunteer labor to build affordable housing from the ground up.

But that model was pre-foreclosure crisis. Now, as thousands of homes sit vacant, Habitat officials say they can't pass up this opportunity.

With prices depressed, many are finding they can buy and rehab cheaper than they can build. (Most Habitat chapters also continue to build.) Rehab projects are often faster, so families can move in sooner. And Habitat officials say rehabbed, owner-occupied houses will ultimately boost home values in high-foreclosure neighborhoods.

Like most nonprofits, Habitat chapters have seen donations fall. But the federal government is handing out millions to help make these rehabs happen.

"It's an incredible opportunity to turn things around," says Mark Andrews, Habitat for Humanity International's senior director of U.S. operations.

Habitat International officials don't have totals of homes being rehabbed because their 1,500 chapters work independently. They do know that about $80 million has been earmarked to go to about 80 to 100 chapters — the first wave of grants from the U.S. Housing and Economic Recovery Act's Neighborhood Stabilization Program. That money will be used to rehab or build about 1,300 homes.

Some chapters are also kicking in their own money to buy foreclosures. And a second wave of federal funding could mean more than $200 million, awarded to Habitat International and state organizations in Alabama, Florida and Louisiana, for about 1,600 additional homes. That money will be awarded later this year.

Rehabbing means new and sometimes dirty jobs for volunteers: Removing mold and lead paint, tearing out nasty carpet, repainting dingy walls.But in Charlotte, where many foreclosures are nearly new homes, the rehab jobs aren't bad. One sunny morning, the sounds of hammers rang out in the Windy Ridge neighborhood as volunteers added a storage shed to a home that had been foreclosed on twice in its seven-year life.

A couple of years ago, Charlotte's Windy Ridge neighborhood became a poster child for everything wrong with the home mortgage industry. It was a nearly new subdivision, yet as a result of predatory lending and easy credit, 61 percent of its 132 homes had seen foreclosures by the end of 2007. Crime was up. Property values had plummeted.Habitat has purchased six foreclosed homes in the subdivision and plans to buy more. Brown's 1,000-square-foot home, the first to be rehabbed, sold new in 2003 for $106,000. Habitat bought it in April for $44,000. Aside from new carpet and paint, the property didn't need a lot of work. Even after repairs, the project cost less than the $60,000 needed to build a new home.

Different cities have different stories. Habitat of Collier County in Naples, Fla., has purchased nearly 50 homes in the troubled Naples Manor neighborhood. When those home values peaked at around $250,000 a few years ago, many homeowners took out equity loans, only to see prices collapse. Now, houses are selling for under $100,000.In Minnesota, Habitat for Humanity Twin Cities is rehabbing pre-1940 homes mostly located in the urban core. Like many chapters, the Twin Cities affiliate is concentrating efforts in a few neighborhoods. By working alongside other groups doing similar work, "we'll have an impact not only on the housing stock, but property values, social connections and how people feel about their neighborhoods," says Kristen Beckmann, the affiliate's director for government relations.

Some chapters, including the Greater San Francisco affiliate, are rehabbing without federal funds. San Mateo County is generally affluent, so it didn't qualify for federal money. But that affluence masks pockets of poverty.Habitat officials plan to continue working on foreclosures as long as it makes sense. But within three to four years, they're hoping the housing market bounces back and they can get out of the rehab business.

"In the short term, and we do truly hope it's the very short term, we're trying to make some lemonade out of lemons," says Phillip Kilbridge, executive director of Habitat for Humanity Greater San Francisco.

If trends hold, neighbors of these newly rehabbed Habitat homes won't have to worry about foreclosures. Thanks to extensive screening and homeowner education, the foreclosure rate for Habitat homes is just 2 percent.At Brown's Habitat home dedication, Habitat of Charlotte Executive Director Bert Green spoke of a new life for the home and neighborhood, rising from the ashes of foreclosure and loss.

Brown grinned as she thanked Habitat workers and volunteers.

"My own land," she said. "My own home."

http://www.miller-mccune.com/business_economics/vacant-homes-give-habitat-a-leg-up-1477?utm_source=Newsletter76&utm_medium=email&utm_content=0929&utm_campaign=newsletters

Burst of Technology Helps Blind to See

By PAM BELLUCK

Blindness first began creeping up on Barbara Campbell when she was a teenager, and by her late 30s, her eye disease had stolen what was left of her sight.

Reliant on a talking computer for reading and a cane for navigating New York City, where she lives and works, Ms. Campbell, now 56, would have been thrilled to see something. Anything.

Now, as part of a striking experiment, she can. So far, she can detect burners on her stove when making a grilled cheese, her mirror frame, and whether her computer monitor is on.

She is beginning an intensive three-year research project involving electrodes surgically implanted in her eye, a camera on the bridge of her nose and a video processor strapped to her waist.

The project, involving patients in the United States, Mexico and Europe, is part of a burst of recent research aimed at one of science's most-sought-after holy grails: making the blind see.

Some of the 37 other participants further along in the project can differentiate plates from cups, tell grass from sidewalk, sort white socks from dark, distinguish doors and windows, identify large letters of the alphabet, and see where people are, albeit not details about them. Linda Morfoot, 65, of Long Beach, Calif., blind for 12 years, says she can now toss a ball into a basketball hoop, follow her nine grandchildren as they run around her living room and "see where the preacher is" in church.

"For someone who's been totally blind, this is really remarkable," said Andrew P. Mariani, a program director at the National Eye Institute. "They're able to get some sort of vision."

Scientists involved in the project, the artificial retina, say they have plans to develop the technology to allow people to read, write and recognize faces.

Advances in technology, genetics, brain science and biology are making a goal that long seemed out of reach — restoring sight — more feasible.

"For a long time, scientists and clinicians were very conservative, but you have to at some point get out of the laboratory and focus on getting clinical trials in actual humans," said Timothy J. Schoen, director of science and preclinical development for the Foundation Fighting Blindness. Now "there's a real push," he said, because "we've got a lot of blind people walking around, and we've got to try to help them."

More than 3.3 million Americans 40 and over, or about one in 28, are blind or have vision so poor that even with glasses, medicine or surgery, everyday tasks are difficult, according to the National Eye Institute, a federal agency. That number is expected to double in the next 30 years. Worldwide, about 160 million people are similarly affected.

"With an aging population, it's obviously going to be an increasing problem," said Michael D. Oberdorfer, who runs the visual neuroscience program for the National Eye Institute, which finances several sight-restoration projects, including the artificial retina. Wide-ranging research is important, he said, because different methods could help different causes of blindness.

The approaches include gene therapy, which has produced improved vision in people who are blind from one rare congenital disease. Stem cell research is considered promising, although far from producing results, and other studies involve a light-responding protein and retinal transplants.

Others are implanting electrodes in monkeys' brains to see if directly stimulating visual areas might allow even people with no eye function to see.

And recently, Sharron Kay Thornton, 60, from Smithdale, Miss., blinded by a skin condition, regained sight in one eye after doctors at the University of Miami Miller School of Medicine extracted a tooth (her eyetooth, actually), shaved it down and used it as a base for a plastic lens replacing her cornea.

It was the first time the procedure, modified osteo-odonto-keratoprosthesis, was performed in this country. The surgeon, Dr. Victor L. Perez, said it could help people with severely scarred corneas from chemical or combat injuries. Other techniques focus on delaying blindness, including one involving a capsule implanted in the eye to release proteins that slow the decay of light-responding cells. And with BrainPort, a camera worn by a blind person captures images and transmits signals to electrodes slipped onto the tongue, causing tingling sensations that a person can learn to decipher as the location and movement of objects.

Ms. Campbell's artificial retina works similarly, except it produces the sensation of sight, not tingling on the tongue. Developed by Dr. Mark S. Humayun, a retinal surgeon at the University of Southern California, it drew on cochlear implants for the deaf and is partly financed by a cochlear implant maker.

It is so far being used in people with retinitis pigmentosa, in which photoreceptor cells, which take in light, deteriorate.

Gerald J. Chader, chief scientific officer at the University of Southern California's Doheny Retinal Institute, where Dr. Humayun works, said it should also work for severe cases of age-related macular degeneration, the major cause of vision loss in older people.

With the artificial retina, a sheet of electrodes is implanted in the eye. The person wears glasses with a tiny camera, which captures images that the belt-pack video processor translates into patterns of light and dark, like the "pixelized image we see on a stadium scoreboard," said Jessy D. Dorn, a research scientist at Second Sight Medical Products, which produces the device, collaborating with the Department of Energy. (Other research teams are developing similar devices.)

The video processor directs each electrode to transmit signals representing an object's contours, brightness and contrast, which pulse along optic neurons into the brain.

Currently, “it’s a very crude image,” Dr. Dorn said, because the implant has only 60 electrodes; many people see flashes or patches of light.

Brian Mech, Second Sight’s vice president for business development, said the company was seeking federal approval to market the 60-electrode version, which would cost up to $100,000 and might be covered by insurance. Also planned are 200- and 1,000-electrode versions; the higher number might provide enough resolution for reading. (Dr. Mech said a maximum electrode number would eventually be reached because if they are packed too densely, retinal tissue could be burned.)

“Every subject has received some sort of visual input,” he said. “There are people who aren’t extremely impressed with the results, and other people who are.” Second Sight is studying what affects results, including whether practice or disease characteristics influence the brain’s ability to relearn how to process visual signals.

People choose when to use the device by turning their camera on. Dean Lloyd, 68, a Palo Alto, Calif., lawyer, was “pretty disappointed” when he started in 2007, but since his implant was adjusted so more electrodes responded, is “a lot more excited about it,” he said. He uses it constantly, seeing “borders and boundaries” and flashes from highly reflective objects, like glass, water or eyes.

With Ms. Morfoot’s earlier 16-electrode version, which registers objects as horizontal lines, she climbed the Eiffel Tower and “could see all the lights of the city,” she said. “I can see my hand when I’m writing. At Little League games, I can see where the catcher, batter and umpire are.”

Kathy Blake, 58, of Fountain Valley, Calif., said she mainly wanted to help advance research. But she uses it to sort laundry, notice cars and people, and on the Fourth of July, to “see all the fireworks,” she said.

Ms. Campbell, a vocational rehabilitation counselor for New York’s Commission for the Blind and Visually Handicapped, has long been cheerfully self-sufficient, traveling widely from her fourth-floor walk-up, going to the theater, babysitting for her niece in North Carolina.

But little things rankle, like not knowing if clothes are stained and needing help shopping for greeting cards. Everything is a “gray haze — like being in a cloud,” she said. The device will not make her “see like I used to see,” she said. “But it’s going to be more than what I have. It’s not just for me — it’s for so many other people that will follow me.”

Ms. Campbell’s “realistic view of her vision” and willingness to practice are a plus, said Aries Arditi, senior fellow in vision science at Lighthouse International, a nonprofit agency overseeing her weekly training, which includes practice moving her head so the camera captures images and interpreting light as objects.

“In 20 years, people will think it’s primitive, like the difference between a Model T and a Ferrari,” said Dr. Lucian Del Priore, an ophthalmology surgeon at New York-Presbyterian Hospital/Columbia University Medical Center, who implanted Ms. Campbell’s electrodes. “But the fact is, the Model T came first.”

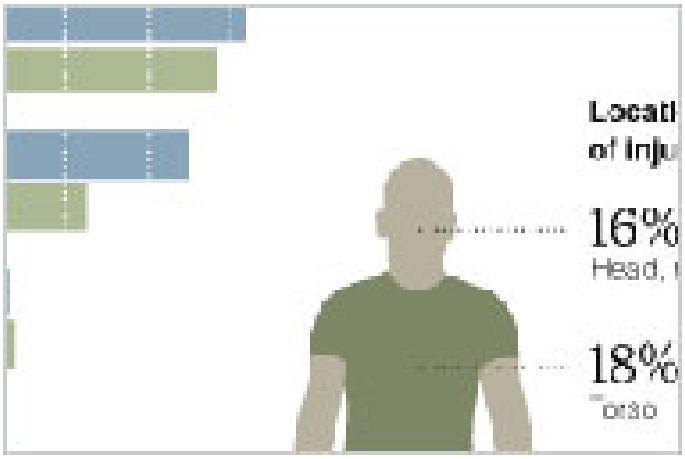
Ms. Campbell would especially like to see colors, but, for now, any color would be random flashes, Dr. Arditi said.

But she saw circular lights at a restaurant, part of a light installation at an art exhibition. “There’s a lot to learn,” she said. Still, “I’m, like, really seeing this.”

http://www.nytimes.com/2009/09/27/health/research/27eye.html?_r=1&nl=health&emc=healthupdateema1

Hurt at Home, and a Fall Is Likely to Blame

By NICHOLAS BAKALAR



Every year about 33 million Americans are injured badly enough to require medical attention, and the most common cause of nonfatal injury in every age group is falling down. Most falls happen at home.

For the most recent reporting period, 2004 to 2007, there was no statistically significant difference between the sexes in rates of injury from overexertion, poisoning or transportation. But women were more likely than men to be injured in a fall and less likely to be struck by an object or injured by a cut.

The analysis, published this month by the Centers for Disease Control and Prevention, found that people 15 to 24 were by far the most likely to be hurt in transportation accidents, and piercing and cutting injury was most common in the 25-to-44 age group. People with some college education were more likely to be injured than those with a bachelor's degree or higher or those with a high school diploma or less.

American Indians and Alaska natives had the highest rates of injury requiring medical attention, and Asians had the lowest. White people had higher rates of injury than African-Americans.

The report offers no explanations for its findings.

The data "tell people where injury occurs and what people were doing at the time they were injured," said Li Hui Chen, an epidemiologist with the C.D.C. and a co-author of the report.

"We know only the statistics. People need to use this report to identify problems and possible solutions."
NICHOLAS BAKALAR

http://www.nytimes.com/2009/09/29/health/research/29stats.html?ref=research

Having a Baby: Training and the Quality of an Obstetrician

By RONI CARYN RABIN

When it comes to delivering a baby, it really does matter where a doctor was trained: some residency programs produce better obstetricians than others.

This is the conclusion of a study that evaluates programs based on how well the patients treated by the programs' graduates fared.

The researchers analyzed the records of 4.9 million deliveries in Florida and New York State from 1992 to 2007, looking for complications like infections and bleeding after vaginal and Caesarean section deliveries.

The 4,124 obstetricians overseeing the deliveries had graduated from 107 different residency programs.

The programs were divided into five groups, based on their graduates' rate of complications. Among women whose babies were delivered by doctors trained in the top fifth of programs, 10.3 percent experienced complications. For the others, the complication rate was 13.6 percent.

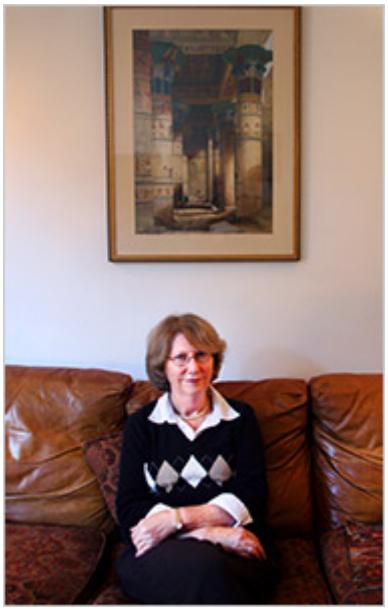
"You can look up on the Web and see what the mortality rate is for cardiac surgeons," said Dr. David A. Asch, executive director of the Leonard Davis Institute of Health Economics at the University of Pennsylvania. "We determined that obstetrics and gynecology residency programs also differ in the quality of the physicians they produce."

Dr. Asch declined to say which obstetrics programs did the best.

http://www.nytimes.com/2009/09/29/health/29baby.html?ref=research

After a Death, the Pain That Doesn't Go Away

By FRAN SCHUMER



Each of the 2.5 million annual deaths in the United States directly affects four other people, on average. For most of these people, the suffering is finite — painful and lasting, of course, but not so disabling that 2 or 20 years later the person can barely get out of bed in the morning.

For some people, however — an estimated 15 percent of the bereaved population, or more than a million people a year — grieving becomes what Dr. M. Katherine Shear, a professor of psychiatry at Columbia, calls "a loop of suffering." And these people, Dr. Shear added, can barely function. "It takes a person away from humanity," she said of their suffering, "and has no redemptive value."

This extreme form of grieving, called complicated grief or prolonged grief disorder, has attracted so much attention in recent years that it is one of only a handful of disorders under consideration for being added to the DSM-V, the American Psychiatric Association's handbook for diagnosing mental disorders, due out in 2012.

Some experts argue that complicated grief should not be considered a separate condition, merely an aspect of existing disorders, like depression or post-traumatic stress. But others say the evidence is convincing.

"Of all the disorders I've heard proposed, they have better data for this than almost any of the other possible topics," said Dr. Michael B. First, a professor of clinical psychiatry at Columbia and an editor of the current manual, DSM-IV. "It would be crazy of them not to take it seriously."

There is no formal definition of complicated grief, but researchers describe it as an acute form persisting more than six months, at least six months after a death. Its chief symptom is a yearning for the loved one so intense that it strips a person of other desires. Life has no meaning; joy is out of bounds. Other symptoms include intrusive thoughts about death; uncontrollable bouts of sadness, guilt and other negative emotions; and a preoccupation with, or avoidance of, anything associated with the loss. Complicated grief has been linked to higher incidences of drinking, cancer and suicide attempts.

"Simply put," Dr. Shear said, "complicated grief can wreck a person's life."

In 2004, Stephanie Muldberg of Short Hills, N.J., lost her son Eric, 13, to Ewing's sarcoma, a bone cancer. Four years after Eric's death, Ms. Muldberg, now 48, walked around like a zombie. "I felt guilty all the time, guilty about living," she said. "I couldn't walk into the deli because Eric couldn't go there any longer. I couldn't play golf because Eric couldn't play golf. My life was a mess.

"And I couldn't talk to my friends about it, because after a while they didn't want to hear about it. 'Stephanie, you need to get your life back,' they'd say. But how could I? On birthdays, I'd shut the door and take the phone off the hook. Eric couldn't have any more birthdays; why should I?"

Hours of therapy and support groups later, Ms. Muldberg was referred to a clinical trial at Columbia. After 16 weeks of a treatment developed by Dr. Shear, she was able to resume a more normal life. She learned to play bridge, went on a family vacation and read a book about something other than dying.

A crucial phase of the treatment, borrowed from the cognitive behavioral therapy used to treat victims of post-traumatic stress disorder, requires the patient to recall the death in detail while the therapist records the session. The patient must replay the tape at home, daily. The goal is to show that grief, like the tape, can be picked up or put away.

"I'd never been able to do that before, to put it away," Ms. Muldberg said. "I was afraid I'd lose the memories, lose Eric."

For some, the recounting is the hardest part of recovering. "That was just brutal and I had to relive it," said Virginia Eskridge, 66, who began treatment 20 years after the death of her husband, Fred Adelman, a college professor in Pittsburgh. "I nearly dropped out, but I knew this was my last hope of getting any kind of functional life back."

At the same time patients learn to handle their grief, they are encouraged to set new goals. For Ms. Eskridge, a retired law school librarian, that meant returning to the campus where her husband had taught.

"Everywhere I went there were reminders of him, because we had been everywhere," she said. "It was like I was getting stabbed in the heart every time I went somewhere."

That feeling finally went away, and Ms. Eskridge was even able to visit her husband's old office. "It really gave me my life back," she said of the treatment. "It sounds extreme, but it's true."

In a 2005 study in The Journal of the American Medical Association, Dr. Shear presented evidence that the treatment was twice as effective as the traditional interpersonal therapy used to treat depression or bereavement, and that it worked faster. The study supported earlier suggestions that complicated grief might actually be different not only from normal grief but also from other disorders like post-traumatic stress and major depression.

Then, in 2008, NeuroImage published a study of the brain activity of people with complicated grief. Using functional magnetic resonance imaging, Mary-Frances O'Connor, an assistant professor of psychiatry at the University of California, Los Angeles, showed that when patients with complicated grief looked at pictures of their loved ones, the nucleus accumbens — the part of the brain associated with rewards or longing — lighted up. It showed significantly less activity in people who experienced more normal patterns of grieving.

"It's as if the brain were saying, 'Yes I'm anticipating seeing this person' and yet 'I am not getting to see this person,' " Dr. O'Connor said. "The mismatch is very painful."

The nucleus accumbens is associated with other kinds of longing — for alcohol and drugs — and is more dense in the neurotransmitter dopamine than in serotonin. That raises two interesting questions: Could

memories of a loved one have addictive qualities in some people? And might there be a more effective treatment for this kind of suffering than the usual antidepressants, whose target is serotonin?

Experts who question whether complicated grief is a distinct disorder argue that more research is needed. "You can safely say that complicated grief is a disorder, a collection of symptoms that causes distress, which is the beginning of the definition of a disease," said Dr. Paula J. Clayton, medical director of the American Foundation for Suicide Prevention. "However, other validators are needed: family history and studies that follow the course of a disorder. For example, once it's cured, does it go away or show up years later as something else, like depression?"

George A. Bonanno, a professor of clinical psychology at Columbia known for his work on resilience (the reaction of the 85 percent of the population that does adapt to loss), was skeptical at first. But, Dr. Bonanno said, "I ran those tests and, lo and behold, extra grief symptoms were very important in predicting what was going on with these people, over and above depression and P.T.S.D."

Regardless of how complicated grief is classified, the discussion highlights a larger issue: the need for a more nuanced look at bereavement. The DSM-IV devotes only one paragraph to the topic.

Studies suggest that therapy for bereavement in general is not very effective. But Dr. Bonanno called the published data "embarrassingly bad" and noted they tended to lump in results from "a lot of people who don't need treatment" but sought it at the insistence of "loved ones or misguided professionals."

Even if clinicians did identify people with complicated grief, there would not be enough therapists to treat them. Despite Dr. Shear's "terrific research" on the therapy she pioneered, said Dr. Sidney Zisook, a professor of psychiatry at the University of California, San Diego, "there aren't a lot of people out there who are trained to do it, and there aren't a lot of patients with complicated grief who are benefiting from this treatment breakthrough."

The issue is pressing given the links between complicated grief and a higher incidence of suicide, social problems and serious illness. "Do the symptoms of prolonged grief predict suicidality, a higher level of substance abuse, cigarette and alcohol consumption?" said Holly G. Prigerson, associate professor of psychiatry at Harvard Medical School and director of the Center for Psycho-oncology and Palliative Care Research at the Dana-Farber Cancer Institute in Boston. "Yes, yes and yes, over and above depression; they're better predictors of those things."

In an age when activities like compulsive shopping are viewed as disorders, the subject of grief is especially sensitive. Deeply bereaved people are often reluctant to talk about their sorrow, and when they do, they are insulted by the use of terms like disorder or addiction. Grief, after all, is noble — emblematic of the deep love between parents and children, spouses and even friends. Our sorrows, the poets tell us, make us human; would proper therapy have denied us Tennyson's "In Memoriam"?

Diagnosing a deeper form of grief, however, is not about taking away anyone's sorrow. "We don't get rid of suffering in our treatment," Dr. Shear said. "We just help people come to terms with it more quickly."

"Personally, if it were me," she added, "I would want that help."

http://www.nytimes.com/2009/09/29/health/29grief.html?nl=health&emc=healthupdateema1

Hyenas Cooperate, Problem-solve Better Than Primates

Spotted hyenas may not be smarter than chimpanzees, but a new study shows that they outperform the primates on cooperative problem-solving tests. (Credit: Image courtesy of Duke University)

ScienceDaily (Sep. 29, 2009) — Spotted hyenas may not be smarter than chimpanzees, but a new study shows that they outperform the primates on cooperative problem-solving tests.

Captive pairs of spotted hyenas *(Crocuta crocuta)* that needed to tug two ropes in unison to earn a food reward cooperated successfully and learned the maneuvers quickly with no training. Experienced hyenas even helped inexperienced partners do the trick.

When confronted with a similar task, chimpanzees and other primates often require extensive training and cooperation between individuals may not be easy, said Christine Drea, an evolutionary anthropologist at Duke University.

Drea's research, published online in the October issue of *Animal Behavior*, shows that social carnivores like spotted hyenas that hunt in packs may be good models for investigating cooperative problem solving and the evolution of social intelligence. She performed these experiments in the mid-1990s but struggled to find a journal that was interested in non-primate social cognition.

"No one wanted anything but primate cognition studies back then," Drea said. "But what this study shows is that spotted hyenas are more adept at these sorts of cooperation and problem-solving studies in the lab than chimps are. There is a natural parallel of working together for food in the laboratory and group hunting in the wild."

Drea and co-author Allisa N. Carter of the Univ. of California at Berkeley, designed a series of food-reward tasks that modeled group hunting strategies in order to single out the cognitive aspects of cooperative problem solving. They selected spotted hyenas to see whether a species' performance in the tests might be linked to their feeding ecology in the wild.

Spotted hyena pairs at the Field Station for the Study of Behavior, Ecology and Reproduction in Berkeley, Calif. were brought into a large pen where they were confronted with a choice between two identical platforms 10 feet above the ground. Two ropes dangled from each platform. When both ropes on a platform were pulled down hard in unison -- a similar action to bringing down large prey -- a trap door opened and spilled bone chips and a sticky meatball. The double-rope design prevented a hyena from solving the task alone, and the choice between two platforms ensured that a pair would not solve either task by chance.

The first experiment sought to determine if three pairs of captive hyenas could solve the task without training. "The first pair walked in to the pen and figured it out in less than two minutes," Drea said. "My jaw literally dropped."

Drea and Carter studied the actions of 13 combinations of hyena pairs and found that they synchronized their timing on the ropes, revealing that the animals understood the ropes must be tugged in unison. They also showed that they understood both ropes had to be on the same platform. After an animal was experienced, the number of times it pulled on a rope without its partner present dropped sharply, indicating the animal understood its partner's role.

"One thing that was different about the captive hyena's behavior was that these problems were solved largely in silence," Drea said. Their non-verbal communication included matching gazes and following one another. "In the wild, they use a vocalization called a whoop when they are hunting together."

In the second and third experiments, Drea found that social factors affected the hyenas' performance in both positive and negative ways. When an audience of extra hyenas was present, experienced animals solved the task faster. But when dominant animals were paired, they performed poorly, even if they had been successful in previous trials with a subordinate partner.

"When the dominant females were paired, they didn't play nicely together," Drea said. "Their aggression toward each other led to a failure to cooperate."

When a naïve animal unfamiliar with the feeding platforms was paired with a dominant, experienced animal, the dominant animals switched social roles and submissively followed the lower-ranking, naïve animal. Once the naïve animal became experienced, they switched back.

Both the audience and the role-switching trials revealed that spotted hyenas self-adjust their behavior based upon social context.

It was not a big surprise that the animals were strongly inclined to help each other obtain food, said Kay Holekamp, a professor of zoology at Michigan State University who studies the behavioral ecology of spotted hyenas.

"But I did find it somewhat surprising that the hyenas' performance was socially modulated by both party size and pair membership," Holekamp said. "And I found it particularly intriguing that the animals were sensitive to the naïveté of their potential collaborators."

Researchers have focused on primates for decades with an assumption that higher cognitive functioning in large-brained animals should enable organized teamwork. But Drea's study demonstrates that social carnivores, including dogs, may be very good at cooperative problem solving, even though their brains are comparatively smaller.

"I'm not saying that spotted hyenas are smarter than chimps," Drea said. "I'm saying that these experiments show that they are more hard-wired for social cooperation than chimpanzees."

Journal reference:

1. Christine M. Drea, Allisa N. Carter. **Cooperative problem solving in a social carnivore**. *Animal Behaviour*, 2009; 78 (4): 967 DOI: 10.1016/j.anbehav.2009.06.030

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

http://www.sciencedaily.com/releases/2009/09/090928131032.htm#

Perennial Energy Crops Could Be Good For Carbon Savings And For Wildlife

Fields of miscanthus in the English landscape. (Credit: Image courtesy of University, Newcastle)

ScienceDaily (Sep. 29, 2009) — Growing the energy crops short rotation coppice (SRC) willow and miscanthus grass could help the UK to reduce carbon emissions and benefit wildlife, according to researchers from the UK Research Councils' Rural Economy and Land Use Programme.

Dr Angela Karp at Rothamsted Research led an interdisciplinary team from the universities of East Anglia and Exeter, the Game and Wildlife Conservation Trust and the Centre for Ecology and Hydrology, in a major research project to identify the effects of increasing the amount of land used to grow these new crops. Their calculations suggest that planting biomass crops to generate electricity does lead to net savings in greenhouse gases, compared with current emissions.SRC willow and miscanthus are already grown over c17,000 hectares in the UK to provide electricity and heat. Government policies aim to encourage up to around one million hectares, some of which could also be processed into transport fuels. But concerns have been raised about the likely effects on farmland biodiversity, water resources and familiar landscapes, as well as the pressures on land used for growing food crops.

The researchers found that the SRC willow in particular actually had positive effects for butterflies, some invertebrates and most bird species. Looking at water usage, they found that SRC willow is similar to cereal crops, while miscanthus is more comparable to woodlands. The team also consulted members of the public about the changes to landscape appearance that would result from growing these novel crops, using virtual-reality computer simulations. Most people showed little concern about the aesthetic effects of the planting, although some expressed worries about lorry movements and processing units.

Dr Angela Karp said: "Fields of SRC willow and the exotic grass miscanthus are still quite unfamiliar in the UK countryside and it is important to look at all the implications of increasing the hectarage.

"Our results suggest that there is definite potential for growing more of them, without negative effects, although we do find that sensitive plantation design would be beneficial, both for wildlife and for aesthetic impact."One of the outcomes from our project is detailed mapping across England, which identifies areas which could be suitable for growing energy crops. This shows that we could meet government objectives of growing 350,000 hectares of these for electricity without impacting on food production. However, to meet an additional 750,000 for transport fuels would increase pressure on available land."

Adapted from materials provided by University, Newcastle, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090916092755.htm#

Telltale Tells Story Of Winds At Phoenix Landing Site

The Telltale consists of a gallows that is mounted on the top of the Meteorological Mast of the Lander. The active element of the instrument is an extremely lightweight Kapton tube hanging in Kevlar fibres. Images taken of the instrument will show the deflection of the Telltale due to the wind. A mirror is mounted below the active part to enable better direction information. (Credit: Mars Simulation Laboratory (www.marslab.dk) / University of Aarhus)

ScienceDaily (Sep. 29, 2009) — Wind speeds and directions were measured for the first time in the Mars polar region using the Phoenix lander's Telltale instrument. Astronomers recorded Easterly winds of approximately 15-20 kilometres per hour during the martian mid-summer. When autumn approached, the winds increased and switched round to come predominantly from the West. While these winds appeared to be dominated by turbulence, the highest wind speeds recorded of up to nearly 60 kilometres per hour coincided with the passing of weather systems, when also the number of dust devils increased by an order of magnitude.

The results are being today at the European Planetary Science Congress in Potsdam by Dr Haraldur Gunnlaugsson.

Phoenix landed in the North polar region of Mars on May 25, 2008 and operated successfully for 151 sols (1 sol is a Martian day, which is 37 minute longer than a day on Earth). The Telltale device consisted of a lightweight tube suspended on top of a meteorological mast, roughly two meters above the local surface. The onboard camera continuously imaged the deflection of the tube in the wind, taking more than 7500 images during the mission.

"Telltale has given us a wealth of information about the local Martian wind velocities and directions. At the Phoenix landing site, we were able to see meteorological changes caused by interactions between the dynamic north pole, where there are ever changing evaporation processes, and the Martian atmosphere" said Dr Gunnlaugsson.

Mars is typically a rather windy place and learning more about the planet's climatic conditions will contribute to the understanding of the Martian water cycle and the identification of areas on the red planet that could sustain life. Local wind measurements by the Telltale instrument, amended with daily images

of the whole northern hemisphere by the Mars Reconnaissance Orbiter spacecraft, have allowed astronomers to gain much deeper information on weather systems on Mars.

“We’ve seen some unexpected night-time temperature fluctuations and are starting to understand the possible ways dust is put into suspension in the Martian atmosphere. For example, we could see that some of the dust storms on Mars do not require the existence of high winds,” said Dr Gunnlaugsson.

Telltale was designed and constructed in Denmark at the Mars Simulation Laboratory at the Aarhus University as a part of the Canadian built meteorological package for Phoenix.

"The challenge was to develop an instrument sensitive enough to detect very light breezes and at the same time able to withstand the violent vibrations during the mission launch. The Telltale instrument, although quite simple, has operated very successfully in the thin atmosphere of Mars,” said Dr. Gunnlaugsson.

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

http://www.sciencedaily.com/releases/2009/09/090916092751.htm#

Light, Photosynthesis Help Bacteria Invade Fresh Produce

New research suggests that exposure to light and possibly photosynthesis itself could be helping disease-causing bacteria to be internalized by lettuce leaves, making them impervious to washing. (Credit: iStockphoto/Alexei Novikov)

ScienceDaily (Sep. 29, 2009) — Exposure to light and possibly photosynthesis itself could be helping disease-causing bacteria to be internalized by lettuce leaves, making them impervious to washing, according to research published in the October issue of the journal *Applied and Environmental Microbiology*.

Salmonella enterica is a common cause of foodborne gastroenteritis, with an estimated number of 1 to 3 million human cases per year in the United States. Fresh produce is increasingly being implicated as a source of infection. One of the largest foodborne outbreaks in recent history, the Salmonella St. Paul outbreak in 2008 which sickened over 1,400 people, was associated with tomatoes and jalapeno peppers.

Previous studies of foodborne pathogens on produce have found that the bacteria do not only attach to the surface of fresh produce but find their way below the surface of the skin through pores called stomata where they can hide from and resist washing and food sanitizers.

In the study, researchers from the Agricultural Research Organization at the Volcani Center in Israel and Tel-Aviv University examined the role that light and photosynthesis might play on the ability of salmonella bacteria to infiltrate lettuce leaves via stomata. Sterile iceberg lettuce leaves were exposed to bacteria either in the light, in the dark, or in the dark after 30 minutes of exposure to light. Incubation in the light or preexposure to light resulted in aggregation of bacteria around open stomata and invasion into the inner leaf tissue. In contrast, incubation in the dark resulted in a scattered attachment pattern and very little internalization.

The researchers believe that the increased propensity for internalization in the light may be due to several factors. First, in the absence of light plants enter a period of dormancy, where stomata are closed and no photosynthesis takes place. In the light, the stomata are open. Additional findings also suggest that the bacteria are attracted to the open stomata by the nutrients produced during photosynthesis which are not present in the dark.

"The elucidation of the mechanism by which Salmonella invades intact leaves has important implications for both pre- and postharvest handling of lettuce and probably other leafy vegetables. The capacity to inhibit internalization should limit bacterial colonization to the phylloplane and consequently might enhance the effectiveness of surface sanitizers," say the researchers.

Adapted from materials provided by American Society for Microbiology, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2009/09/090928172524.htm#

Orgasms, Sexual Health And Attitudes About Female Genitals

Debby Herbenick is associate director of the Center for Sexual Health Promotion in the School of Health, Physical Education and Recreation at Indiana University. (Credit: Image courtesy of Indiana University)

ScienceDaily (Sep. 29, 2009) — An Indiana University study published in the September issue of the *International Journal of Sexual Health* found that women who feel more positively about women's genitals find it easier to orgasm and are more likely to engage in sexual health promoting behaviors, such as having regular gynecological exams or performing vulvar self-examinations.

"These are important findings about body image," said Debby Herbenick, associate director of the Center for Sexual Health Promotion in the School of Health, Physical Education and Recreation. "Our culture often portrays women's genitals as dirty and in need of cleaning and grooming. Some women may have had greater exposure to such negative messages or may be more susceptible to their impact."

Herbenick's study created a scale for measuring men's and women's attitudes toward women's genitals. Such a scale, she wrote in the study, could be useful in sex therapy, in medical settings to help better understand decision-making that goes into gynecological care and treatment, and in health education settings involving women and their sexual health. The study also found that men had more positive attitudes about women's genitals than women.

"Women are often more critical about their own bodies -- and other women's bodies -- than men are," Herbenick said. "What we found in this study is that men generally feel positive about a variety of aspects of women's genitals including how they look, smell, taste and feel."

Herbenick, also a sexual health educator for The Kinsey Institute for Research in Sex, Gender and Reproduction, offers the following suggestions regarding the findings:

- **Body image**. Parents might consider how they can help their daughters to feel more positively about their bodies, such as by teaching them accurate names for their body parts, including their genitals (e.g., "vulva" rather than "down there") and responding in supportive ways to their self-exploration. "Rather than saying, 'don't touch down there -- it's dirty,' parents might let their children know that it's OK for them to touch their genitals, but in private spaces such as their own bedroom or the bathroom," Herbenick said.
- **Advertisements and marketing**. Health educators might consider ways that they can teach women and men about their bodies in positive, sex-positive ways by openly discussing how some products or marketing campaigns make people feel about their bodies.

The survey component of the study involved 362 women and 241 men, most of whom were white/Caucasian and between the ages of 18 and 23.

"Our study builds on previous research that demonstrates that the mind and body are highly connected in regard to sex," said Herbenick. "When women feel more positively about female genitals, they likely feel more relaxed in their own skin, more able to let go and thus more likely to experience pleasure and orgasm."

The study was supported by The Joseph Miller Foundation.

Journal reference:

1. Debra L. Herbenick. **The Development and Validation of a Scale to Measure Attitudes Toward Women's Genitals**. *International Journal of Sexual Health*, 2009; 21 (3): 153 DOI: 10.1080/19317610903149692

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

http://www.sciencedaily.com/releases/2009/09/090928172536.htm#

Focus On The Wild Could Avert Plant Pollination Threat

The rare bumblebee Bombus ruderata which is making a comeback on flower mixtures sown for agri-environment schemes. (Credit: Claire Carvell)

ScienceDaily (Sep. 28, 2009) — The global threat to the pollination of flowers and food production crops, highlighted by a dramatic decline in honeybee colonies, could be eased by a renewed focus on 'wild' pollinators. Agri-environment schemes that encourage farmers to create bee-friendly habitats could be the key to increasing numbers of valuable wild pollinators like bumblebees in the wider countryside.

Dr Claire Carvell, a researcher with the UK Centre for Ecology & Hydrology (CEH) stresses the crucial role of wild pollinators: 'The important point to note is that while the economic value of pollination, estimated at around £20 billion worldwide, is often credited entirely to honeybees, bumblebees and several other wild bee species are in fact much more effective pollinators of many crops such as field beans, clover, tomatoes and apples. This arises from a combination of morphological adaptations and their flower visiting behaviour.'

Wild pollinators are seen by Dr Carvell as a vital 'insurance policy' to avoid the effect of honeybee losses such as those in the US, leaving crops like almonds and apples without their key pollinators, and in China where growers have been forced to pollinate apples by hand. 'With honeybee numbers dwindling and the obvious risks of relying on a single domesticated species to provide almost a third of what we eat, it is vital to conduct more research into both managed and wild pollinator populations.'

Solutions to the decline in pollinators, apart from improvements to honey bee husbandry and breeding, include the commercial use of non-honeybee species for crop pollination and the conservation and restoration of high-quality habitats for all pollinators in the wider landscape. CEH research has been used to design options for bumblebees under the agri-environment schemes in England, which provide funding to farmers who deliver effective environmental management on their land. Dr Carvell explains: 'We developed simple, low-cost seed mixtures containing pollen and nectar- rich forage plants. Our monitoring studies have shown that these can increase bumblebee numbers by more that 30-fold when sown at the edges of cropped fields. These targeted measures can also attract rare bumblebee species, many of which are now normally confined to the last remaining fragments of flower rich grasslands on

protected areas and reserves. Our lab and field studies have shown that boosting forage resources significantly increases the number of reproductive bees produced.'

But the scale of take up of these options by farmers had been disappointing. 'It is vital that we better engage farmers in this process', says Dr Carvell. 'CEH are working with industry partners Syngenta who have set up a training scheme called Operation Bumblebee to spread the word on pollinator conservation. More than 1000 hectares of the pollen and nectar mix have been sown by over 500 farmers, and this approach is now being launched across Europe under Operation Pollinator.

Better news for the plight of honeybee colonies has emerged from research in Spain at Environmental Microbiology Reports. For the first time, scientists have isolated the parasite *Nosema ceranae (Microsporidia)* from professional apiaries suffering from honeybee colony depopulation syndrome. They report that they went on to treat the infection with complete success.

Adapted from materials provided by AlphaGalileo Foundation, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090928095500.htm#

Infant Pain, Adult Repercussions: How Infant Pain Changes Sensitivity In Adults

A premature infant in a neonatal intensive care unit. (Credit: iStockphoto/Alison Hausmann)

ScienceDaily (Sep. 28, 2009) — Scientists at Georgia State University have uncovered the mechanisms of how pain in infancy alters how the brain processes pain in adulthood.

Research is now indicating that infants who spent time in the neonatal intensive care unit (NICU) show altered pain sensitivity in adolescence. These results have profound implications and highlight the need for pre-emptive and post-operative pain medicine for newborn infants.

The study, published online in the journal Frontiers in Behavioral Neuroscience, sheds light on how the mechanisms of pain are altered after infant injury in a region of the brain called the periaqueductal gray, which is involved in the perception of pain.

Using Sprague-Dawley rats, Jamie LaPrairie, a graduate student in associate professor Anne Murphy's laboratory, examined why the brief experience of pain at the time of birth permanently decreased pain sensitivity in adulthood.

Endogenous opioid peptides, such as beta-endorphin and enkephalin, function to inhibit pain. They're also the 'feel good' substances that are released following high levels of exercise or love. Since these peptides are released following injury and act like morphine to dampen the experience of pain, LaPrairie and Murphy tested to see if the rats, who were injured at birth, had unusually high levels of endogenous opioids in adulthood.

To test this hypothesis, LaPrairie and Murphy gave adult animals that were injured at the time of birth a drug called naloxone. This drug blocks the actions of endogenous opioids. After animals received an injection of naloxone, they behaved just like an uninjured animal.

The scientists then focused on the periaqueductal gray region to see if inflammation at birth altered the natural opioid protein expression in this brain region. Using a variety of anatomical techniques, the investigators showed that animals that were injured at birth had endogenous opioid levels that were two times higher than normal.

While it's beneficial to decrease pain sensitivity in some cases, it's not good to be completely resilient to pain.

"Pain is a warning sign that something is wrong," Murphy explained. "For example, if your hand is in water that's too hot, pain warns you to remove it before tissue damage occurs."

Interestingly, while there is an increase in endorphin and enkephalin proteins in adults, there is also a big decrease in the availability of mu and delta opioid receptors. These receptors are necessary in order for pain medications, such as morphine, to work. This means that it takes more pain-relieving medications in order to provide relief as there are fewer available receptors in the brain. Studies in humans are reporting the same phenomenon.

The number of invasive procedures an infant experienced in the NICU is negatively correlated with how responsive the child is to morphine later in life; the more painful procedures an infant experienced, the less effective morphine is in alleviating pain.

The study by LaPrairie and Murphy has major implications for the treatment of infants in neonatal intensive care. On average, a prematurely born infant in a neonatal intensive care unit will experience 14 to 21 invasive procedures a day, including heel lance, insertion of intravenous lines, and intubation. All of these procedures are quite painful and are routinely conducted without prior analgesics or anesthetics.

"It's imperative that pain be treated," Murphy said. "We once assumed that a newborn infant is insensitive to pain, and this is clearly not the case. Even at that period of time, the central nervous system is able to respond to pain, and our studies show that the experience of pain completely changes the wiring of the brain in adulthood."

The next steps in Murphy's research include the study of how neonatal injury at birth alters stress responses, as well as the affects of infant injury on long-term learning and memory.

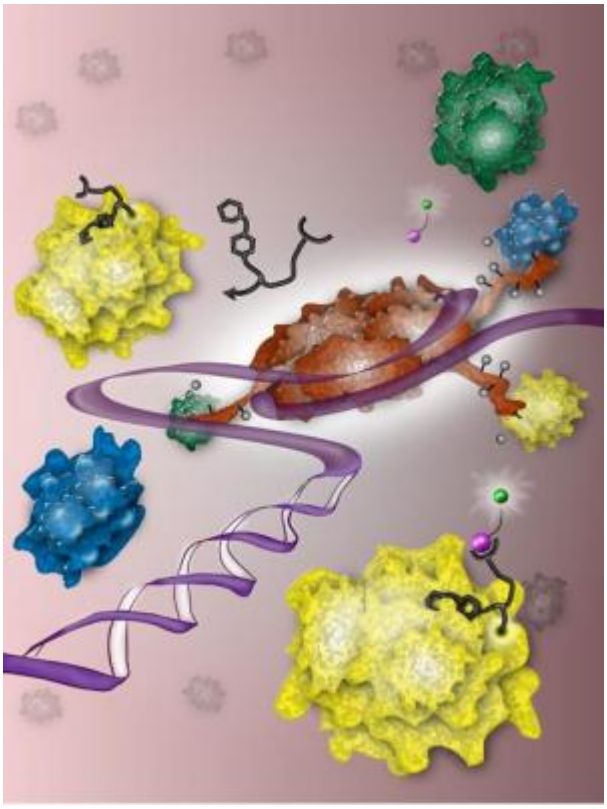
LaPrairie's and Murphy's work was supported by the National Institutes of Health, the Center for Behavioral neuroscience, a consortium of seven universities at Georgia State, and the Georgia State Brains and Behavior Program.

The article, titled "Neonatal injury alters adult pain sensitivity by increasing opioid tone in the periaqueductal gray," appears in the September 2009 edition of journal *Frontiers in Behavioral Neuroscience*, Vol. 3, p. 1-11.

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

http://www.sciencedaily.com/releases/2009/09/090927130048.htm

Mechanism For Potential Friedreich's Ataxia Drug Uncovered



To identify the target of compounds that reactivate the silenced frataxin gene in Friedreich's ataxia, the research team synthesized an activity profiling probe. This molecule has a multiple components: the two rings that make up the active compound, a crosslinking agent (the arrow), a linker region, and a chemical group called an alkyne for attachment of a dye (green sphere), which is linked to another chemical group called an azide. The azide reacts with the alkyne through "click chemistry" to form a covalent bond. This then lights up the target of the compound. The active compound, a histone deacetylase inhibitor, changes the structure of nucleosomes bound to DNA (center). Blue and green structures are other proteins, such as other histone deacetylases, that are not targeted by the drug. (Credit: Image by Mary O'Reilly)

ScienceDaily (Sep. 28, 2009) — Using clever chemistry, a Scripps Research team has pinpointed the enzyme target of a drug group that stops the progression of the devastating disease Friedreich's ataxia in mice and may do the same for humans. The findings, developed in collaboration with scientists from Repligen Corporation, help advance this treatment approach one step closer toward human clinical trials, which will be a welcome event for disease sufferers who currently have few treatment options.

The work, reported as the cover article of the September 25, 2009 issue of the journal *Chemistry & Biology*, could also lead to treatments for related conditions such as Huntington's disease and the spinocerebellar ataxias.

"It will be very rewarding if our work actually leads to a therapy for Friedreich's," says Joel Gottesfeld, a professor in the Department of Molecular Biology and leader of the Scripps Research team that discovered the potential treatment. "This is a horrible disease."

Friedreich's ataxia, which afflicts about one of every 20,000 to 50,000 people in the United States, is caused by inadequate production of the protein frataxin, which leads to degeneration of nerve tissue and an array of associated complications including heart disease and scoliosis. In most cases, sufferers are ultimately confined to a wheelchair and many die as young adults.

Researchers have tied this low frataxin production to a large repetition of a specific triplet DNA pattern in the frataxin gene. Though many questions remain open, it appears that the unusual DNA structure resulting from these repetitions somehow attracts enzymes known as histone deacetylases (HDACs). These enzymes alter the packaging of the DNA in chromosomes in a way that inactivates the expression of the frataxin gene, though it remains intact.

In 2006, the Gottesfeld team reported the discovery of a compound simply called 4b that blocked HDAC activity, jumpstarting frataxin production in white blood cells from Friedreich's patients. Later work

showed that a close derivative of 4b increased the level of frataxin production in a mouse model for Friedreich's ataxia.

But researchers remained unsure of how these molecules work, and understanding a drug's activity is critical to moving forward with drug development, as well as to gaining better understanding of a disease.

To answer that question, Chunping Xu, a postdoctoral research associate in Gottesfeld's lab, drew on work by Scripps Research Professors Barry Sharpless and Ben Cravatt and their groups. Using a technique referred to as "click chemistry" and other methods, Xu combined 4b with a fluorescent tag, resulting in a compound called 1-BP. She then incubated this creation with samples of various HDACs. If the enzyme or enzymes targeted became fluorescent, she would know it was due to binding with 1-BP.

The results were unequivocal. "This molecule has just an astonishing preference for HDAC3 over any of the other HDAC enzymes," says Gottesfeld.

Related experiments with 1-BP and extracts from Friedreich's patients' cells, and other tests done by Repligen confirmed HDAC3 as the target.

HDAC3 is part of a whole family of HDACs (at least 18) that could have been involved. By identifying the one that's playing a key role, the scientists have revealed the path, or at least a path, that can control the production of the frataxin protein. With that identified, the scientists are better positioned to understand what's causing the disease.

Having such information about the mechanism of a potential drug treatment is also critical to understanding what effects a drug might have on patients. The Gottesfeld team's work was completed in collaboration with researchers from Repligen Corporation, based in Waltham, MA, which is pursuing a Friedreich's treatment suitable for human clinical trials.

But the Scripps Research team's work isn't done. Gottesfeld and his colleagues will continue to study HDAC3 and its inhibitors in hope of identifying exactly how this enzyme controls frataxin production, and whether it directly or indirectly inactivates the frataxin gene. Such work could help researchers better understand how Friedreich's and similar diseases such as Huntington's progress, improving the chances of effective treatments.

"When you delve deeper into the mechanisms," says Gottesfeld, "You never know if you might uncover new targets and new therapeutic interventions that are even better than what you're working with."

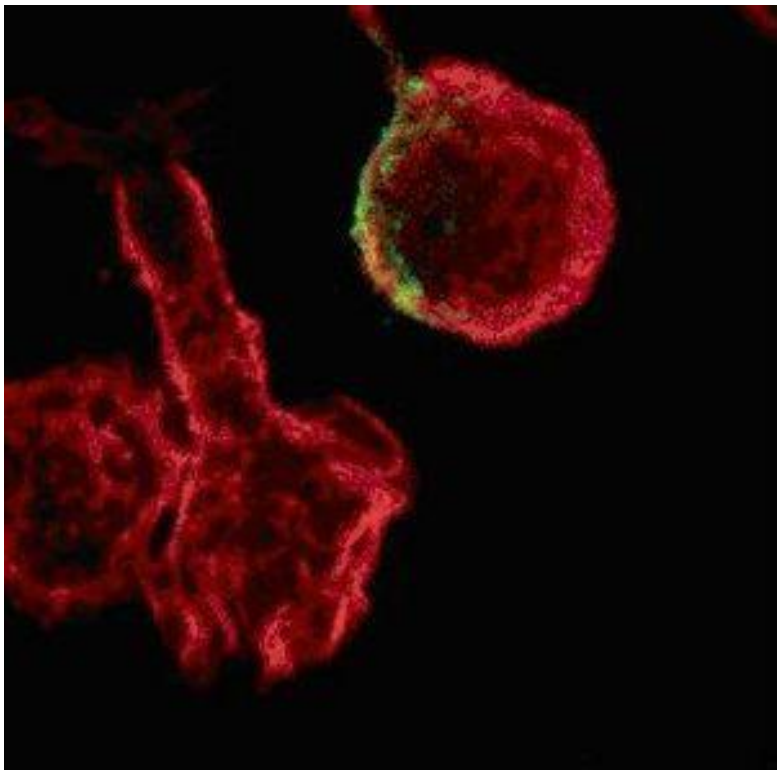
This research was supported by the National Institute of Neurological Disorders and Stroke of the National Institutes of Health, the Friedreich's Ataxia Research Alliance, GoFAR, Ataxia UK, and Repligen Corporation.

In addition to Xu and Gottesfeld, authors on the paper, titled "Chemical probes identify a role for histone deacetylase 3 in Friedreich's ataxia gene silencing," are Elisabetta Soragni, C. James Chou, and David Herman from Scripps Research, and Heather Plasterer and James Rusche from Repligen Corporation.

Adapted from materials provided by Scripps Research Institute.

http://www.sciencedaily.com/releases/2009/09/090927130044.htm#

How HIV Cripples Immune Cells



The actin cytoskeleton of human T-lymphocytes (red) in the presence of the stimulus CCL-19. An HIV-1 infection (HIV-1 protein CA in green) leads to the loss of actin reorganization and therefore of cell motility. (Credit: Hygiene Institute, Heidelberg University Hospital)

ScienceDaily (Sep. 28, 2009) — In order to be able to ward off disease pathogens, immune cells must be mobile and be able to establish contact with each other. The working group around Professor Dr. Oliver Fackler in the Virology Department of the Hygiene Institute of the Heidelberg University Hospital has discovered a mechanism in an animal model revealing how HIV, the AIDS pathogen, cripples immune cells: Cell mobility is inhibited by the HIV Nef protein.

The study was published in the journal *Cell Host & Microbe.* This discovery may have pointed the way towards a new treatment approach.

Over 30 million persons worldwide are infected with HIV. Typically, after the initial infection accompanied by acute symptoms, there is a latency period of several years before the acquired immune deficiency syndrome (AIDS) manifests. The human immunodeficiency virus (HIV) has developed numerous strategies for eluding the body's defenses and the medications administered. The prerequisite for efficient reproduction of the virus in the patient’s body is the virus’s own Nef protein. Without Nef, the development of AIDS is significantly slowed or even stopped completely. The underlying mechanism of this observation was a complete mystery up to now, however.

HIV modifies the cell structure system of the host cells

Viruses alter the support structures of affected cells, enabling them to enter the cells more easily. The cell structure element actin, which also gives muscles their mobility, aids in the motility of immune cells. This is necessary for immune cells to be able to establish contact with each other and combat the virus. After each movement, actin must be returned to its original state in order to be available once again. HIV especially attacks immune cells of the T-helper type. These cells support not only direct "defense against

the enemy", but are also necessary for building sufficient antibodies against the invader. For this, they must rely on their mobility.

Short-circuiting of two different signal paths in the cell by Nef

The researchers examined the movement of cells in living zebra fish embryos and were able to show that cell mobility is inhibited by the HIV Nef protein. As they continued their experiments on cell cultures, they were able to explain the underlying mechanism: Nef causes an enzyme that normally has nothing to do with cell mobility to deactivate a regulator for actin regeneration. Nef therefore causes a short-circuit of two cellular mechanisms, thus inhibiting the reorganization of the cell structure element actin and the cell's ability to move. Thus, the affected immune cells can no longer fulfill their function.

“We speculate that the negative effect of Nef on the mobility of T-helper cells has far reaching consequences for the efficient formation of antibodies by B-lymphocytes in the patient. The mechanism we have described could be involved in the increasingly observed malfunction of B-lymphocytes in AIDS patients”, explains Professor Fackler. Up to now, Nef has not been a target of antiviral therapy. Since one of the first molecular mechanisms has now been decoded, however, and the importance of Nef for the disease has become clearer, this could change in the future.

Journal reference:

1. Stolp et al. **HIV-1 Nef Interferes with Host Cell Motility by Deregulation of Cofilin**. *Cell Host & Microbe*, 2009; 6 (2): 174 DOI: 10.1016/j.chom.2009.06.004

Adapted from materials provided by University Hospital Heidelberg.
http://www.sciencedaily.com/releases/2009/09/090916103426.htm#

Researchers Go Underground To Reveal 850 New Species In Australian Outback

Some of the 850 new species discovered in underground water, caves and micro-caverns across outback Australia. (Credit: Courtesy of the Australian Center for Evolutionary Biology & Biodiversity, University of Adelaide)

ScienceDaily (Sep. 28, 2009) — Australian researchers have discovered a huge number of new species of invertebrate animals living in underground water, caves and "micro-caverns" amid the harsh conditions of the Australian outback.

A national team of 18 researchers has discovered 850 new species of invertebrates, which include various insects, small crustaceans, spiders, worms and many others.

The team – led by Professor Andy Austin (University of Adelaide), Dr Steve Cooper (South Australian Museum) and Dr Bill Humphreys (Western Australian Museum) – has conducted a comprehensive four-year survey of underground water, caves and micro-caverns across arid and semi-arid Australia.

"What we've found is that you don't have to go searching in the depths of the ocean to discover new species of invertebrate animals – you just have to look in your own 'back yard'," says Professor Austin from the Australian Center for Evolutionary Biology & Biodiversity at the University of Adelaide.

"Our research has revealed whole communities of invertebrate animals that were previously unknown just a few years ago. What we have discovered is a completely new component to Australia's biodiversity. It is a huge discovery and it is only about one fifth of the number of new species we believe exist underground in the Australian outback."

Only half of the species discovered have so far been named. Generically, the animals found in underground water are known as "stygofauna" and those from caves and micro-caverns are known as "troglofauna".

Professor Austin says the team has a theory as to why so many new species have been hidden away underground and in caves.

"Essentially what we are seeing is the result of past climate change. Central and southern Australia was a much wetter place 15 million years ago when there was a flourishing diversity of invertebrate fauna living on the surface. But the continent became drier, a process that last until about 1-2 million years ago, resulting in our current arid environment. Species took refuge in isolated favorable habitats, such as in underground waters and micro-caverns, where they survived and evolved in isolation from each other.

"Discovery of this 'new' biodiversity, although exciting scientifically, also poses a number of challenges for conservation in that many of these species are found in areas that are potentially impacted by mining and pastoral activities," he says.

The research team has reported its findings at a scientific conference on evolution and biodiversity in Darwin, which celebrates the 200th anniversary of Charles Darwin: http://www.evolutionbiodiversity2009.org. The conference finishes today.

The team's research has been funded by the Australian Research Council (ARC) Environmental Futures Network.

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

http://www.sciencedaily.com/releases/2009/09/090928095214.htm

New View Of Lagoon Nebula: GigaGalaxy Zoom Phase 3

The third image of ESO's GigaGalaxy Zoom project is an amazing vista of the Lagoon Nebula taken with the 67-million-pixel Wide Field Imager attached to the MPG/ESO 2.2-metre telescope at the La Silla Observatory in Chile. The image covers more than one and a half square degree-- an area eight times larger than that of the Full Moon -- with a total of about 370 million pixels. It is based on images acquired using three different broadband filters (B, V, R) and one narrow-band filter (H-alpha). (Credit: ESO)

ScienceDaily (Sep. 28, 2009) — The third image of ESO's GigaGalaxy Zoom project has just been released online, completing this eye-opening dive into our galactic home in outstanding fashion. The latest image follows on from views, released over the last two weeks, of the sky as seen with the unaided eye and through an amateur telescope. This third instalment provides another breathtaking vista of an astronomical object, this time a 370-million-pixel view of the Lagoon Nebula of the quality and depth needed by professional astronomers in their quest to understand our Universe.

The newly released image extends across a field of view of more than one and a half square degree — an area eight times larger than that of the full Moon — and was obtained with the Wide Field Imager attached to the MPG/ESO 2.2-metre telescope at the La Silla Observatory in Chile. This 67-million-pixel camera has already created several of ESO's iconic pictures.

The intriguing object depicted here — the Lagoon Nebula — is located four to five thousand light-years away towards the constellation of Sagittarius (the Archer). The nebula is a giant interstellar cloud, 100 light-years across, where stars are forming. The scattered dark patches seen all over the nebula are huge clouds of gas and dust that are collapsing under their own weight and which will soon give birth to clusters of young, glowing stars. Some of the smallest clouds are known as "globules" and the most prominent ones have been catalogued by the astronomer Edward Emerson Barnard.

The Lagoon Nebula hosts the young open stellar cluster known as NGC 6530. This is home for 50 to 100 stars and twinkles in the lower left portion of the nebula. Observations suggest that the cluster is slightly

in front of the nebula itself, though still enshrouded by dust, as revealed by reddening of the starlight, an effect that occurs when small dust particles scatter light.

The name of the Lagoon Nebula derives from the wide lagoon-shaped dark lane located in the middle of the nebula that divides it into two glowing sections.

This gorgeous starscape is the last in the series of three huge images featured in the GigaGalaxy Zoom project, launched by ESO as part of the International Year of Astronomy 2009 (IYA2009). Through three giant images, the GigaGalaxy Zoom project reveals the full sky as it appears with the unaided eye from one of the darkest deserts on Earth, then zooms in on a rich region of the Milky Way using an amateur telescope, and finally uses the power of a professional telescope to reveal the details of a famous nebula. In this way, the project links the sky we can all see with the deep, "hidden" cosmos that astronomers study on a daily basis. The wonderful quality of the images is a testament to the splendour of the night sky at ESO's sites in Chile, which are the most productive astronomical observatories in the world.

"The GigaGalaxy Zoom project's dedicated website has proved very successful, drawing hundreds of thousands of visitors from all around the world," says project coordinator Henri Boffin. "With the trilogy now complete, viewers will be able to explore a magnificently detailed cosmic environment on many different scales and take a breathtaking dive into our Milky Way."

Adapted from materials provided by ESO.

http://www.sciencedaily.com/releases/2009/09/090928095339.htm#

HIV's Ancestors May Have Plagued First Mammals

The remains of an ancient HIV-like virus have been discovered in the genome of the two-toed sloth. (Credit: iStockphoto/Nancy Craft)

ScienceDaily (Sep. 28, 2009) — The retroviruses which gave rise to HIV have been battling it out with mammal immune systems since mammals first evolved around 100 million years ago – about 85 million years earlier than previously thought, scientists now believe.

The remains of an ancient HIV-like virus have been discovered in the genome of the two-toed sloth *[Choloepus hoffmanni]* by a team led by Oxford University scientists who publish a report of their research in this week's Science.

'Finding the fossilised remains of such a virus in this sloth is an amazing stroke of luck,' said Dr Aris Katzourakis from Oxford's Department of Zoology and the Institute for Emergent Infections, James Martin 21st Century School. 'Because this sloth is so geographically and genetically isolated its genome gives us a window into the ancient past of mammals, their immune systems, and the types of viruses they had to contend with.'

The researchers found evidence of 'foamy viruses', a particular kind of retrovirus that resembles the complex lentiviruses, such as HIV and simian retroviruses (SIVs) – as opposed to simple retroviruses that are found throughout the genomic fossil record.

'In previous work we had found evidence for similar viruses in the genomes of rabbits and lemurs but this new research suggests that the ancestors of complex retroviruses, such as HIV, may have been with us from the very beginnings of mammal evolution,' said Dr Aris Katzourakis.

Understanding the historical conflict between complex viruses and mammal immune systems could lead to new approaches to combating existing retroviruses, such as HIV. It can also help scientists to decide which viruses that cross species are likely to cause dangerous pandemics – such as swine flu (H1N1) – and which, like bird flu (H5N1) and foamy viruses, cross this species barrier but then never cause pandemics in new mammal populations.

Adapted from materials provided by University Of Oxford.

http://www.sciencedaily.com/releases/2009/09/090927145354.htm#

Math Used As A Tool To Heal Toughest Of Wounds

ScienceDaily (Sep. 28, 2009) — Scientists expect a new mathematical model of chronic wound healing could replace intuition with clear guidance on how to test treatment strategies in tackling a major public-health problem.

The Ohio State University researchers are the first to publish a mathematical model of an ischemic wound – a chronic wound that heals slowly or is in danger of never healing because it is fed by an inadequate blood supply. Ischemic wounds are a common complication of diabetes, high blood pressure, obesity and other conditions that can be characterized by poor vascular health.

An estimated 6.5 million people in the United States are affected by chronic wounds, and many are at risk of losing limbs or even dying as a result of the most severe of these wounds.

Modeling by mathematicians with expertise in biomedical processes has become increasingly important in the health sciences. The modeling reduces the need for guesswork and time-consuming animal testing traditionally required as researchers pursue prevention, diagnosis and treatment of complex diseases.

“Before you treat any problem successfully, you have to understand it,” said Chandan Sen, professor and vice chair for research in Ohio State’s Department of Surgery and a senior author of the study. “Now that we have this model, we can take the next step to find what factors in the equations can be fine-tuned to the point where the net result is improvement in the ischemic wound outcome.”

The modeling research appears this week in the online early edition of the *Proceedings of the National Academy of Sciences.*

The mathematical model, to date, simulates both non-ischemic wounds – those typical of wounds in healthy people with good circulation – and ischemic wounds. The current model produced results that generally match pre-clinical expectations: that a normal wound will close in about 13 days, and that 20 days after the development of an ischemic wound, only 25 percent of the wound will be healed.

The model also showed that normal wounds have higher concentrations of proteins and cells expected to be present during the healing process, while ischemic wounds lack oxygen and remain in a prolonged inflammatory phase that interferes with the subsequent cascade of events required to begin wound closure.

Sen, also executive director of the Comprehensive Wound Center at Ohio State, recently published a report about a biological pre-clinical model of an ischemic wound that his lab designed using the skin on a pig’s back. The new mathematical model, a system of partial differential equations, borrowed some data from the animal model, but also includes numerous calculations assigning values to the various cells and chemicals involved in the wound-healing process.

“Wound geometry is complicated because it is three-dimensional,” said Avner Friedman, a senior author of the paper and a Distinguished University Professor at Ohio State. “It would be infeasible to perform our computations within the framework of this geometry. However, we used some mathematical ideas to reduce the problem to a simpler geometry without giving up any of the important aspects of the process.”

It is not just the wound that is three-dimensional, the researchers noted. The complexity of this process is compounded by the fact that the wound-healing model must take into account both the total space occupied by the wound and the time required for the healing process.

Wound healing under normal conditions occurs in four overlapping stages: haemostasis, when platelets make clots to stop bleeding and release chemicals that attract cells to the wound; transient inflammation, when a variety of white blood cells go to work to kill infectious agents and generate growth factors

needed for repair; proliferation, when new blood vessels form and when cells produce a bed, called the extracellular matrix, on which the repair occurs; and remodeling, which can take years, as the repaired wound site gains strength.

Sen and colleagues have spent years studying the characteristics of wounds and the intricate details of the healing process. Oxygen is a known essential element to the healing process, and high-pressure oxygen chambers are used to treat some wounds. But for ischemic wounds, oxygen alone isn't enough.

Scientists know that reduced blood flow to a wound site means that oxygen, important nutrients and circulating cells are not finding their way to the wound to initiate healing. Researchers hope that manipulating mathematical models of these conditions could offer guidance on how to approach this problem without the time and trial-and-error required in biological studies on animals.

"We're not just considering what type of therapy should be used for these wounds. It is the specifics of when and how you apply it – those are the details that matter," Sen said. "Mathematical algorithms provide more pointed data that biologists can use to develop hypotheses."

Developing the biological model was an important start, Sen and Friedman noted. To create an animal model of an ischemic wound, researchers had to strike a careful balance so they reduced blood flow to the wound site without killing all the surrounding tissue by cutting off too much blood. Sen said the 8-millimeter-wide cylindrical puncture wounds rest on what the researchers consider an "island" of skin receiving too little blood to effectively deliver healing cells and chemicals to the wound. Details about the animal model are published in the May issue of the journal Physiological Genomics, a publication of the American Physiological Society.

In developing the mathematical model, Friedman worked with first author Chuan Xue, a postdoctoral researcher in Ohio State's Mathematical Biosciences Institute, to assign values to variables in the first two stages of wound healing. These included oxygen concentration, concentration of growth factors, density of white blood cells that fight pathogens, density of fibroblasts that perform part of the repair, and density of tips and sprouts of tiny new blood vessels.

The two also modeled the extracellular matrix – the bed on which cells work to close the wound – in a way that allows for the matrix to change the way it functions over time. This part of the model also allowed for simulation of the exertion of pressure – a characteristic of certain types of ulcers that people with diabetes are prone to develop.

Xue noted that the equations were borrowed from the mathematical theory of homogenization by manipulating a single parameter – called parameter alpha – to draw the distinction between ischemic and nonischemic wounds in the model. This is one example, Friedman noted, of simplifying the model without leaving out important biological details.

This work is supported by the National Science Foundation, the National Institutes of Health and the Center for Clinical and Translational Science at Ohio State.

Adapted from materials provided by Ohio State University.

http://www.sciencedaily.com/releases/2009/09/090921162144.htm#

Pulling Together Increases Your Pain Threshold

Oxford winning the 2009 boat race. (Credit: Image courtesy of University Of Oxford)

ScienceDaily (Sep. 28, 2009) — A study of Oxford rowers has shown that members of a team who exercised together were able to tolerate twice as much pain as when they trained on their own.

In the study, published September 16 in the Royal Society journal *Biology Letters*, researchers from the University of Oxford's Institute of Cognitive and Evolutionary Anthropology found the pain threshold of 12 rowers from the Oxford Boat Race squad was greater after group training than after individual training.

They conclude that acting as a group and in close synchrony seems to 'ramp up' pain thresholds. The underlying endorphin release may be the mechanism that underpins communal-bonding effects that emerge from activities like religious rituals and dancing.

Each of the 12 rowers participated in four separate tests. They were asked to row continuously for 45 minutes in a virtual boat in the gym (as in normal training), in an exercise carried out in two teams of six and then in a separate session as individuals, unobserved by other team members. After each of the sessions, the researchers measured their pain threshold by how long they could stand an inflated blood pressure cuff on the arm.

The study found there was a significant increase in the rowers' pain threshold following exercise in both individual and group sessions (a well established response to exercise of any kind). However, after the group training there was a significantly larger increase as compared with training carried out individually.

Since close synchrony is the key to successful competition-class racing, these results suggest that doing a synchronised activity as a group increases the endorphin rush that we get from physical exertion. The study says that since endorphins help to create a sense of bonhomie and positive effect, this effect may underlie the experience of warmth and belonging that we have when we do activities like dancing, sports, religious rituals and other forms of communal exercise together.

Professor Robin Dunbar, Head of the Institute of Cognitive and Evolutionary Anthropology at Oxford University, said: 'Previous research suggests that synchronised physical activity such as laughter, music and many religious activities makes people happier and is part of the bonding process. We also know that physical exercise creates a natural high through the release of endorphins. What this study shows us is that synchrony alone seems to ramp up the production of endorphins so as to heighten the effect when we do these activities in groups.'

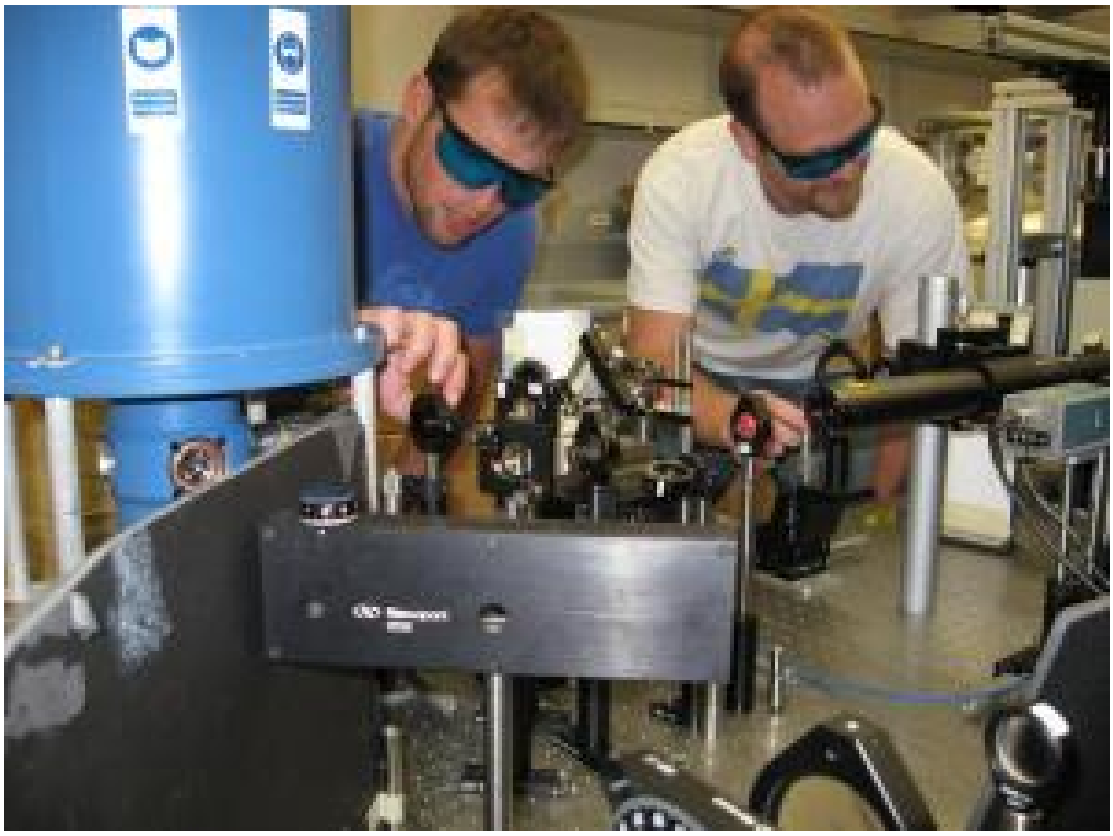
Lead author Dr Emma Cohen, from the Institute of Cognitive and Evolutionary Anthropology, said: 'The results suggest that endorphin release is significantly greater in group training than in individual training even when power output, or physical exertion, remains constant. The exact features of group activity that generate this effect are unknown, but this study contributes to a growing body of evidence suggesting that synchronised, coordinated physical activity may be responsible.'

One of the researchers involved in this study was Robin Ejsmond-Frey, a double Blue in rowing and former President of the Oxford University Boat Club.

Adapted from materials provided by University Of Oxford.

http://www.sciencedaily.com/releases/2009/09/090927150348.htm#

Discovery Brings New Type Of Fast Computers Closer To Reality



Alex High and Aaron Hammack adjust the optics in their UCSD lab. (Credit: Image courtesy of University of California - San Diego)

ScienceDaily (Sep. 28, 2009) — Physicists at UC San Diego have successfully created speedy integrated circuits with particles called "excitons" that operate at commercially cold temperatures, bringing the possibility of a new type of extremely fast computer based on excitons closer to reality.

Their discovery, detailed this week in the advance online issue of the journal *Nature Photonics*, follows the team's demonstration last summer of an integrated circuit—an assembly of transistors that is the building block for all electronic devices—capable of working at 1.5 degrees Kelvin above absolute zero. That temperature, equivalent to minus 457 degrees Fahrenheit, is not only less than the average temperature of deep space, but achievable only in special research laboratories.

Now the scientists report that they have succeeded in building an integrated circuit that operates at 125 degrees Kelvin, a temperature that while still a chilly minus 234 degrees Fahrenheit, can be easily attained commercially with liquid nitrogen, a substance that costs about as much per liter as gasoline.

"Our goal is to create efficient devices based on excitons that are operational at room temperature and can replace electronic devices where a high interconnection speed is important," said Leonid Butov, a professor of physics at UCSD, who headed the research team. "We're still in an early stage of development. Our team has only recently demonstrated the proof of principle for a transistor based on excitons and research is in progress."

Excitons are pairs of negatively charged electrons and positively charged "holes" that can be created by light in a semiconductor such as gallium arsenide. When the electron and hole recombine, the exciton decays and releases its energy as a flash of light.

The fact that excitons can be converted into light makes excitonic devices faster and more efficient than conventional electronic devices with optical interfaces, which use electrons for computation and must then convert them to light for use in communications devices.

"Our transistors process signals using excitons, which like electrons can be controlled with electrical voltages, but unlike electrons transform into photons at the output of the circuit," Butov said. "This direct coupling of excitons to photons allows us to link computation and communication."

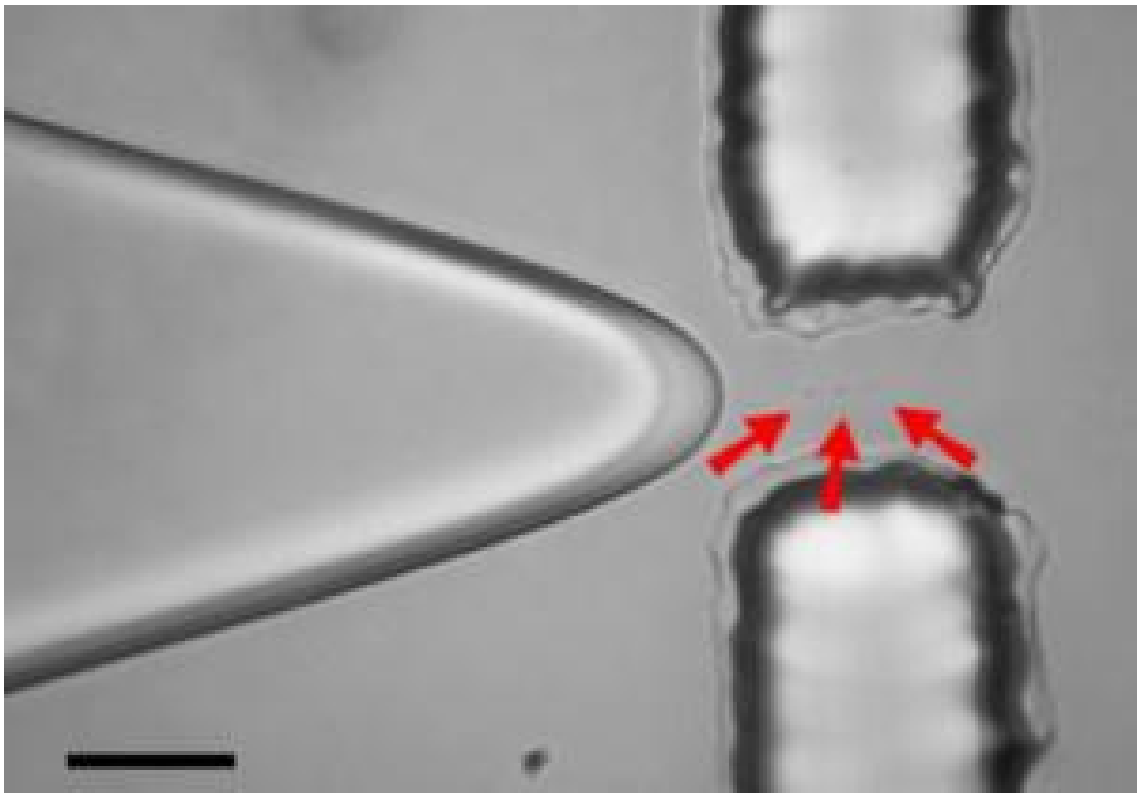
Other members of the team involved in the discovery were physicists Gabriele Grosso, Joe Graves, Aaron Hammack and Alex High at UC San Diego, and materials scientists Micah Hanson and Arthur Gossard at UC Santa Barbara.

Their research was supported by the Army Research Office, the Department of Energy and the National Science Foundation.

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2009/09/090927165439.htm#

New Nanochemistry Technique Encases Single Molecules In Microdroplets



The NIST "on-demand" single-molecule drop dispenser: Water flows through a microfluidic channel, roughly 35 microns wide, and enters a narrow constriction where it breaks up into droplets. Varying the width of the constriction changes the size of the drops and lacing the water with desired molecules of just the right concentration causes the resulting droplets to pick up single molecules of interest 99 percent of the time. (Credit: C. López-Mariscal and K. Helmerson, NIST)

ScienceDaily (Sep. 28, 2009) — Inventing a useful new tool for creating chemical reactions between single molecules, scientists at the National Institute of Standards and Technology (NIST) have employed microfluidics—the manipulation of fluids at the microscopic scale—to make microdroplets that contain single molecules of interest.

By combining this new microfluidic "droplet-on-demand" method with "optical tweezers" that could merge multiple droplets and cause their molecular contents to react, the research may ultimately lead to a compact, integrated setup for obtaining single-molecule information on the structure and function of important organic materials, such as proteins, enzymes, and DNA.

With the aid of NIST's Center for Nanoscale Science and Technology, physicists Carlos López-Mariscal and Kristian Helmerson created a tiny microfluidic device with a channel through which water can flow. Squeezed into a narrow stream by a mixture of oils whose viscosity, or resistance to flow, exerts pressure on it, the water then enters a narrow constriction. The water's abrupt pressure drop—accompanied by a dash of detergent—breaks its surface tension, splitting it into small droplets. (This same effect occurs when a thin stream of water falling from a faucet breaks up into small drops.)

The droplet sizes are highly uniform and can be tuned by adjusting the width of the constriction. With this technique, the researchers made droplets about a micrometer in diameter—or half an attoliter (half a billionth of a billionth of a liter) in volume.

In the microfluidic channel, the water is laced with desired molecules of just the right concentration, so that resulting droplets each pick up on average just one molecule of interest. Inside each droplet, the individual molecules of interest slosh around freely in the relatively roomy sphere, along with the water molecules that make up the bulk of every droplet.

By using laser beams, the researchers can move two or more single-molecule-containing droplets, cause them to coalesce, and observe the reactions through optical methods. For their initial reactions, the researchers are mixing fluorescent molecules that emit different colors, but in the future, they envision more interesting chemical reactions, such as those between an infectious agent and an antibody, or a chromosome and a drug. The researchers can shape a laser beam into any desired pattern and thereby trap not only single drops, but arrays of them, opening up new possibilities for single-molecule spectroscopy.

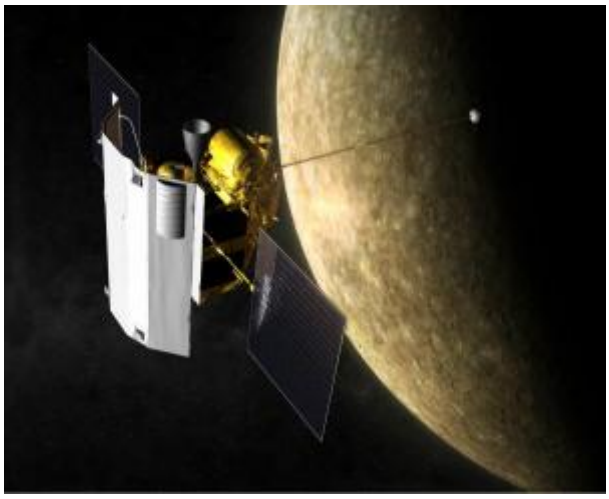
Journal reference:

1. C. López-Mariscal and K. Helmerson. **Optical trapping of hydrosomes**. *Proc. SPIE*, 2009; 7400, 740026

Adapted from materials provided by National Institute of Standards and Technology (NIST).

http://www.sciencedaily.com/releases/2009/09/090922185700.htm#

MESSENGER Spacecraft Prepares For Final Pass By Mercury



Artist's impression of MESSENGER at Mercury. (Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington)

ScienceDaily (Sep. 28, 2009) — NASA's Mercury Surface, Space Environment, Geochemistry, and Ranging spacecraft known as MESSENGER will fly by Mercury for the third and final time on Sept. 29. The spacecraft will pass less than 142 miles above the planet's rocky surface for a final gravity assist that will enable it to enter Mercury's orbit in 2011.

Determining the composition of Mercury's surface is a major goal of the orbital phase of the mission. The spacecraft already has imaged more than 90 percent of the planet's surface. The spacecraft's team will activate instruments during this flyby to view specific features to uncover more information about the planet.

"This flyby will be our last close look at the equatorial regions of Mercury, and it is our final planetary gravity assist, so it is important for the entire encounter to be executed as planned," said Sean Solomon, principal investigator at the Carnegie Institution in Washington. "As enticing as these flybys have been for discovering some of Mercury's secrets, they are the hors d'oeuvres to the mission's main course -- observing Mercury from orbit for an entire year.

The spacecraft may observe how the planet interacts with conditions in interplanetary space as a result of activity on the sun. During this encounter, high spectral- and high spatial-resolution measurements will be taken again of Mercury's tenuous atmosphere and tail.

"Scans of the planet's comet-like tail will provide important clues regarding the processes that maintain the atmosphere and tail," said Noam Izenberg, the instrument's scientist at the Johns Hopkins University Applied Physics Laboratory, or APL, in Laurel, Md. "The Mercury Atmospheric and Surface Composition Spectrometer will give us a snapshot of how the distribution of sodium and calcium vary with solar and planetary conditions. In addition, we will target the north and south polar regions for detailed observations and look for several new atmospheric constituents."

As the spacecraft approaches Mercury, cameras will photograph previously unseen terrain. As the spacecraft departs, it will take high-resolution images of the southern hemisphere. Scientists expect the spacecraft's imaging system to take more than 1,500 pictures. Those images will be used to create a mosaic to complement the high resolution, northern-hemisphere mosaic obtained during the second Mercury flyby. The first flyby took the spacecraft over the eastern hemisphere in January 2008, and the second flyby took it over western side in October 2008.

"We are going to collect high resolution, color images of scientifically interesting targets that we identified from the second flyby," said Ralph McNutt, a project scientist at APL. "The spectrometer also will make measurements of those targets at the same time."

Two spacecraft maneuvers will improve the ability of the spacecraft's Neutron Spectrometer to detect low-energy neutrons sensitive to the abundances of iron and titanium on Mercury's surface. These two elements absorb neutrons and are critical to an understanding of how the planet and its crust formed. A combination of day and night measurements will enable scientists to test the influence that planetary surface temperature has on the neutron population. The data are important for interpreting measurements that will be made after the probe is in orbit around Mercury.

An altimeter will make a topographic profile along the instrument ground track of Mercury's surface. The data gathered will provide additional topography of Mercury's surface features for ongoing studies of the form and structure of its craters and large faults. The information also will extend scientists' equatorial view of Mercury's global shape and allow them to confirm the discovery made during the first and second flyby that Mercury's equatorial region is slightly elliptical.

The spacecraft has completed nearly three-quarters of its 4.9-billion-mile journey to enter orbit around Mercury. The trip includes more than 15 trips around the sun. In addition to flying by Mercury, the spacecraft flew past Earth in August 2005 and Venus in October 2006 and June 2007.

The project is the seventh in NASA's Discovery Program of low-cost, scientifically focused space missions. The spacecraft was designed and built by APL. The mission also is managed and operated by APL for NASA's Science Mission Directorate in Washington.

Adapted from materials provided by NASA.

http://www.sciencedaily.com/releases/2009/09/090927140838.htm#

Four degrees of warming 'likely'

By David Shukman
Environment correspondent, BBC News

In a dramatic acceleration of forecasts for global warming, UK scientists say the global average temperature could rise by 4C (7.2F) as early as 2060.

The Met Office study used projections of fossil fuel use that reflect the trend seen over the last 20 years.

Their computer models also factored in new findings on how carbon dioxide is absorbed by the oceans and forests.

The finding was presented at an Oxford University conference exploring the implications of a 4C rise.

The results show a "best estimate" of 4C being reached by 2070, with a possibility that it will come as early as 2060.

" **Previously we haven't looked at the impact of burning fossil fuels so intensely** "
Richard Betts

Richard Betts of the Met Office Hadley Centre described himself as "shocked" that so much warming could occur within the lifetimes of people alive today.

"If greenhouse gas emissions are not cut soon then we could see major climate changes within our own lifetimes," he said.

"Four degrees of warming averaged over the globe translates into even greater warming in many regions, along with major changes in rainfall."

Big burn

The model finds wide variations, with the Arctic possibly seeing a rise of up to 15C (27F) by the end of the century.

Western and southern parts of Africa could warm by up to 10C, with other land areas seeing a rise of 7C or more.

In its 2007 assessment, the Intergovernmental Panel on Climate Change (IPCC) said the average warming by the end of the century would probably lie between 1.8C and 4C (3.2-7.2F), though it did not rule out the possibility of larger rises.

Key to the Met Office calculations was the use of projections showing fossil fuel use continuing to increase as it has done for the last couple of decades.

"Previously we haven't looked at the impact of burning fossil fuels so intensely," said Dr Betts.

"But it's quite plausible we could get a rise of 4C by 2070 or even 2060."

Dr Betts and his colleagues emphasise the uncertainties inherent in the modelling, particularly the role of the carbon cycle.

But he said he was confident the findings were significant and would serve as a useful guide to policymakers.

The presentation at Oxford's Environmental Change Institute came as negotiators from 192 countries were gathering in Bangkok for the latest set of prepatory talks in the run-up to December's UN climate summit.

Major governments of developing and industrialised nations are committed to a deal that would keep the global temperature rise to 2C, which many regard as a threshold for "dangerous" climate change.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8279654.stm

Published: 2009/09/28 19:04:37 GMT

Champagne flavour in the bubbles

By Pallab Ghosh
Science correspondent, BBC News

It is champagne's bubbles which give the drink flavour and fizz, and glasses that promote bubbles will improve the drinking experience, scientists say.

Research shows there are up to 30 times more flavour-enhancing chemicals in the bubbles than in the rest of the drink.

Wine experts say the finding changes completely our understanding of the role of bubbles in sparkling drinks.

The study is reported in the journal Proceedings of the National Academy of Sciences (PNAS).

Commenting on the research, Dr Jamie Goode, founder of wineanorak.com, said: "In the past, we thought that the carbon dioxide in the bubbles just gave the wine an acidic bite and a little tingle on the tongue, but this study shows that it is much more than this."

According to Dr Goode, the research demonstrates that using fluted glasses for sparkling wine and champagne is more than simply a matter of etiquette.

"Glasses that encourage more bubbles to come up are going to be better," he says. "At the bottom of proper champagne glasses, they put a little bit of (rough) glass, which encourages the nucleation of the flow of bubbles."

Essence of champagne

Dr Gerard Liger-Belair of Reims University, France, is one of the authors of the PNAS report. He said: "It's the very first time that we have been able to detect the fine chemistry of champagne aerosols which are really the essence of champagne."

Dr Liger-Belair admits to having been "obsessed" with bubbles all his life. He used an ultra-high resolution mass spectrometer to study the detailed chemical composition of the aerosols emerging from sparkling wine and champagne.

"The flavour of sparkling wine is determined by the contribution of hundreds and hundreds of different components. We have to detect which of these components are important in the aerosols."

Dr Liger-Belair and his colleague Philippe Schmitt-Kopplin, of the Institute for Ecological Chemistry and Molecular BioGeochemistry in Neuherberg, have studied five champagnes and high-quality sparkling wines so far.

They discovered that in all cases the bubbles were very much richer in the essential flavours of the wine.

According to Dr Goode, the findings may explain why champagnes and sparkling wines produced using the "champagne method" taste so nice.

"It seems that the traditional champagne method ensures that there is a fine stream of bubbles, which, presumably, will give you a more enduring aromatic lift."

The next stage of the research is to compare the raw scientific data with the subjective reactions of expert wine tasters to discover the precise chemicals in the bubbles that give the best tasting drink, and then to explore the possibility of making champagne and sparkling wines taste even better.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8279073.stm

Published: 2009/09/28 21:13:17 GMT

Working mothers' children unfit

Children whose mothers work are less likely to lead healthy lives than those with "stay at home" mothers, a study says.

The Institute of Child Health study of more than 12,500 five-year-olds found those with working mothers less active and more likely to eat unhealthy food.

Other experts said more work was needed to see if the results applied to other age groups.

The study is in the Journal of Epidemiology and Child Health.

About 60% of mothers with children aged up to five are estimated to be in work.

Results

The mothers were asked about the hours they worked and their children's diet, exercise levels and sedentary activities.

" **With many more mums having no choice but to work these days and with government policy actively encouraging it, it is difficult to know how mums can do better** "
Sally Russell, Netmums

A third of the mothers had not worked since the birth of their child, but the mothers who were employed were spending an average of 21 hours a week at work.

They took into account factors likely to influence the results, such as the mothers' level of education and socioeconomic circumstances.

They found that five-year-olds whose mothers worked part-time or full-time were more likely to primarily consume sweetened drinks between meals.

They used their computers or watched television for at least two hours a day compared to the children of "stay at home" mothers who spent less than two hours on these activities.

They were also more likely to be driven to school compared to the children of "stay at home" mothers who tended to walk or cycle.

The children whose mothers had a flexible working pattern did have healthier lifestyles but when other factors were taken into account the researchers said there was little evidence that these children behaved more healthily.

'Time constraints'

Professor Catherine Law, who led the study, said they had not looked at fathers in this study because fathers employment levels had not changed whereas the numbers of working mothers had increased dramatically.

She said: "For many families the only parent or both parents will be working.

"Time constraints may limit parents' capacity to provide their children with healthy foods and opportunities for physical activity.

"Our results do not imply that mothers should not work.

"Rather they highlight the need for policies and programmes to help support parents."

The same children took part in an earlier study by the Institute of Child Health (ICH) which found that those with working mothers were more likely to be obese or overweight by the age of three.

In the latest study, many of the five-year-olds were engaging in health behaviours likely to promote excess weight gain: 37% were mainly eating crisps and sweets between meals, 41% were consuming sweetened drinks and 61% used the television or a computer at least two hours daily.

'Controversial research'

Glenys Jones, nutritionist with the Medical Research Council Human Nutrition Research, said the study was interesting because of limited research so far on the impact of maternal employment on child health choices.

"More work is needed to take into account factors such as how related health behaviours are affected and if the age of the child alters the relationships observed."

Sally Russell, a spokesman for Netmums, said: "The stress and guilt associated with being a working mum is something we are all too well aware of. This report adds to that guilt.

"With many more mums having no choice but to work these days and with government policy actively encouraging it, it is difficult to know how mums can do better. "

A Department of Health spokesman said: "Our Change4Life movement is already helping over 370,000 families eat well, move more and live longer by helping them to understand the harm that fat and added

sugar can cause to children's health, and offering them simple yet effective ways to make changes to their diet and increase their activity levels."

BBC website readers have been sending in their comments on this story. Here is a selection of their thoughts and experiences.

I was a lone parent working mum. My son is now 25 and for about half his time at school I worked full time. He always walked to school and ate healthily. He is very fit and a perfect weight for his height. I guess he is pretty typical. ***Eva McDiarmid, Glasgow, UK***

Damned if we do, damned if we don't. Never mind the fact that most of us don't have the luxury of choice in the matter. Thanks for reporting this so widely and making my commute to work just a little bit more rubbish today, BBC. ***Debbie Newton, Leeds, UK***

I'm cross on so many levels, but mainly a personal one! I work, my husband doesn't, he is our daughter's main carer. He walks her to school, he looks after her after school stuff and cooks her meals every day. She has restricted TV time and is not allowed sweets. Why do people insist on saying 'mother' when they often mean 'parent'. It's wrong on other levels too of course, but for me it's the stupidity of assuming a mum should stay at home and a dad should work - are we still in the 50s? ***Naomi, Sussex, UK***

As a lone mum to one daughter, I work full time because I cannot manage financially any other way. I feel like I'm damned if I do and I'm damned if I don't. I get encouraged to work over 30 hours a week and get a financial incentive for doing this through tax credits, but I feel like I am also heavily criticised for not being a 'proper' mum by not spending enough time with my daughter. I leave the house at 8am every day, get home at 5.30pm every day, my daughter goes to bed at 7pm. I'd love to know where I'm supposed to shoehorn in some quality time with my girl! ***Jane Crabtree, Middlesbrough, UK***

This does make me feel even more guilty for working. Being in full-time work and handing over my three year old to childcare is bad enough, and then having to spend a lot of time during the evenings and weekends doing 'house stuff' really doesn't leave me much time to spend with him, doing the things we want to do. I almost wish we could go back to the days when the mother was expected to stay at home, and the father provide. Sadly, this isn't financially possible in my case. ***Hannah Steward, Oldbury, UK***

Well this story is of no surprise. But why should it be mothers who stay at home? Surely in these days of equality fathers should be discussed as well. My wife and I decided one of us would be at home to bring up the children ourselves. We based our decision about who would stay home on earning power. I hear many parents say they can't afford to not work yet they will lavish money on unnecessary extras. It's often about priority not ability. Too many children these days are treated like 'hobby children'. ***N Bair, Glossop, UK***

I can't win. I don't want to work, I want to look after my family and ensure my kids have a good life. But unlike the many teen parents, I was pregnant at 16 and I married the father of my kids. We purchased a house when I was 18 and we work hard to pay our mortgage. I see this as what all parents should do to instil pride in themselves and their children. I don't live off other people's tax, I pay for the lazy people who live off the state. If a mother or father stays at home because their income allows them to then I feel this is the dream for all parents and this is very lucky. ***Catrina Stephens, Trowbridge, UK***

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8278742.stm

Published: 2009/09/28 23:30:23 GMT

School stars 'enjoy good health'

Children who impress their peers at school tend to go on to enjoy better health as adults, research suggests.

The study was based on a 30-year follow-up of more than 14,000 children born in Sweden in 1953.

The Journal of Epidemiology and Community Health study found the least popular children had a nine times higher risk of ischaemic heart disease.

They were also more at risk of diabetes, drug, alcohol and mental health problems.

The degree of popularity, power and status enjoyed by each child was assessed when the children reached sixth grade in 1966 by asking them who they most preferred to work with at school.

STATUS BANDS
- Marginalised (no nominations)
- Peripheral (one nomination)
- Accepted (two to three nominations)
- Popular (four to six nominations)
- Favourite (at least seven nominations)

Individual children were categorised into five status bands depending on how many nominations they received.

The researchers then matched up this data against information on hospital admissions between 1973 and 2003.

For both men and women, the children who were furthest down the pecking order at school had the highest overall risk of serious health problems as an adult.

For instance, they were more than four times as likely to require hospital treatment for hormonal, nutritional and metabolic diseases as the most popular children.

And their risk of mental health problems was more than doubled.

The researchers said the findings could not be explained by social class.

Negative self-image

Lead researcher Ylva Almquist, from the Centre for Health Equity Studies at the University of Stockholm, said children with a low status might lack social support, and be starved of information.

This could lead to a more negative self-image, which could lead to lower expectations, stunted ambition - and poor choices in life.

"For example, children in lower peer status positions may adopt a more health-damaging lifestyle, including behaviours such as heavy smoking and drinking.

"These behaviours are known to be major risk factors for heart diseases."

Ms Almquist said it was possible that some children's popularity was a result of poor health - but the effect found in the study was too broad for this to be the only factor.

She said the study suggested that schools should work to foster social equality in the classroom, and to boost children's self-image.

Professor Alan Maryon-Davis, president of the UK Faculty of Public Health, said: "Children who feel undervalued or are bullied at school often grow up lacking self-confidence.

"They then seek comfort in over-eating, smoking or drinking to excess, and all too often find themselves on the slippery slope to chronic ill-health.

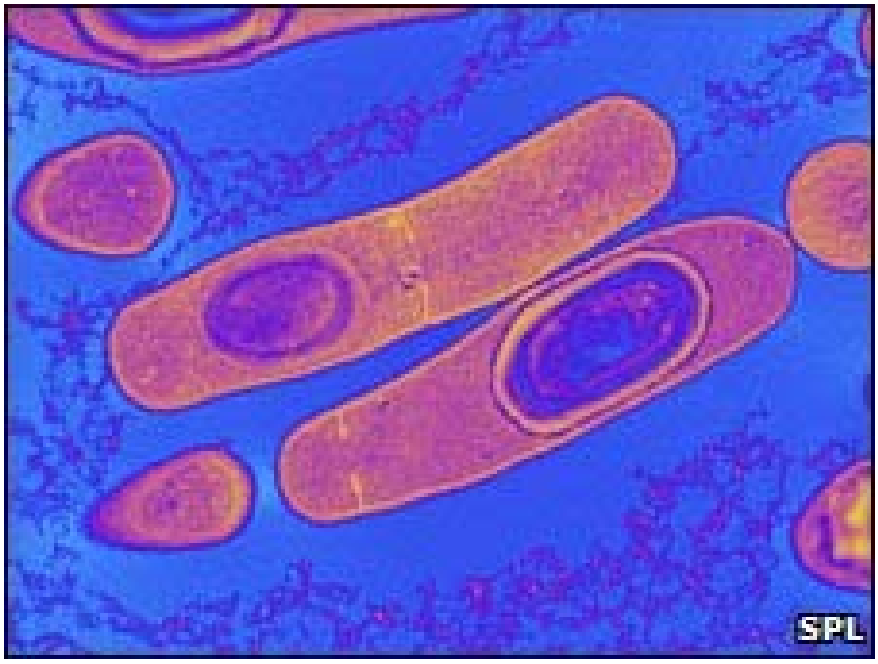
"It is crucial to do whatever we can to help children and young people feel valued."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8275535.stm

Published: 2009/09/28 23:40:08 GMT

C. diff rise due to 'gene switch'

The rise in Clostridium difficile infections in recent years is due to genetic changes rather than dirty hospitals, say UK researchers.



Comparison of an historic strain and a strain from the outbreak at Stoke Mandeville hospital in 2003 found it had evolved to be more virulent.

It can spread more easily and cause more severe symptoms, the team reports in Genome Biology journal.

NHS trusts have a target to cut C. difficile infections by 30% by 2010/11.

The bacteria are present in the gut of as many as 3% of healthy adults and 66% of infants.

It rarely causes problems in healthy people but can lead to illness when the normal balance of bacteria in the gut is disrupted, for example with use of certain antibiotics, and it is the leading cause of hospital-acquired diarrhoea.

" **The deep clean programme was never going to work against this organism in the long term** "
Professor Brendan Wren

In the past five years, a new group of highly virulent C. difficile strains has emerged - PCR-ribotype 027 - which cause more severe diarrhoea and a higher rate of deaths.

Analysis of the full genome of the "hyper-virulent" strains and an older strain showed the bacteria have acquired genes which enable them to survive better in the environment, spread more easily and make patients more severely ill.

In all, five different genetic regions appear to have accumulated in the bacteria in past couple of decades, the team reported in Genome Biology.

Fighting back

The number of cases of C. difficile has risen dramatically since the 1990s, although latest figures show cases are now consistently falling.

Stoke Mandeville Hospital saw two major outbreaks of C. difficile between 2003 and 2006 that caused 35 deaths.

Study leader Professor Brendan Wren, from the London School of Hygiene and Tropical Medicine, said the study would help scientists understand how C. difficile became so aggressive.

"These strains came from nowhere and the sudden rise in C. difficile was due to their spread.

"The bugs are fighting back and the one clear thing that comes out of this study is it is not down to cleaning but that the strain has evolved with new chunks of DNA.

"The deep clean programme was never going to work against this organism in the long term."

Hygiene measures are still needed to keep the infection under control, he added.

A spokeswoman for the Health Protection Agency said it closely monitored the evolution of C. difficile strains.

"All strains of C. difficile require intervention and control - the intervention involved when dealing with the 027 strain is no different than how any other strain is treated.

"All C. difficile requires treatment and vigilant infection control procedures in order to reduce rates of infection."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8273863.stm

Published: 2009/09/27 23:10:07 GMT

Pakistani Artists Find a Contemporary Voice

By JANE PERLEZ

KARACHI, Pakistan — When Bani Abidi returned to this country in 2003 after studying for a master's degree at the Art Institute of Chicago, she was anxious about the precarious position of her homeland. She wanted to make art that would address it, that would somehow speak to both Pakistanis and Americans about the way the United States, in her view, had pushed Pakistan into falling in line with the war on terror, regardless of the potential fallout.

Soon after, Ms. Abidi hired a traditional brass pipe band — a legacy of colonial days that is now thoroughly South Asian — and asked its members to play the most American song she could think of. The video that resulted, "Shan Pipe Band Learns the Star Spangled Banner" (2004), shows the musicians moving through a sputtering though good-natured cacophony of squeaky notes — a seven-minute anthem to the discordant alliance between the two countries.

Ms. Abidi has since become a well-known artist at home and, in some circles, abroad (another of her videos, about the pompous behavior of some Pakistani politicians, was recently acquired by the Museum of Modern Art in Manhattan), and her Shan Pipe Band piece is now on prominent display in "Hanging Fire," the first large-scale American survey of contemporary Pakistani art, at Asia Society in New York through Jan. 3. Like most of the show's artworks — there are 55, by a total of 15 artists — it embodies a deep engagement with the politics and culture of Pakistan and a worldly, provocative and often humorous approach to art that few in the West would associate with this troubled country.

In fact, though, the works on view in New York seem a fair representation of the spirit and sensibilities animating the increasingly vibrant contemporary-art scene that gave rise to "Hanging Fire." That scene, barely visible a generation ago, has been fed in recent years by a surge of newly rich collectors and a proliferation of private galleries that offer the work of Pakistani painters, sculptors and video and installation artists — whose own ranks have grown as existing art-education programs have expanded and new ones have cropped up around the country.

The main centers of new art in Pakistan are its two largest cities, Karachi and Lahore. Karachi, on the Arabian Sea, is the country's financial and media capital, brash and cosmopolitan (and violent). In the last 60 years it has grown from a city of fewer than a half-million residents to one of the 20 largest cities in the word, with a population of about 17 million. It is also home to the Indus Valley School of Art and Architecture, an upstart institution founded in 1989, after the death of the military dictator Zia ul-Haq; the school's creation signaled the end of a dark era when art galleries hid works with any content critical of the state.

Across the country, Lahore, despite its 10 million people, feels relatively sedate. A hub of South Asian artistic and intellectual life for centuries, it is still widely seen as the cultural center of Pakistan. It is home

to the country's leading art school, the National College of Arts, founded as the Mayo School of Arts in the 1880s by John Lockwood Kipling, a British painter, sculptor and the father of Rudyard Kipling. It attracts students from all over Pakistan (the warring tribal area, too) and a prestigious roster of teachers. The college is known for its classes in the exacting technique of miniature painting favored in Mughal times, adapted to modern themes — a popular genre that many contemporary artists have disdained as sell-out art.

A Karachi artist represented in the Asia Society show, Naiza Khan, works in an unusual, somewhat oblique feminist vein out of a light-filled studio on the top floor of the family home in the upper-middle-class Defense Housing Authority neighborhood. Shiny metal sculptures of women's corsets, camisoles and skirts fill the room. Her contribution to "Hanging Fire" includes a red suede and steel piece called "Spine" (2008) modeled on restrictive South Asian female underwear of the early 20th century.

Like so much Pakistani contemporary art, Ms. Khan's work is influenced by the country's often toxic mix of religion and politics. She had long worked on themes of the female body and attire, and was inspired to begin making female armor, she said, when militant Islamic women dressed in black burqas and defiantly wielding long sticks were shown on television as the defenders of a radical mosque, known as Lal Masjid, in the Pakistani capital, Islamabad.

"At Lal Masjid, for the first time one saw a seemingly strong women's force," Ms. Khan said of the mid-2007 incident that resulted in the storming of the mosque by the military and the deaths of more than 80 people.

Some of her pieces, like the armored skirt, are a takeoff on the chastity belt. "Spine" was based on a backless bustier made in fuchsia silk and gold embroidery, an heirloom of a friend. Ms. Khan found the scarlet suede that covers it under a pile of leather scraps at a Karachi factory that manufactures bulletproof vests. She then persuaded a shoemaker to come to her tree-filled courtyard, where he worked alongside a welder: galvanized steel was fashioned into the rounded shapes at the top of the piece by the welder, then the shoemaker painstakingly stitched the suede over the steel.

Radical art is being made in Lahore, too. Anwar Saeed, a professor at the National College of Arts, works in a very different studio atmosphere from Ms. Khan's: a small, excruciatingly spare room on the third floor of a walkup in the city's old town. An old-fashioned transistor radio sits on his desk in front of the window, a neat line of pencils alongside suggesting the Lahori devotion to craft.

Mr. Saeed's large acrylics on canvas are a far cry from the traditionalism with which his employer is identified. Often painted in bright hues reminiscent of Gauguin, they dwell on the conflict of longing and the impossibility of its realization, on sex and death. In the Asia Society show, visitors can leaf through a visual notebook by Mr. Saeed titled "A Book of Imaginary Companions," in which he has painted lewd, funny images of men onto the pages of a published book called "I, Pierre Seel, Deported Homosexual." "Pierre" is an English translation of the true story of a gay Frenchman who was betrayed by a lover, sent to a concentration camp by the Germans during World War II, and lived to tell his experiences.

"It was a book about pain and torture, so I thought I should make images of pleasure," Mr. Saeed said. He describes his images, some of recognizable Pakistani actors and singers, as "something close to pornography, playful, completely enjoyable."

There are still plenty of limits here. The book could never be shown in Pakistan, where homosexuality is recognized as a part of life in many extended families, but is barely accepted in public discourse, Mr. Saeed said.

"No one would have the courage to show it here — it's too explicit," he said, adding that he had recently sold a large acrylic with explicit homosexual imagery to a well-to-do young collector who will hang it in his Karachi home.

In India, where homosexuality is more accepted in art and the media than in Pakistan, a Mumbai gallery recently selected 14 pages for an exhibition. "The safer ones," Mr. Saeed said wryly.

http://www.nytimes.com/2009/09/29/arts/design/29artists.html?ref=design

RIDGEFIELD
A Festive Salute to All Things Bicycle

By SUSAN HODARA

"Bike Rides: The Exhibition," which opened Saturday at the Aldrich Contemporary Art Museum, presents bicycles in all their glory. There are high-tech bicycles made from bamboo and titanium, two of Lance Armstrong's carbon fiber bikes, and nationalistic creations like the restored and elaborately personalized vintage Schwinns from the Puerto Rico Schwinn Club, based in New York City. Among the sculptural works — from China, India and Brazil — is Cai Guo-Qiang's "Illusion of Childhood," an assemblage of bicycles, toys and other objects.

The exhibition also features bike racks, a bicycle advocacy mural and bicycle-inspired videos, including "Helmet-Cam Video" by David Byrne, the musician, artist and bicycling proponent, in which he navigates Manhattan by bike.

The co-curators of "Bike Rides" — Richard Klein, the Aldrich's director of exhibitions, and Mónica Ramírez-Montagut — enlisted Mr. Byrne to serve as adviser. "He suggested we open the show up to bike advocates and aficionados as well as artists," Ms. Ramírez-Montagut said.

In keeping with that approach, the Aldrich is hosting Bike Fest on Oct. 4. The event begins with Le Tour d'Aldrich — three organized bike rides, for novice, intermediate and advanced bikers ages 18 and older, that run from 13.4 to 27 miles and end at the museum.

All afternoon, the museum's parking lot will be the site of demonstrations, helmet fittings, bicycle tune-ups and more. Highlights include performers on BMX bikes and acrobats on unicycles. At 3:30 p.m., children and adults can enter a "Primp my bike" competition for the chance to win a Cannondale, with artistic and technical merit judged by exhibiting artists.

Many of the participating artists will attend the festival. Miguel Luciano will be offering snow cones from his "Pimp My Piragua," a customized pushcart that pays homage to the piragüeros who sell shaved ice in his native Puerto Rico.

Also on hand will be members of Mexican Pride, a bicycle collective in Queens whose contributions to "Bike Rides" include Vicente Olivares's chrome-plated "Confites Lowrider Bike."

The exhibition explores a societal shift, said Ms. Ramírez-Montagut. "We are experiencing a bike boom in contemporary culture," she said, citing a confluence of conditions: Fluctuating gas prices are driving a desire for energy independence, and a commitment to sustainability is motivating bicycling commuters. Municipal government's investment in a cycling infrastructure, including bike lanes and bike racks, promotes the choice to cycle.

"Bikes are at their best," she added. They're light, safe and gorgeous.

"This is a conscious initiative to reach out to different communities, to bring them to the museum for something they like. Hopefully they'll come back."

"Bike Rides: The Exhibition," through Jan. 3, 2010, at the Aldrich Contemporary Art Museum, 258 Main Street, Ridgefield. Bike Fest will be held Oct. 4, 1 to 5 p.m.; admission is $10. Le Tour d'Aldrich begins at 11:30 a.m. at East Ridge Middle School; $25 covers ride, Bike Fest and T-shirt. Information at (203) 438-4519 or aldrichart.org.

http://www.nytimes.com/2009/09/27/nyregion/27spotct.html?ref=design

Dutch Modern Art for a Historic Occasion

By BENJAMIN GENOCCHIO

"Double Dutch," at the Hudson Valley Center for Contemporary Art, is one of the more pleasant surprises among the cultural events celebrating the 400th anniversary of the European discovery of the Hudson Valley and its ensuing settlement. Not only is this a worthy show, presenting lively, energetic work by 16 contemporary Dutch-born or Dutch-based artists, but it also includes the installation of sculptures by two of them on the Peekskill waterfront.

Like so many towns along the Hudson, Peekskill was founded by Dutch settlers. The town, as students of American history (and many residents) know, was named for Jan Peeck, a 17th-century tavern keeper from New Amsterdam who spent his spare time bartering with the Indians at a trading post on the Hudson located on the site of modern Peekskill.

The changing use and occupation of the land is the subject of the more spectacular and more beautiful of the two outdoor public works, "Time Sharing" (2009), by Daan Padmos — a house fabricated in steel in the style of early Dutch dwellings along the Hudson. It is propped up on a cylinder, close to the water, as if it had rolled right off a ship and onto shore. The title suggests that none of us own the land, this place; we are just passing through.

Close to the boat launch, on the other side of Riverfront Green Park, is Serge Onnen's "Planetariummonetarium" (2009), an ambiguous sculpture in the shape of a massive helmet with tubes radiating from the exterior. Inside are pennies from around the world, glued down, and more tubes. One of the tubes doubles as a telescope, trained on the nearby Indian Point nuclear power plant. The view inserts human needs into a bucolic natural setting.

There is more quirky art up at the Hudson Valley Center for Contemporary Art, where visitors will discover a stimulating and nicely arranged show of installation art and some video by 14 artists, most of them young. Much of the work involves craftsmanship, with the artists forging charming and sometimes quaint tableaux that combine social and political narratives and visual poetry. Not only are these works interesting to look at, but they also make the viewer think.

The show begins on a richly visual note with Dylan Graham's "Dissent in the Colonial Pacific" (2009), an indoor installation created for the space that incorporates all manner of symbolic odds and ends — including a carved wooden tombstone — that together serve as an epitaph to Dutch colonial rule in the Pacific. Curiously enough, Mr. Graham is one of the few artists in the show who looks directly to the pageant of history for inspiration.

There will be criticism, perhaps, that too much of the work in this show looks the same, and that it is sometimes hard to distinguish one artist's work from another's. Improvised constructions employing bits and pieces of everyday materials are everywhere, ranging from Maartje Korstanje's whimsical and untitled treelike mixed-media sculpture to Karen Sargsyan's sculptural installation, "Human Behavior" (2007), recreating a scene from Mozart's "Magic Flute" out of paper, iron, clay, wood and other materials.

But the show contains exceptional works, among them Job Koelewijn's "Sanctuary" (2007), a life-size gas station (pumps and roof) constructed out of more than 3,000 books from his personal library. It towers over the rest of the show, anchoring the selection while simultaneously inviting us to reflect on what it is that fuels the world: Is it oil, or is it ideas, specifically the distilled wisdom that books have historically possessed?

Some of the videos are also pretty entertaining, though you need to give them a little time to understand what is going on. Erik van Lieshout's "Sex is Sentimental" (2009) offers an account of how he fell in love with his assistant and discusses the problems of being in love with someone you work closely with every day. Martha Colburn, meanwhile, uses paper collage and digital animation in her fanciful retelling of the history of the Hudson Valley, from the treatment of the Indians to modern urban problems like drug abuse.

The quadricentennial has brought all kinds of beautiful and fascinating art into regional museums, but this exhibition, the product of tremendous research and effort by the organizers, is one of the most stimulating. The show's energy is intoxicating, even if installation and video art is not one's cup of tea. The irony is that it took a historical anniversary to introduce us to the liveliness of this contemporary art.

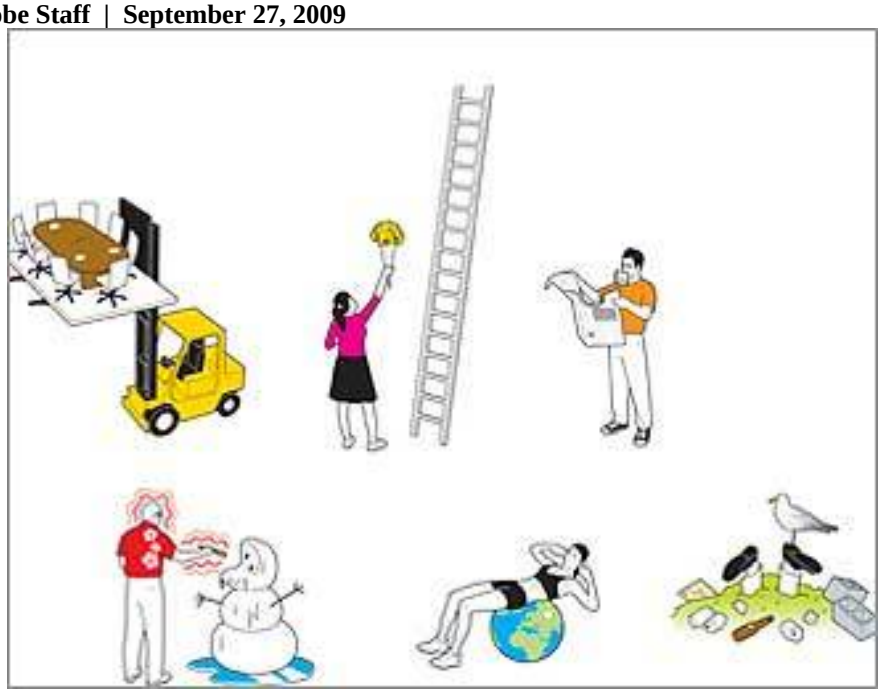
"Double Dutch," Hudson Valley Center for Contemporary Art, 1701 Main Street, Peekskill, through July 26, 2010. Information: (914) 788-0100 or hvcca.org.

http://www.nytimes.com/2009/09/27/nyregion/27artswe.html?ref=design

Thinking literally

The surprising ways that metaphors shape your world

By Drake Bennett, Globe Staff | September 27, 2009



WHEN WE SAY someone is a warm person, we do not mean that they are running a fever. When we describe an issue as weighty, we have not actually used a scale to determine this. And when we say a piece of news is hard to swallow, no one assumes we have tried unsuccessfully to eat it.

These phrases are metaphorical--they use concrete objects and qualities to describe abstractions like kindness or importance or difficulty--and we use them and their like so often that we hardly notice them. For most people, metaphor, like simile or synecdoche, is a term inflicted upon them in high school English class: “all the world’s a stage,” “a house divided against itself cannot stand,” Gatsby’s fellow dreamers are “boats against the current, borne back ceaselessly into the past.” Metaphors are literary creations--good ones help us see the world anew, in fresh and interesting ways, the rest are simply cliches: a test is a piece of cake, a completed task is a load off one’s back, a momentary difficulty is a speed bump.

But whether they’re being deployed by poets, politicians, football coaches, or realtors, metaphors are primarily thought of as tools for talking and writing--out of inspiration or out of laziness, we distill emotions and thoughts into the language of the tangible world. We use metaphors to make sense to one another.

Now, however, a new group of people has started to take an intense interest in metaphors: psychologists. Drawing on philosophy and linguistics, cognitive scientists have begun to see the basic metaphors that we use all the time not just as turns of phrase, but as keys to the structure of thought. By taking these everyday metaphors as literally as possible, psychologists are upending traditional ideas of how we learn, reason, and make sense of the world around us. The result has been a torrent of research testing the links between metaphors and their physical roots, with many of the papers reading as if they were commissioned by Amelia Bedelia, the implacably literal-minded children’s book hero. Researchers have sought to determine whether the temperature of an object in someone’s hands determines how “warm” or “cold” he considers a person he meets, whether the heft of a held object affects how “weighty” people

consider topics they are presented with, or whether people think of the powerful as physically more elevated than the less powerful.

What they have found is that, in fact, we do. Metaphors aren't just how we talk and write, they're how we think. At some level, we actually do seem to understand temperament as a form of temperature, and we expect people's personalities to behave accordingly. What's more, without our body's instinctive sense for temperature--or position, texture, size, shape, or weight--abstract concepts like kindness and power, difficulty and purpose, and intimacy and importance would simply not make any sense to us. Deep down, we are all Amelia Bedelia.

Metaphors like this "don't invite us to see the world in new and different ways," says Daniel Casasanto, a cognitive scientist and researcher at the Max Planck Institute for Psycholinguistics in the Netherlands. "They enable us to understand the world at all."

Our instinctive, literal-minded metaphorizing can make us vulnerable to what seem like simple tweaks to our physical environment, with ramifications for everything from how we build polling booths to how we sell cereal. And at a broader level it reveals just how much the human body, in all its particularity, shapes the mind, suggesting that much of what we think of as abstract reasoning is in fact a sometimes awkward piggybacking onto the mental tools we have developed to govern our body's interactions with its physical environment. Put another way, metaphors reveal the extent to which we think with our bodies.

"The abstract way we think is really grounded in the concrete, bodily world much more than we thought," says John Bargh, a psychology professor at Yale and leading researcher in this realm.

Philosophers have long wondered about the connection between metaphor and thought, in ways that occasionally presaged current-day research. Friedrich Nietzsche scornfully described human understanding as nothing more than a web of expedient metaphors, stitched together from our shallow impressions of the world. In their ignorance, he charged, people mistake these familiar metaphors, deadened from overuse, for truths. "We believe that we know something about the things themselves when we speak of trees, colors, snow, and flowers," he wrote, "and yet we possess nothing but metaphors for things--metaphors which correspond in no way to the original entities."

Like Nietzsche, George Lakoff, a professor of linguistics at the University of California at Berkeley, and Mark Johnson, a philosophy professor at the University of Oregon, see human thought as metaphor-driven. But, in the two greatly influential books they have co-written on the topic, "Metaphors We Live By" in 1980 and "Philosophy in the Flesh" in 1999, Lakoff and Johnson focus on the deadest of dead metaphors, the ones that don't even rise to the level of cliche. They call them "primary metaphors," and they group them into categories like "affection is warmth," "important is big," "difficulties are burdens," "similarity is closeness," "purposes are destinations," and even "categories are containers."

Rather than so much clutter standing in the way of true understanding, to Lakoff and Johnson these metaphors are markers of the roots of thought itself. Lakoff and Johnson's larger argument is that abstract thought would be meaningless without bodily experience. And primary metaphors, in their ubiquity (in English and other languages) and their physicality, are some of their most powerful evidence for this.

"What we've discovered in the last 30 years is--surprise, surprise--people think with their brains," says Lakoff. "And their brains are part of their bodies."

Inspired by this argument, psychologists have begun to make their way, experiment by experiment, through the catalog of primary metaphors, altering one side of the metaphorical equation to see how it changes the other.

Bargh at Yale, along with Lawrence Williams, now at the University of Colorado, did studies in which subjects were casually asked to hold a cup of either iced or hot coffee, not knowing it was part of the

study, then a few minutes later asked to rate the personality of a person who was described to them. The hot coffee group, it turned out, consistently described a warmer person--rating them as happier, more generous, more sociable, good-natured, and more caring--than the iced coffee group. The effect seems to run the other way, too: In a paper published last year, Chen-Bo Zhong and Geoffrey J. Leonardelli of the University of Toronto found that people asked to recall a time when they were ostracized gave lower estimates of room temperature than those who recalled a social inclusion experience.

In a paper in the current issue of Psychological Science, researchers in the Netherlands and Portugal describe a series of studies in which subjects were given clipboards on which to fill out questionnaires--in one study subjects were asked to estimate the value of several foreign currencies, in another they were asked to rate the city of Amsterdam and its mayor. The clipboards, however, were two different weights, and the subjects who took the questionnaire on the heavier clipboards tended to ascribe more metaphorical weight to the questions they were asked--they not only judged the foreign currencies to be more valuable, they gave more careful, considered answers to the questions they were asked.

Similar results have proliferated in recent years. One of the authors of the weight paper, Thomas Schubert, has also done work suggesting that the fact that we associate power and elevation ("your highness," "friends in high places") means we actually unconsciously look upward when we think about power. Bargh and Josh Ackerman at MIT's Sloan School of Business, in work that has yet to be published, have done studies in which subjects, after handling sandpaper-covered puzzle pieces, were less likely to describe a social situation as having gone smoothly. Casasanto has done work in which people who were told to move marbles from a lower tray up to a higher one while recounting a story told happier stories than people moving them down.

Several studies have explored the metaphorical connection between cleanliness and moral purity. In one, subjects who were asked to recall an unethical act, then given the choice between a pencil and an antiseptic wipe, were far more likely to choose the cleansing wipe than people who had been asked to recall an ethical act. In a follow-up study, subjects who recalled an unethical act acted less guilty after washing their hands. The researchers dubbed it the "Macbeth effect," after the guilt-ridden, compulsive hand washing of Lady Macbeth.

To the extent that metaphors reveal how we think, they also suggest ways that physical manipulation might be used to shape our thought. In essence, that is what much metaphor research entails. And while psychologists have thus far been primarily interested in using such manipulations simply to tease out an observable effect, there's no reason that they couldn't be put to other uses as well, by marketers, architects, teachers, parents, and litigators, among others.A few psychologists have begun to ponder applications. Ackerman, for example, is looking at the impact of perceptions of hardness on our sense of difficulty. The study is ongoing, but he says he is finding that something as simple as sitting on a hard chair makes people think of a task as harder. If those results hold up, he suggests, it might make sense for future treaty negotiators to take a closer look at everything from the desks to the upholstery of the places where they meet. Nils Jostmann, the lead author of the weight study, suggests that pollsters might want to take his findings to heart: heavier clipboards and heavier pens for issues that they want considered answers for, lighter ones for questions that they want gut reactions on.

How much of an effect these tweaks might have in a real-world setting, researchers emphasize, remains to be seen. Still, it probably couldn't hurt to try a few in your own life. When inviting a new friend over, suggest a cup of hot tea rather than a cold beer. Keep a supply of soft, smooth objects on hand at work--polished pebbles, maybe, or a silk handkerchief--in case things start to feel too daunting. And if you feel a sudden pang of guilt about some long-ago transgression, try taking a shower.

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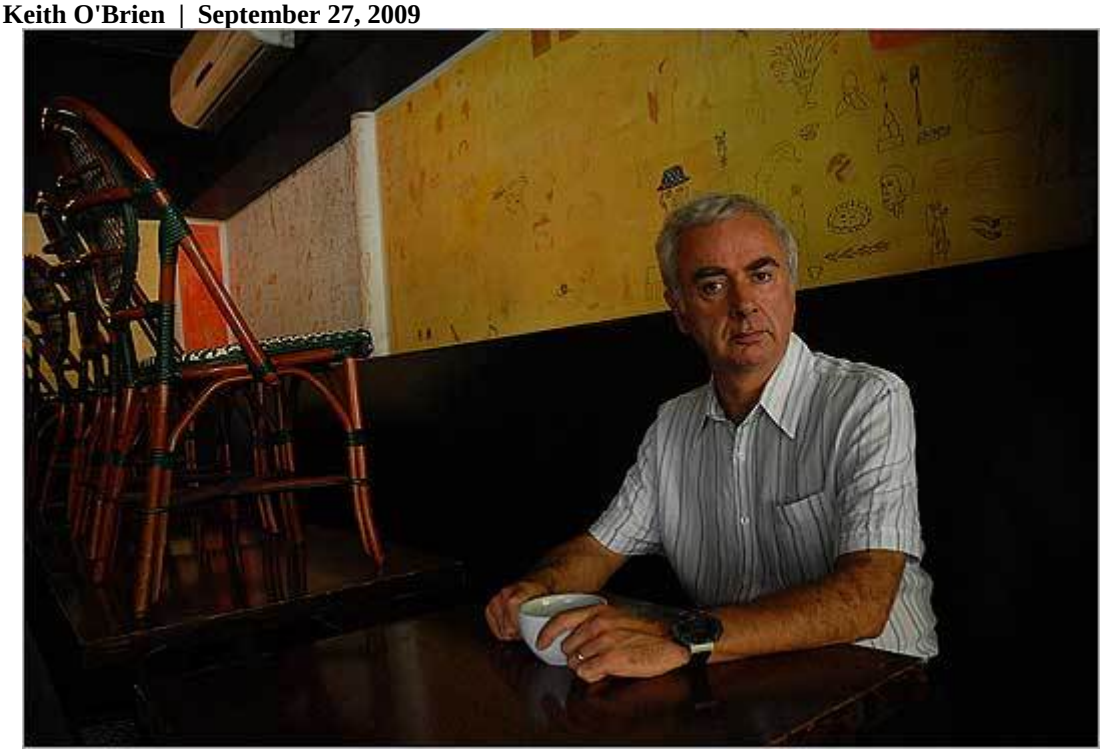
http://www.boston.com/bostonglobe/ideas/articles/2009/09/27/thinking_literally/?page=full

Do you speak criminal?

Why mobsters don't talk like you and me

By Keith O'Brien | September 27, 2009



CRIMINALS, MORE OFTEN than not, do not have resumes. They generally can't peddle their services on billboards, hire advertising agencies to develop their brands, find new hires on Monster.com, or discuss their problems at trade shows. And yet, just like normal, everyday law-abiding citizens, criminals are often businesspeople, seeking the one thing that every good company needs most: good, reliable help.

The dilemma of whom to trust is not one that's exclusive to criminals--we make such decisions every day--but it's a problem that's especially prickly for those who live in a world shrouded in secrecy, a world where even a man's name may not be his actual name. In his new book, "Codes of the Underworld: How Criminals Communicate" (Princeton University Press), sociologist and Mafia expert Diego Gambetta explores this subculture and unearths an unspoken language among bad men. He offers insight on how mobsters, pedophiles, prisoners, and other shady characters earn one another's trust and prove their mettle. And what he documents is both disturbing and, sometimes, hilarious.

It turns out--according to Gambetta, a native Italian and a sociology professor at the University of Oxford--that there are really practical reasons why Sicilian mobsters like to use nicknames, why pedophiles might out themselves to others online, why prison inmates fight (or don't fight), and why mobsters from Japan to Russia might be out there, right now, reciting lines from "The Godfather," such as, "Leave the gun. Take the cannoli."

No, seriously.

IDEAS: Based on your research, what would people find most surprising about how people communicate in the criminal underworld?

GAMBETTA: I would say doing things that would seem irrational to us. Like revealing bad things that you've done. Or hurting yourself. Or hurting innocent people. I have a chapter on self-harm, which is probably the most unexpected thing you find.

IDEAS: What are some examples of ways criminals compromise themselves to prove their toughness or trustworthiness to another criminal?

GAMBETTA: One thing you can look at is how pedophile rings on the Internet work. Some of them work by asking new members to contribute previously unknown photographs to their website. In that sense, they contribute to the website of pedophile photographs, but at the same time they're also giving information that they themselves have done that. So they are unlikely to be undercover agents. And with respect to physical harm, the best domain in which criminals have to prove their toughness, day in and day out, is prison. You find a lot of self-harm in prison.

IDEAS: What will prisoners do to themselves?

GAMBETTA: They will cut themselves, bang their head against a wall, swallow dangerous objects.

IDEAS: And that proves what?

GAMBETTA: It proves that you are tough enough and mad enough for them not to easily consider the option of coercing through physical violence.

IDEAS: In every prison movie you see, prisoners are fighting. Are prisoners really fighting all the time?

GAMBETTA: Yes, they certainly do fight a lot. And from a social science point of view, the interesting thing is when do they fight rather than not fight?

You see, for instance, that younger people and women tend to fight more than older prisoners, longer-sentenced prisoners, hardened criminals, because they are under a greater threat. They don't have a violence capital to display.

IDEAS: You dedicate a chapter of the book to nicknames that criminals, namely mobsters, use, including The Accountant, Joe Baloney, Mozzarella, and--my favorite--Nino the Fool. Why do mobsters use nicknames so often?

GAMBETTA: The more dangerous the job you do as a mobster, the more it seems nicknames are used. For those that were convicted of homicide, they were referred to by others much more frequently by nicknames than by their real names. One hypothesis is they use it to make it harder for law enforcement to identify them. And there's a simple reason--at least in Sicily. Namely, that a lot of people have the same name.

IDEAS: In the Mafia underworld, how celebrated is the movie "The Godfather"?

GAMBETTA: It is very celebrated. Not just by the Sicilian Mafia and by the Italian-American Mafia, but oddly enough by people in the same line of business in Russia, in China, and in Japan. We have evidence that they understood that that was the sector of the economy in which they themselves moved, and there's lots of evidence that they liked the film, that they could recite, by heart, bits of the film, in countries which you would think would have nothing to do with it.

IDEAS: We've got criminals out there in China and Japan who are modeling themselves after Michael and Sonny Corleone?

GAMBETTA: We do have evidence of that. Yes.

IDEAS: What are some other ways that criminals are modeling themselves on film portrayals?

GAMBETTA: Well, I guess ”The Godfather” is the big example because, for example, they don’t like movies like ”Donnie Brasco.”

IDEAS: Why not?

GAMBETTA: ”Donnie Brasco” is a very good movie, but it shows them as losers, as being taken in by this extremely skillful FBI agent, Joseph Pistone, aka Donnie Brasco. Several of them landed in jail, thanks to his undercover operation. And so, the movie portrays them at the losing end, and they don’t like that. Movies for them are a way of advertising, a way of gaining legitimacy.

IDEAS: Do you watch mob movies? ”The Godfather”? Did you watch ”The Sopranos”?

GAMBETTA: I did.

IDEAS: Did you enjoy it?

GAMBETTA: I did enjoy it, yes. Although I don’t think very many of them would go and see a psychiatrist. I don’t think there’s any record of anyone doing such a thing.

IDEAS: What about that great American movie ”Analyze This,” starring Billy Crystal and Robert DeNiro?

GAMBETTA: I didn’t see that one.

IDEAS: You’re probably better off, actually.

GAMBETTA: I suspect I was.

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http://www.boston.com/bostonglobe/ideas/articles/2009/09/27/do_you_speak_criminal/

UNCOMMON KNOWLEDGE: SURPRISING INSIGHTS FROM THE SOCIAL SCIENCES
Stats that teams ignore

Sports statistics, counting heartbeats and how to spend like a winner
By Kevin Lewis | September 27, 2009

THE USE OF STATISTICS in professional sports has accelerated in recent years. Nevertheless, it looks like teams are still leaving a lot of money on the table. Researchers from the University of Chicago analyzed every pitch thrown in Major League Baseball from 2002-2006 and every play in the National Football League from 2001-2005. They found that pitchers seem to be throwing too many fastballs and throwing pitches too predictably. Football teams aren't passing enough and are also too predictable. The researchers estimate that the average baseball team gives up 20 runs per season--costing $4 million per year--and the average football team gives up one point per game--costing $5 million per year.

Kovash, K. & Levitt, S., "Professionals Do Not Play Minimax: Evidence from Major League Baseball and the National Football League," National Bureau of Economic Research (September 2009).

Listen to your heart, literally
PERHAPS HEARTFELT decisions are smarter than we think. A team of psychologists in Germany asked people to count their own heartbeats (without taking a pulse) and then asked them to play a computer gambling game, which required choosing repeatedly among four card decks that yielded different returns. People who were more accurate at counting their own heartbeats picked more cards from the decks with better returns. It seems that people who are in touch with feedback from their own body have an easier time learning from positive and negative experiences.

Werner, N. et al., "Enhanced Cardiac Perception Is Associated with Benefits in Decision-Making," Psychophysiology (forthcoming).

Like triggers like
WHEN IN ROME, do as the Romans do, or at least mimic what they do. That's the conclusion of a speed-dating experiment in France. Several women were asked by the researcher to mimic the verbal and nonverbal behavior of a random subset of men encountered during a speed-dating session. Men who were mimicked thought their interaction with the woman was better, rated her as more sexually attractive, and were more willing to provide contact information.

Guéguen, N., "Mimicry and Seduction: An Evaluation in a Courtship Context," Social Influence (October 2009).

Spend like a winner

BY DEFINITION, partisans tend to support their party and its associated ideological agenda, but does partisanship carry over into everyday behavior? Political scientists at Yale compared local spending (via sales tax data) to local partisanship to see if partisans changed their spending depending on who won a presidential election. There was a significant effect, such that a more Democratic county (with a 65% vote share, compared to a county with a split vote) increased spending by about 1 percent if a Democrat won, and vice versa for Republicans. Assuming each partisan responded accordingly, this means that every Democrat increased spending, and every Republican decreased spending, by about 3 percent. This change kicked in right after the election, and wasn't necessarily the result of redistribution expectations, since the effect was also strong in both the poorest Democratic and Republican counties. This means that companies with most of their business in red or blue states should gain or lose business after a presidential election--something investors may want to note.

Gerber, A. & Huber, G., "Partisanship and Economic Behavior: Do Partisan Differences in Economic Forecasts Predict Real Economic Behavior?" American Political Science Review (August 2009).

You can't walk staight

NOTWITHSTANDING ALL THE of stories of people getting lost in the wilderness, many people probably assume they'd be able to navigate their way out of the middle of nowhere, even without fancy instruments. Not likely, according to researchers. They asked people to walk on a straight course in a forest or a desert for several hours. Whenever the sun or moon wasn't visible, people tended to walk in circles, without even noticing. When blindfolded, people often walked in very tight circles--within the dimensions of a basketball court--and in all directions. This suggests that our internal compass is barely good enough for a few yards, much less a few miles.

Souman, J. et al., "Walking Straight into Circles," Current Biology (forthcoming).

Kevin Lewis is an Ideas columnist. He can be reached at kevin.lewis.ideas.gmail.com. ■

http://www.boston.com/bostonglobe/ideas/articles/2009/09/27/stats_that_teams_ignore/

Transgenic Songbirds Provide New Tool To Understand The Brain

Zebra Finch. The ability to manipulate songbird genes may yield the molecular secrets of vocal learning and neuronal replacement. (Credit: iStockphoto/David Gluzman)

ScienceDaily (Sep. 30, 2009) — The ability to manipulate songbird genes may yield the molecular secrets of vocal learning and neuronal replacement.

You can learn a lot from an animal. By manipulating the DNA of mice, flies, frogs and worms, scientists have discovered a great deal about the genes and molecules behind many of life's essential processes. These basic functions often work about the same in people as they do in "model" animals. But if you want to study more sophisticated cognitive processes such as humans' ability to learn language from one another, you need a more sophisticated organism. For the first time, researchers have devised a way to alter the genes of the zebra finch, one of a handful of social animals that learn to "speak" by imitating their fellows.

After decades of studying the behavior and anatomy of vocal learning, scientists will be able to use the technique to explore vocal learning at the molecular level. The new tool, reported online in the September 28 issue of *PNAS Early Edition*, may also reveal secrets about exactly how, when and why some neurons are replaced in the adult brain.

"The roadblock had been that you couldn't manipulate the genes," says Fernando Nottebohm, Dorothea L. Leonhardt Professor and head of the Laboratory of Animal Behavior at The Rockefeller University, where the research was conducted. "Ultimately, you have to understand how things are working at the most basic molecular level, and this will take our research there."

Nottebohm, Research Associate Robert Agate and colleagues adapted a method used to alter quail genes for use in the finch. The researchers used an HIV-based lentivirus that is able to insert attached genes into the genome of the hosts it infects. To prove the method works, the scientists inserted genes that produce green fluorescent protein in cells throughout the body. They found that they had to inject at least 10 times as much of the viral vector into finch embryos than in quail for the genes to take root. But after refining

the method, they produced several birds that had incorporated the genes into their germline cells, meaning they could pass them along to their offspring. These "founder" transgenic songbirds did not suffer any obvious side effects from the genetic experiment: They developed normally, learned to sing, and mated. But because of the fluorescent protein produced throughout their bodies, they glow green when exposed to a specific wavelength of blue light. The green can be best seen before the hatchlings' feathers grow in, but can still be glimpsed in the eyes, legs and around the beaks of the older, feathered birds.

The transgenic songbirds will enable Nottebohm, who discovered neuronal replacement in the adult vertebrate brain and described the neural circuitry by which songbirds learn to sing, to investigate the genes that control these processes. "With transgenic songbirds, we hope to have a splendid tool to get into the molecular biology of vocal learning and neuronal replacement in an adult vertebrate brain," Nottebohm says.

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

http://www.sciencedaily.com/releases/2009/09/090929091933.htm

Protein Structure Sheds Light On How Insects Smell, Points To Eco-Friendly Pest Control

The structure of the silkworm moth GOBP2 bound to an analogue of its sex pheromone, shows binding to the arginine amino acid (blue and green ball and stick) at the entry to the binding pocket. (Credit: Birkbeck, University of London; Rothamsted Research; Diamond Light Source)

ScienceDaily (Sep. 30, 2009) — New research announced today, Wednesday 30th September, by a team of leading scientists working with the UK's national Synchrotron, Diamond Light Source, could have a significant impact on the development and refinement of new eco-friendly pest control methods for worldwide agriculture.

Published in the *Journal of Molecular Biology*, the study was carried out by Dr Jing-Jiang Zhou and colleagues at the world's oldest agricultural research centre and the largest UK facility, Rothamsted Research, in collaboration with Professor Nick Keep's group from the Institute of Structural and Molecular Biology at Birkbeck, University of London.

Dr Jing-Jiang Zhou, Senior Research Scientist in insect molecular biology at Rothamsted Research, studies insect olfaction and chemical ecology at the molecular level, he explains, "Using Diamond Light Source's intense X-rays, we unravelled the detailed mechanisms linked to pheromone detection which dictates mating behaviour in silkworm moths. They are a model organism and any new insights into the working of their olfactory system has repercussions on our global understanding how insects locate mates and their hosts."

Solving this protein structure also represents a significant achievement in the advance of structural biology in the UK and it marks the 100th new structure identified at Diamond since its opening in 2007.

Professor Dave Stuart, Life Sciences Director at Diamond Light Source adds: "It is a milestone and it illustrates the fascinating range of structural biology being undertaken in the UK. Congratulations to the Rothamsted and Birkbeck groups; thanks to productive groups like these, there is currently an exponential growth in the number of structures solved at Diamond."

The importance of understanding how insects 'smell' and how the chemical signals are recognised is useful for many things, but especially for pest control in agriculture. Determining the composition and processes behind the olfactory functions of insects feed directly in to the development and refinement of new pathways to influence insect host locating behaviours. Plants use chemical signals to repel and attract

insects and by harnessing a detailed understanding of the signals, farmers can plant companion species to create 'odours' that would make an area very unattractive or attractive to insects according to what they require. This is more commonly known as the push-pull system.

Many insects depend on chemicals like pheromones to communicate with each other and to find a suitable mate. There are two main sex pheromone components bombykol and bombykal in the silkworm moth. Bombykol, the first insect pheromone discovered 50 years ago is the only component involved in mating behaviour whereas bombykal is an antagonist.

Dr Jing-Jiang Zhou, adds: "So far, we know that odorant binding proteins [OBPs] within the organism pick up pheromones at pores on the outside of the antenna and carry them through a watery layer to the nerve endings. But it is not clear whether they simply transport and release molecules which bind to olfactory receptors or whether they form a specific OBP- pheromone complex which then activates the receptor. The structures we determined using the crystallography capabilities at Diamond give us a view of how these processes work."

Prof. Stuart explains how crystallography helps: "Studying proteins and the role they play within organisms is like having a 100 locks and keys in front of you and not having any idea as to what fits what…By solving the structure of these proteins, we understand more about their function and matching them becomes much easier."

Dr Zhou concludes: "It's not just the farming community which stands to benefit from this work. These new insights will be fed into the development and refinement of biosensors where detection sensitivity is paramount in areas like blood tests. One of our spin-off companies are also investigating how bees can detect some small quantities of explosives and stand to benefit from any knowledge we generate."

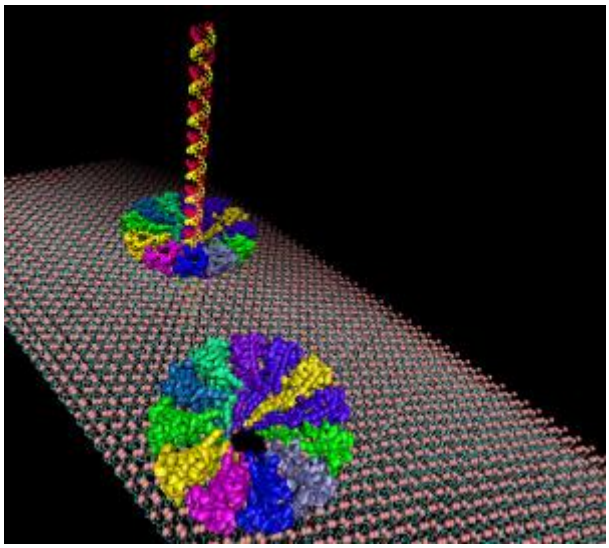
Rothamsted Research Institute is funded by BBSRC and Dr Zhou's project is funded by a BBSRC SCIBS initiative grant 'Defining the chemical space for ligands of odourant- binding proteins Ref:BB/D005892/1.

Diamond Light Source is funded by the UK Government through STFC and by the Wellcome Trust. Diamond is a platform for research for the Research Councils and in particular for AHRC, BBSRC,EPSRC, MRC and NERC.

Adapted from materials provided by Diamond Light Source, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090929141526.htm

Nanotechnology: Artificial Pore Created



Scientists inserted the modified core of a nanomotor, a microscopic biological machine, into a lipid membrane. The resulting channel enabled them to move both single- and double-stranded DNA through the membrane. (Credit: Image courtesy of University of Cincinnati)

ScienceDaily (Sep. 30, 2009) — Using an RNA-powered nanomotor, University of Cincinnati (UC) biomedical engineering researchers have successfully developed an artificial pore able to transmit nanoscale material through a membrane.

In a study led by UC biomedical engineering professor Peixuan Guo, PhD, members of the UC team inserted the modified core of a nanomotor, a microscopic biological machine, into a lipid membrane. The resulting channel enabled them to move both single- and double-stranded DNA through the membrane.

Their paper, “Translocation of double-stranded DNA through membrane-adapted phi29 motor protein nanopores,” will appear in the journal Nature Nanotechnology, Sept. 27, 2009. The engineered channel could have applications in nano-sensing, gene delivery, drug loading and DNA sequencing," says Guo.

Guo derived the nanomotor used in the study from the biological motor of bacteriophage phi29, a virus that infects bacteria. Previously, Guo discovered that the bacteriophage phi29 DNA-packaging motor uses six molecules of the genetic material RNA to power its DNA genome through its protein core, much like a screw through a bolt.

"The re-engineered motor core itself has shown to associate with lipid membranes, but we needed to show that it could punch a hole in the lipid membrane," says David Wendell, PhD, co-first author of the paper and a research assistant professor in UC’s biomedical engineering department. "That was one of the first challenges, moving it from its native enclosure into this engineered environment."

In this study, UC researchers embedded the re-engineered nanomotor core into a lipid sheet, creating a channel large enough to allow the passage of double-stranded DNA through the channel.

Guo says past work with biological channels has been focused on channels large enough to move only single-stranded genetic material.

"Since the genomic DNA of human, animals, plants, fungus and bacteria are double stranded, the development of single pore system that can sequence double-stranded DNA is very important," he says.

By being placed into a lipid sheet, the artificial membrane channel can be used to load double-stranded DNA, drugs or other therapeutic material into the liposome, other compartments, or potentially into a cell through the membrane.

Guo also says the process by which the DNA travels through the membrane can have larger applications.

"The idea that a DNA molecule travels through the nanopore, advancing nucleotide by nucleotide, could lead to the development of a single pore DNA sequencing apparatus, an area of strong national interest," he says.

Using stochastic sensing, a new analytical technique used in nanopore work, Wendell says researchers can characterize and identify material, like DNA, moving through the membrane.

Co-first author and UC postdoctoral fellow Peng Jing, PhD, says that, compared with traditional research methods, the successful embedding of the nanomotor into the membrane may also provide researchers with a new way to study the DNA packaging mechanisms of the viral nanomotor.

"Specifically, we are able to investigate the details concerning how double-stranded DNA translocates through the protein channel," he says.

The study is the next step in research on using nanomotors to package and deliver therapeutic agents directly to infected cells. Eventually, the team's work could enable use of nanoscale medical devices to diagnose and treat diseases.

"This motor is one of the strongest bio motors discovered to date," says Wendell, "If you can use that force to move a nanoscale rotor or a nanoscale machine … you're converting the force of the motor into a machine that might do something useful."

Funding for this study comes from the National Institutes of Health's Nanomedicine Development Center. Guo is the director of one of eight NIH Nanomedicine Development Centers and an endowed chair in biomedical engineering at UC.

Coauthors of the study include UC research assistant professor David Wendell, PhD, postdoctoral fellow Peng Jing, PhD, graduate students Jia Geng and Tae Jin Lee and former postdoctoral fellow Varuni Subramaniam from Guo's previous lab at Purdue University. Carlo Montemagno, dean of the College of Engineering and College of Applied Science, also contributed to the study.

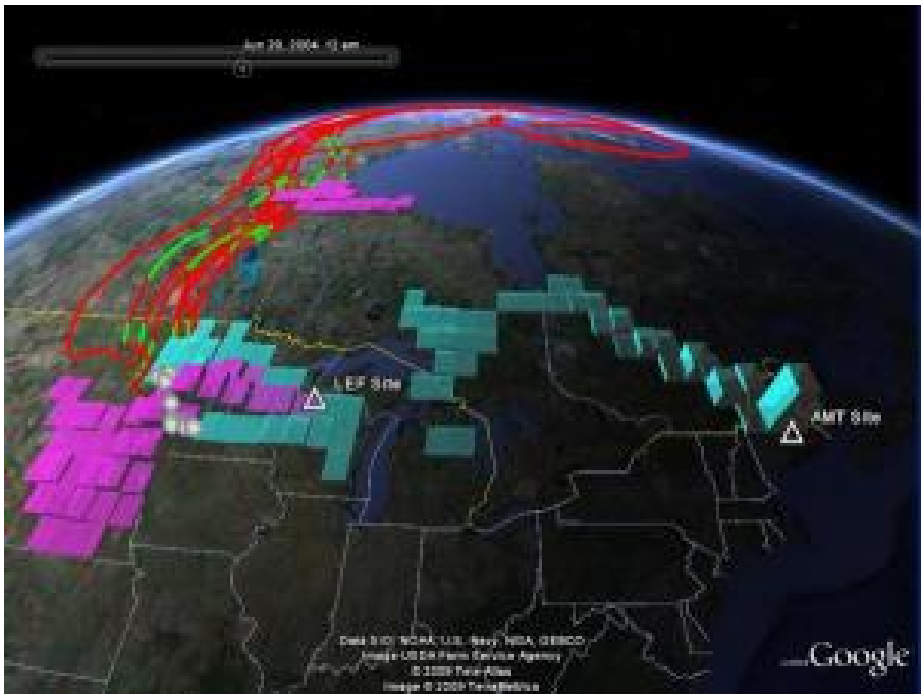
Journal reference:

1. . **Translocation of double-stranded DNA through membrane-adapted phi29 motor protein nanopores**. *Nature Nanotechnology*, Sept. 27, 2009

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

http://www.sciencedaily.com/releases/2009/09/090928131020.htm

Google Earth Application Maps Carbon's Course



A Google Earth application reveals carbon dioxide in the lowest part of the atmosphere close to Earth's surface (green tracks) and carbon dioxide at higher altitudes that are immune from ground influences (red tracks). (Credit: Tyler Erickson and Google Earth)

ScienceDaily (Sep. 30, 2009) — Sometimes a picture really is worth a thousand words, particularly when the picture is used to illustrate science. Technology is giving us better pictures every day, and one of them is helping a NASA-funded scientist and her team to explain the behavior of a greenhouse gas.

Google Earth -- the digital globe on which computer users can fly around the planet and zoom in on key features -- is attracting attention in scientific communities and aiding public communication about carbon dioxide. Recently Google held a contest to present scientific results using KML, a data format used by Google Earth.

"I tried to think of a complex data set that would have public relevance," said Tyler Erickson, a geospatial researcher at the Michigan Tech Research Institute in Ann Arbor.

He chose to work with data from NASA-funded researcher Anna Michalak of the University of Michigan, Ann Arbor, who develops complex computer models to trace carbon dioxide back in time to where it enters and leaves the atmosphere.

"The datasets have three spatial dimensions and a temporal dimension," Erickson said. "Because the data is constantly changing in time makes it particularly difficult to visualize and analyze."

A better understanding of the carbon cycle has implications for energy and environmental policy and carbon management. In June 2009, Michalak described this research at the NASA Earth System Science at 20 symposium in Washington, D.C.

A snapshot from Erickson's Google Earth application shows green tracks representing carbon dioxide in the lowest part of the atmosphere close to Earth's surface where vegetation and land processes can impact the carbon cycle. Red tracks indicate particles at higher altitudes that are immune from ground influences.

The application is designed to educate the public and even scientists about how carbon dioxide emissions can be traced. A network of 1,000-foot towers across the United States is equipped with instruments by NOAA to measure the carbon dioxide content of parcels of air at single locations.

The application is designed to educate the public and even scientists about how carbon dioxide emissions can be traced. A network of 1,000-foot towers across the United States, like the tower above, are equipped with instruments by NOAA to measure the carbon dioxide content of parcels of air at single locations.

But where did that gas come from and how did it change along its journey? To find out, scientists rely on a sleuthing technique called "inverse modeling" – measuring gas concentrations at a single geographic point and then using clues from weather and atmospheric models to deduce where it came from. The technique is complex and difficult to explain even to fellow scientists.

Michalak related the technique to cream in a cup of coffee. "Say someone gave you a cup of creamy coffee," Michalak said. "How do you know when that cream was added?" Just as cream is not necessarily mixed perfectly, neither is the carbon dioxide in the atmosphere. If you can see the streaks of cream (carbon dioxide) and understand how the coffee (atmosphere) was stirred (weather), then scientists can use those clues to retrace the time and location that the ingredient was added to the mix.

The visual result typically used by scientists is a static two-dimensional map of the location of the gas, as averaged over the course of a month. Most carbon scientists know how to interpret the 2D map, but visualizing the 3D changes for non-specialists has proved elusive. Erickson spent 70 hours programming the Google Earth application that makes it easy to navigate though time and watch gas particles snake their way toward the NOAA observation towers. For his work, Erickson was declared one of Google's winners in March 2009.

"Having this visual tool allows us to better explain the scientific process," Michalak said. "It's a much more human way of looking at the science."

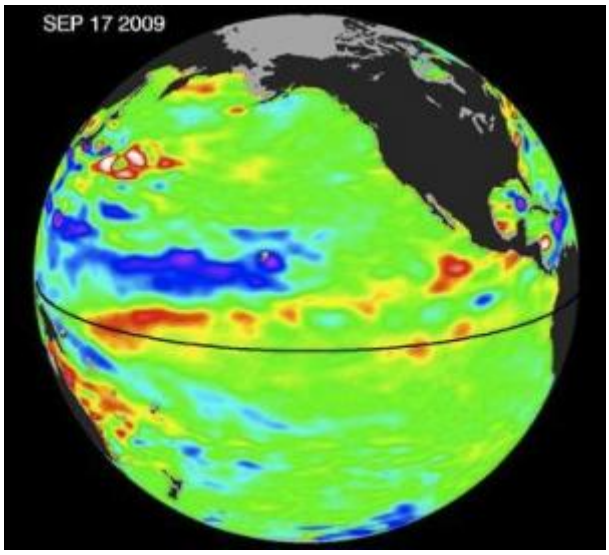
The next step, Erickson said, is to adapt the application to fit the needs of the research community. Scientists could use the program to better visualize the output of complex atmospheric models and then improve those models so that they better represent reality.

"Encouraging more people to deliver data in an interactive format is a good trend," Erickson said. "It should help innovation in research by reducing barriers to sharing data."

Adapted from materials provided by NASA.

http://www.sciencedaily.com/releases/2009/09/090928195032.htm

Floundering El Ninos Make For Fickle Forecasts



Pools of warm water known as Kelvin waves can be seen traveling eastward along the equator (black line) in this Sept. 17, 2009, image from the NASA/French Space Agency Ocean Surface Topography Mission/Jason-2 satellite. El Ninos form when trade winds in the equatorial western Pacific relax over a period of months, sending Kelvin waves eastward across the Pacific like a conveyor belt. (Credit: NASA/JPL Ocean Surface Topography Team)

ScienceDaily (Sep. 29, 2009) — Since May 2009, the tropical Pacific Ocean has switched from a cool pattern of ocean circulation known as La Niña to her warmer sibling, El Niño. This cyclical warming of the ocean waters in the central and eastern tropical Pacific generally occurs every three to seven years, and is linked with changes in the strength of the trade winds. El Niño can affect weather worldwide, including the Atlantic hurricane season, Asian monsoon season and northern hemisphere winter storm season. But while scientists agree that El Niño is back, there's less consensus about its future strength.

One of the characteristics that signal a developing El Niño is a change in average sea surface height compared to normal sea level. The NASA/French Space Agency Jason-1 and Ocean Surface Topography Mission/Jason-2 satellites continuously observe these changes in average sea surface height, producing near-global maps of the ocean's surface topography every 10 days.

Recent data on sea-level height from the Jason-1 and Ocean Surface Topography Mission/Jason-2 satellites, displayed at http://sealevel.jpl.nasa.gov/science/jason1-quick-look/ , show that most of the equatorial Pacific is near normal (depicted in the images as green). The exceptions are the central and eastern equatorial Pacific, which are exhibiting areas of higher-than-normal sea surface heights (warmer-than-normal sea-surface temperatures) at 180 and 110 degrees west longitude.

The latest image from Jason-2, which can be seen at http://sealevel.jpl.nasa.gov/science/jason1-quick-look/2009/images/20090917P.jpg , reflects a 10-day data cycle centered around September 17, 2009. It shows a series of warm "bumps" visible along the equator, denoted in the image by a black line. Known as Kelvin waves, these pools of warm water were triggered when the normally westward-blowing trade winds weakened in late July and again in early September, sending them sliding eastward from the western Pacific toward the Americas. The Kelvin waves are 5 to 10 centimeters (2 to 4 inches) high, a few hundred kilometers wide and a few degrees warmer than surrounding waters. Traveling east at about 3 meters per second (6 miles per hour), they are expected to reach the coast of Peru in October. (An animation of the evolution of Pacific Ocean conditions since January 2006 is at: http://www.jpl.nasa.gov/videos/earth/elnino20090928.mov).

Yet the present condition of this year's El Niño is dwarfed in comparison with the "macho" El Niño of 1997-1998, which brought devastating floods to California and severe drought to Indonesia, Australia and the Philippines. As seen in this September 20, 1997, image from the NASA/French Space Agency Topex/Poseidon satellite (see http://sealevel.jpl.nasa.gov/files/images/browse/entp2090.gif), the size and intensity of the 1997-1998 event were much greater by this time of year. That leads some scientists, such as Bill Patzert, an oceanographer and climatologist at NASA's Jet Propulsion Laboratory, Pasadena, Calif., to express uncertainty as to whether this El Niño event will intensify enough to deliver the dramatic impacts seen during that last intense El Niño in 1997-1998.

"For the past few months, the trade winds have weakened somewhat, but whether the new Kelvin waves traveling eastward across the Pacific will be adequate to pump this El Niño up enough to reinvigorate it and deliver any real impacts remains uncertain," Patzert says.

Patzert notes that it is important to remember that not all El Niños are created equal. "Some El Niños are show stoppers, but most are mild to modest, with minimal to mixed impacts," he says. He notes that since 1998, there have been three mild to moderate El Niño's: in 2002-2003, 2004-2005 and 2006-2007.

None of these events delivered the heart-thumping impacts of the monster El Niño of 1997-1998. During the winter of 1997-1998, Southern California was soaked with nearly 79 centimeters (more than 31 inches) of rain (twice Los Angeles' normal annual rainfall amount of about 38.5 centimeters, or 15.14 inches). In addition, there was heavy snowpack in the Sierra Nevada and Rocky Mountains. In comparison, during the past four winters, Los Angeles has averaged only 24.6 centimeters (9.7 inches) of rain (64 percent of normal), and snowpacks have been stingy.

In fact, Patzert notes that this El Niño bears many similarities to the 2006-2007 El Niño event. During that winter, much of the American Southwest experienced record-breaking drought, and Los Angeles had its driest winter in recorded history.

So what will El Niño 2009-2010 hold in store for the world this coming winter? In spite of the uncertainties, experienced climate forecasters around the world will continue to monitor the Pacific closely for further signs of El Niño development and will give it their best shot.

"Unless present El Niño conditions intensify, I believe this El Niño is too weak to have a major influence on many weather patterns," he says. "A macho El Niño like that of 1997-1998 is off the board, but I'm hoping for a relaxation in the tropical trade winds and a surprise strengthening of El Niño that could result in a shift in winter storm patterns over the United States. If the trade winds decrease, the ocean waters will continue to warm and spread eastward, strengthening the El Niño. That scenario could bring atmospheric patterns that will deliver much-needed rainfall to the southwestern United States this winter. If not, the dice seem to be loaded for below-normal snowpacks and another drier-than-normal winter."

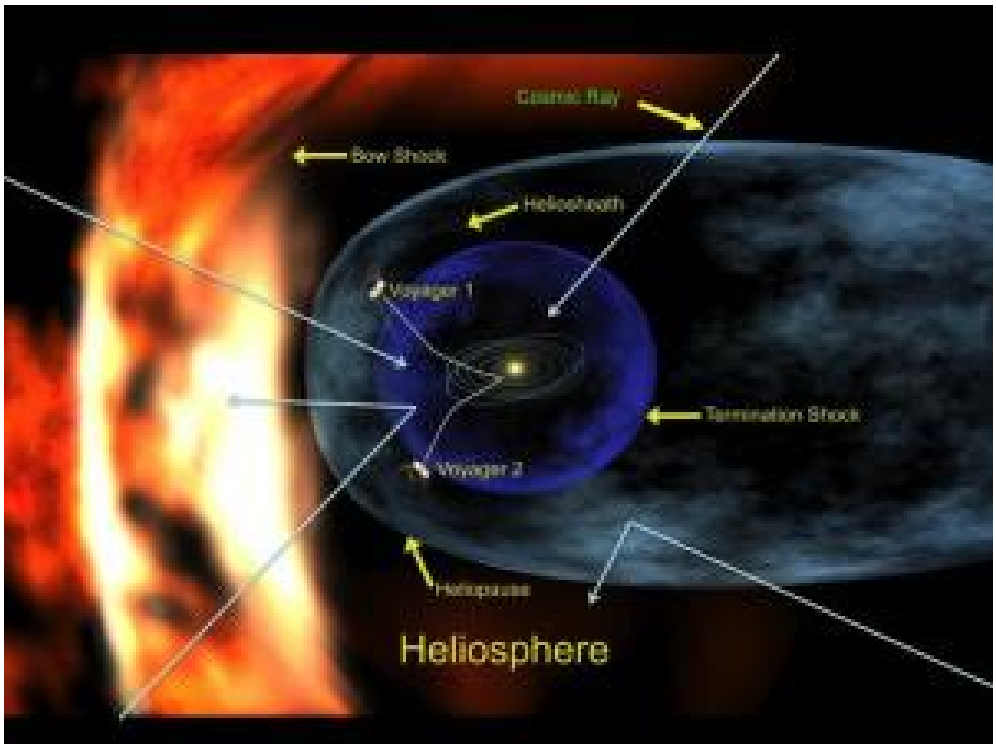
Still, Patzert remains hopeful. "Don't give up on this El Niño," he added. "He might make a late break and put his spin on this fall and winter's weather systems."

To learn more about Jason-1 and the Ocean Surface Topography Mission/Jason-2, visit: http://sealevel.jpl.nasa.gov .

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2009/09/090928194832.htm

Cosmic Rays Hit Space Age High



An artist's concept of the heliosphere, a magnetic bubble that partially protects the solar system from cosmic rays. (Credit: Richard Mewaldt/Caltech)

ScienceDaily (Sep. 29, 2009) — Planning a trip to Mars? Take plenty of shielding. According to sensors on NASA's ACE (Advanced Composition Explorer) spacecraft, galactic cosmic rays have just hit a Space Age high.

"In 2009, cosmic ray intensities have increased 19% beyond anything we've seen in the past 50 years," says Richard Mewaldt of Caltech. "The increase is significant, and it could mean we need to re-think how much radiation shielding astronauts take with them on deep-space missions."

The cause of the surge is solar minimum, a deep lull in solar activity that began around 2007 and continues today. Researchers have long known that cosmic rays go up when solar activity goes down. Right now solar activity is as weak as it has been in modern times, setting the stage for what Mewaldt calls "a perfect storm of cosmic rays."

"We're experiencing the deepest solar minimum in nearly a century," says Dean Pesnell of the Goddard Space Flight Center, "so it is no surprise that cosmic rays are at record levels for the Space Age."

Galactic cosmic rays come from outside the solar system. They are subatomic particles--mainly protons but also some heavy nuclei--accelerated to almost light speed by distant supernova explosions. Cosmic rays cause "air showers" of secondary particles when they hit Earth's atmosphere; they pose a health hazard to astronauts; and a single cosmic ray can disable a satellite if it hits an unlucky integrated circuit.

The sun's magnetic field is our first line of defense against these highly-charged, energetic particles. The entire solar system from Mercury to Pluto and beyond is surrounded by a bubble of solar magnetism called "the heliosphere." It springs from the sun's inner magnetic dynamo and is inflated to gargantuan proportions by the solar wind. When a cosmic ray tries to enter the solar system, it must fight through the

heliosphere's outer layers; and if it makes it inside, there is a thicket of magnetic fields waiting to scatter and deflect the intruder.

"At times of low solar activity, this natural shielding is weakened, and more cosmic rays are able to reach the inner solar system," explains Pesnell.

Mewaldt lists three aspects of the current solar minimum that are combining to create the perfect storm:

1. The sun's magnetic field is weak. "There has been a sharp decline in the sun's interplanetary magnetic field (IMF) down to only 4 nanoTesla (nT) from typical values of 6 to 8 nT," he says. "This record-low IMF undoubtedly contributes to the record-high cosmic ray fluxes."
2. The solar wind is flagging. "Measurements by the Ulysses spacecraft show that solar wind pressure is at a 50-year low," he continues, "so the magnetic bubble that protects the solar system is not being inflated as much as usual." A smaller bubble gives cosmic rays a shorter-shot into the solar system. Once a cosmic ray enters the solar system, it must "swim upstream" against the solar wind. Solar wind speeds have dropped to very low levels in 2008 and 2009, making it easier than usual for a cosmic ray to proceed.
3. The current sheet is flattening. Imagine the sun wearing a ballerina's skirt as wide as the entire solar system with an electrical current flowing along the wavy folds. That is the "heliospheric current sheet," a vast transition zone where the polarity of the sun's magnetic field changes from plus (north) to minus (south). The current sheet is important because cosmic rays tend to be guided by its folds. Lately, the current sheet has been flattening itself out, allowing cosmic rays more direct access to the inner solar system.

"If the flattening continues as it has in previous solar minima, we could see cosmic ray fluxes jump all the way to 30% above previous Space Age highs," predicts Mewaldt.

Earth is in no great peril from the extra cosmic rays. The planet's atmosphere and magnetic field combine to form a formidable shield against space radiation, protecting humans on the surface. Indeed, we've weathered storms much worse than this. Hundreds of years ago, cosmic ray fluxes were at least 200% higher than they are now. Researchers know this because when cosmic rays hit the atmosphere, they produce an isotope of beryllium, 10Be, which is preserved in polar ice. By examining ice cores, it is possible to estimate cosmic ray fluxes more than a thousand years into the past. Even with the recent surge, cosmic rays today are much weaker than they have been at times in the past millennium.

"The space era has so far experienced a time of relatively low cosmic ray activity," says Mewaldt. "We may now be returning to levels typical of past centuries."

NASA spacecraft will continue to monitor the situation as solar minimum unfolds. Stay tuned for updates.

Adapted from materials provided by NASA/Goddard Space Flight Center. Original article written by Dr. Tony Phillips, Heliophysics News Team.

http://www.sciencedaily.com/releases/2009/09/090929133244.htm

Metallic Glass For Bone Surgery

Arc melter in which a plasma of up to 3000°C is produced between a tungsten tip (center) and a water-cooled copper plate. (Credit: ETH Zurich/LMPT)

ScienceDaily (Sep. 29, 2009) — It is possible that broken bones will in the near future be fixed using metallic glass. Materials researchers at ETH Zurich have developed an alloy that could herald a new generation of biodegradable bone implants.

When bones break, surgeons need screws and metal plates to fix the broken bones in place. These supports are usually made of stainless steel or titanium. Once the bones have healed, the metal parts have to be removed from the body via further surgery. In order to reduce the burden on patients, materials researchers have taken up the task of producing implants from bioabsorbable metals. These implants should stabilize the bones only for as long as they need to heal. The metal dissolves in the body over time, rendering removal surgery unnecessary. Implants made of magnesium-based alloys are proving particularly promising. Magnesium is mechanically stable and degrades completely by releasing ions which are tolerated by the body. However, all magnesium alloys have one major drawback: when they dissolve they produce hydrogen (H_2), which can be harmful to the body. Around the magnesium implants gas bubbles develop which hinder bone growth and thus the healing process, and potentially cause infection.

No side effects thanks to more zinc

Materials researchers working with Jörg Löffler, Professor of Metal Physics and Technology at ETH Zurich, have now eliminated these side-effects. They have succeeded in producing an innovative magnesium-zinc-calcium alloy in the form of a metallic glass which is biocompatible and shows significantly more favourable degradation behaviour. Metallic glasses are produced by rapid cooling of the molten material. The speed of the cooling process prevents the atoms from adopting the crystal

structure found in traditional metals. As a result, metallic glasses have an amorphous structure like that of window glass. Thanks to this procedure, the researchers can add much more zinc to the molten magnesium than is possible with conventional alloys.

The glassy alloy developed by the ETH researchers Bruno Zberg, Peter Uggo-witzer and Jörg Löffler contains up to 35% zinc and 5% calcium atoms, with the rest made up of magnesium. A crystalline magnesium-zinc alloy can contain a maximum of 2.4% zinc atoms. If the percentage is higher, an undesired crystalline phase precipitates in the magnesium matrix. The magnesium-zinc-calcium glass can be produced in a thickness of up to 5 millimetres. The major advantage of a high percentage of zinc is that it changes the corrosion behaviour of the magnesium fundamentally. In fact, clinical tests with small platelets of the new magnesium-zinc-calcium alloy showed no hydrogen evolution! Thus this new alloy, in the form of a metallic glass, has considerable potential as a non-harmful bone implant material. The research work has been published in the online version of *Nature Materials.*

Journal reference:

1. Zberg B, Uggowitzer PJ & Löffler JF. **MgZnCa glasses without clinically observable hydrogen evolution for biodegradable implants**. *Nature Materials*, Published online 27th September 2009 DOI: 10.1038/NMAT2542

Adapted from materials provided by ETH Zurich, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090928095456.htm

High-heels Linked To Heel And Ankle Pain

New research suggests that the types of shoes women wear, specifically high-heels, pumps and sandals, may cause future hind-foot (heel and ankle) pain. (Credit: iStockphoto)

ScienceDaily (Sep. 29, 2009) — Women should think twice before buying their next pair of high-heels or pumps, according to researchers at the Institute for Aging Research of Hebrew SeniorLife in a new study of older adults and foot problems.

The researchers found that the types of shoes women wear, specifically high-heels, pumps and sandals, may cause future hind-foot (heel and ankle) pain. Nearly 64 percent of women who reported hind-foot pain regularly wore these types of shoes at some point in their life.

"We found an increased risk of hind-foot pain among women who wore shoes, such as high-heels or pumps, that lack support and sound structure," says lead author Alyssa B. Dufour, a graduate student in the Institute's Musculoskeletal Research Program.

Published in the October issue of the journal *Arthritis Care & Research*, the study is one of the first to examine the association between shoe wear—beyond just high-heel use—and foot pain. The researchers, who analyzed foot-examination data from more than 3,300 men and women in The Framingham Study, say past shoe wear among women is a key factor for hind-foot pain. They found no significant link between foot pain and the types of shoes men wear.

While foot pain is a common complaint in the U.S. adult population—foot and toe symptoms are among the top 20 reasons for physician visits among those 65 to 74 years of age—relatively little is known about the causes of foot pain in older adults. Women are more likely than men to have foot pain; however, it is not known if this is due to a higher prevalence of foot deformities, underlying disease, shoe wear, or other lifestyle choices.

From a list of 11 shoe types, study participants were asked about the one style of shoe they currently wear on a regular basis, what they regularly wore during five age periods in the past, and if they experience pain, aching or stiffness in either foot on most days. Nearly 30 percent of women and 20 percent of men reported generalized foot pain, which is in line with other foot-pain studies. Ms. Dufour's team, however, found a significant association in women who reported hind-foot pain and past shoe wear that included high-heels and pumps.

The shoe types were classified as "poor" (high-heels, pumps, sandals and slippers), "average" (hard- or rubber-soled shoes and work boots), and "good" (athletic and casual sneakers). More than 60 percent of women reported wearing "poor" shoes in the past, compared to only 2 percent of men (13 percent of women said they currently wear "poor" shoes).

When we walk, a significant biomechanical shock is delivered to the foot each time our heel strikes the ground. "Good" shoes, such as sneakers and other athletic footwear, often have soles and other features that soften this shock and protect the foot. The heel and ankle take the brunt of this shock, which may be why women who wear high-heeled shoes often report pain in this part of the foot.

"Young women," says Ms. Dufour, "should make careful choices regarding their shoe types in order to potentially avoid hind-foot pain later in life." Scientists at the Institute for Aging Research conduct rigorous medical and social studies, leading the way in developing strategies for optimizing individuals' strength, vigor and physical well-being, as well as their cognitive and physical independence, in later life. Hebrew SeniorLife is a 105+-year-old organization committed to maximizing the quality of life of seniors through an integrated network of research and teaching, health care and housing.

Wear Properly Fitting Shoes

Poor fitting shoes can cause a number of foot problems for diabetics and non-diabetics alike. They can cause bunions, corns, calluses, hammertoes and other disabling foot problems that are a significant public health risk in the United States. More than 43 million Americans have foot problems, many of which are serious enough to warrant medical attention.

Alyssa B. Dufour, a graduate student in the Musculoskeletal Research Program at the Institute for Aging Research of Hebrew SeniorLife and the lead author of a recent study on shoe wear and foot pain, suggests the following tips for making sure your shoes fit properly:

- Comfort—rather than style or fashion—should rule shoe selection.
- Judge shoes by how they fit, not by the size marked on the box; shoe sizes vary by brand and style.
- Have both feet measured when you purchase shoes; foot size increases with age.
- Fit shoes to your longest foot; most people have one foot that is larger than the other.
- Avoid high-heels and shoes with pointed or tapered toes.
- Fit shoes at the end of the day when your feet are their longest.
- Try on both shoes and walk a few steps to make sure they are comfortable.
- When the shoes are on, wiggle your toes to ensure that you can move them freely.

Ms. Dufour says to keep in mind this basic principle: your shoes should conform to the shape of your foot—your feet should never conform to the shape of your shoes.

Journal reference:

1. Alyssa B. Dufour, Kerry E. Broe, Anne H. Walker, Erin Kivell, Uyen-Sa D.T. Nguyen, Marian T. Hannan, David R. Gagnon, Howard J. Hillstrom. **Foot Pain: Is Current or Past Shoewear a Factor?** *Arthritis Care & Research*, 2009; DOI: 10.1002/art.24733

Adapted from materials provided by Hebrew SeniorLife Institute for Aging Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090929004214.htm

Did The Great Depression Have A Silver Lining? Life Expectancy Increased By 6.2 Years

Buried machinery in barn lot in Dallas, South Dakota, during the Dust Bowl, an agricultural, ecological, and economic disaster in the Great Plains region of North America in 1936. (Credit: United States Department of Agriculture / Courtesy of Wikimedia Commons)

ScienceDaily (Sep. 29, 2009) — The Great Depression had a silver lining: During that hard time, U.S. life expectancy actually increased by 6.2 years, according to a University of Michigan study published in the current issue of the *Proceedings of the National Academy of Sciences*.

Life expectancy rose from 57.1 in 1929 to 63.3 years in 1932, according to the analysis by U-M researchers José A. Tapia Granados and Ana Diez Roux. The increase occurred for both men and women, and for whites and non-whites.

"The finding is strong and counterintuitive," said Tapia Granados, the lead author of the study and a researcher at the U-M Institute for Social Research (ISR). "Most people assume that periods of high unemployment are harmful to health."

For the study, researchers used historical life expectancy and mortality data to examine associations between economic growth and population health for 1920 to 1940. They found that while population health generally improved during the four years of the Great Depression and during recessions in 1921 and 1938, mortality increased and life expectancy declined during periods of strong economic expansion, such as 1923, 1926, 1929, and 1936-1937.

The researchers analyzed age-specific mortality rates and rates due to six causes of death that composed about two-thirds of total mortality in the 1930s: cardiovascular and renal diseases, cancer, influenza and pneumonia, tuberculosis, motor vehicle traffic injuries, and suicide. The association between improving health and economic slowdowns was true for all ages, and for every major cause of death except one: suicide.

Although the research did not include analyses of possible causes for the pattern, Tapia Granados and Diez Roux offer some possible explanations about why population health tends to improve during recessions but not expansions.

"Working conditions are very different during expansions and recessions," Tapia Granados said. "During expansions, firms are very busy, and they typically demand a lot of effort from employees, who are required to work a lot of overtime, and to work at a fast pace. This can create stress, which is associated with more drinking and smoking.

"Also, new workers may be hired who are inexperienced, so injuries are likely to be more common. And people who are working a lot may also sleep less which is known to have implications for health. Other health-related behaviors such as diet may also change for the worse during expansions."

In recessions, Tapia Granados noted, there is less work to do, so employees can work at a slower pace. There is more time to sleep, and because people have less money, they are less likely to spend as much on alcohol and tobacco.

In addition, economic expansions are also associated with increases in atmospheric pollution which has well-documented short-term effects on cardiovascular and respiratory mortality. Other reasons that periods of economic expansion may be bad for health could include increases in social isolation and decreases in social support that typically occur when people are working more.

The researchers noted that their study examined the relation between recessions and mortality for the population as a whole, and not the effect of becoming unemployed on an individual person. In fact, their results show that downturns in economic activity may have overall beneficial effects on the population, even if becoming unemployed has adverse health consequences for a given person.

"Social science is not physics," Tapia Granados said. "But regularities in the past allow us at least some confidence in forecasting the future. Historical experience tells us that no particular deterioration of mortality is to be expected as a consequence of a recession beyond an increase in suicides which, although clearly important, is of small magnitude compared to the reduced number of fatalities from other causes."

Other studies suggest that the relationship between population health and business cycles may be weakening, at least in the U.S. and in Japan, where the phenomenon of karoshi—sudden death from overwork among Japanese salarymen—dramatically illustrates the dangers of life in economic boom times.

Still, Tapia Granados hopes that a better understanding of the beneficial effects of recessions on health may perhaps contribute to the development of economic policies that enhance health and minimize or buffer adverse impacts of economic expansions. And he cautions that the findings also suggest that suicide prevention services—often the casualties of budget cuts during economic downturns—are more important during bad times than ever.

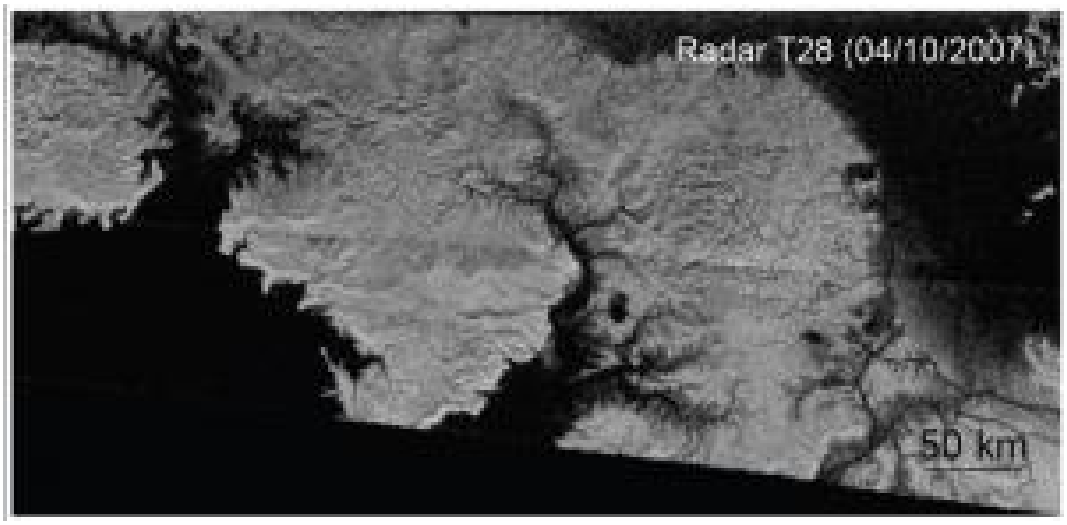
Journal reference:

1. José A. Tapia Granadosa, Ana V. Diez Roux. **Life and death during the Great Depression**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0904491106

Adapted from materials provided by University of Michigan.

http://www.sciencedaily.com/releases/2009/09/090928172530.htm

Global View Of Valleys On Saturn's Moon Titan Shows North-South Contrast



Fluvial valleys in the north polar region of Titan. (Credit: Cassini Radar Team, ESA, JPL, NASA)

ScienceDaily (Sep. 29, 2009) — A team of international scientists led by Mirjam Langhans, from the German Aerospace Center (DLR), will present first results of a global analysis of spatial patterns, occurrence and origin of river channels on Titan at the European Planetary Science Congress in Potsdam, Germany, on Wednesday 16 September.To date scientists have focused their investigations on single channels due to the fact that radar and spectral data have only been captured for some narrow areas of the surface below the thick nitrogen atmosphere of this mysterious moon of Saturn. This data jigsaw puzzle is increasingly being filled in through further fly bys of Titan by NASA's Cassini spacecraft. Now, for the first time, the DLR team has developed a global perspective of the deposits of liquid hydrocarbons, such as methane and ethane, and their effected forms of erosion.

Beside the Earth, Titan is the only body in the Solar System where liquids directly have been proved to exist. The moon's exceptionally thick atmosphere, where chemical reactions occur at freezing temperatures of -179 degrees Celsius, makes this second largest moon of the Solar System of special interest for planetary science.The DLR scientists have compiled a global map of Titan, which combines all radar data and details the surface of Titan down to 300 meters in size. Furthermore, data in near infrared wavelengths have been captured for a wide band around the equator by Cassini's Visual and Infrared Mapping Spectrometer (VIMS) with a resolution of up to 300 meters per pixel.

On this equatorial band, bright continent areas and extensive dune regions can be distinguished. Dark spots on the continent areas are of special interest, because they are supposed to be fluvial deposits. Additional radar data show channels precisely linked to them, which are dry, canyon-like, and broadly distributed.Towards the north pole, the picture is much richer. There is a dense network of branching, active river systems similar to those on Earth. They are visible down to small tributaries on radar images and can be seen flowing into multiple lakes. Contrastingly, hardly any channels are found at the south pole.

"The observations of the extensive river structures at the north pole have led the team to a fascinating conclusion: there must be heavy and frequent rain of liquid hydrocarbons. Furthermore the measured channels provide first clues about the composition and relative age of different regions of Titan," said Langhans.

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

http://www.sciencedaily.com/releases/2009/09/090915202244.htm

MAD Unveils Taichung Convention Center With Solar Eco-Skin

by Bridgette Meinhold, 09/25/09

Like a cluster of pleated, venetian blind-esque volcanoes, this new convention center in Taiwan has "skin" that will naturally ventilate the structure and generate energy from solar power. Beijing-based MAD Architects recently designed the Taichung Convention Center as a commission by the Taiwanese government. The center is intended to become a new local landmark and help redefine the cultural landscape of the city, while also drawing attention to sustainable development and growth.

The folded solar eco-skin of the building serves two purposes – first, the envelopes provide natural air flow to the interior to minimize air conditioning. Second, the pleatings also utilize a "double photovoltaic glass," which will help reduce energy consumption. One side of the pleat is a transparent material that lets light into the interior, providing plentiful natural daylight, while the other side of the pleat is solid.

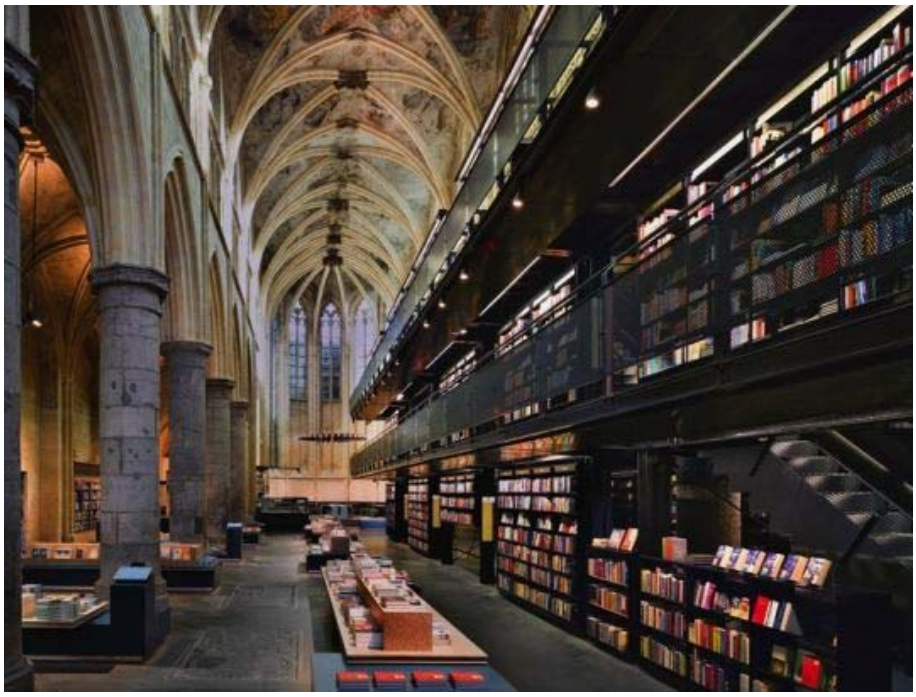
Built according to existing site topography, the structure of the center further accentuates what was already there. The moutainous forms resemble craters and are anywhere from 39-85 meters in height. Outdoor courtyards and balconies dot the architectural form to create a more organic landscape. In total, the building area is over 216,000 square meters (+ 2.3 million sq ft) and will have various uses including entertainment, retail, convention space, offices and parking. The inside of the convention center is filled with light and will hopefully be all it claims to be in terms of sustainability.

+ MAD http://www.i-mad.com/?go/#/exhibitions/list/28/

http://www.inhabitat.com/2009/09/25/mad-unveils-taichung-convention-center-with-solar-eco-skin/

Ancient Church Renovated into Modern Bookstore

by Diane Pham, 09/24/09



Whether you're religious or not, this old Dominican church will certainly bring you the enlightenment you've been seeking. After months of renovation this magnificent structure originally constructed in 1294 has opened its doors to the public as a "brand new" bookstore in the heart of Maastricht. A superb example of adaptive re-use, the Selexyz Dominicanen infuses rich and historic architecture with plentiful shelves ripe with information.Dating back to the 13th century, the structure was a Dominican church until Maastricht was invaded by Napoleon in 1794 and the group was forced out of the country. Since that point it has been briefly used as a parish, then a warehouse, then an archive, *then* a giant parking lot for bicycles (not such a terrible idea) and finally made over into a bookstore.Led by architecture firm Merkx + Girod, the new installations are highlighted by a towering, three-storey black steel book stack stretching up to the stone vaults. The highest shelves are reachable by lift or by a set of stairs within the sleek, well-made stack. The views provided from the top shelf along the nave of the church are nothing short of uplifting.At the back of the church customers and visitors can sit and admire the beautifully renovated 14th century ceiling frescoes, or chat over a cup of coffee in the café situated in the former choir. In a bit of humor the bookstore also installed a cross-shaped reading table where anyone can sit and flip through the magazines and newspapers kept in the slats of the table. So far the design has won the Lensvelt de Architect Interior Prize, and in 2008 The Guardian called it the
"best bookstore in the world".Selexyz Dominicanen belongs to the popular Selexyz chain and maintains a wide selection of books across all subjects, even boasting a sizeable collection of books in English. As more and more churches are being abandoned due to redundancy, maybe this is something for Barnes and Noble to think about…

+ Merkx + Girod http://www.merkx-girod.nl/

http://www.inhabitat.com/2009/09/24/gorgeous-church-renovated-into-modern-bookstore/

PREFAB FRIDAY: Parasitic Homes Take Root On Empty Walls

by Bridgette Meinhold, 09/25/09

As more people filter into the city, open land to build on will become more and more scarce, and we may have to use every available bit of space we can, including empty bare walls, bridge pylons, and retaining walls. The Prefab Parasite, designed by Australia-based Lara Calder Architects, is such a structure — aiming to turn previously empty vertical surfaces into livable and attractive private space. Mimicking parasitic qualities, the home is designed for durability and adaptability, evident in its construction out of prefabricated panels so that the home can be affixed onto any wall or pylon large and strong enough to hold it.Each dwelling would be specifically designed for each site. Its basic construction begins as the prefabricated panels are secured onto the wall with a mounting plate. Afterward, the floors and the internal ribs are installed, and finally the paneling is laid on top to provide lateral bracing and tie the building together. The paneling is an eco-solid surface material made of compressed bamboo and recycled paper.Accessed via a retractable staircase, the dwelling is placed about 3 or 4 meters above the street level. Depending on the needs of the residents, the width could be wide or narrow, but would maintain a cross sectional area of 36 square meters (387 sq ft). Residents walk up to their one-bedroom home, and are first greeted by a home office located on the first landing. Next comes the bedroom, then the living area, the kitchen and dining, and finally on the top terrace is an open air balcony.Since none of the structure really touches the ground, the footprint of the house consists of the service shaft that connects it to power, sewer and water. Don't think too hard about the details yet or how it would all work, but do think about the potential of such a concept — especially how it might play into the movie version of your favorite graphic novel. The Parasite Prefab is a fascinating concept for hyper-dense and prefabricated housing, and could be the future of urban living.

+ Lara Calder Architects http://www.laracalderarchitect.com.au/

Via designboom

http://www.inhabitat.com/2009/09/25/prefab-friday-parasitic-homes-take-root-on-empty-walls/

Stereotypes Loom Larger As Our Brains Age

By: Tom Jacobs

There are a lot of clichés thrown around about the elderly, but one that seems to be true — or at least is backed up by research — is the belief they tend to be more prejudiced than younger people. This phenomenon — noted in *The New York Times* as early as 1941 — is widely assumed to be the result of socialization. After all, today's senior citizens grew up in an era when racism was widespread and gays stayed in the closet. Of course they aren't as open-minded as their children and grandchildren.

A decade ago, a research team led by William von Hippel of the University of Queensland challenged that assumption. The psychologists proposed that older people may exhibit greater prejudice because they have difficulty inhibiting the stereotypes that regularly get activated in all of our brains. They suggested an aging brain is not as effective in suppressing unwanted information — including stereotypes.

In two recently published papers, von Hippel and Gabriel Radvansky of the University of Notre Dame provide compelling support for this concept. In the *Journal of Experimental Social Psychology*, they describe a series of experiments designed to assess whether older adults were relatively more likely to draw and remember stereotypic inferences.

Forty-eight older adults (age 60 to 88) and 71 younger adults (age 18 to 25), read four stories, each of which "allowed for stereotypic inferences." Two of the tales featured African Americans, one dealt with people from Appalachia, and one involved Jews. After finishing the stories, the participants were shown a series of statements relevant to the tale, and asked to rate them as true or false. Some of these statements were strictly factual, while others contained inferences of stereotypes.

The results revealed "significantly greater memory strength among older adults for stereotype-consistent situation models," the researchers write. "This finding supports our suggestion that older adults are more likely to make stereotypic inferences during comprehension, and that this stereotyping carries over into their later memory for that information."

This process "appears to be a more general phenomenon of aging," they note, adding that some older adults "may be relying on stereotypes despite their best intentions to the contrary."

The second paper, published earlier this year in the journal *Aging, Neuropsychology and Cognition*, contains a way around this problem. It describes a study in which older and younger adults read a story in which a central character was employed in a sex-stereotyped profession. In half the stories, the character's gender was consistent with the stereotype (a male plumber), while in the other half it was inconsistent (a female plumber).

"Results revealed that with explicit labeling, older adults were able to discount their stereotypes and avoid processing difficulties when subsequent stereotype-inconsistent information was encountered," the researchers write. "These data suggest that when counter-stereotypical information is explicitly provided at encoding (that is, the first stage of the memory process, in which stimuli are initially registered), older adults are no more likely than younger adults to rely on stereotypes, and are similarly capable of altering their interpretation of a situation when information suggests that information is incorrect."

In real life, of course, no one is pointing out biased statements as they emerge from the mouths or friends, family members or talk-show hosts. So for older adults, the best advice might be to avoid acquaintances who speak in stereotypes. This research suggests prejudice can be contagious, and we become more susceptible as our brains age.

http://www.miller-mccune.com/news/stereotypes-loom-larger-as-our-brains-age-1505

Concepts are born in the hippocampus

- 14:12 28 September 2009 by **Nic Fleming**
- For similar stories, visit the **The Human Brain** Topic Guide

File under "dog" (Image: Bjorn Mansson/IBL/Rex)
A diminutive chihuahua and a lumbering Irish wolfhound look completely different, yet most us know they both belong to the concept called "dog". Now the brain regions responsible for our ability to organise the world into separate concepts have been pinpointed.

Forming a concept involves selecting the important characteristics of our experiences and categorising them. The degree to which we are able to do this effectively is a defining characteristic of human intelligence. Yet little is known about how conceptual knowledge is created and used in the brain.

Fractal patterns

In an attempt to identify the brain regions responsible, Dharshan Kumaran and colleagues at the Wellcome Trust Centre for Neuroimaging, University College London, showed 25 volunteers pairs of fractal patterns that represented the night sky and asked them to forecast the weather – either rain or sun – based on the patterns.

Conceptual rules based on the positions and combinations of the patterns governed whether the resulting outcome would be rain or sun, but the volunteers were not told this. Instead correct predictions were rewarded with cash prizes, encouraging the volunteers to deduce these conceptual rules.

In an initial learning phase, the different possible combinations were repeatedly shown to the participants. While they could make their predictions by simply memorising previous outcomes, they could also begin to realise that rules based on the positions and combinations of the patterns governed whether the result would be rain or sun.

Concepts form

In a second phase, the volunteers were provided with less information to encourage them to apply the rules they had identified. This enabled the researchers to separate those volunteers who had formed the concept in the learning phase from those who hadn't.

During both experiments fMRI scanning was used to identify areas of brain activity. Kumaran and colleagues found that in the first phase, they could tell if a volunteer would go on to apply concepts in the second phase by the degree of activity in their hippocampus, which is known to be responsible for learning and memory.

In the second phase, activity centred on the ventromedial prefrontal cortex (vMPFC), important in decision-making, was active.

Hippocampus rules

The team concluded that the hippocampus creates and stores concepts, and passes this information onto the vMPFC where it is put to use during the making of decisions.

People with amnesia are also known to have problems forming concepts, so Kumaran hopes his findings will lead to the development of improved teaching methods and other tools for the treatment of amnesiacs.

"Knowing what specific computations and processes the hippocampus is important for will allow us to develop better learning procedures for those with amnesia," said Kumaran.

Early learning

In a 1997 study published in *Science*, Faraneh Vargha-Khadem of the University College London Institute of Child Health found three young amnesiacs with hippocampal damage attained normal levels of speech and language competence, literacy, and factual knowledge. She concluded the hippocampus was not necessary for the acquisition of conceptual knowledge.

But Kumaran says he believes the brains of the children in Vargha-Khadem's research could have learned to compensate as they had hippocampus damage from birth or a very early age.

Journal reference: *Neuron*, vol 63, p 889

http://www.newscientist.com/article/dn17862-concepts-are-born-in-the-hippocampus.html?full=true&print=true

Curling Up With Hybrid Books, Videos Included

By MOTOKO RICH

For more than 500 years the book has been a remarkably stable entity: a coherent string of connected words, printed on paper and bound between covers.

But in the age of the iPhone, Kindle and YouTube, the notion of the book is becoming increasingly elastic as publishers mash together text, video and Web features in a scramble to keep readers interested in an archaic form of entertainment.

On Thursday, for instance, Simon & Schuster, the publisher of Ernest Hemingway and Stephen King, is working with a multimedia partner to release four "vooks," which intersperse videos throughout electronic text that can be read — and viewed — online or on an iPhone or iPod Touch.

And in early September Anthony E. Zuiker, creator of the television series "CSI," released "Level 26: Dark Origins," a novel — published on paper, as an e-book and in an audio version — in which readers are invited to log on to a Web site to watch brief videos that flesh out the plot.

Some publishers say this kind of multimedia hybrid is necessary to lure modern readers who crave something different. But reading experts question whether fiddling with the parameters of books ultimately degrades the act of reading.

"There is no question that these new media are going to be superb at engaging and interesting the reader," said Maryanne Wolf, a professor of child development at Tufts University and author of "Proust and the Squid: The Story and Science of the Reading Brain." But, she added, "Can you any longer read Henry James or George Eliot? Do you have the patience?"

The most obvious way technology has changed the literary world is with electronic books. Over the past year devices like Amazon's Kindle and Sony's Reader have gained in popularity. But the digital editions displayed on these devices remain largely faithful to the traditional idea of a book by using words — and occasional pictures — to tell a story or explain a subject.

The new hybrids add much more. In one of the Simon & Schuster vooks, a fitness and diet title, readers can click on videos that show them how to perform the exercises. A beauty book contains videos that demonstrate how to make homemade skin-care potions.

Not just how-tos are getting the cinematic work-up. Simon & Schuster is also releasing two digital novels combining text with videos a minute or 90 seconds long that supplement — and in some cases advance — the story line.

In "Embassy," a short thriller about a kidnapping written by Richard Doetsch, a video snippet that resembles a newscast reveals that the victim is the mayor's daughter, replacing some of Mr. Doetsch's original text.

"Everybody is trying to think about how books and information will best be put together in the 21st century," said Judith Curr, publisher of Atria Books, the Simon & Schuster imprint that is releasing the electronic editions in partnership with Vook, a multimedia company. She added, "You can't just be linear anymore with your text."

In some cases, social-networking technologies enable conversations among readers that will influence how books are written.

The children's division of HarperCollins recently released the first in a young-adult mystery series called "The Amanda Project," and has invited readers to discuss clues and characters on a Web site. As the series continues, some of the reader comments may be incorporated into minor characters or subplots.

Susan Katz, publisher of HarperCollins Children's Books, predicted that "there is going to be a popular kind of literature where the author is seen as the leader of a large group and will pick and choose from these suggestions" by readers.

Bradley J. Inman, chief executive of Vook, said readers who viewed prototypes of "The 90-Second Fitness Solution" by Pete Cerqua or "Return to Beauty" by Narine Nikogosian "intuitively saw the benefits of augmenting how-to books with video segments." Mr. Inman said readers then "warmed to" the fictional editions.

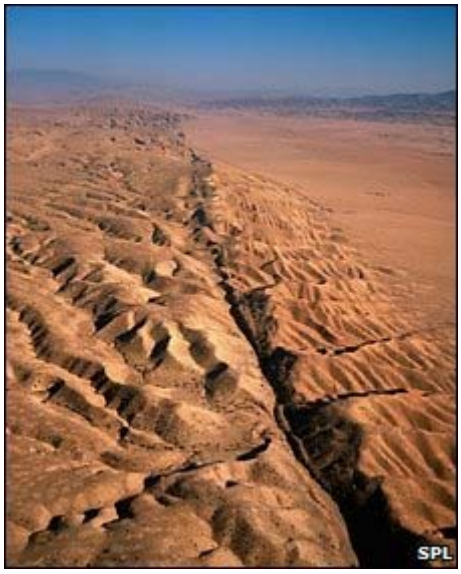
Jude Deveraux, a popular romance author who has written 36 straightforward text novels, said she loved experimenting with "Promises," an exclusive vook set on a 19th-century South Carolina plantation in which the integrated videos add snippets of dialogue and atmosphere.

Ms. Deveraux said she envisioned new versions of books enhanced by music or even perfume. “I’d like to use all the senses,” she said.
Brian Tart, publisher of Dutton, an imprint of Penguin Group USA, which released “Level 26,” said he wanted the book’s text to be able to stand on its own, but the culture demanded rethinking the format. “Like everybody, you see people watching these three-minute YouTube videos and using social networks,” Mr. Tart said. “And there is an opportunity here to bring in more people who might have thought they were into the new media world.”
Readers of “Level 26,” which Mr. Zuiker wrote with Duane Swierczynski, have had a mixed response to what the publisher is marketing as a “digi-novel.”
“It really makes a story more real if you know what the characters look like,” commented Fred L. Gronvall in a review on Amazon.com. The videos, he wrote, “add to the experience in a big way.”
But another reviewer, posting as Rj Granados, wrote, “Do you really think cheesy video vignettes will IMPROVE the book?”
Some authors believe the new technologies can enrich books. For his history of street songs in 18th-century France, Robert Darnton, director of the Harvard University Library, will include links to recordings of the actual tunes.
But Mr. Darnton, author of “The Case for Books: Past, Present and Future,” warned that reading itself was changing, and not necessarily for the better. “I think we can see enough already to worry about the loss of a certain kind of sustained reading,” he said.
Mr. Doetsch, the author of “Embassy,” said the new editions should not replace the traditional book. He has written a forthcoming novel, “The 13th Hour,” that he thinks is too long to lend itself to the video-enhanced format. The new editions, he said, are “like dipping a novel into a cinematic pool and pulling it out and getting the best parts of each.”
Some authors scoff at the idea of mixing the two mediums. “As a novelist I would never ever” allow videos to substitute for prose, said Walter Mosley, the author of “Devil in a Blue Dress” and other novels. “Reading is one of the few experiences we have outside of relationships in which our cognitive abilities grow,” Mr. Mosley said. “And our cognitive abilities actually go backwards when we’re watching television or doing stuff on computers.”

http://www.nytimes.com/2009/10/01/books/01book.html?_r=1&hp

Earthquakes weaken distant faults

The major 2004 earthquake in Sumatra may have weakened the San Andreas fault, 8,000km away in California.



This is according to scientists who took measurements from the fault over two decades.

Reporting in the journal Nature, the team found that small "repeating earthquakes" became more frequent as the San Andreas Fault weakened.

This pattern, they say, could help to forecast earthquakes in the future, something that is currently impossible.

The team, led by Taka'aki Taira, of the University of California at Berkeley, studied a section of the San Andreas Fault near Parkfield, which is sometimes called the "earthquake capital of the world".

The area has long been studied by earthquake researchers and it contains a fixed array of seismometers called the high resolution seismic network.

Dr Taira, who was based at Washington DC's Carnegie Institution when he carried out the work, used measurements from these highly sensitive seismometers, some of which are several kilometres below the Earth's surface.

" **It is possible that the strength of faults and earthquake risk is affected by seismic events on the other side of the world** "
Fenglin Niu, Carnegie Institution

"The equipment is at depths where the noise level is very low, so it collects very good data," explained Dr Taira.

He and his team studied repeating earthquakes because they provided a "background frequency" against which changes in the fault could be compared.

"These events happen regularly and the size of the event is about the same," he told BBC News.

"But after Sumatra, the frequency changed - it increased - but the magnitude decreased.

"That is a signal of the fault weakening; you only have to push a little bit and the fault fails."

Fenglin Niu from Carnegie, who also took part in the research, said: "So it is possible that the strength of faults and earthquake risk is affected by seismic events on the other side of the world."

The 2004 Sumatran earthquake was magnitude 9.3 - one of the strongest on record - and triggered the tsunami that killed more than 220,000 people.

The 30 September 2009 earthquake along the same fault line was measured at magnitude 7.6.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8283873.stm

Published: 2009/09/30 18:47:29 GMT

UK mammals have 'Celtic fringe'

By Judith Burns
Science and environment reporter, BBC News

DNA tests on British populations of small mammals show a genetically distinct "Celtic Fringe", say scientists at The University of York.

Voles, shrews, mice and stoats in northern and western areas have different DNA from their counterparts in other parts of the British Isles.

The paper, in Proceedings B journal, says the different populations arrived at the end of the last ice age.

The authors say the work sheds light on the origins of the Celtic people.

The traditional view is that the ancestors of British Celts spread from central Europe during the Iron Age and were later displaced by the arrival of the Anglo Saxons.

However, recent genetic studies have challenged this theory, suggesting a much earlier origin, dating back to the end of the last ice age, 19,000 years ago.

This paper suggests that the study of small mammal populations could help resolve the controversy.

Seven species

The team compared the mitrochondrial DNA of seven small mammal species, this being the best genetic marker for studying colonisation history.

The seven species were three types of vole: bank vole, water vole and field vole; two types of shrew: common shrew and pygmy shrew; the house mouse and the stoat.

Lead author, Professor Jeremy Searle, told BBC News: "We found this extraordinary pattern that within the British Isles you get these two genetic types for a number of species. One having peripheral distribution and one having a central and eastern distribution.

"Seeing that distribution and trying to think how it came about was interesting in itself - but also the fact that it has this similarity with the distribution of cultural and genetic types in humans."

Professor Searle said that the mitrochondrial DNA in the two groups was sufficiently different that "they could not have originated one from the other within Britain but must have originated outside Britain and come in as two separate entities".

The authors say that both types of each species must have arrived before Britain was cut off from Europe by rising sea levels 8,000 years ago.

They believe that the type now confined to the Celtic periphery colonised Britain first, sometime after the end of the last ice age, and spread throughout the British Isles.

The global climate remained mild until 12,900 years ago when a sudden drop in temperature brought permafrost back to the British Isles for more than 1,000 years. This caused a drop in the small mammal population.

A new wave

When temperatures rose again a new wave of small mammals colonised Britain and replaced the now sparse populations of the first type everywhere except on the northern and western edges.

Professor Searle suggests that a similar pattern is likely to apply to humans as there is archaeological evidence of humans in Britain after the last ice age, 19,000 years ago.

He said: "It could be that, like the small mammals, this first wave of humans did not do well during the cold spell but managed to hang on. Once it was over, another group came in and replaced the first type everywhere apart from the peripheral areas.

"And so one could suggest that the human Celtic Fringe was set up by exactly the same sort of events that set up the animal Celtic Fringe.

He suggests that the Celtic Fringe has since been reinforced culturally by different sets of people occupying the fringe areas and also what is now England, for instance the Romans, Anglo Saxons and Normans.

"This fits well with studies that others are doing on human genetic patterns and with the growing idea that the Celtic genetic type has been there a very long time."

Dr John Stewart of The Natural History Museum said he appreciated the paper's realistic approach to the issue: "It is only by looking at a variety of different organisms that we can see genetic biogeographic patterns emerging."

"It is really important to treat humans as part of a suite of animals that were being pushed and pulled around the landscape by changes in climate."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8279567.stm

Published: 2009/09/30 16:34:37 GMT

Daily sweets 'linked to violence'

Children who eat sweets and chocolate every day are more likely to be violent as adults, according to UK researchers.

The Cardiff University study involving 17,500 people is the first into effects of childhood diet on adult violence.

It found 10-year-olds who ate sweets daily were significantly more likely to have a violence conviction by age 34.

Researchers suggested they had not learnt to delay gratification, but other experts said already "difficult" children might be given more sweets.

The researchers looked at data on around 17,500 people and found that 69% of the participants who were violent at the age of 34 had eaten sweets and chocolate nearly every day during childhood, compared to 42% who were non-violent.

Delinquents

This link between confectionery consumption and later aggression remained even after controlling for other factors such as parenting behaviour, the area where the child lived, not having educational qualifications after the age of 16 and whether they had access to a car when they were 34.

" **Targeting resources at improving children's diet may improve health and reduce aggression** "
Dr Simon Moore, Cardiff University

The researchers put forward several explanations for the link including the idea that the confectionery makes the adult addicted to certain additives and that these may contribute towards adult aggression.

The study was reported in the British Journal of Psychiatry.

Stunted learning

Dr Simon Moore, who led the study, has carried out previous research on young offenders.

He was aware that they tend to have very poor diets including lots of confectionery - but was intrigued to find the link.

" **This is either utter nonsense or a very bad April Fool's Day joke** "
Julian Hunt Food and Drink Federation

He said: "Our favoured explanation is that giving children sweets and chocolate regularly may stop them learning how to wait to obtain something they want.

"Not being able to defer gratification may push them towards more impulsive behaviour, which is strongly associated with delinquency.

"Targeting resources at improving children's diet may improve health and reduce aggression."

Professor Alan Maryon-Davis, president of the UK Faculty of Public Health, said: "Another explanation is that children who are already more demanding, aggressive and 'difficult' are more likely to be given sweets and chocolates to keep them quiet for a while.

"It is an interesting area that needs looking into a little more deeply."

Julian Hunt, Food and Drink Federation (FDF) director of communications, said: "This is either utter nonsense or a very bad April Fool's Day joke.

"Anti-social behaviour stems from deep-rooted social and environmental factors, such as poor parenting and a deprived upbringing, and is not linked to whether or not you ate sweeties as a kid.

"How anyone could leap to such a conclusion is beyond me."

But Dr Simon Moore said: "We are fairly confident that this is a realistic relationship - the key is explaining what the mechanism is behind this relationship.

"We think that rewarding bad behaviour in childhood with confectionary can lead to later problems but we need to look at this more closely."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8281147.stm

Published: 2009/09/30 23:16:54 GMT

Pregnant smoking 'psychosis link'

Mothers who smoke during pregnancy put their children at greater risk of psychotic symptoms such as delusions and hallucinations, a study suggests.

A UK survey of 12-year-olds found those whose mothers had smoked were 20% more likely to suffer such problems.

The link was 84% more pronounced if 20 or more cigarettes a day were smoked.

The researchers suggested tobacco exposure in the womb may affect the child's brain development, but admitted further study of the issue was needed.

The research by Cardiff, Nottingham, Bristol and Warwick universities was part of a long-running study known as the Avon Longitudinal Study of Parents and Children looking at how genetics and the environment affects health.

" **Maternal smoking may be an important risk factor in the development of psychotic experiences in this population** "
Dr Stanley Zammit, lead researcher

During this latest part of the programme, 12-year-olds were asked if they had had any psychotic episodes such as delusions and hallucinations in the past six months.

In total, 11% of the group did, the British Journal of Psychiatry reported.

The group was also studied for their mother's use of cannabis and alcohol.

No link was found for the drug, while only those whose mothers drank more than 22 units had a higher chance of psychotic episodes.

Researchers said the findings added more weight to the argument against smoking during pregnancy - about 15% of pregnant women still do not give up the habit when they conceive.

Lead researcher Dr Stanley Zammit said: "Maternal smoking may be an important risk factor in the development of psychotic experiences in this population."

He said the cause of the link was unclear, although it was likely to be related to the development of the brain's function governing attention and cognition.

However, he said further research was needed into the issue.

Dr Ken Checinski, of the Royal College of Psychiatrists, agreed.

"The findings are compelling, but we must not jump to conclusions.

"The results need to be replicated in other studies now to be sure.

"However, we already know that smoking during pregnancy is linked to a number of others risks, such as low birth-weight and complications."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8283723.stm

Published: 2009/09/30 23:17:06 GMT

Cooling 'cuts baby brain damage'
By Fergus Walsh
Medical correspondent, BBC News

Babies who are starved of oxygen at birth have a much lower risk of brain damage if they are given mild hypothermia, major research suggests.

More than 300 babies were involved in a trial carried out at 33 hospitals in the UK and in five other countries.

Researchers found full-term babies who suffered oxygen loss at birth were 57% more likely to survive without brain damage if their bodies were cooled.

The findings are published in the New England Journal of Medicine.

The babies' body temperature was brought down by about 4C using a fluid-filled mat under their sheet.

Doctors are not exactly sure why it helps, but think that slowing their metabolism reduces the after-shocks of the birth trauma, giving the brain time to recover.

Starved of oxygen

Dr Denis Azzopardi, from Imperial College London and who led the trial, said: "The study builds on a 20-year body of research but gives, for the first time, irrefutable proof that cooling can be effective in reducing brain damage after birth asphyxia.

"Although unfortunately it doesn't work in every case, our study showed the proportion of babies that survived without signs of brain damage went from 28% to 44% with cooling treatments - that's a 57% increase."

Carmel Bartley, Family Support Manager from the children's charity Bliss, said: "This is very welcome research into an area which is known to save lives. Cooling of babies with birth asphyxia is an innovative technique already being used in some neonatal centres.

"This is a specialist treatment that we would like to see used more widely to ensure the very best outcomes for our most vulnerable babies."

The trial involved 325 full-term babies who had been starved of oxygen at birth.

Half of the newborn babies had their body temperature reduced to 33-34C (91-93F) for 72 hours followed by gradual re-warming in intensive care. Normal body temperature is around 37C (98F).

The study received nearly £1m of funding from the Medical Research Council and mostly involved hospitals in the UK, plus neonatal units in Ireland, Sweden Finland, Hungary and Israel.

Over to NICE

Becca Gallogly's daughter Emma is one of the babies in the group that was cooled. Emma is a bright and active four-year-old but when she was born she was dangerously ill after suffering oxygen loss.

Becca says she feels very fortunate that Emma is well: "Every day I thank my lucky stars that we've been as lucky as we have.

"For the first two years of her life we felt we were wishing a lot of it away, because we were so anxious for her to meet her next milestone and see how she developed.

"We were looking for problems and thankfully there weren't any."

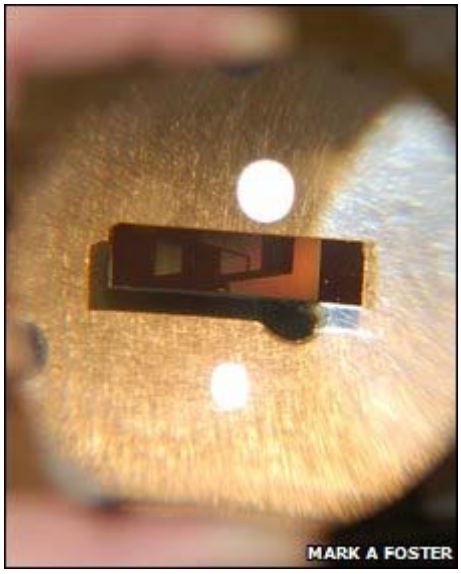
The trial data will now be assessed by the National Institute for Health and Clinical Excellence (NICE) to see whether the technique should be rolled out to all neonatal units.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8283738.stm

Published: 2009/09/30 21:07:44 GMT

'Time telescope' could boost web

Researchers have demonstrated a "time telescope" that could squeeze much more information into the data packets sent around the internet.



Rather than focusing information-carrying light pulses in space, like a normal lens, it focuses them in time.

The telescope comprises laser beams that combine in a tiny silicon structure to compress the pulses.

A prototype device, described in Nature Photonics, boosted the data rate of telecoms-wavelength pulses by 27 times.

A general rule in physics is that the shorter a pulse is in time, the higher its "bandwidth" - a measure of the spread of colours within it, and therefore of its information-carrying capacity.

State-of-the-art devices used in telecommunications today generate pulses with a bandwidth of 10 GHz, using standard electronics to encode information onto those pulses directly.

Purely optical systems can generate pulses with a bandwidth nearly 100,000 times higher. However, getting the information onto the pulses, or modulating them, has been beyond the reach of the electronics that are currently used.

Light pulses are spread out in space; if an instantaneous snapshot could be taken of them, those that are longer in time would appear physically larger.

The trick to the new work is to use "temporal lenses" that can squash comparatively long pulses in time by selectively speeding up or slowing down their different parts.

Light race

The idea uses silicon waveguides as the lenses.

A long, 10-GHz pulse containing bits of data and a much shorter laser pulse with no information pass through one of these waveguides.

A race is then set up between the halves of the pulse, with the back speeding up and the front slowing down as it passes through an optical fibre.

That is due to complex interactions with the silicon, forcing the data-rich pulse to take on the temporal properties of the shorter pulse.

Just like an optical telescope, combining two of these temporal lenses creates a time telescope that can take a standard 10 GHz pulse and create an "image" of it.

That jams the same information into a pulse just one twenty-seventh as long.

"The primary limitation of this approach right now is the length of the packet that can be compressed," said Cornell University's Mark Foster, lead author of the research.

"Typical packets used in internet communications are much longer than 24 bits, therefore extending the time window over which compression occurs is the primary problem to be solved in future generations of this device," he told BBC News.

Reading out the data on a light pulse is limited by the same electronics that generate them in current systems, so a "decompressing" scheme would need to be implemented on the receiving end.

However, Dr Foster said that the system, while complex, is very robust and needs relatively little power, making it potentially attractive for industrial use.

Moreover, he said, it could be applied to the fields of chemistry and biology, which can probe the most minute and fastest processes in nature - such as protein folding or chemical reactions - if only given structured pulses of sufficiently short duration.

The new method could vastly improve the ultimate time limit of these studies.

While significant work would need to be done before the world's data rates see the benefit of the new approach, Dr Foster is still impressed with how it initially came together.

"The most surprising thing for me was seeing it all work," he said.

"You spend a lot of time designing and modelling the system and putting it all together and it is always surprising and exciting to see it work as well as you imagined it would."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/8281544.stm

Published: 2009/09/30 10:57:43 GMT

Missile Defense

By MICHAEL BESCHLOSS

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A FIERY PEACE IN A COLD WAR

Bernard Schriever and the Ultimate Weapon

By Neil Sheehan

Illustrated. 534 pp. Random House. $32

When we think about how America won the cold war, our attention tends to fasten on grand, public moments of presidential leadership, like Truman's decision to resist Stalin's designs on Europe, Kennedy's settlement of the Cuban missile crisis or Reagan's realization that he could "do business" with Mikhail Gorbachev. This is not wrong, but it elides other pivot-points, invisible to Americans even as they were happening, that, in retrospect, loom almost as important. The C.I.A.'s hidden success in assessing the Soviet war machine is one example. Another consists of the crucial Pentagon decisions, unheralded at the time, that ensured our ability to match Soviet power and enforce an armed stalemate between the two superpowers until, as George Kennan had forecast in the late 1940s, the Soviet empire collapsed from within.

"A Fiery Peace in a Cold War," Neil Sheehan's deeply researched, compulsively readable and important book, is about one of those decisions. It reminds us that, as the founders warned, the survival of the United States depends on our ability not only to choose wise presidents, but also to maintain a federal government that attracts extraordinary talent at all levels. As Sheehan shows us almost cinematically, this was particularly true in the 1950s, when American leaders had to decide whether to keep resisting Soviet power mostly with strategic bombers, or to build an awe-inspiring force of nuclear-tipped missiles.

Those years constituted a historical epoch that is mainly important for the nuclear war that did not happen. The problem is how to dramatize a nonevent. Telling a tale that unfolded in conflicts behind Washington's closed doors is more difficult than recounting the boom and bang of battlefields. But Sheehan succeeds by using the same technique he employed in his splendid book "A Bright Shining Lie" (1988), which focused on one man, Lt. Col. John Paul Vann, to tell the larger history of America's tragic experience in Southeast Asia.

In the early 1950s, the champion of strategic bombers in the United States was the famous, truculent, imperious Gen. Curtis LeMay, the chief of the Strategic Air Command, who, during the last months of World War II, had tried to break Japan's will and avert the necessity of an American invasion by dropping 150,000 tons of firebombs on Japanese cities. After the war, LeMay built a bomber force that for years ensured American military pre-eminence. It had the potential to drop nuclear weapons on targets across the Soviet Union, Eastern Europe and China, killing, if necessary (in a 1954 classified estimate), as many as 60 million people.

As Sheehan describes it, the problem with LeMay was that by the mid-1950s, he "was no longer willing to hear anything that did not fit his preconceptions." And he was convinced that the key to prevailing in the cold war would remain his bombers, which he touted as "the best delivery vehicle" in the "battle against Soviet air power." LeMay even argued that the United States should "cease stockpiling of conventional weapons," which he considered "obsolete," and go all-nuclear, because America should "always use the best weapons available in either general or limited war" — a view that made many Americans ridicule and fear him when he publicly expressed it as George Wallace's independent-party running mate in 1968.

In the Pentagon of the 1950s, LeMay was "king of the mountain," as one colleague put it, known for pulverizing those few men who tried to stand in his way. Fortunately for us all, he met his match in the hero of Sheehan's book, Gen. Bernard Schriever. Sheehan calls him "the handsomest general in the United States Air Force." Born in 1910 in northern Germany, Schriever was brought by his mother to the United States in 1916 in order to reunite with his father, an engineering officer for German passenger liners, who had been stranded at the start of World War I. The family settled in the German-speaking part of the Texas hill country. After studying at Texas A & M, Schriever began his career in the Army Air Corps.

Lacking LeMay's blinders, Bennie Schriever realized that the Soviets planned to rest their future defense not on bombers but on intercontinental ballistic missiles capable of striking the United States with only 15 minutes of advance warning. The Kremlin was also fast improving batteries of surface-to-air missiles that could knock LeMay's beloved bombers out of the sky. Schriever feared that unless the Pentagon immediately shifted its ambitions from bombers to missiles, the Kremlin would within just a few years be able to threaten the world. Despite LeMay's brutish efforts to marginalize him, Schriever became, as Sheehan writes, "the indispensable man in the creation of the intercontinental ballistic missile during the cold war and the enormous consequences that were to flow from it."

Schriever's new way of thinking began in 1953, when he was still a colonel. During a briefing on intermediate-range bombers at Maxwell Air Force Base in Alabama, he had a fateful conversation with the legendary refugee scientists Edward Teller and John von Neumann. They predicted that by 1960, the United States would be creating hydrogen bombs so lightweight that missiles could carry them. The following year, Schriever, by then a general, was asked to supervise, on highest priority, the creation of some kind of ICBM force. "I'll take the job," Schriever replied, "provided I can run it — completely run it — without any interference from those nitpicking sons of bitches in the Pentagon."

On a matter like ICBMs, there was only so much that could be decided down the chain of command from the White House — especially when the sitting president of the United States had been the World War II Allied commander in Europe and was an expert allocator of existing resources to shape (or reshape) American military forces. In July 1955, along with von Neumann and others, Schriever had an audience with President Eisenhower in the West Wing. He explained not only the paramount importance of ICBMs

and the “radical” new organization he had established near Los Angeles to develop them, but also why he had not handed the project over to commercial aircraft contractors, which was so often the custom of the time. This was all “in the interest of compressing time,” he said, “our most critical commodity.”

“Most impressive!” Ike declared. “There is no question this weapon will have a profound impact on all aspects of human life . . . in every corner of the globe — military, sociological, political.” One of Schriever’s colleagues observed that they had “introduced the president . . . to the nuclear missile age.” Eisenhower secretly ordered the Pentagon to build ICBMs with “maximum urgency.” That same summer, Schriever learned from intelligence sources how little time they had: the Soviets were already testing - intermediate-range ballistic missiles.

Sheehan describes Schriever’s buccaneering techniques, his many bureaucratic struggles and shrewd collaboration with von Neumann and other scientists like Wernher von Braun, his public emergence (a 1957 Time magazine cover story called him “Missileman Schriever”) and his coolheaded reaction to the troubling “left punch” of the early misfires at Cape Canaveral. This was at the time of Sputnik, when Nelson Rockefeller, John Kennedy and other politicians were making wrongheaded claims that the United States was suffering from a “missile gap.” Schriever’s ultimate success can be counted in weaponry: by December 1962, the United States could boast 132 Atlas ICBMs to defend it against the Soviet Union. By then, too, four stars gleamed from Schriever’s shoulder. By that time, as Sheehan writes, “no Soviet statesman with a vestige of sanity could risk a surprise attack.” “We beat them to the draw,” Schriever later said.

Although he is mainly interested in his protagonist, Sheehan brings the other characters to life as well, and fully sets Schriever’s career in the historical context of the early years of American-Soviet confrontation. One complaint: Sheehan lists the most important sources he used to write each chapter in backnotes, but there is no excuse for a book of this quality to forgo footnotes or some other kind of annotation that tells us the precise source for each of his facts and quotations. This would be more of a problem if Sheehan did not have such a reputation for care and accuracy.

As for Schriever, who married a onetime pop music star and died in 2005, he proved to be a prophet with little honor. Before the publication of this excellent book, few Americans would have recognized his name. Indeed, he was pushed down the path to oblivion as early as 1961, when Robert McNamara and his self-confident “whiz kids” took over the Pentagon. Looking on Schriever as a relic of what they considered the somnolent, misguided Eisenhower years, they made it very clear that they did not want or need his services.

Michael Beschloss is the author, most recently, of “Presidential Courage: Brave Leaders and How They Changed America, 1789-1989.”

http://www.nytimes.com/2009/10/04/books/review/Beschloss-t.html?_r=1&nl=books&emc=booksupdateema1

Fade to Black

By CHRISTOPHER HITCHENS
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NOCTURNES

Five Stories of Music and Nightfall

By Kazuo Ishiguro

221 pp. Alfred A. Knopf. $25

"The owl of Minerva," wrote Hegel, "spreads its wings only with the falling of the dusk." By this he meant to say that an epoch or an era cannot really be judged or estimated until it has entered its closing phase. For those of us fated to lead smaller and less portentous existences, it is still the gathering shade of evening that very often gives rise to our most intense, and sometimes necessarily our most melancholy, moments of reflection and retrospect.

A whole musical repertoire has been consecrated to (one of my favorite words) the crepuscular. Many of these compositions, too, are marked by a certain mournfulness, though some of Debussy's nocturnes can strike the ear as relatively affirmative. It has been proposed that Debussy was influenced by the nightfall paintings of James McNeill Whistler, and it would certainly be apt for the purposes of this article if that turned out to be true. The best-loved of Whistler's "moonlights," as he called them, is the hauntingly lit "Nocturne" that gives us Battersea Bridge as a long London day fades to black. Critics seem to agree that Whistler's main influence at that time was the Japanese woodblock master Hiroshige, whose marvelous work, along with other Japanese aesthetic achievements, was just then being made known to the West.

So Kazuo Ishiguro has quite a tradition on which to draw in these five tales of human emotion in the waning hours of light. It's the time of day that isn't quite day when some people — such as myself — start to feel truly awake. It's also pre-eminently the moment, especially if moonrise chances to be involved, when life may seem rather stale without music. This is all well known to the cafe proprietors of Venice — the location of the first and last of these stories — who make sure to employ bands or orchestras that never cease to perform. Indeed, the narrator of "Crooner" tells us that as a freelance guitarist on the Piazza San Marco he can remember "once last summer, going from band to band and playing 'The Godfather' nine times in one afternoon."

Ishiguro likes this flat "Godfather" note well enough to strike it again twice in the last story, "Cellists," and it is only fair to warn you that he relies for much of his effect not on the slow metamorphosis of blue into gray but on bathos and sometimes on pure farce. In "Malvern Hills," another guitarist, believing himself underappreciated in the metropolis, seeks a more tranquil life in the west of England and plays a nasty practical joke that has unintended consequences. The fact that he plays it on two holiday-making Swiss musicians is almost irrelevant: music itself has little to do with the narrative, and the three characters might as well have juggling or animal-training in common.

The only other story set in England, "Come Rain or Come Shine," descends from farce almost into slapstick. An unambitious young man comes to stay with a more go-ahead couple who had been his friends at university. The purpose of the invitation soon discloses itself: Ray is supposed to act as an emollient on the evidently fraying marriage of Charlie and Emily. The crucial thing Ray and Emily have in common is that, as the slightly unexciting opening sentence informs us: "Like me, Emily loved old American popular songs." But he is sternly instructed by Charlie to discard this, his only ace, and indeed if Emily even mentions "that croony nostalgia music" to pretend that he knows nothing of the subject. So that's the end of music as the food of love or indeed the fuel of narrative, and the action downshifts into Ray's accidentally disfiguring Emily's private diary and then trying to make enough of a mess to convince her that the apartment has been invaded by a dog.

The "croony nostalgia" theme is back in the story "Nocturne," where we meet again a character from the opening tale, "Crooner." She is now a hysterical and fading star, recovering from plastic surgery in a private wing of a Beverly Hills hotel. Meeting a face-lifted saxophonist from an adjoining room, she forms an apparently spontaneous love-hate attachment and in the course of the "love" part incites him to help steal a music-award statuette that she abruptly decides should be rightfully his. All you have to believe is that two still-heavily-bandaged middle-aged people would escape arrest as they roamed a hotel ballroom and crammed the statuette up the rear end of a turkey. Oh, you would also have to believe that the star, Lindy Gardner, has taken the same surname as her crooner ex-husband, Tony.

Ishiguro doesn't put himself to very much trouble with his names. The cop who fails to see what's in front of his nose in the above story produces his ID and says, unmemorably, "L.A.P.D. . . . Name's Morgan." Charlie and Ray were at school with someone named Tony Barton. In "Malvern Hills" the young man's former schoolteachers are identified as having been just plain Mrs. Fraser and Mr. Travis. One of them is awarded an unsurprising nickname. The prospective lover of the mystery woman in "Cellists" is a certain Peter Henderson. In the same story there appears a relatively exotic Hungarian. His name is Tibor.

As if in recompense for this banality, Ishiguro does like to afflict his characters with something like Tourette's syndrome. Whether it's Venice or Malvern, it is perfect strangers who are told, without any appreciable loss of time, that the long-standing marriage of the person who is doing all the talking is coming to an end. In one instance this disclosure is made in the glare of full morning sunlight, in the other it does take place during an attempted nocturnal serenade, but there's no evocation of the lengthening shadows. (In any case, people surely tend to make these tragically abrupt confessions to strangers somewhat nearer to the end of the night.)

The story that most justifies its inclusion under the book's title is "Cellists," where it is only by means of a slowly developed series of "movements" and after a long sequence of late après-midis that we are led to

appreciate the world of mania and deception that can underlie, as with the world of chess, the universe inhabited by the fanatically musical. This time I shouldn't say anything about the plot or rather its absence, except that it, too, has its jokey element: the old joke about the person who doesn't know whether or not he can play the violin, because he's never tried. It's set at the end of the season as well, as if to emphasize the evanescence of everything, but it's somehow a slight waste of Venice, and if Ishiguro's narrator — all five stories are first person — had omitted to mention "the evening passeggiatta," the setting could have been anywhere. Understatement is one thing, but in aiming for it Ishiguro generally achieves the merely ordinary. Here, for instance, is Ray's no-doubt eagle eye as it surveys the apartment of his two old friends:

"Maybe Emily had done the tidying herself; in any case, the large living room was looking pretty immaculate. Tidiness aside, it had been stylishly done up, with modern designer furniture and arty objects — though someone being unkind might have said it was all too obviously for effect."

Of course it could all have been done not for effect, or "done up" somehow unstylishly or accoutred with "designer furniture" that cleverly contrived not to be modern. An objet that was deliberately not d'art would also, in this context, be something of an innovation.

And how, in case you should ask, did the narrator of "Nocturne" wake up after his silly Beverly Hills adventure? "With a jerk." How did Miss McCormack nod when her potential cello-playing genius had stilled his bow? Why, she nodded "approvingly." What kind of glance did Emily give to her diary? "No more than a cursory" one. I became dispirited as I noticed that Ishiguro almost never chose a formulation or phrase that could be called his own when a stock expression would do.

He seemed to me, in "A Pale View of Hills" and "The Remains of the Day," to have intuited something subtle and miniature and layered, in what I read as a latent analogy between English and Japanese society. In "The Unconsoled," which was heavier going, he at least showed how musical commitments could be, as one might say, a cause of "discord." "Never Let Me Go" was so orchestrated as to slowly gather pace and rhythm from its varied sections. But these five too-easy pieces are neither absorbingly serious nor engagingly frivolous: a real problem with a musical set, and a disaster, if only in a minor key, when it's a question of prose.

Christopher Hitchens is a columnist for Vanity Fair.

http://www.nytimes.com/2009/10/04/books/review/Hitchens-t.html?ref=books

Kid Stuff

By PAMELA PAUL
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NURTURESHOCK

New Thinking About Children

By Po Bronson and Ashley Merryman

336 pp. Twelve. $24.99

As if we needed yet another indicator of economic collapse, note that the men who once chronicled financial high jinks have turned to baby sling strategy and sibling rivalry. First Michael Lewis, author of "Liar's Poker," hit the best-seller list with a memoir about the perils (and awww, rewards) of being a dad. Now Po Bronson, who made his name novelizing Bay Area bond trading and Silicon Valley upstarts, has come out with a book on child-rearing. But not just any book! "NurtureShock," with its Toffleresque title, promises to revolutionize parenthood with "New Thinking About Children." According to Bronson and his co-writer, Ashley Merryman, who runs a church-based tutoring program for urban youth, "nurture shock" is the panic common to new parents that "the mythical fountain of knowledge is not magically kicking in." It's that gut-pummeling doubt that hits the moment you bring your first child home from the hospital— "They let us keep this thing?" — and snowballs from there. Such feelings of inadequacy, the authors suggest, are justified. But, as they write with deeply felt earnestness, "small corrections in our thinking today could alter the character of society long term, one future-citizen at a time."

The key, outlined in 10 deftly organized chapters, is to ignore common assumptions about children in favor of the latest social science, much of it counterintuitive. Think it's best for 10th-grade slackers to high-tail it to school at 7 a.m.? Wrong! Let them sleep in, say the prevailing studies on teenagers and sleep. Believe that reading the Berenstain Bears and other turgid "pro-social" stories will make your kindergartner more genial? They're actually more likely to inspire in her new ways of tormenting her little brother.

Based on a pair of Bronson's high-profile cover stories for New York magazine, which applied similarly brazen titles ("Learning to Lie," "How Not to Talk to Your Kids") to academic research of the past two decades, the book is perhaps less revolutionary about parenthood than it is revelatory about books on parenthood. That sounds weighty and abstruse, so as Bronson and Merryman might phrase it, let me "unpack" what I mean. Ann Hulbert, author of "Raising America," could easily lend a hand. As Hulbert made clear in her 2003 history of parenting advice, each generation of parents falls sway if not to a singular sanctified Dr. Spock, then to a bevy of conflicting sages. (The current generation is likely to be remembered as that of Drs. Sears and Brazelton on the child-centered side, John Rosemond on the parent-centric side, and Jenny McCarthy and Tori Spelling on the Hollywood-mommy fringe.) Whereas others may call upon medical training, paternal wisdom or been-there-done-that motherhood, Bronson and Merryman, having "parsed through the science and reviewed the evidence," appeal to scientific reason — just as, Hulbert writes, experts more than a century ago first urged the scientific and systematic study of children.

What comes around goes around, goes away and then comes back. In a chapter on overpraise, the authors describe laboratory studies in which children, having taken an initial test and then been praised for their intelligence, fared worse in follow-up rounds, while children who were instead commended for their effort challenged themselves further and performed better over all. Frequent and oft-undeserved rewards in the form of praise, the authors caution, deprive a child of motivation and discourage persistence. "It's a neurobiological fact," they write, pointing to studies of M.R.I. scans and trained rodents. True, but far from new. Albeit without the sci-techy benefit of brain imaging, in 1964, "Children: The Challenge," a popular manual of the day, warned, "Praise, as a means of encouragement, must be used very cautiously." It can be "dangerous" if a child sees praise as a reward and "could easily lead to discouragement," the author, Rudolf Dreikurs, noted.Still, much of the research here on the upkeep of children is interesting and worthwhile. (And what new parent has the fortitude to sift through academic journals?) Several studies, for example, demonstrate that the more children are threatened with punishment, the more they lie and the better they get at it. In one, kids who attend a traditional colonial school in western Africa, where teachers frequently slap children for misdeeds, were especially likely to lie progressively more in order to avoid the consequences. Another study found that reading "The Boy Who Cried Wolf" increased children's likelihood of lying, while a book on George Washington and the cherry tree decreased it dramatically. And not because kids revere Washington — the students in the study were Canadian.

One of the most valuable chapters looks at how white parents deal with race. For those who think it best to describe Caucasians as "pinkish white" and blacks as "brown skinned" (raise your hands, Upper West Siders), recent research delivers a strong rebuke. Pretending race doesn't exist leaves young children to form their own — often racist — opinions. A chapter on early childhood testing delivers similarly distressing and critical news. Bronson and Merryman do parents a service by calling attention to studies that seldom make their way into the media.But to judge from these pages, the authors are a bit too enthralled with their academic sources. Their penchant for describing psychological studies and research projects as if they were chemistry experiments, with phrases like "the test of scientific analysis" and "the science of peer relations," conjure up the image of Thomas Dolby repeatedly exhorting "Science!" Let's face it — even if, as the authors suggest, "preschoolers' E.F. capability can be measured with simple computerized tests," chances are, this year's E.F. ("executive function") will be tomorrow's E.Q. ("emotional intelligence"), which the authors deride as an unreliable predictor of academic achievement or adult success.No doubt we'll worry about that later. For now, Bronson is, above all, a brilliant packager of books about what people care about most: themselves. As he did in "What Should I Do With My Life?," his 2002 best seller, Bronson has adroitly polished a fairly unoriginal subject into high-gloss pop psychology. This isn't the big news of the day, but the small, consequential news that affects our daily lives; it's the stuff of breakfast shows and private-school parenting seminars. It's "What Should I Do With My Kids?" And isn't that all about me, anyway?

Pamela Paul is the author of "Parenting, Inc."

http://www.nytimes.com/2009/10/04/books/review/Paul-t.html?ref=books

Perpetual Revelations

By ROSS DOUTHAT
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THE CASE FOR GOD

By Karen Armstrong

406 pp. Alfred A. Knopf. $27.95

The Bush era was a difficult time for liberal religion in America. The events of 9/11 were not exactly an advertisement for the compatibility of faith and reason, faith and modernity, or faith and left-of-center politics. Nor was the domestic culture war that blazed up in their wake, which lent a "with us or against us" quality to nearly every God-related controversy. For many liberals, the only choices seemed to be secularism or fundamentalism, the new atheism or the old-time religion, Richard Dawkins or George W. Bush.

But now the wheel has turned, and liberal believers can breathe easier. Bush has retired to Texas, and his successor in the White House is the very model of a modern liberal Christian. Religious conservatism seems diminished and dispirited. The polarizing issues of the moment are health care and deficits, not abstinence education or intelligent design. And the new atheists seem to have temporarily run out of ways to call believers stupid.

The time, in other words, is ripe for a book like "The Case for God," which wraps a rebuke to the more militant sort of atheism in an engaging survey of Western religious thought. Karen Armstrong, a former nun turned prolific popular historian, wants to rescue the idea of God from its cultured despisers and its more literal-minded adherents alike. To that end, she doesn't just argue that her preferred approach to religion — which emphasizes the pursuit of an unknowable Deity, rather than the quest for theological

correctness — is compatible with a liberal, scientific, technologically advanced society. She argues that it's actually truer to the ancient traditions of Judaism, Islam and (especially) Christianity than is much of what currently passes for "conservative" religion. And the neglect of these traditions, she suggests, is "one of the reasons why so many Western people find the concept of God so troublesome today."

Both modern believers and modern atheists, Armstrong contends, have come to understand religion primarily as a set of propositions to be assented to, or a catalog of specific facts about the nature of God, the world and human life. But this approach to piety would be foreign to many premodern religious thinkers, including the greatest minds of the Christian past, from the early Fathers of the Church to medieval eminences like Thomas Aquinas.

These and other thinkers, she writes, understood faith primarily as a practice, rather than as a system — not as "something that people thought but something they did." Their God was not a being to be defined or a proposition to be tested, but an ultimate reality to be approached through myth, ritual and "apophatic" theology, which practices "a deliberate and principled reticence about God and/or the sacred" and emphasizes what we can't know about the divine. And their religion was a set of skills, rather than a list of unalterable teachings — a "knack," as the Taoists have it, for navigating the mysteries of human existence.

It's a knack, Armstrong argues, that the Christian West has largely lost, and the rise of modern science is to blame. Not because science and religion are unalterably opposed, but because religious thinkers succumbed to a fatal case of science envy.

Instead of providing the usual portrait of empiricism triumphing over superstition, Armstrong depicts an extended seduction in which believers were persuaded to embrace the "natural theology" of Isaac Newton and William Paley, which seemed to provide scientific warrant for a belief in a creator God. Convinced that "the natural laws that scientists had discovered in the universe were tangible demonstrations of God's providential care," Western Christians abandoned the apophatic, mythic approach to faith in favor of a pseudoscientific rigor — and then had nowhere to turn when Darwin's theory of evolution arrived on the scene.

An Aquinas or an Augustine would have been unfazed by the idea of evolution. But their modern successors had convinced themselves that religious truth was a literal, all-or-nothing affair, in which doctrines were the equivalent of scientific precepts, and sacred texts needed to coincide exactly with the natural sciences. The resulting crisis produced the confusions of our own day, in which biblical literalists labor to reconcile the words of Genesis with the existence of the dinosaurs, while atheists ridicule Scripture for its failure to resemble a science textbook.

To escape this pointless debate, Armstrong counsels atheists to recognize that theism isn't a rival scientific theory, and that it is "no use magisterially weighing up the teachings of religion to judge their truth or falsehood before embarking on a religious way of life. You will discover their truth — or lack of it — only if you translate these doctrines into ritual or ethical action." Believers, meanwhile, are urged to recover the wisdom of their forebears, who understood that "revealed truth was symbolic, that Scripture could not be interpreted literally" and that "revelation was not an event that had happened once in the distant past but was an ongoing, creative process that required human ingenuity."

This is an eloquent case for the ancient roots of the liberal approach to faith, and my summary does not do justice to its subtleties. But it deserves to be heavily qualified. Armstrong concedes that the religious story she's telling highlights only a particular trend within monotheistic faith. The casual reader, however, would be forgiven for thinking that the leading lights of premodern Christianity were essentially liberal Episcopalians avant la lettre.

In reality, these Christian sages were fiercely dogmatic by any modern standard. They were not fundamentalists, reading every line of Scripture literally, and they were, as Armstrong says, "inventive,

fearless and confident in their interpretation of faith." But their inventiveness was grounded in shared doctrines and constrained by shared assumptions. Their theology was reticent in its claims about the ultimate nature of God but very specific about how God had revealed himself on earth. It's true that Augustine, for instance, did not interpret the early books of Genesis literally. But he certainly endorsed a literal reading of Jesus' resurrection — and he wouldn't have been much of a Christian theologian if he hadn't.

Which is to say that it's considerably more difficult than Armstrong allows to separate thought from action, teaching from conduct, and dogma from practice in religious history. The dogmas tend to sustain the practices, and vice versa. It's possible to gain some sort of "knack" for a religion without believing that all its dogmas are literally true: a spiritually inclined person can no doubt draw nourishment from the Roman Catholic Mass without believing that the Eucharist literally becomes the body and blood of Christ. But without the doctrine of transubstantiation, the Mass would not exist to provide that nourishment. Not every churchgoer will share Flannery O'Connor's opinion that if the Eucharist is "a symbol, to hell with it." But the Catholic faith has endured for 2,000 years because of Flannery O'Connors, not Karen Armstrongs.

This explains why liberal religion tends to be parasitic on more dogmatic forms of faith, which create and sustain the practices that the liberal believer picks and chooses from, reads symbolically and reinterprets for a more enlightened age. Such spiritual dilettantism has its charms, but it lacks the sturdy appeal of Western monotheism, which has always offered not only myth and ritual and symbolism (the pagans had those bases covered), but also scandalously literal claims — that the Jews really are God's chosen people; that Christ really did rise from the dead; and that however much the author of the universe may surpass our understanding, we can live in hope that he loves the world enough to save it, and us, from the annihilating power of death.

Such literalism can be taken too far, and "The Case for God" argues, convincingly, that it needs to coexist with more mythic, mystic and philosophical forms of faith. Most people, though, are not mystics and philosophers, and they are hungry for myths that are not only resonant but true. Apophatic religion may be the most rigorous way to go in search of an elusive God. But for most believers, it will remain a poor substitute for the idea that God has come in search of us.

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http://www.nytimes.com/2009/10/04/books/review/Douthat-t.html?ref=books

The Book Thief
By CHRISTOPHER R. BEHA
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THE MAN WHO LOVED BOOKS TOO MUCH

The True Story of a Thief, a Detective, and a World of Literary Obsession

By Allison Hoover Bartlett

274 pp. Riverhead Books. $24.95

Between 1999 and 2003, John Gilkey used dozens of credit card numbers acquired from his department store job to steal more than $100,000 worth of rare books before being caught and sent to jail, partly through the effort of one bookseller named Ken Sanders. When Gilkey and Sanders's story found its way to the journalist Allison Hoover Bartlett, she came to see it as "not only about a collection of crimes but also about people's intimate and complex and sometimes dangerous relationship to books."

In "The Man Who Loved Books Too Much," Bartlett uses these two men as a starting point for a series of vignettes in which the love of books turns to madness. Her examples range from the merely eccentric to the sociopathic, from the professor in Nebraska who was forced to sleep on a cot in his kitchen to make room for his 90 tons of books to the 19th-century Spanish monk who strangled one man and stabbed nine others in order to raid their libraries.

Bartlett's sketches of bibliomania are breezily drawn and often fascinating. If they ultimately fail to cohere into something more, the fault rests at the book's center, with Gilkey himself. It's not that his actions aren't interesting, but that they don't mean any of the things Bartlett wants them to mean. Time and again she asks "what it was about books that made him continually risk jail time for them." Yet when we learn that as a boy, Gilkey once emerged from Montgomery Ward with a pilfered catcher's mitt that didn't even fit his hand, the riddle is already solved. Gilkey's earliest experiment with credit card fraud netted him "a watch, a pizza and a poster of the movie 'Psycho.' " His first two trips to jail resulted from his writing bad checks to buy foreign currency and pay off gambling debts. Throughout his interviews with Bartlett, he speaks of "free" air travel, hotel rooms and meals. In other words, Gilkey is not a biblio-maniac whose need for books eventually drives him to steal, but a kleptomaniac whose need to steal eventually drives him to books. As such, he is a difficult figure around which to build a work about "literary obsession."

There is a related problem with the thief's antagonist, Ken Sanders, the "rare-book dealer and self-styled sleuth" who helped to track him down. Bartlett seems nearly as puzzled by Sanders's interest in the crimes as she is by the crimes themselves. But throughout the period of Gilkey's spree, Sanders was the security chairman of the Antiquarian Booksellers' Association of America; it was his task to protect members from theft and fraud. His performance in that job seems diligent but not especially crazed. Mainly, he sends out e-mail.

That the author recognizes the thematic limits of these men is evident by the attention she gives to her third leading character: herself. Bartlett's attempts at New Journalistic self-implication aren't always convincing, but they provide some riveting moments, as when Bartlett and Gilkey tour a bookstore he once victimized while the owner looks on in helpless rage. In this scene, we glimpse Gilkey's true strangeness, which is only incidentally related to books.

Given the problem at the heart of "The Man Who Loved Books Too Much," it is a testament to Bartlett's skill that it reads as well as it does. "Every man must die," explained that murderous Spanish monk, "but good books must be conserved." His story and others Bartlett tells really are about "intimate and complex and sometimes dangerous" relationships to books. Gilkey's story, on the other hand, is mostly about the crimes.

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http://www.nytimes.com/2009/10/04/books/review/Beha-t.html?ref=books

What's It All About, Bambi?

By DWIGHT GARNER
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THE HIDDEN LIFE OF DEER

Lessons From the Natural World

By Elizabeth Marshall Thomas

239 pages. Harper. $24.99.

In her 1993 best seller, "The Hidden Life of Dogs," Elizabeth Marshall Thomas had the wit — and the commercial good sense — to boil her observations down to a six-word equation. "What do dogs want?" she asked. Her obvious but resonant answer was simply: "Each other."

In her new book, "The Hidden Life of Deer," Ms. Thomas takes on a more skittish and elusive subject. Deer don't want to be around humans; they are hard to tell apart; they resist interpretation. What do deer want? The answer will not be a two-worder.

Ms. Thomas lives in rural New Hampshire, and she began purposefully observing deer a few winters ago, after a season in which the trees in the Northeast produced a small acorn crop, and deer were starving. She began to leave out corn for them, against the strictures of the New Hampshire Fish and Game Department, which warned that feeding led to overpopulation and aggression, and drew deer dangerously away from their winter shelters.

At first Ms. Thomas left a little corn, then quite a lot, "50 to 75 pounds a day or about 2 pounds per deer at their maximum number." Why, against all advice, did she feed them? "Because they were cold and hungry," she explains, "because they hadn't found enough to eat in the fall, because each had just one life."

Ms. Thomas's tenderhearted arguments will strike some as being tender-headed. Deer have become a nuisance in the Northeast. They spread the ticks that carry Lyme disease. They decimate gardens. They cause more human deaths — thanks to the cars that plow sickeningly into them — than any other animal. (Bees cause the second most.)

In this slim and amiable book Ms. Thomas gathers a pile of small, not uninteresting observations about deer, and in doing so she subtly alters the way you look at them in a forest or from a window.

She learns that it's easiest to tell deer apart if you first learn to identify groups of them. She probes their rigid caste system, discovering that high-ranking deer will prevent their lessers from eating near them. She disputes the notion that fighting among male deer is often lethal.

She writes about deer's sex lives (during rutting season, females will squat and expel an unwanted buck's semen), their sleeping habits, the divided stomachs that let them pack food in now and then regurgitate and chew it more deliberately later.

Ms. Thomas was driven to write "The Hidden Life of Deer" partly because of her disgust with much of what passes for literature about deer. "I often felt I was eavesdropping on love letters between game managers and hunters," she writes.

She isn't opposed to deer hunting, although she deplores the doltish spectacle it has become. She writes, caustically: "We fill the woods with invasive primates camouflaged to look like piles of leaves who sneak around, sprinkling estrus doe urine and manipulating gadgets that sound like antlers clashing." She likens using these kinds of gizmos to "something like fishing with dynamite" and describes it as "not a measure of skill."

She notes that in New Hampshire during the snowy fall of 2007, hunters killed "an estimated 13,416 deer ... or 15 percent of New Hampshire's deer population. A similar slaughter in human terms would eliminate all the people in two of New Hampshire's biggest cities, Manchester and Nashua, along with the populations of several towns."

She can't help adding: "With all due respect to the nation's fish and game departments, more deer die because people hunt them than because people feed them. No matter how opposed to deer feeding some people may be, no one has ever suggested that extra food in winter could result in a death toll of such magnitude."

"The Hidden Life of Deer" is written in simple, homely sentences that occasionally give off a distracting whiff of New Age potpourri. The references to Gaia and a quasi-mystical "Old Way" are one thing. Beaming out what she calls a "thought-message" to an animal in trouble is another.

Ms. Thomas's treacly side is nicely balanced, though, by the fact that she's ornery. When a car hits a bear near her house, she prevents a cop and later a hunter from tracking and killing the injured animal. She thought the bear still had a chance, and she turned out to be right. She sees it limping happily around years later.

At the time, she writes, "the officer wondered aloud if I might have been drinking." A friend of Mr. Thomas's defends her: "She doesn't drink. She's always like this."

Ms. Thomas does not have much patience, either, with gardeners who complain about deer destroying their expensive plantings. "In my cosmology, indigenous wild deer are more important than exotic ornamental shrubs," she writes.

"As far as I'm concerned," she adds, "they can eat my shrubs right down to the stumps if they feel like it."

What do deer want? They want to live next door to Elizabeth Marshall Thomas.

http://www.nytimes.com/2009/10/02/books/02book.html?ref=books

Tracing the Many Lives of Anne Frank and Her Still-Vivid Wartime Diary

By JANET MASLIN
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ANNE FRANK

The Book, the Life, the Afterlife

By Francine Prose

322 pages. Harper. $24.99.

When Francine Prose taught Anne Frank's diary to a class at Bard College two years ago, one of her students reported getting funny looks from students not in the class. "They acted as if he were assuming some sort of ironic-regressive pose that involved carrying around a children's classic, the equivalent of using his grade school lunch box as an attaché case," Ms. Prose reports in her new book about Anne (as this book refers to her). Her dogged and impassioned scholarship will dispel many such misimpressions about this subject.

Ms. Prose uses her formidable powers of discernment to write incisively about many facets of the Anne Frank phenomenon, from the life itself to the various ways in which it has been willfully distorted. And although Ms. Prose jokes she could hear friends opening magazines as she expounded on Anne Frank over the telephone, she turns her thoughts into a lively and illuminating disquisition.

If there is a central point about Anne here, it is that she was a precociously self-aware writer rather than a spontaneous, ingenuous diarist. It takes a real writer, Ms. Prose points out, to hide the mechanics of her work and make it sound as if she is simply talking to her readers. Similarly, it takes a gifted explicator to make it sound as if she is presenting her arguments conversationally rather than creating elaborate, research-heavy diatribes to back them up.

Ms. Prose's "Anne Frank" has no frills or illusions. It surely does not pretend to be the definitive work on this subject. Instead, it draws upon and synthesizes some of the keenest observations made about Anne by writers like John Berryman, Philip Roth, Cynthia Ozick, Judith Thurman and Harold Bloom, seeming to extract the most succinct and provocative thoughts from each one.

Ms. Prose's book uses a forthright structure, beginning with a chapter explaining the circumstances that led Anne to spend over two years hidden in the secret annex to a building in Amsterdam. She then devotes chapters to the publication of the book; the adaptation of that book into a Broadway play; the further adaptation of it into a Hollywood movie; the way the book has been used in schools; and the way it continues to excite antipathy in some quarters. Above and beyond a normal research effort, Ms. Prose has examined the worst of the Internet hate sites, the ones that favor the word hoax or call Anne Frank's book a work of kiddie pornography.

That opening section about Anne's life provides "Anne Frank: The Book, the Life, the Afterlife" with a relatively unsurprising introduction. Yet Ms. Prose picks up on the less familiar aspects of Anne's character (a friend's mother would remark that "God knows everything, but Anne knows better"). And she fills in the final months that Anne, nearing 16 and incarcerated at Bergen-Belsen, could not immortalize on paper. She also fills in blanks about what became of the four other people who shared the annex with Anne, her parents and her sister, Margot. And she emphasizes the heroism of those who helped these Jews survive for as long as they did.

When Ms. Prose writes about the book, she pays careful attention to Anne's set of revisions and to what they reveal about her writerly choices. She admires the diary's way of using small household details to reveal each resident's character and underscores how ably she transformed those around her into larger-than-life personalities. She goes on to describe the difficulties in getting the diary published, not only in the United States (where someone at Alfred A. Knopf rejected it as a "dreary record of typical family bickering, petty annoyances and adolescent emotions") but also in Europe.

Of the 1950 German translation that omitted anti-German references, Ms. Prose writes coolly: "This reluctance to offend readers in a country whose leaders had murdered the book's author was one gauge of the speed at which the diary had already become a commodity that the public might, or might not, choose to buy." In dealing with stage and screen versions of Anne's story, Ms. Prose tracks the attempts to make the story happier, fluffier, more dramatic and more "universal." As she puts it, "The adorable was emphasized at the expense of the human, the particular was replaced by the so-called universal, and universal was interpreted to mean American — or in any case, not Jewish" for all kinds of reasons, not least of them commercial ones.

As she provides her blow-by-blow account of the denaturing of the Anne Frank story, Ms. Prose remains impressively fair. She believes the book to be a masterpiece written by a complicated artist who died too young. But she by no means clings to the idea that every word of its text should have been inviolable, and she recognizes the occasional improvements that were made. The deletion of a 13-year-old girl's "bubbly longueurs," she says, must be seen as an improvement even by Anne's most devoted fans.

This seemingly narrow work is an impressively far-reaching critical work, an elegant study both edifying and entertaining. In a book full of keen observations and fascinating disputes (the craziest of which involves Meyer Levin, who had no qualms about both reviewing the book in The New York Times Book Review and trying to act as its agent), Ms. Prose looks in all directions to find noteworthy material. And when she writes of how Anne's diary, which according to a 1996 survey was at one point required reading for 50 percent of the schoolchildren in the United States, keeps on finding its way "onto the desks of teachers who discover that the book most certainly does not, as they say, teach itself," she underscores the importance of keen analysis. This is a Grade A example of what a smart, precise and impassioned teacher can do.

http://www.nytimes.com/2009/10/01/books/01maslin.html?ref=books

The Waxing and Waning of America's Political Right

By JACKSON LEARS
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THE DEATH OF CONSERVATISM

By Sam Tanenhaus

123 pages. Random House. $17.

One puzzling feature of American politics is that the people who call themselves conservatives seldom want to conserve anything. The modern conservative movement promotes radical transformation while ignoring classical conservative ideas — for example, Edmund Burke's respect for established institutions and customs, for continuity with tradition and for incremental change.

The recent history of the American right, writes Sam Tanenhaus, involves the triumph of "movement conservatism" over the Burkean version. In his view "the paradox of the modern Right" is that "its drive for power has steered it onto a path that has become profoundly and defiantly un-conservative," and that has finally led to electoral disaster, political irrelevance and "rigor mortis."

This obituary is premature, but the story leading up to it is deftly told. "The Death of Conservatism" is an expanded version of an essay that originally ran in The New Republic. It traverses several decades of complex political change, so inevitably it neglects some important topics. What remains is an elegant brief history of the modern conservative movement, as unsparing in its critique of liberal hubris as of revanchist resentment.

Mr. Tanenhaus, editor of both The New York Times Book Review and the Week in Review, traces the origins of modern conservatism to revulsion against the policy intellectuals who came to power during the New Deal. While ideologues on the right worried about this mandarin "new class," moderate Republicans made their peace with it and cheered Eisenhower to victory in 1952. "When at last conservatives gained a foothold within the establishment, political and intellectual," Mr. Tanenhaus writes, "it was because they had earned their way."

Agreeing to play the game by New Deal rules, they accepted progressive taxation, some government regulation of business and the rudimentary welfare state created by the Democrats.

But the right-wing ideologues sensed a sellout. The young William F. Buckley raged against “atheistic socialists” at Yale, defended Joseph McCarthy and argued — with some justification — that the “liberal consensus” functioned as a closed system rather than as an arena for open debate. The mandarins of the center scoffed. The historian Richard Hofstadter characterized the “pseudo-conservative revolt” of McCarthyism as the unleashed irrationality of “mass man.”

In 1960 the title of a book by the sociologist Daniel Bell announced “The End of Ideology.” Since Democrats and Republicans agreed on fundamentals like government-business partnership and a bipartisan cold war, Mr. Bell wrote, politics had become about managerial procedures rather than ideological commitment.

Seldom have the perils of premature obituary been so quickly revealed. Even as Mr. Bell wrote, conservatives were on the move — in Orange County, Calif., and other Sunbelt suburbs, on college campuses, and eventually in the “Draft Goldwater” movement that led to his nomination in 1964. Barry Goldwater’s defeat as president gave centrist liberals more cause to congratulate themselves.

But the euphoria was not to last. “The liberal sun, even as it steadily enlarged, swerved off its consensus course and strayed into the astral wastes of orthodoxy,” Mr. Tanenhaus writes. He shrewdly identifies the hubris at the heart of midcentury liberalism — the tendency to transform pragmatism from a method into a metaphysic and an unassailable truth backed by experts.

Daniel Patrick Moynihan’s 1965 report, “The Negro Family,” for example, deplored the “tangle of pathology” afflicting urban blacks. While black leaders accused him of complicity with “the white power structure,” Mr. Tanenhaus writes, “Moynihan’s analysis implied there could be no honest disagreement with him, or with the social science that informed his thinking.” Like Buckley, New Left radicals began to expose the stultifying effects of consensus as they attacked the slogans of national mission used to justify the war in Vietnam. The supposedly pragmatic liberals retreated into their own orthodoxy.

As the liberal consensus collapsed in 1968, Richard M. Nixon won by posing as a moderate. But he could not keep his resentments in check for long, and they led him to the abuse of executive power that ended in scandal. “Even as he destroyed his own presidency,” Mr. Tanenhaus writes, “he released the furies of movement politics most conspicuously with us today.”

Rage at Nixon’s alleged maltreatment provoked right-wing Republicans’ resurgence, led by “the tribune of this new polarity,” Ronald Reagan. His election in 1980 inaugurated three decades of rule by the right, culminating in the catastrophic overreaching of President George W. Bush, the most dedicated movement conservative ever to occupy the White House.

As the Bush administration crashed and burned, Mr. Tanenhaus argues, the Democrats moved right, creating a pragmatic consensus — one suited to the Burkean temper of the times: cautious, incrementalist, wary of speculative schemes and imperial adventures. As the Obama administration adapted its thinking to a conservative age, he concludes, movement conservatives retreated into impotent protest and angry oblivion.

“The Death of Conservatism” is a persuasive intellectual history of the right, but it omits a lot of institutional history and ignores money and power altogether. A fuller history would have paid attention to Lewis F. Powell Jr.’s 1971 memorandum to the U.S. Chamber of Commerce, “Attack on the American Free Enterprise System.” Powell, soon to be a Supreme Court justice, urged friends of capitalism to retake command of public discourse by financing think tanks, reshaping mass media and seeking influence in universities and the judiciary.

This did happen in the decades to follow. What had once been far-right fantasies — abolishing welfare, privatizing Social Security, deregulating banking, embracing preventive war — became legitimate policy positions, emanating from institutions that cost a lot of money to maintain: the Heritage Foundation, the American Enterprise Institute, the Fox News Network, as well as numerous corporate lobbying organizations and university professorships. Money talked.

None of this ideological infrastructure has disappeared. Whether the Obama administration can stand up to its power remains to be seen. Despite popular support for a robust public option in health care coverage and even a single-payer system, the airwaves are pervaded by the buzzwords of the market — competition, incentives, consumer choice. Foreign policy, too, remains dominated by right-wing assumptions. Whatever President Obama's intentions (and it would be a mistake to underestimate him), he will find the imperial presidency difficult to repudiate. The bureaucratic labyrinths of the national security state will be dismantled no more easily than the hundreds of American military bases around the world, many of them shrouded in secrecy. Nor will it be easy to challenge the assumptions that underlie empire: the humanitarian dreams of interventionists in Mr. Obama's own party and the relentless Republican demands for toughness. Here as elsewhere, the right wields far more power than its weak popular support warrants. Reports of its death have been exaggerated.

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http://www.nytimes.com/2009/09/29/books/29lears.html?ref=books

Last Call for an Elegant Rail Station

By NICOLAI OUROUSSOFF

STUTTGART, Germany — The clash between builders and preservationists is as old as architecture itself, but it reached a fever pitch in the recent gilded age. And it is especially fraught in Germany, where the construction boom that began with the country's reunification sometimes seems like a convenient tool for smoothing over unpleasant historical truths.

Few current projects better illustrate this conflict than Stuttgart 21, a plan to build an enormous new railway station, along with 37 miles of underground track, in the heart of this old industrial city. The $7 billion development, which is expected to be approved by the end of the year, is part of an ever-expanding high-speed train network that planners hope will one day link the entire continent. As one of the largest developments in Europe, it could radically transform the city center.

But the design shows a callous disregard for architectural history. Its construction would require the partial destruction of one of the city's most recognizable landmarks: the Hauptbahnhof, Paul Bonatz's Stuttgart central rail terminal, a monument of early German Modernism built from 1914 to 1928.

And in a particularly perverse gesture of "facadism" — a favorite tactic of bureaucrats and developers in which a few architectural elements are preserved while the rest of a structure is bulldozed — it would leave the station's main hall and tower standing like some architectural amputee.

Even more troubling, Stuttgart 21 joins a growing list of misguided projects that are reducing Germany's 20th-century architectural history to a fairy tale version of the truth.

Bonatz's most celebrated works, like a system of streamlined locks and bridges built along the Rhine in the late 1920s, have a spare elegance reminiscent of the best examples of W.P.A. architecture in America. And even some of his Nazi-era work, like the 1936 Basel Art Museum, has an undeniably human dimension. Its stone facade, with its low classical arches, remains one of the city's beloved landmarks.

But Bonatz is not an easy architect to love. The struggle to keep his practice afloat at the height of the Nazi era led him into endless compromises — aesthetic and moral. His studies for a gargantuan round stadium and a Munich train station — mercifully never built — represented the kind of grotesquely overblown classicism that Hitler adored. At the same time, his criticism of the work of Paul Troost, one of Hitler's favorite architects, irritated the Gestapo. He eventually fled to Turkey.

Bonatz, in other words, was the kind of morally ambiguous opportunist found throughout architectural history, someone who may have ignored uncomfortable political realities when it served his interests and who fine-tuned his aesthetic to suit the values of his clients. Yet he also produced works of undeniable beauty.

Completed several years before Hitler took power, the Stuttgart terminal may be Bonatz's most masterly architectural balancing act. Its imposing front facade, marked by a shallow arcade and towering stone pillars, is as haunting as an early de Chirico painting. Framed by stone entry halls at either end, it has a severe, stripped-down Classicism that also suggests why Bonatz was able to continue building well into the Nazi era. The two monumental wings, which extend back to frame the tracks, only add to the terminal's imposing scale.

Yet Bonatz carefully softened this effect by placing the clock tower at the station's southeast corner. The position of the tower, which once housed private waiting rooms for the king, helps to break down the design's symmetry and gives it a human dimension. Set slightly off center from the city's historic axis, it also demonstrates a genuine sensitivity to context, locking the design into a larger urban composition without interrupting the flow of traffic.

Stylistically, the design embodies Bonatz's quest to find a balance between Classicism and Modernism. The first of the two wings, built from 1914 to 1917, is the most traditional and conservative, with spiraling wood staircases inside and elaborate ironwork grates over the first-floor windows. The great entry hall, built at the same time, had a traditional wood beam ceiling.

By the mid-1920s, when Bonatz was designing the second entry hall, he was using brick vaults instead of timber. The final wing, designed a few years later, was the most streamlined, its windows forming staccato horizontal bands that suggest that the architect was moving toward a more Modern aesthetic.

The entire composition can be read as an effort to come to terms with some of the period's deepest anxieties: the struggle to keep pace with jolting technological and social changes and the related fear of losing contact with the past.

The new station, designed by Ingenhoven Architects, lacks similar ambitions. To construct it, the German rail authority plans to destroy everything but the terminal's main halls and tower. The platforms would be buried underground, with the tracks set parallel to the old entry hall. A vast plaza would sit on top of this lower level, its surface pierced by big, eye-shaped light wells. Four new entryways, with shell-shaped glass and concrete roofs, would lead down to the platforms from the plaza's corners.

The plan's defenders argue that it is critical to the city's economic future. It will reaffirm Stuttgart's place as a hinge between Western and Eastern Europe, as well as speed up travel south, to Athens. What's more, demolishing the old tracks and burying the platforms underground will free acres of valuable real estate in the city center — something that could generate billions of Euros in revenue for the rail authority.

Finally, there is the belief that large-scale infrastructure projects are just what we need in tough times. We need jobs, don't we? And aren't the best parts of the old building being saved?

What's scary about this approach is its familiarity. Engineers, stop watches in hand, calculate the most efficient time between two points. Politicians crunch numbers, estimating that the bigger the job, the

bigger the rewards. Developers begin counting the profits to be made when large swaths of public land are turned over to private interests.

Meanwhile, those who care about cities and their history are placated with the facadist dodge. And architecture is reduced to a picture postcard — an empty, superficial veneer.

In the case of Stuttgart, the nuances that breathe life into the design — the sequence of spaces leading from the city to the tracks, the conflict between tradition and modernity, will be lost. The new entry halls, however elegantly conceived, are likely to make the old hall seem like an appendage, stripping it of the function that gave it meaning.

There were other possible options. A proposal by the architect Roland Ostertag that would have replaced the existing train shed with a barrel-shaped glass roof would have been far more elegant and economical. Moving part of the tracks underground could have been part of that scheme too. And the difference in travel time would probably have been minimal. Many opponents of the plan assert that the new design would shave just a few minutes of travel time between Stuttgart and Ulm, the next stop on the line. Replacing the tracks that run between the two cities would save much more time. When I spoke to the station's architect, he did not dispute this claim.

But this option was never fully explored, lest it give ammunition to the project's opponents.

The insistence on putting economics above culture has already led to the destruction of major historic monuments like the Palace of the Republic in Berlin, a landmark of the East German period. It may soon lead to the dismemberment of Tempelhof Airport, one of the few great architectural accomplishments of the early Nazi period. If it continues, it will lead to a cheapened, oversimplified view of history, one that suppresses the conflicts and contradictions that make cities vital.

http://www.nytimes.com/2009/10/03/arts/design/03railway.html?ref=design

'Hanging Fire'
Activist Energy With a Light Touch

By HOLLAND COTTER

Known to many New Yorkers primarily for art exhibitions, Asia Society is a grander entity than its Park Avenue galleries might suggest. According to its press materials, the institution's overarching mission is to "promote understanding among the people, leaders and institutions of Asia and the United States" and to generate new ideas in "the fields of policy, business, education, arts and culture."

Are those fields listed in order of importance? If so, it might explain why the work in the society's surveys of new art, like the current "Hanging Fire: Contemporary Art From Pakistan," tends so often to be topical in content, market ready in format and didactic in delivery.

One of the first of the society's big one-country shows, "Inside Out: New Chinese Art" in 1998, sold itself on the notion that the most significant work emerging from China was all by brash, young, implicitly democracy-loving rebels in thrall to the Western media and eager to break with their own cultural past. This profile was meant to win Western hearts, and it did. That many artists still produced ink-and-brush landscapes and calligraphy and were subtly but radically updating these traditions was barely acknowledged.

In 2005, "Edge of Desire: Recent Art in India" focused heavily on art that addressed current social issues like sectarian violence and the effects of a global market economy. Not represented was a range of new abstract or near-abstract art and sculpture from South Asia that doesn't necessarily look "Indian" and that is personal, and only incidentally political, in content.

This exhibition of new art from Pakistan, with its references to war, religion and consumerism, largely conforms to the Asia Society model, except for its size. The Chinese show had more than 60 artists, the Indian survey more than 40. Both were spread over two New York City spaces. "Hanging Fire" has 15 artists and takes up just two Asia Society galleries, one very modest in scale.

So it doesn't pretend to be a survey. It's a closely edited group show drawn from a small pool of artists, most of whom attended the National College of Arts in Lahore. Given these restrictions, it's surprising that the show has the variety it does.

Lahore had been a cultural hub for centuries by the time Pakistan was separated from India in 1947, and it has remained so. After partition, the National College of Arts was forged from an existing colonial institution, and schools were also established in other cities. Various forms of up-to-date modernism were introduced, often by local artists who had returned from study in Europe.

But progress was never smooth. Contemporary art maintained an uneasy relationship with the country's successive military governments and with the state religion, Islam. Social and cultural repression was particularly intense during the era of Islamization initiated by General Zia ul-Haq in the late 1970s, when women were discouraged from public participation in cultural life and only landscape painting, calligraphy and abstraction passed official muster.

Despite obstructions, and also because of them, art moved forward with an activist urgency that it has not lost. Catalytic figures appeared, many of them women. Salima Hashmi, the curator of the Asia Society show, is one. After graduating from the National College in 1968, she began to teach there, remaining an influential and vocal presence.

The senior artist she has chosen for the show is a former teaching colleague, the painter Zahoor ul Akhlaq, who had tremendous impact on younger artists before he died in 1999, the victim of a violent crime: he was shot and killed when someone broke into his home. As a teacher, he revived interest in manuscript painting (also known as miniature painting), the indigenous genre dating back to the Mughal dynasty, encouraging young artists both to master its demanding forms and styles and to infuse them with new content.

Several artists he inspired now have international reputations, most notably Shahzia Sikander, but also Ambreen Butt, Imran Qureshi and Saira Wasim. Mr. Qureshi, who was born in 1972 and has become an influential figure himself, has a series of paintings in the show of observant Muslims going about their lives. The style is crisp and deft, but the figures of bearded young men are clearly meant to pique our jihadist fears.

The show has direct references to violence, two of which involve images of animals. Rashid Rana's gorgeous "Red Carpet 1" is collage of thousands of tiny photographs taken in a slaughterhouse. Huma Mulji's "High Rise, Like City Drive" consists of the taxidermied form of a water buffalo set atop a neo-Classical column. Although the piece, made for the show, comes with elaborate socio-political glosses, it is, intentionally or not, a monument to the death of an innocent being.

A hyper-realist drawing of a single bullet by Ayaz Jokhio, Arif Mahmood's photograph of a boy playing with a toy gun and Ali Raza's image, collaged from burned paper, of a veiled and screaming woman are in line with an international view of Pakistan as one big danger zone. Faiza Butt's confectionary, gender-blend painting of turbaned men surrounded by hair dryers, pistols and ice cream cones takes some of the edge off of this paranoiac view and is one of the more interesting of the show's several exercises in issue-driven whimsy.

The others probably suffer from being seen in a Western institutional context, where they lose some of their complexity. They include Asma Mundrawala's little pop-up versions of nostalgic fantasies; Adeela Suleman's motorbike helmets for women, made from cooking pots; Hamra Abbas's rocking-horse version of the winged creature who flew the prophet Muhammad to Jerusalem from Mecca; and Bani Abidi's video of a Paskistani pipe band taking a stab at "The Star-Spangled Banner."

This light-touch approach to politics has become common in contemporary art in the last decade, perhaps in reaction to heavy-hitting work of the 1990s. Wit can be effective but can too easily devolve into cleverness without some toughing edge of weirdness. Mahreen Zuberi's gouache paintings of dental procedures have that edge. So do Nazia Khan's semi-abstract drawings of — what? Cloth? Wrinkled skin? Damaged flesh? That we can't tell is what gives the work some resistance, makes it feel personal rather than just an illustration of smart ideas.

This sense of the personal is very much present in a 1997 triptych by Mr. Akhlaq called “A Visit to the Inner Sanctum 1-3,” in which he acknowledges his debt to miniature painting but goes beyond it with a dark, near-abstract vision of birds and calligraphic characters that seem to emerge from a rain of ashes. Anwar Saeed’s gawky homoerotic figures, particularly those painted and collaged on the pages of a little printed book, similarly feel as if they’re about something that mattered deeply to the artist, that they’re a physical extension of him.

A student and teaching colleague of Mr. Akhlaq, Mr. Saeed was visiting him the night of the shooting and was badly wounded himself. The miniature-size pictures in the book were his first attempts to retrain himself physically to paint. That he returned to art with images considered morally unacceptable in his culture adds a political dimension to his work that intensifies it without entirely defining it.

In a neutral context, we would probably stop and look at these paintings because they are baffling and magnetic, as personal as diary entries. We might then become aware of the complicated skill that went into their making. Only last are we likely to want to place them in the political context of “contemporary art from Pakistan.”

If exhibitions encouraged us to approach art in something like this order, rather than the other way around, we might have an art experience deeper and more lasting than that given by even the most polished institutional package tour.

“Hanging Fire: Contemporary Art From Pakistan” continues through Jan. 3 at the Asia Society Museum, 725 Park Avenue, at 70th Street; (212) 288-6400, asiasociety.org.

http://www.nytimes.com/2009/10/02/arts/design/02group.html?ref=design

'Icons of the Desert'
Painting the Ancient, Invisible Dream

By KEN JOHNSON

In 1971, a teacher named Geoffrey Bardon, working with indigenous Australians in the remote settlement of Papunya, near the center of the continent, had an idea that you wouldn't have expected to bear fruit beyond the region. He provided a group of elderly and middle-aged men with acrylic paints and pieces of Masonite and suggested that they make paintings based on their own aesthetic and spiritual traditions.

Accustomed to painting their bodies and ceremonial objects and making temporary sand mosaics, the men took to the new materials brilliantly. Improbably, a new movement was born, and within a few years paintings made by Aboriginal artists from across Australia had become an international phenomenon. Western collectors bought them, museums and galleries exhibited them, and a giant tourist industry grew up around them.

The fad for Aboriginal painting was off-putting. Certainly the works were visually catchy: with their bold, diagrammatic compositions, finely coordinated colors and dotted patterns they appealed to Western eyes trained to respond to abstraction and folk and outsider art. But there were questions about authenticity and the exploitation of indigenous artists. In 2006 the Australian Senate investigated allegations that non-Aboriginals were cranking out some of the paintings and that others were being made by Aboriginals working under sweatshop conditions, and found much cause for concern.

Given this problematic background you could be forgiven for approaching "Icons of the Desert: Early Aboriginal Paintings From Papunya" at the Grey Art Gallery warily. But if you skip it you miss a beautiful show. Organized by the Australian art historian Roger Benjamin for the Herbert F. Johnson Museum of Art at Cornell University, it presents about 50 paintings, most made where it all began, in Papunya in the early '70s. All are from the collection of the New Yorkers John and Barbara Wilkerson, who began acquiring Aboriginal paintings in 1994. Focusing on the earliest works — those known as Papunya boards — they wisely avoided possibly dubious material that might have been produced only for the ravenous market.

Although the iconography and graphic vocabulary the Papunya artists used were more than 10,000 years old, their paintings have the visual impact of Modern abstractions. With a deft, sensuously immediate

touch, the artists typically activated flat, frontal designs with dense patterns of dots, stripes and concentric circles and squares. There is a familial resemblance among most of the paintings; at first the exhibition looks like the work of one collective consciousness. But with extended viewing, differences emerge.

Johnny Warangkula Tjupurrula's "Water Dreaming at Kalipinypa" (1972), a panel approximately 2 ½ feet square covered with a patchwork pattern of fine white hatch marks and dotted and concentric circles, is a work of breathtaking subtlety. It's like an aerial view of farmland and forests lightly dusted by snow.

By contrast, in Shorty Lungkarta Tjungurrayi's "Mystery Sand Mosaic" (1974), in which four sausage-shaped forms seem to be standing at the edge of a well, dotted concentric bands radiating around the dark center are rendered in incandescently bright hues.

After the introduction of Masonite panels, other art teachers brought canvas and stretchers to Papunya, enabling the painters to create larger works. The exhibition's earliest painting on canvas is one from 1974 by Mr. Tjungurrayi. On an approximately 5 ½-by-3 ½-foot surface, he painted scores of overlapping whorls of different sizes in reds, yellows and pinks. The forms come out at you with exuberant energy, like sounds from a jazz orchestra.

Often, differently patterned layers create fascinating spatial complexities. Made on a slightly off-square panel with cut-off corners, Clifford Possum Tjapaltjarri's "Women's Dreaming About Bush Tucker 'Yarlga' " (1972) has dotted, cloudlike formations partly obscuring a center of white concentric circles and radiating spokes. It too gives the impression of an aerial photograph, this one of a secret military installation. According to the catalog, the painting represents women sitting around a campfire; "bush tucker" is the Australian term for the various sorts of food that Aboriginals foraged for; "yarlga" is an onionlike comestible.

As that interpretive note on Mr. Tjapaltjarri's painting suggests, there is a major dimension to Aboriginal works that will be lost on most viewers: what they meant and represented to the artist. When asked about the significance of different forms in their paintings, the Papunya artists (most of whom have since died) explained that they referred to waterholes, streams, food sources, landscapes, totemic animals, ancestors, mythic beings, rituals, "songlines" and so on. In other words, far from merely decorative, the paintings represent highly elaborated cosmologies.

But because of language barriers and reluctance on the part of artists to divulge much about their sacred traditions, interpretations offered in wall labels and in the catalog remain partial and speculative. Moreover, the Aboriginal cast of mind is so different from that of the West that even the most extensive explanations can be mystifying. "The Dreaming," a recurring subject in Aboriginal paintings that has to do with the origins of the world, is a pretty hard concept to grasp for a viewer raised on French Enlightenment-style reasoning.

At the doorway leading to the Grey's downstairs gallery, a wall label warns away Aboriginal women and children should any happen to be visiting. Two of the paintings below are the only ones in the show depicting people, but none in the lower-level group are any more compelling than the ones upstairs. They are restricted because they represent information that only male initiates are traditionally allowed to know. They are also believed to be inhabited by dangerously powerful supernatural entities. Secularized Westerners don't think art can have that kind of potency, but who knows, maybe that is our loss.

"Icons of the Desert: Early Aboriginal Paintings From Papunya" is on view through Dec. 5 at the Grey Art Gallery, New York University, 100 Washington Square East, Greenwich Village; (212) 998-6780, nyu.edu/greyart.

http://www.nytimes.com/2009/10/02/arts/design/02aboriginal.html?ref=design

Thomas Chambers
Setting Full Sail Toward the 20th Century

By ROBERTA SMITH

In the late 1930s the New York art dealers Albert Duveen and Norman Hirschl started turning up some intriguing paintings in upstate New York. These works depicted conventional subjects of 19th-century American painting — Hudson River landscapes and marine views of ships, harbors and naval battles — but in an entrancing, slightly demonic style unlike anything the dealers had seen before. Neither strictly realist nor naïve, they packed a formal, even decorative punch. The works felt ahead of their time, as if the artist had grasped that reality was, in the end, a geometry-based situation, much as early 20th-century painters would. Unfortunately none of the canvases were signed.

Then one day the pair came across a large and ambitious painting in this style that had both a title and signature. It depicted the American warship Constitution defeating the British vessel Guerrière in the War of 1812. It was signed T. Chambers. In 1942 Hirschl and Duveen organized an exhibition of their finds at the Macbeth Gallery in New York. They titled it "T. Chambers, Active 1820-1840: First American Modern."

Since then T. Chambers has acquired the first name of Thomas, a slim biography and a working life that dated from 1834 to 1866. His exuberant paintings are admired by scholars and collectors of 19th-century American painting. They can be found in museums along the Eastern seaboard, and inland, too. Almost everywhere I would guess they jump off the walls at you — the first Chambers I saw, at the Brooklyn Museum, sure did.

But have there been any major Chambers exhibitions? Not one, at least not until now, with the extraordinary survey of nearly 50 paintings at the American Folk Art Museum. Organized last year at the

Philadelphia Museum of Art by Kathleen A. Foster, its curator of American art, "Thomas Chambers (1808-1869)" confirms that there is nothing quite like the starchy hybrid that Chambers devised.

He aimed to please. His images are like chorus lines singing and dancing their hearts out, ever so slightly off-key and out of step. Every part contributes vocally and vigorously to the whole. The trilling patterns of ocean waves, rounded trees or riverside hedgerows; the sharp-edged mountains and shorelines, overemphatic clouds, glossy rivers and almost lurid sunsets — they all lock arms, and do a little more than their bit. The slight awkwardness amplifies. You see them perform and you see their performance, gaining a greater understanding of the visual appetite by having it thoroughly satisfied.

The desire to please is also explicit in the way Chambers's compositions sometimes repeat with slight variations — views of West Point, Niagara Falls, Lake George and Mount Vesuvius (which Chambers never saw). It was as if he were reproducing a successful formula because of customer demand, which he was. Art was Chambers's ambition and his means of survival, and he painted as many as 10 copies of a popular scene.

Chambers was born in Whitby, England, into a poor seafaring family, where artistic talent literally saved or at least prolonged lives. His older brother George, sent to sea at age 10, revealed such a knack for painting and decorating the ship's gear that, at 18, he was released from his indentures and sent to art school. Four years later he was in London, where he became a successful marine painter. Even William IV, the Sailor King, commissioned a work. But George died in 1840; his early years at sea had ruined his health.

Thomas followed George to London, picking up artistic skills from him and probably first working, as George had, as a painter of theater scenery and panoramas. Ms. Foster surmises that Chambers was an impatient, restless sort who decided to try his luck across the Atlantic. On March 1, 1832, he was in New Orleans — at the courthouse, to be precise — filing a declaration of intention to become an American citizen. After that, census reports, directories and newspaper advertisements show him moving every few years: New York City, Baltimore, Boston, Albany and back to New York City. He listed himself variously as a landscape painter, marine painter and occasionally as a "fancy" painter, which indicated skills at ornamental painting that may have included the decoration of furniture, mirrors and tinware.

Twice he consigned groups of paintings to auction, a common practice by which artists publicized themselves and raised money in a time when galleries and dealers were virtually unheard of. But Chambers seems mostly to have just scraped by. In his lifetime he never gained the acclaim of contemporaries like Thomas Cole, and suddenly he dropped from sight in New York in 1866, two years after the death of his wife, Harriet. He had returned to Whitby, where he died in the poorhouse, unknown and alone. Ms. Foster finally closed the circle by locating his death certificate, although this is the least bit of the new information that she lays out in her phenomenal catalog.

Chambers the man is as dim as his paintings are vivid. They do communicate impatience. Maybe Chambers didn't have time for the delicacies of one-point perspective and atmospheric; it was easier to fit the image together in a series of flattish planes, letting mountains upholstered in trees meet a river's mirrored surface with a nearly straight line and small jolt. It also made a stronger impression more quickly.

Chambers knew that his clients — members of the nascent middle class, not the elite — didn't have much time for artistic diversions or much experience buying paintings. His abbreviations also had the boldness of the folk art and painted furniture that was more familiar to them.

He synthesized and formulized. He executed images that would appeal to local pride, like "Packet Ship Passing Castle Williams, New York Harbor," in which the waves are indicated by parallel rows of matching whitecaps. Staten Island is seen against a sky streaked with pink and the ship is at nearly full sail, racing toward the picture's right edge like a bustling courtier in a large, fancy wig.

Often he painted from engravings of other artists' work, sometimes depicting places, like Vesuvius, he never visited, including Waterloo and the Rhine, where there's a castle on every carapace. His scenes of frigates tossed by immense, S-curve waves were based on scenes in popular pirate novels, and he painted contemporary events, like the wreck of the ship Bristol, washed up on Far Rockaway Beach. The curving bay recurs in the magnificent, incisively pink "View of Nahant (Sunset)," where crescents of ruddy beach and sky alternate with the dark foreground, the semicircle of ocean and ships and a flirtatious ring of lavender clouds.

This exhibition includes landscapes by other artists, including Cole, Thomas Doughty and William Matthew Prior, but don't be surprised if you pass them by. Chambers's work may lack the historic pedigree and national symbolism, say, of Cole's paintings, but on the wall, it's no contest.

There are also a few tables and a chest of drawers patterned in the fancy style. Of particular interest is a small black box with a scene of a steamship stippled in white on its inside lid and a band of flowers stenciled in gold and silver around its exterior. Chambers slipped between these two approaches, took what he needed and sped on, toward 20th-century painting. Knocking together his planes of water, sky and land, he found a new wholeness that jumps toward you, before you expect it.

"Thomas Chambers (1808-1869): American Marine and Landscape Painter" is on view through March 7 at the American Folk Art Museum, 45 West 53rd Street, Manhattan; (212) 265-1040, folkartmuseum.org.

http://www.nytimes.com/2009/10/02/arts/design/02chambers.html?ref=design

America, Captured in a Flash

By HOLLAND COTTER

Like probably a zillion other school kids, “My country tears of thee” was the way I understood the first line of “America.” Maybe that’s the way the Swiss-born photographer Robert Frank heard it too when he came to the United States from Europe in 1947, at 22, with English his second, third or fourth language.

Sadness seems to trickle through the 83 photographs in his classic 1959 book, “The Americans,” his disturbed and mournful song-of-the-road portrait of a new homeland and the subject of a 50th-anniversary exhibition now at the Metropolitan Museum of Art.

Once rejected for its pessimism, now sanctified for its political prescience, the book distills heartache, anger, fear, loneliness and occasional joy into a brew that has changed flavor with time but stayed potent. You may not know exactly what you’re imbibing when you pick up “The Americans” for the first time, or when you visit the Met show, but a few pictures in, and you’re hooked.

Some images you will recognize even if you never knew where they came from: a shot of a woman standing in an apartment window, her face hidden by a windblown American flag; a middle-aged black woman, maybe a nurse, holding a baby with skin so pale it looks extraterrestrial.

Mr. Frank took those pictures in Hoboken, N.J., and Charleston, S.C. The photograph used on the cover of the book’s first American edition was from New Orleans. It’s an exterior shot of a trolley car seen from the side, its passengers seated in the social order that prevailed in a pre-civil-rights, pre-feminist, pre-youth-culture nation.

From left to right we see, one behind the other, a white man, a white woman, a white boy, a white girl, a black man, a black woman. The white woman looks with sharp-eyed suspicion at the camera; the white boy, impassive but curious, sees it too; so does the black man, who seems to be on the verge of tears.

I'm reading feelings in here, but I think Mr. Frank was reading them into his subjects, which is why his pictures, separately and together, feel so personally laden. At this point, in 1955, he was on the first leg of a transcontinental car trip that would last 10 months and take him 10,000 miles. He was still learning the American language, the language of race and class, a stranger in a strange land that was getting more baffling.

How did he come to be there? Born in a German Jewish family in Zurich in 1924, he was interested in picture making early on. He apprenticed with several leading local photographers in his teens; in his early 20s he was doing promising work, examples of which are in the Met show. But he was temperamentally restless and impulsive. He needed to leave home, so he headed for New York.

He was restless there too. He landed a job at Harper's Bazaar and quickly ditched it. He left for a photography jaunt to Central and South America, came back to New York, got married, had a child, went to France and Spain for a spell, returned to New York again, had another child.

Socially, his impulsiveness worked for him. He was good at introducing himself to people. That's how he met Edward Steichen, then curator of photography at the Museum of Modern Art, and how he later met Walker Evans, who hired him as an assistant and more or less arranged for him to get a Guggenheim fellowship in 1955. That gave Mr. Frank enough money to travel the country, photographing as he went, with the goal of producing a book.

He made three separate car trips of different lengths, the first from New York to Detroit, the second from New York to Savannah, Ga. The third trip, in a secondhand Ford Business Coupe, was the big one. It took him, with many stops, through the Deep South and Texas to Los Angeles. There, joined by his family, he took a breather before heading back east alone, through Montana to Chicago, then to New York.

The New Orleans picture came fairly early in this trip. It was a miracle that he got it. He was focused on shooting a parade when he suddenly swung around, and there was the trolley. Many pictures happened that way. He was in the right place at the right time, but he also had the right reflexes, a dancer's combination of precision and abandon. And he had the right instincts or, maybe, attitude. For some people a camera is armor. For Mr. Frank it was an antenna, a feeling and thinking device.

Once back in New York at the end of his travel year, he carried his instincts and reflexes into the darkroom and onto the editing table. From the many thousands of pictures he had snapped, he made hundreds of contact sheets; the Met has a fascinating selection. And from these he pulled around a thousand working prints, which he tacked to his studio walls and slowly, slowly whittled down to 100, to 95, to 86, to 83.

That final selection forms the bulk of the show "Looking In: Robert Frank's 'The Americans,' " which was organized by Sarah Greenough, senior curator of photographs at the National Gallery of Art in Washington, and Jeff L. Rosenheim of the Met's photography department. As in the book, the sequence begins with the Hoboken flag and unfolds in four sections, distinguished by mood and tempo.

Images of flags, cars and jukeboxes set up a light, steady under-beat for recurring character types: socialites and politicians, bikers and retirees, urban cowboys, hot-to-trot teenagers and just plain folks. A starlet in Hollywood strikes a pose; three drag queens vamp on a New York City street. A hard-eyed waitress glares into space; a hotel elevator attendant dreams a pensive dream as people in furs and suits blur past her.

Occasionally figures appear in landscapes, as in an image of an itinerant preacher kneeling, robed in white, beside the Mississippi River. Just as often, landscapes are all but empty. A Montana mining town seen from a window looks blasted and abandoned; a stretch of New Mexican highway, shot from ground-level, road-kill perspective, is a blank line to the horizon until you spot a speck of a car.

A similar road appears in another photograph, though here the car is parked right in front of us, its headlights on. Through the windshield we see dim figures — Mr. Frank's first wife, Mary, and their two children — bundled together for warmth. Whether they are asleep or sitting in open-eyed exhaustion is hard to say, they are so shadowy, so near but so far away.

Theirs is the concluding image in "The Americans," and it is true to the spirit of the sequence as a whole. It is not a perfect picture in any conventional way. Its balances are odd; its atmosphere is blurry and grainy, as if with static or dust. Like many of Mr. Frank's pictures, it isn't about an event but about an uncertain moment between events, when emotional guards are down, and dark feelings can flow in. In the way a film still does, it seems to call for a larger narrative to make sense. (In 1958 Mr. Frank announced that he was giving up still photography for films, and he made many.)

The ostensibly throwaway style of this and other pictures had a huge influence, from the 1960s forward, on young artists who understood that traditional models of resolution and wholeness, in art as in life, are unstable, if not illusory. That "The Americans" could embody this concept while being a virtuosic feat of formal discipline and psychic endurance only increased its exemplary status, except perhaps to Mr. Frank himself, now 84, whose attitude toward his book has tended to grow more antagonistic with its critical and commercial success.

And how does the "The Americans" come across today? In the nominally post-racial Obama era, its political urgencies feel less immediate than they once did, but also prophetic. Its mournful tenderness, without being sentimental, seems deeper than ever. The days and nights it records are more than a half-century gone. The preacher, the nurse, the woman hidden by the flag, the sharp-eyed woman and the tearful black man on the trolley are, you imagine, gone.

What's left is a still-strange country and a book of pictures by a foreigner who came to America impulsively, traveled our roads restlessly, and by not fully knowing our language heard it correctly and told us, the way we could not, truths about ourselves.

"Looking In: Robert Frank's 'The Americans' " remains through Jan. 3 at the Metropolitan Museum of Art; (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/09/25/arts/design/25frank.html

How Nonsense Sharpens the Intellect

By BENEDICT CAREY

In addition to assorted bad breaks and pleasant surprises, opportunities and insults, life serves up the occasional pink unicorn. The three-dollar bill; the nun with a beard; the sentence, to borrow from the Lewis Carroll poem, that gyres and gimbles in the wabe.

An experience, in short, that violates all logic and expectation. The philosopher Soren Kierkegaard wrote that such anomalies produced a profound "sensation of the absurd," and he wasn't the only one who took them seriously. Freud, in an essay called "The Uncanny," traced the sensation to a fear of death, of castration or of "something that ought to have remained hidden but has come to light."

At best, the feeling is disorienting. At worst, it's creepy.

Now a study suggests that, paradoxically, this same sensation may prime the brain to sense patterns it would otherwise miss — in mathematical equations, in language, in the world at large.

"We're so motivated to get rid of that feeling that we look for meaning and coherence elsewhere," said Travis Proulx, a postdoctoral researcher at the University of California, Santa Barbara, and lead author of the paper appearing in the journal Psychological Science. "We channel the feeling into some other project, and it appears to improve some kinds of learning."

Researchers have long known that people cling to their personal biases more tightly when feeling threatened. After thinking about their own inevitable death, they become more patriotic, more religious and less tolerant of outsiders, studies find. When insulted, they profess more loyalty to friends — and when told they've done poorly on a trivia test, they even identify more strongly with their school's winning teams.

In a series of new papers, Dr. Proulx and Steven J. Heine, a professor of psychology at the University of British Columbia, argue that these findings are variations on the same process: maintaining meaning, or coherence. The brain evolved to predict, and it does so by identifying patterns.

When those patterns break down — as when a hiker stumbles across an easy chair sitting deep in the woods, as if dropped from the sky — the brain gropes for something, anything that makes sense. It may

retreat to a familiar ritual, like checking equipment. But it may also turn its attention outward, the researchers argue, and notice, say, a pattern in animal tracks that was previously hidden. The urge to find a coherent pattern makes it more likely that the brain will find one.

"There's more research to be done on the theory," said Michael Inzlicht, an assistant professor of psychology at the University of Toronto, because it may be that nervousness, not a search for meaning, leads to heightened vigilance. But he added that the new theory was "plausible, and it certainly affirms my own meaning system; I think they're onto something."

In the most recent paper, published last month, Dr. Proulx and Dr. Heine described having 20 college students read an absurd short story based on "The Country Doctor," by Franz Kafka. The doctor of the title has to make a house call on a boy with a terrible toothache. He makes the journey and finds that the boy has no teeth at all. The horses who have pulled his carriage begin to act up; the boy's family becomes annoyed; then the doctor discovers the boy has teeth after all. And so on. The story is urgent, vivid and nonsensical — Kafkaesque.

After the story, the students studied a series of 45 strings of 6 to 9 letters, like "X, M, X, R, T, V." They later took a test on the letter strings, choosing those they thought they had seen before from a list of 60 such strings. In fact the letters were related, in a very subtle way, with some more likely to appear before or after others.

The test is a standard measure of what researchers call implicit learning: knowledge gained without awareness. The students had no idea what patterns their brain was sensing or how well they were performing.

But perform they did. They chose about 30 percent more of the letter strings, and were almost twice as accurate in their choices, than a comparison group of 20 students who had read a different short story, a coherent one.

"The fact that the group who read the absurd story identified more letter strings suggests that they were more motivated to look for patterns than the others," Dr. Heine said. "And the fact that they were more accurate means, we think, that they're forming new patterns they wouldn't be able to form otherwise."

Brain-imaging studies of people evaluating anomalies, or working out unsettling dilemmas, show that activity in an area called the anterior cingulate cortex spikes significantly. The more activation is recorded, the greater the motivation or ability to seek and correct errors in the real world, a recent study suggests. "The idea that we may be able to increase that motivation," said Dr. Inzlicht, a co-author, "is very much worth investigating."

Researchers familiar with the new work say it would be premature to incorporate film shorts by David Lynch, say, or compositions by John Cage into school curriculums. For one thing, no one knows whether exposure to the absurd can help people with explicit learning, like memorizing French. For another, studies have found that people in the grip of the uncanny tend to see patterns where none exist — becoming more prone to conspiracy theories, for example. The urge for order satisfies itself, it seems, regardless of the quality of the evidence.

Still, the new research supports what many experimental artists, habitual travelers and other novel seekers have always insisted: at least some of the time, disorientation begets creative thinking.

http://www.nytimes.com/2009/10/06/health/06mind.html?ref=health

Early Births Take a Toll, Group Says

By THE ASSOCIATED PRESS

WASHINGTON (AP) — Nearly one in 10 of the world's babies is born premature, and about one million infants die each year as a result, according to a report that is the first attempt to measure a toll that is hidden in much of the world.

The problem is concentrated in poor countries, with the vast majority of the nearly 13 million premature babies born each year in Africa and Asia, according to the report, released on Sunday by the March of Dimes.

The rates are highest in Africa, but North America follows closely behind, concludes the first part of the report, a collaboration with the World Health Organization. The report, and its implications, are to be discussed this week at a child health meeting in India.

Differing factors fuel premature births in rich countries and poor ones. Wealthy nations like the United States have sophisticated neonatal intensive care units for the tiniest babies. That produces headlines about miracle babies and leads to a false sense that modern medicine conquers prematurity — without acknowledging lifelong problems including cerebral palsy, blindness and learning disabilities that often plague survivors.

Scientists do not know all the reasons for preterm birth or how to stop early labor once it starts, one reason that the report urges major new research. Nor does much of the world even track how many babies are premature, or what happens to them.

"These are conservative estimates," said Christopher Howson, an epidemiologist with the March of Dimes. "As shocking as this toll is, that toll will only rise."

The W.H.O. hopes to complete a more in-depth, country-by-country count next year.

Yet even in very poor countries, there are ways to improve the survival of premature babies, but most mothers are not aware of them, said Dr. Joy Lawn, a pediatrician and director of Save the Children who is based in South Africa.

"Even in educated families, there's a sense of fatalism if a baby is born preterm. There's no expectation they can do anything," Dr. Lawn said. "With pretty simple solutions, these deaths could be halved, but it doesn't seem to be a priority."

She points to Malawi, where traditionally, new mothers have tied babies to their backs as they go about their day. Today, mothers of premature babies are taught to tie them in front, under their clothes, she said. The skin-to-skin contact keeps the infant's body temperature more stable, a key to survival, and the babies can nurse at will, promoting weight gain.

Babies born before completion of the 37th week of pregnancy are considered premature. The March of Dimes report found that a small fraction of babies in the United States are born before 32 weeks, the very early premature infants who face the greatest risk of death and lifelong health problems. But even being born a few weeks early can lead to breathing problems, jaundice and learning or behavioral delays.

http://www.nytimes.com/pages/health/index.html

When the Doctor Is Distressed

By PAULINE W. CHEN, M.D.

I met Jeff (not his real name) during my surgical residency, not long after I graduated from medical school. Despite the fact that he was a fellow doctor-in-training, Jeff towered over me not just in height and breadth, but also in self-assurance. Nothing ever seemed to faze my colleague: his work in the operating room was rumored to be perfect, he relished clinical and scientific debates with anyone up for the challenge, and he astounded the rest of the residents time and time again with his casual references to the latest clinical research and findings. While the other residents and I might stagger around after caring for a series of trauma patients, Jeff was tireless. He would continue to stride exuberantly into the emergency department, a surgical decathlete in a starched twill white coat, poised for, as he once put it, “another opportunity to excel.”

Patients liked him, senior surgeons respected him, and his peers took to either emulating him or referring to him amongst themselves as “the Uberman.”

But then Jeff became a new father. While he was ecstatic at first, handing out cigars and proudly suffering the congratulatory backslaps of hospital staff, there were signs that he was starting to fray at the edges. The frequent citations of minutiae from surgical journals petered out, and he dropped the erudite, professorial discourses that once seemed so integral to his professional persona. At rounds, our twice-daily team visits to all the patients, he was no longer the first to show up; and when he went in to see the patients, he skimped on their physical exams. Jeff’s wife was working full-time, and it was hard not to notice that the constant stress of trying to be present for his wife and son while surviving surgical residency was beginning to get to him.

One afternoon, I saw him wander into the I.C.U. looking as if he were lost. One of his patients had taken a turn for the worse, and another resident had paged him for help. Jeff’s hair was disheveled, a pair of thick glasses replaced his usual contacts and his white coat was creased in all the wrong places.

I could hear him jingling some loose change in his right coat pocket, but he made no effort to pull out his stethoscope to listen to his patient's heart and lungs or to look over the vital signs chart. He gave a brief glance and nod to the resident who had called him but became increasingly distracted as the resident relayed the story for a second time and asked for suggestions.

Jeff stood at the foot of the bed, staring at the monitors with his eyes wide open but glazed over.

"She doesn't look that bad," he mumbled at last. "I think she's O.K." He stared at the monitors for a minute longer then looked at his watch. "Just give her some intravenous fluids," he said to the resident. "I've got to get home."

That night, as the woman's fever grew worse and her blood pressure dipped and urine output dwindled, it became clear that Jeff had made an error in judgment. An overwhelming infection had taken hold, and Jeff had missed it. Although she would eventually recover, I could not help asking myself if his patient might have fared better if Jeff had examined her, spoken at length with the nurse and the other resident, and had done the kind of obsessive sleuthing job that once distinguished him from the rest of us. I had to wonder if her full-blown infection might have been headed off or at least tempered if he had not been under such stress outside of work.

As I watched Jeff leave the I.C.U .the next morning, head hung low and utterly dejected, the resident who had called Jeff the afternoon before leaned over and whispered to me. "All these guys are the same," he said. "Once they have a baby, they lose their edge." He shook his head and continued, "That's why I keep my life simple. The hours I can handle. When all the other stuff gets in the way" — he waved his hand in the air, as if clearing away cobwebs — "that's when you start making mistakes."

At the time, I thought that the resident was referring to the several male residents like Jeff who had recently become new fathers. But over time, I realized he was referring to all of us, men *and* women, regardless of whether we had had children or not.

In spite of the long hours and the all-consuming nature of our work, we generally managed to do our jobs and do them well. But whenever one of us experienced additional stress apart from our work, the house of cards in which we functioned would start to collapse. Unable to admit to or find support for our distress, we would continue to soldier on at the hospital, leaving a series of mistakes, ranging from barely perceptible to blatant, in our wake.

I was reminded of Jeff and doctors like him when I read a study published last week in The Journal of the American Medical Association. While a lot of attention has been given to the long work hours of residents and medical errors, researchers at the Mayo Clinic in Rochester, Minn., found that distress, and not only fatigue, contributed to errors by doctors-in-training. Residents who suffered from burnout and depression could pose as much risk to patients as those doctors-in-training who were exhausted, regardless and independent of their level of fatigue.

Up until now, the distress in residency training has, for the most part, been largely underestimated or even accepted. "There has been a tendency in medicine to minimize our distress because our focus is supposed to be on the patient," said Dr. Colin P. West, lead author of the study and an associate program director of Mayo's internal medicine training program. "We are supposed to be tough enough, but the distress in medical training right now is epidemic."

Individual coping strategies and significant life events like death or marriage can all lead to higher distress levels, but some of the sources of distress among current residents may also be related to larger societal shifts. "When you think back 50 or even 20 years ago, the majority of physicians were men, and their wives took care of the kids at home," Dr. West noted. Although it's unknown whether stress levels in medical training are worse today, more and more young physicians have chosen to share family responsibilities. That choice leaves everyone with less time and energy to devote to patient care. "If you

only have so much gas in the tank, you are going to have to shift responsibilities and deal with less energy for medical practice."

While residency work hour limits are intended to ameliorate fatigue, they do not directly address distress. "Fatigue is important in patient safety issues, but we are missing out if we focus on that exclusively," Dr. West remarked. "We have got to address burnout, depression and overall quality of life."

It is also unclear exactly how fatigue and distress interact with one another in a clinical setting or if they are even related. "My feeling is that fatigue may be one other aspect of distress," Dr. West posited, "but they are probably separate things."

Addressing distress in medical training will require navigating a difficult balancing act. "The scope of clinical practice is so incredibly broad that you have to train for years and years to fulfill just a minimal level of competence," Dr. West said. "We need to figure out what is the right amount of stress to develop outstanding physicians, but not so much that it decays their humanity." Much like a runner who is training for a marathon, there is an optimal level, a "sweet point," of stress. "If we decay it too much, we may end up with physicians who won't be competent," Dr. West said. "But if we continue as we have in past decades, we are going to end up paying the price of burnout, lack of empathy and doctors leaving the profession."

Eventually Jeff, my colleague in training, regained his equilibrium and his standing as one of the most competent surgical residents I have ever known. But I know that he did so alone and with little support from his elders or from any of his peers.

Researchers like Dr. West are working on finding ways to support the well-being of residents and practicing physicians. Many of these potential solutions are premised on two things: acknowledging the distress, then helping doctors find meaning in their work by supporting the ideals that inspired them to become doctors in the first place.

"Most of us got into this profession because of passion for medicine, for taking care of people," Dr. West said. "But somewhere along the way, it gets drummed out. We have to figure out the best ways, the right way, for different individuals to thrive."

Join the discussion on the Well blog, "Among Doctors, an Epidemic of Distress."

http://www.nytimes.com/2009/10/01/health/01chen.html?ref=health

Understanding the Anxious Mind

By ROBIN MARANTZ HENIG

Jerome Kagan's "Aha!" moment came with Baby 19. It was 1989, and Kagan, a professor of psychology at Harvard, had just begun a major longitudinal study of temperament and its effects. Temperament is a complex, multilayered thing, and for the sake of clarity, Kagan was tracking it along a single dimension: whether babies were easily upset when exposed to new things. He chose this characteristic both because it could be measured and because it seemed to explain much of normal human variation. He suspected, extrapolating from a study he had just completed on toddlers, that the most edgy infants were more likely to grow up to be inhibited, shy and anxious. Eager to take a peek at the early results, he grabbed the videotapes of the first babies in the study, looking for the irritable behavior he would later call high-reactive.

No high-reactors among the first 18. They gazed calmly at things that were unfamiliar. But the 19th baby was different. She was distressed by novelty — new sounds, new voices, new toys, new smells — and showed it by flailing her legs, arching her back and crying. Here was what Kagan was looking for but was not sure he would find: a baby who essentially fell apart when exposed to anything new.

Baby 19 grew up true to her temperament. This past summer, Kagan showed me a video of her from 2004, when she was 15. We sat in a screening room in Harvard's William James Hall — a building named, coincidentally, for the 19th-century psychologist who described his own struggles with anxiety as "a horrible dread at the pit of my stomach ... a sense of the insecurity of life." Kagan is elfin and spry, balding and bespectacled. He neither looks nor acts his age, which is 80. He is one of the most influential developmental psychologists of the 20th century.

On the monitor, Baby 19 is a plain-looking teenager, hiding behind her long, dark hair. The interview, the same one given to all 15-year-olds in the longitudinal study, begins with questions about school. She has very few extracurricular activities, she says in a small voice, but she does like writing and playing the violin. She fidgets almost constantly as she speaks, twirling her hair, touching her ear, jiggling her knee. "This is the overflow of her high-reactive nature," Kagan told me, standing near the monitor so he could fast-forward to the good parts.

Here was a good part: The interviewer asks Baby 19 what she worries about.

"I don't know," Baby 19 says after a long pause, twirling her hair faster, touching her face, her knee. She smiles a little, shrugs. Another pause. And then the list of troubles spills out: "When I don't quite know what to do and it's really frustrating and I feel really uncomfortable, especially if other people around me know what they're doing. I'm always thinking, Should I go here? Should I go there? Am I in someone's way? ... I worry about things like getting projects done... I think, Will I get it done? How am I going to do

it? ... If I'm going to be in a big crowd, it makes me nervous about what I'm going to do and say and what other people are going to do and say." Baby 19 is wringing her hands now. "How I'm going to deal with the world when I'm grown. Or if I'm going to sort of do anything that really means anything."
Her voice trails off. She wants to make a difference, she says, and worries about whether she will. "I can't stop thinking about that."
Watching this video again makes Kagan fairly vibrate with the thrill of rediscovery: here on camera is the young girl who, as an infant, first embodied for him what it meant to be wired to worry. He went on to find many more such children, and would watch a big chunk of them run into trouble with anxiety or other problems as they grew up.
The tenuousness of modern life can make anyone feel overwrought. And in societal moments like the one we are in — thousands losing jobs and homes, our futures threatened by everything from diminishing retirement funds to global warming — it often feels as if ours is the Age of Anxiety. But some people, no matter how robust their stock portfolios or how healthy their children, are always mentally preparing for doom. They are just born worriers, their brains forever anticipating the dropping of some dreaded other shoe. For the past 20 years, Kagan and his colleagues have been following hundreds of such people, beginning in infancy, to see what happens to those who start out primed to fret. Now that these infants are young adults, the studies are yielding new information about the anxious brain.
These psychologists have put the assumptions about innate temperament on firmer footing, and they have also demonstrated that some of us, like Baby 19, are born anxious — or, more accurately, born predisposed to be anxious. Four significant long-term longitudinal studies are now under way: two at Harvard that Kagan initiated, two more at the University of Maryland under the direction of Nathan Fox, a former graduate student of Kagan's. With slight variations, they all have reached similar conclusions: that babies differ according to inborn temperament; that 15 to 20 percent of them will react strongly to novel people or situations; and that strongly reactive babies are more likely to grow up to be anxious. They have also shown that while temperament persists, the behavior associated with it doesn't always.
Kagan often talks about the three ways to identify an emotion: the physiological brain state, the way an individual describes the feeling and the behavior the feeling leads to. Not every brain state sparks the same subjective experience; one person might describe a hyperaroused brain in a negative way, as feeling anxious or tense, while another might enjoy the sensation and instead uses a positive word like "alert." Nor does every brain state spark the same behavior: some might repress the bad feelings and act normally; others might withdraw. But while the behavior and the subjective experience associated with an emotion like anxiety might be in a person's conscious control, physiology usually is not. This is what Kagan calls "the long shadow of temperament." The oldest high-reactive subjects in Kagan's and Fox's studies, like Baby 19, are in their 20s now, and for many of them, no matter how much they manage to avoid looking anxious to an outsider, fears still rattle in their skulls at 3 o'clock in the morning. They remain anxious just below the surface, their subconscious brains still twitchy, still hypervigilant, still unable to shift attention away from perceived threats that aren't really there.
ANXIETY IS NOT fear, exactly, because fear is focused on something right in front of you, a real and objective danger. It is instead a kind of fear gone wild, a generalized sense of dread about something out there that seems menacing — but that in truth is not menacing, and may not even be out there. If you're anxious, you find it difficult to talk yourself out of this foreboding; you become trapped in an endless loop of what-ifs.
"I was flesh bereft of spirit," wrote the journalist Patricia Pearson in "A Brief History of Anxiety (Yours and Mine)," in a pitch-perfect description of this emotional morass, "a friable self, grotesque... I got an AIDS test. I had my moles checked. I grew suspicious of pains in my back. If I was nauseous, I worried about cancer and started reading up obsessively on symptoms. I lay in bed whenever I could, trying to shut up the clamor of terror with sleep."
When the "clamor of terror" starts to interfere with functioning, as it did for Pearson when she was a crime reporter in her early 30s, worrying turns into a clinical anxiety disorder, of which there are several forms: panic, social anxiety, phobia, obsessive-compulsive, post-traumatic stress and a catch-all called generalized anxiety disorder. Taken together, they make anxiety the most common mental illness in America, affecting an estimated 40 million adults, according to the National Institute of Mental Health. And that figure doesn't even count the far greater swath who are garden-variety worriers, people who fret when a child is late, who worry when they hear a siren headed toward home, who are sure that a phone call in the middle of the night means someone is dead.

In the brain, these thoughts can often be traced to overreactivity in the amygdala, a small site in the middle of the brain that, among its many other functions, responds to novelty and threat. When the amygdala works as it should, it orchestrates a physiological response to changes in the environment. That response includes heightened memory for emotional experiences and the familiar chest pounding of fight or flight. But in people born with a particular brain circuitry, the kind seen in Kagan's high-reactive study subjects, the amygdala is hyperreactive, prickly as a haywire motion-detector light that turns on when nothing's moving but the rain. Other physiological changes exist in children with this temperament, many of them also related to hyperreactivity in the amygdala. They have a tendency to more activity in the right hemisphere, the half of the brain associated with negative mood and anxiety; greater increases in heart rate and pupil dilation in response to stress; and on occasion higher levels of the stress hormones cortisol and norepinephrine.

But having all the earmarks of anxiety in the brain does not always translate into a subjective experience of anxiety. "The brain state does not make it a disorder," Kagan told me. "The brain state exists, and the statement 'I'm anxious,' exists, and the correlation is imperfect." Two people can experience the same level of anxiety, he said, but one who has interesting work to distract her from the jittery feelings might do fine, while another who has just lost his job spends all day at home fretting and might be quicker to reach a point where the thrum becomes overwhelming. It's all in the context, the interpretation, the ability to divert your attention from the knot in your gut. These variations also happen when someone grows up from an anxious infant to someone either fretful or tranquil. One aim of Kagan's and Fox's longitudinal studies is to watch how the life stories of these high-strung babies unfold.

The quintessential longitudinal study, the one often mentioned because it set the standard, is the Framingham Heart Study, which enshrined the idea of risk factors. It was through Framingham, for instance, that scientists learned that high blood pressure was a risk factor for cardiovascular disease, since it followed its subjects for long enough to detect that those who had high blood pressure in their 30s and 40s were more likely to have heart disease later in life.

But such studies draw conclusions about trends, not destinies. If someone with high blood pressure treats it early, the risk of heart disease can be reduced significantly. Similarly, if someone with an anxiety-prone temperament grows up in the right surroundings, he or she might never develop a full-blown anxiety disorder.

Kagan's first exposure to longitudinal studies came shortly after he received his Ph.D. from Yale in 1954. He was working at the Fels Research Institute on the campus of Antioch College in Ohio, where a longitudinal study of middle-class children had been going on for nearly 30 years. He stumbled upon a gigantic room "loaded with prose summaries of what these children were like from the age of 1 month on," he told me recently. He knew a treasure trove when he saw one.

Among these prose summaries, which ultimately Kagan and a colleague, Howard Moss, turned into the book "Birth to Maturity," were descriptions indicating that babies had different innate temperaments. Kagan studiously ignored this finding; it didn't fit with his left-leaning politics, which saw all individuals as born inherently the same — blank slates, to use the old terminology — and capable of achieving anything if afforded the right social, economic and educational opportunities. "I was so resistant to awarding biology much influence, I didn't follow up on the inhibited temperaments I was seeing," he told me. It took another 20 years of listening to arguments about nature versus nurture for Kagan finally to entertain the possibility that some behavior might be attributed to genes.

BY THE TIME Kagan moved to Harvard in 1964, the notion of an inborn temperament was on the ascent, in part because of the findings of Stella Chess and Alexander Thomas of New York University, who divided children into three categories: easy children, difficult children and those who were slow to warm up. Remembering the Fels data, Kagan embarked on his own longitudinal study of temperament. In 1979, he screened about 400 preschoolers, exposing them to new toys and new people in a laboratory playroom, videotaping them and coding their behavior. About 15 percent ended up in the group Kagan called "behaviorally inhibited": wary, subdued, tending to hover near their mothers. Another 15 percent were "behaviorally uninhibited." They were the fearless ones, who ran around trying to play with every new toy and chatting happily with the examiner. When Kagan talks about such children, he uses one of his favorite words: "ebullient."

Over the next five years, 107 of these children — half of them timid, half bold — came back to the lab for more testing. (To keep environmental differences to a minimum, Kagan restricted his sample to children who were white, middle class and healthy at birth.) Their behavior was again recorded and again coded. Temperament, it turned out, tended to be stable over those five years, at least in children who started out

at the extremes. There was a shift toward the middle between ages 2 and 7, but only 3 of the 107 changed categories completely from uninhibited to inhibited or vice versa. In addition, the most inhibited 7-year-olds showed some physiological differences that indicated an exaggerated response to stress.

Kagan and his colleagues, Nancy Snidman and J. Steven Reznick, published their results in Science in 1988. The physiological measurements led them to believe something biological was at work. Their hypothesis: the inhibited children were "born with a lower threshold" for arousal of various brain regions, in particular the amygdala, the hypothalamus and the hypothalamic-pituitary-adrenal axis, the circuit responsible for the stress hormone cortisol.

Though its findings seem almost self-evident today, the Science paper made a splash at the time. "There are two kinds of great research," Susan Engel, a developmental psychologist at Williams College, told me when I discussed Kagan's study with her. "There's research that is counterintuitive, that shows you something you'd never guess on your own, and there's research that shows you irrefutably what you had an intuition about, something you thought was true but didn't have evidence to support." Kagan's research was of the second type, she says: "a beautiful, elegant experimental demonstration of an old intuition."

But these subjects were preschoolers when Kagan first met them, already too old for him to know how much to attribute to nature rather than nurture. Couldn't the inhibited children somehow have been raised to be wary instead of born that way? So the following year, Kagan began a new study he said he hoped would minimize the effects of the environment. He recruited infants who were just 4 months old, planning to categorize them according to temperament and to follow them as they grew to see whether temperament in infancy predicted anything about subsequent personality.

How to measure temperament in babies so young, at an age when some parents are still wondering whether a smile means happiness or gas? Kagan couldn't measure the amygdala directly, so he looked for signs of its rampant firing that would be meaningful — and measurable — in infants. Since projections from the amygdala connect it to brain regions that control motor activity and the autonomic nervous system (heartbeat, breathing and other involuntary actions), he reasoned that if the amygdala was highly reactive, it would show up as increased motor activity, fretting and crying, as well as increases in heart rate, respiration and blood pressure.

Showing that a few physical measurements could offer insight into a baby's psyche was one of Kagan's real contributions. "Where his work had so much depth was not only in the longitudinal follow-up," says Joan Kaufman, a Yale psychologist who was a research assistant at Harvard when the study began, "but in thinking about the behavioral phenotype of an inborn temperament and really assessing it with such rigor."

Kagan brought about 500 babies — as before, all white, middle class and healthy — into the laboratory, placed them in infant seats in front of a video camera and exposed them to a series of novel stimuli. He showed them a schematic face that emitted words in a synthetic voice designed to be what he called "discrepant but not terrifying." He dangled a dancing mobile with plastic Winnie the Pooh characters — again, nothing scary, but something new. He brought to their noses a cotton swab that had been dipped in diluted alcohol. The battery of novel stimuli took 45 minutes. Some of the babies gazed contentedly throughout. Others were in constant motion, kicking and moving their arms fitfully, furrowing their brows, arching their backs or crying if they were really upset.

Kagan and his research assistants again looked at videotapes and coded movements and cries. Based on the final tally, each infant was categorized as either low-reactive, high-reactive or somewhere in between. The low-reactives were the classic easy babies, the ones who take unfamiliarity in stride. The high-reactives, among them Baby 19, thrashed and whimpered when exposed to the same unfamiliar things. It was clear, as they twisted about in their infant seats, that these babies were high-maintenance, difficult to comfort.

About 40 percent were low-reactive, and about 20 percent were high-reactive. Kagan brought most of them, as well as those with intermediate temperament, back for testing at ages 1 and 2. About half of them — primarily those at each extreme — returned for further testing at ages 4, 7, 11 and 15. That pattern continues to this day, even after Kagan retired in 2000 and handed over his records to a collaborator, Carl Schwartz, an adolescent psychiatrist at Harvard and Massachusetts General Hospital, who tested some of Kagan's subjects when they were 18 or 21.

By the earliest assessments, certain patterns had already emerged. At age 4, children who had been high-reactive were four times as likely to be behaviorally inhibited as those who had been low-reactive. By age 7, almost half of the jittery babies had developed symptoms of anxiety — fear of thunder or dogs or

darkness, extreme shyness in the classroom or playground — compared with just 10 percent of the more easygoing ones. About one in five of the high-reactive babies were consistently inhibited and fearful at every visit up to the age of 7.

"Fear is an incredibly heterogeneous construct," says Daniel Pine, a child psychiatrist at the National Institute of Mental Health. Pine collaborates on the two longitudinal studies at the University of Maryland, conducting psychiatric interviews and functional M.R.I. scans on subjects at several stages. "Fear of social things is different from fear of physical things." The same brain circuitry is probably involved in both, he said, but different fears tend to show up at different points in development: fear of things like clowns, balloons or spiders emerging early in life; fear of things like social situations with peers emerging later. In addition, it's relatively easy to avoid the physical things that frighten you; if you're afraid of dogs, you can just take a different route to school to keep from passing that bull terrier down the street. It's much harder to avoid social fears — you can avoid the dog on the way to school, but you still have to go to school.

The children tended to get a better grip on their fearfulness as they got older. By adolescence, the rate of anxiety in Kagan's study subjects declined overall, including in the high-risk group. At 15, about two-thirds of those who had been high-reactors in infancy behaved pretty much like everybody else.

One such person was Mary, now a 21-year-old junior at Harvard, who was in the high-reactive group as a baby and was moderately fearful at ages 1 and 2. She didn't think of herself as anxious, just dutiful. "I don't stray from the rules too much," she said when we spoke by telephone not long ago. "But it's natural for me — I never felt troubled about it. I was definitely the kid who worked really hard to get good grades, who got all my homework done before I watched TV." Mary also was an accomplished ballet dancer as a child, which gave her a way to work off energy and to find a niche in which she excelled. That talent, plus being raised in what Kagan called a "benevolent home environment," might have helped shift Mary's innate inhibition to something more constructive. If Mary's high-reactive temperament is evident now, it comes out in the form of conscientiousness and self-control.

PEOPLE WITH A nervous temperament don't usually get off so easily, Kagan and his colleagues have found. There exists a kind of sub-rosa anxiety, a secret stash of worries that continue to plague a subset of high-reactive people no matter how well they function outwardly. They cannot quite outrun their own natures: consciously or unconsciously, they remain the same uneasy people they were when they were little.

Most of the high-reactive kids in Kagan's study did well in adolescence, getting good grades, going to parties, making friends. Scratch the surface, though, and many of them — probably most of them — were buckets of nerves. "It's only the high-reactives who say, 'I'm tense in school,' 'I vomit before examinations,' 'If we're going on a class trip to D.C., I can't sleep the night before,' " Kagan told me. "They don't like it, but they've accepted the fact that they're just tense people." Invoking Jungian terminology, he called it the difference between persona (the outer-directed personality) and anima (the inner-directed thoughts and feelings). The persona can be controlled, but the anima often cannot.

Nathan Fox of the University of Maryland says that when the anima erupts in high-risk children, it often takes the form of excessive vigilance and misdirected attention. In the first of his two longitudinal studies of temperament, begun in 1989, he followed 180 children from the age of 4 months and gave them a set of neuropsychological tests when they were between 13 and 15. One test, called the spatial-cuing task, measures vigilance and the ability to disengage attention from a perceived threat. It shows two faces briefly on a computer screen, one on each side — the same face looking threatening on one side and pleasant on the other. The faces fade away, and an arrow appears on one side of the screen, sometimes on the side the threatening face had been on, sometimes on the other. The subject must notice the arrow and press a button to indicate whether the arrow points up or down.

Adults with clinical anxiety consistently are faster at pressing the correct button if the arrow is on the side of the screen where the threatening face had been, and slower if the arrow is on the other side. (Non-anxious adults show no such subconscious preference.) In the kids in Fox's study, those who were born anxiety-prone — even the outwardly calm, well-adjusted ones — tended to perform this task like anxious adults, paying more attention to the threatening face whether or not they meant to.

A similar result came from another test Fox gave his subjects, called the potentiated startle response. In this test, teenagers are placed in front of a screen and told that when the screen is blue, there is a chance a puff of air will be blasted at their throats — a sensation that, Fox assured me, is surprising and uncomfortable but not painful. When the screen is green, they're safe; they are told that no puff of air will ever come when the green screen is on. Then, to evoke a startle, the experimenter plays a loud noise and

measures the teenager's response (an involuntary eye blink). All subjects have a robust startle response when the blue screen is on, which reflects the fact that they are tensing up in anticipation of that uncomfortable air puff. But anxiety-prone kids startle just as much with the green, supposedly safe screen. They stay on guard, anxious and wired, even when the situation is not threatening. Again, this finding held no matter how the subjects behaved in real life — and no matter how they were feeling while the test was taking place.

Fox's collaborator, Daniel Pine of the N.I.M.H., conducted functional M.R.I. scans on 27 of these study subjects when they were adolescents. While they were in the scanner, Pine showed them pictures of fearful faces. Sometimes he told them to try to measure how wide the nose was — in other words, to focus on a detail that is emotionally neutral. Other times he told them to think about how afraid they felt looking at the person in the picture.

Teenagers who were in the group at low risk for anxiety showed no increase in activity in the amygdala when they looked at the face, even if they had been told to focus on their own fear. But those in the high-risk group showed increased activity in the amygdala when they were thinking about their own feelings (though not when they were thinking about the nose). Once again, this pattern was seen in anxiety-prone youngsters quite apart from whether they had problems with anxiety in their daily lives. In the high-risk kids, even those who were apparently calm in most settings, their amygdalas lighted up more than the others' did.

Temperamental type tends to reveal itself not only in functional M.R.I. scans but also in structural M.R.I.'s, which look at brain anatomy rather than activity. In 2007 Carl Schwartz, the Harvard psychiatrist who has taken over the follow-up work on Kagan's two longitudinal studies, put 76 of Kagan's study subjects in an M.R.I. machine. At the time, they were 18 years old. (Baby 19 was part of the sample; Mary was asked to participate, but she declined.) He found that the subjects who were high-reactors at 4 months tended to show significant thickening in the prefrontal cortex compared to those who were low-reactors. "This was amazing," Schwartz told me. "The temperament they exhibited as infants still seemed to leave a fingerprint in the brain 18 years later."

He is still trying to work out the exact meaning of this fingerprint; he cannot yet tell, for instance, whether a thicker cortex is a cause of a high-reactive temperament, or an effect, or something else entirely. One job of the prefrontal cortex is inhibitory, putting a damper on signals that come from the amygdala. Could it be that the cortex thickens more in the anxiety-prone as it is busy tamping down the overactive amygdala and growing new neural connections? Or does a thicker cortex come first, and contribute to a tendency to be anxious in the first place?

One way Schwartz tried to untangle his uncertainties was by winnowing from his sample the 14 subjects who had ever been given a diagnosis of social-anxiety disorder. What was left, presumably, were 62 young people who all functioned just fine, at least in the sense of never having suffered from social anxiety. Schwartz reviewed their brain images, and the difference between the cortical thickening in the high-reactive group and the low-reactives not only remained; it also became more pronounced. One explanation of this could be that a thicker cortex is protective in the anxiety-prone. He surmises that those 14 subjects who developed problems did so in part because their cortex was thinner, and the high-reactives who had avoided social anxiety had the thickest cortexes of all.

So what do these brain-anxious young people report about their state of mind? Anxiety, remember, can occur at three levels: brain, behavior and subjective experience. Were the ones whose brains looked anxious on the M.R.I. scans actually experiencing the sensation of being anxious?

This is a question the scientists struggle with, hampered as they are by peoples' inability to report their own feelings accurately. Pine told me that his subjects often admit, after the fact, that they had been more afraid during the experiment than they said at the time — leaving him unsure what conclusions to draw.

According to Kagan, the high-reactive temperament is characterized by a tendency to be supersensitive to your own body's signals. Wouldn't you expect, then, that anxiety-prone kids would have some insight into their own brains? Yet even in the high-risk subjects, objective brain state and subjective experience of anxiety still don't always track.

It is also difficult to say whether high-reactive people are aware, more generally, that their brains are more tightly coiled than other people's. "What people say about what they're feeling is significant, but it is hardly the whole story," Schwartz says. "Some of those kids probably do have a subjective awareness of their brain state; others who have equally large amygdala signals — depending on how they have adapted, how they've been brought up and supported — might have little awareness of it." In some cases, he says, people might even have "reframed" certain physical sensations that could be considered

symptoms of anxiety — like feeling jazzed up or having your pulse quicken — as "vaguely exhilarating or exciting."
Studies like Pine's and Schwartz's might actually be revealing not an anxious brain at all but an experimental artifact, says the developmental psychologist Robert Plomin. Plomin, who runs a longitudinal twin study of genes and behavior at King's College, London, agrees that anxiety does have a neurological fingerprint, but he worries about a disconnect between anxiety in the lab and anxiety as a quotidian experience. "Let's say that in your real life you learn to manage your temperamental dispositions so you don't freak out," he said. "Let's say you learn to take a deep breath, learn tricks to make yourself function better in life. But in the lab you're not dealing with social situations you've learned to control. You're just shown — boom! — some horrible picture of a bloody accident." If your response to a brutal image is milliseconds faster than the response of someone who is more sanguine, Plomin asked, what does that really tell you about how your brain would respond in the real world to a worrisome situation?
To make the anxiety-provoking lab challenge more authentic and emotionally charged, Pine and his colleagues at the N.I.M.H., Eric Nelson and Amanda Guyer, concocted an elaborate experimental setup to persuade teenagers in a functional M.R.I. machine that their social status really is on the line: a fake Internet chat room. They created a set of potential chat-room partners for their subjects: smiley, fictitious teenagers, complete with sham MySpace pages. The setup was that the other kids would eventually tell the subjects in the scanner whether they did or did not want to chat with them. The scans were taken, then, while the subjects were lying still, awaiting the verdict. In a handful of pilot experiments, this has proved to be an emotionally significant challenge for teenagers with social anxiety. The anxious youngsters, while waiting to hear from one of the pretend teenagers they wanted to avoid, showed more reactivity in the amygdala and prefrontal cortex. Pine has conducted this same experiment on 40 of Fox's longitudinal-study subjects and is currently analyzing the results.
Still, tracking the anxious mind, even with a more realistic experimental setup, means having the subject lie in an M.R.I. scanner, which is inherently not only artificial but also stressful. So Plomin's point is interesting. Brain scans and other lab findings might reflect something deep and persistent going on in the anxious mind. But if you have learned to control your behavior, to structure your life so you can limit triggers and cope with your emotional skittishness, how much does it really matter?
THE BEHAVIORAL STRAND of the brain-behavior-experience triad is the one that seems most amenable to intervention, and scientists are now investigating how it is that two-thirds of those with a high-reactive temperament manage to avoid trouble. Many environmental factors no doubt come into play — some of them malleable, some less so. In Kagan's first study, for instance, he found that birth order seemed relevant. Behaviorally inhibited children were much more likely to have older siblings: two-thirds of them did, compared with just one-third of the uninhibited children. Could having older siblings, he and his co-authors wondered, mean being teased and pushed, which becomes a source of chronic stress, which in turn amplifies a biological predisposition to inhibition? Kagan never replicated this finding, as intriguing as it was — which shows how difficult it can be to tease out which environmental factors are relevant, and which turn out to be incidental. Fox, meanwhile, noted that the high-reactive babies who went to day care when they were young were significantly less fearful at age 4 than were the high-reactives who stayed home with their mothers.
Attempts to see what kind of parenting works best with an anxiety-prone temperament leave almost as many questions asked as answered. Which is better for a fearful, high-strung child — a parent who coddles the child and says everything will be all right, or a parent who sets firm, strict limits and has no tolerance for skittishness? You could picture it as going either way, really. On the one hand, it might be good to shield children from the things that worry them. On the other hand, it might be better to urge them, maybe even force them, to confront the things they dread.
Scientists from both Kagan's and Fox's labs have looked at this question in a systematic way, and they have come up with two somewhat different findings. Both studies involved a series of home visits and hours of videotapes of mother-baby interactions. But one study, by Kagan's graduate student Doreen Arcus in the early 1990s, found that what seemed to be best for high-reactive babies were mothers who set firm limits and did not rush too quickly to comfort them when they cried. And the other, by Fox's postdoctoral fellow Amie Ashley Hane a decade later, found something slightly different: that the best fit for high-strung babies were sensitive mothers, who met their fearful children on their own terms and interacted with them in a way that was accepting and supportive without being intrusive. Sometimes, of course, there's a fine line between firm and hardhearted, and a fine line between supportive and intrusive.

This makes it especially tough to turn research findings like Arcus's and Hane's into clear guidance on how best to care for a fretful child.

The best outcome, however it happens, is to rear a child who learns to wrestle his demons on his own. Some children figure out themselves what works best. "Inner struggles pulled at me for years until I was able to just let go and calm myself," wrote one of Kagan's high-reactive study subjects in an essay, revealing a wisdom far beyond his 13 years. "For example, when I first heard about the anthrax in Washington, I began to have an upset stomach. I realized it was simply because of my anxiety that I was feeling sick. As soon as I realized that, the stomachache went away. Because I now understand my predisposition toward anxiety, I can talk myself out of simple fears." There are many adults, anxious or not, who can't control their own interior monologues as well as this boy can.

For the children who need help grappling with their fears, some psychologists try to intervene early, with programs that give worried children tools for quieting the scary thoughts in their heads. Kids are often taught the same skills that anxious adults are, a variation on cognitive behavior therapy, designed to stop the endless recursive loop of rumination, replacing it with a smart, rational interior voice. In a way, it's teaching anxious people to do what non-anxious people do naturally.

"I joke a lot about my anxiety," wrote a young woman named Brittany on the group blog We Worry, part of a thriving community of anxiety blogs. "And there are times I do find it funny. I can do this because there is that voice in my head that tells me what I'm worrying about is irrational. But then I worry about worrying about irrational things. It is a never-ending cycle." She might laugh at herself, she wrote, but life can get "overwhelming to me sometimes. Things that don't even register to most people are uphill battles for me."

Even those with normal, run-of-the-mill fretfulness — not a clinical anxiety disorder like Brittany's — struggle to outsmart their brooding. "I have a friend who's a clinical psychologist, and we talk about this a lot — what people do on their own to make themselves less anxious," said Engel of Williams College, who is writing a book about temperament called "Red Flags and Red Herrings." Engel said she is by nature very anxious, as is the eldest of her three sons. "The way we deal with it is that we both get everything done in lots of time. We can't stand the anxiety of a looming deadline; we're so worried about being late that we do it five days early." This is one way to alleviate anxiety, she said. "There are other things we could do. We could drink, we could procrastinate, we could pretend we don't have the deadline. I guess we both happen to be lucky that our method is adaptive."

This kind of adapting might have something to do with intelligence, says Steven Pinker, a psychologist at Harvard and author of "The Blank Slate: The Modern Denial of Human Nature." He says he believes, based on pure conjecture, that people with higher intelligence are better at overcoming their anxious temperament and more likely to "see their own worry list as a problem to be solved, minimizing unnecessary anxiety while still being anxious enough to get things done." At least one study lends support to Pinker's impression. In a 2004 article called "Can Worriers Be Winners?" two British scientists gave personality questionnaires to a group of financial services managers and found that those who reported themselves as scoring high on anxiety traits, like being nervous about performing well on the job, turned out to be better employees, but only if their worrying was accompanied by high cognitive ability.

Fox said that what distinguishes the high-reactives who learn to adapt from those who don't often comes down to something simple, like finding one or two supportive friends — or, like Mary and her ballet, finding something they're good at and can feel self-confident about. But there could be some physiological differences between the adapters and the nonadapters, too. Baby 19, for instance, ran into some problems as she grew up. At a year old, she was one of the most fearful children in Kagan's study, and she had an episode of depression in middle school and a diagnosis of social anxiety disorder as a teenager. While these could have been related to any of a number of environmental factors, including a broken home, they could be related too to something curious that turned up in the brain scan Schwartz did on Baby 19 when she was 18 years old.

When Baby 19 was in the functional M.R.I. scanner and shown a series of unfamiliar faces, Schwartz said, her amygdala was highly reactive — about three times as much as that of a typical low-reactor. This was what Schwartz expected in someone with her temperament and psychiatric history. More surprising, though, was how her prefrontal cortex appeared on the structural M.R.I. scan. Rather than the thickened cortex that so many young adults with her temperament had, Baby 19's was relatively thin.

"This is the brain area implicated in emotional regulation," Schwartz told me. Could it be that in her case, her thin cortex was unable to regulate excessive activity in the amygdala, leading to more problems than someone with a thicker cortex would encounter? "At the level of an individual, it's always a bit

dangerous to draw conclusions," he said. "In fact, it's pretty much impossible. But maybe one thing that affects outcome is whether the genes that contribute to these two areas, the amygdala and the cortex, travel together or separately." Maybe a high-reactive person with a jumpy amygdala can manage to avoid the behavioral and subjective experience of anxiety because of a strong cortex that can quiet the overactive brain. But in Baby 19's case, the jumpy amygdala might instead have been accompanied by a cortex less able to mount an inhibitory response. "Maybe when those things occur together," Schwartz said, "your outcome is that you have a little bit more trouble."

LOOKING AT THE neurology of anxiety raises the inevitable question of why a trait that causes so much mental anguish would have evolved in the first place. For the species as a whole, it is most likely an advantage to have some group members who are hypervigilant and who see everything as a threat, always ready to sound an alarm and leap into action. For the individual, though, being inhibited can mean having fewer mating opportunities, not to mention the psychic burden, wearing yourself ragged with a brain that's always on high alert.

In the modern world, the anxious temperament does offer certain benefits: caution, introspection, the capacity to work alone. These can be adaptive qualities. Kagan has observed that the high-reactives in his sample tend to avoid the traditional hazards of adolescence. Because they are more restrained than their wilder peers, he says, high-reactive kids are less likely to experiment with drugs, to get pregnant or to drive recklessly. They grow up to be the Felix Ungers of the world, he says, clearing a safe, neat path for the Oscar Madisons.

People with a high-reactive temperament — as long as it doesn't show itself as a clinical disorder — are generally conscientious and almost obsessively well-prepared. Worriers are likely to be the most thorough workers and the most attentive friends. Someone who worries about being late will plan to get to places early. Someone anxious about giving a public lecture will work harder to prepare for it. Test-taking anxiety can lead to better studying; fear of traveling can lead to careful mapping of transit routes.

Kagan told me that in the 40 years he worked at Harvard, he hired at least 200 research assistants, "and I always looked for high-reactives. They're compulsive, they don't make errors, they're careful when they're coding data." He said he would bet that when the United States sends people up in space, the steely, brave astronauts were low-reactive as infants, and the mission-control people down on the ground, doing the detail work that keeps the craft aloft, were high-reactive.

An anxious temperament might serve a more exalted function too. "Our culture has this illusion that anxiety is toxic," Kagan said. But without inner-directed people who prefer solitude, where would we get the writers and artists and scientists and computer programmers who make society hum? Kagan likes to point out that T. S. Eliot suffered from anxiety, and that biographies indicate that he was a typical high-reactive baby. "That line 'I will show you fear in a handful of dust' — he couldn't have written that without feeling the tension and dysphoria he did," Kagan said.

These are overgeneralizations, of course. And they're easy to shoot down with exceptions. But all the exceptions mean, really, is that the link between neurology and behavior is complicated. There may well be hundreds of different temperaments, and these studies have investigated only two — the most stable and most amenable to measurement, but still just two. If it were as simple as saying that a high-reactive infant will become a behaviorally inhibited child who will become an anxious adult, all the scientific work on temperament would amount to little more than charting horoscopes.

The predictive power of an anxiety-prone temperament, such as it is, essentially works in just one direction: not by predicting what these children will become but by predicting what they will not. In the longitudinal studies of anxiety, all you can say with confidence is that the high-reactive infants will not grow up to be exuberant, outgoing, bubbly or bold. Still, while a Sylvia Plath almost certainly won't grow up to be a Bill Clinton, she can either grow up to be anxious and suicidal, or simply a poet. Temperament is important, but life intervenes.

As for Baby 19, she has not yet gone against type, and odds are she never will. She is in college and doing pretty well, Kagan told me. But her temperament still comes through in her personality. Kagan said Baby 19 tends to be "dour" and "melancholy." And she is still, and probably always will be, a worrier.

Robin Marantz Henig is a contributing writer. Her last article for the magazine was about the federal effort to diagnose mysterious diseases.

http://www.nytimes.com/2009/10/04/magazine/04anxiety-t.html

Technique can pinpoint tinnitus

It is possible to pinpoint the area of the brain that is activated when a person suffers from tinnitus, according to US doctors.

Tinnitus is a condition where sounds are heard in one or both ears when there is no external source.

While doctors had thought tinnitus was generated by ear problems, they now believe it is generated in the brain.

The team at Henry Ford Hospital in Detroit used a special scanner to map the locations in the brain.

They hope it will allow more targeted therapies to be developed.

The scan is called magnetoencephalography (MEG) and it measures the very small magnetic fields generated by intracellular electrical currents in the neuron cells in the brain.

The team at the Henry Ford Hospital have already tried using chips which generate electrical noise directly in the brain in two patients to try to interfere with the tinnitus signals.

They are presenting their findings to the annual meeting of the American Academy of Otolaryngology.

Scanning results

The doctors collected MEG results from 17 patients with tinnitus and 10 patients without.

They played patients various sounds until they agreed that that was the sound they experienced and then scanned their brains while the sound was played.

TINNITUS FACTS

2.3 million sufferers in the UK with moderate or severe tinnitus
Characterised by a singing, ringing, buzzing or whistling noise in the ear
Some sufferers notice the sounds when it is very quiet, some find they are much louder
Tinnitus noise can beat in time with your pulse

Most people experience brief periods of tinnitus after long exposure to loud noise

For the patients with tinnitus in one ear, MEG imaging detected the greatest amount of activity in the auditory cortex on the opposite side of the brain.

For patients with ringing in both ears, MEG revealed activity in both hemispheres of the brain, with greater activity appearing in the opposite side of the brain to the ear with the strongest perception of tinnitus.

Dr Michael Seidman, director of neurologic surgery at the Henry Ford Hospital, who led the work, said 2-4% of sufferers had really persistent tinnitus that they found impossible to ignore.

He said: "Using MEG, we can actually see the areas in the brain that are generating the patient's tinnitus which allows us to target and treat it.

"Another part of the brain that lights up is the limbic system which is supposed to govern how we react to things.

"This may explain why some patients can fairly successfully ignore their tinnitus while others find themselves fixated on it."

Dr Seidman said imaging systems currently used to study tinnitus provide a general location compared to the sophistication of MEG.

He said: "It's like having the lights on in only the city of Detroit, compared to having the lights on in the entire state of Michigan."

Dr Mark Downs, executive director at the Royal National Institute for Deaf People said, more than half a million people in the UK had their health seriously affected by tinnitus.

He said: "This work could potentially solve a further piece of the tinnitus puzzle.

"It is a unique way to monitor how the brain is affected by tinnitus in real time, helping researchers to see how effective new treatments are."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8287791.stm

Published: 2009/10/03 23:02:43 GMT

Young adults' anxiety 'overload'

Young adults are suffering from "anxiety overload", a UK charity warns.

A survey of 18-24 year olds found 66% feel stressed or anxious at least once a week, with money and job worries being the main cause.

Almost a third of respondents said they did not tell anyone of their worries, raising the need to teach young people "coping strategies", said Rethink.

Women seemed most badly affected, with one in three suffering frequent anxiety, compared with one in 10 men.

The YouGov poll of 2,000 adults, 250 of whom were aged 18-24, found 33% of young women felt stressed or anxious most days or every day.

" **It is worrying that young people are unable to speak openly about their anxieties** "
Lucie Russell, Young Minds

Money worries were given as the main reason by 45% of respondents, followed by 33% having concerns about job prospects and 29% worried about pressures from school or university.

Some said they would seek advice or support from a partner or friend, but almost one third (31%) say they kept stress and anxiety to themselves.

Pressures

James Gorman, Rethink National Young Persons' Programme Manager said the pressures on young people were "huge".

"With the number of young people not in education or employment rising, it's no wonder many are feeling the strain.

"It is extremely important that we teach young people strategies for coping with stress and protecting their mental health.

"Failure to get the right help at the right time can have lasting consequences.

"The longer people suffer in silence, the harder it is to help them recover."

Lucie Russell, Young Minds campaigns director, said the survey suggested young people felt really stressed much of the time.

"It is worrying that young people are unable to speak openly about their anxieties.

"Young people should be taught coping strategies early on at school and at home, so they can deal with difficult feelings and situations.

"But there must also be readily available support both at school and in the community, so that young people don't have to suffer alone."

Paul Farmer, chief executive at Mind said young people were bearing the brunt of the recession.

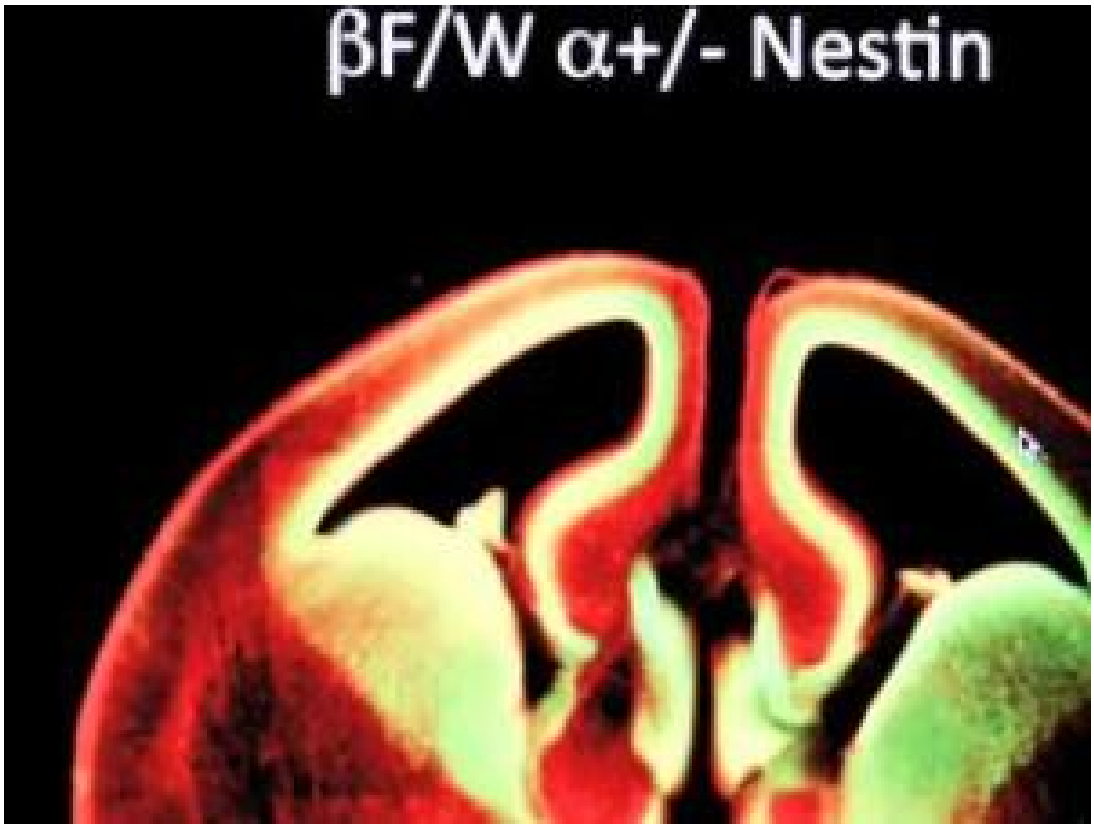
"Employment is scarce and without a job, anxiety, low self-esteem and unhappiness can set in.

"Unfortunately, stigma around mental health is particularly bad amongst adolescents, which means they tend to bottle things up rather than seek support."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8286939.stm

Published: 2009/10/04 23:02:57 GMT

Gene Controlling Number Of Brain Cells Pinpointed



A new study suggests that a single gene, called GSK-3, controls the signals that determine how many neurons actually end up composing the brain. (Credit: Image courtesy of University of North Carolina School of Medicine)

ScienceDaily (Oct. 5, 2009) — In populating the growing brain, neural stem cells must strike a delicate balance between two key processes – proliferation, in which the cells multiply to provide plenty of starting materials – and differentiation, in which those materials evolve into functioning neurons.

If the stem cells proliferate too much, they could grow out of control and produce a tumor. If they proliferate too little, there may not be enough cells to become the billions of neurons of the brain. Researchers at the University of North Carolina at Chapel Hill School of Medicine have now found that this critical balance rests in large part on a single gene, called GSK-3.

The finding suggests that GSK-3 controls the signals that determine how many neurons actually end up composing the brain. It also has important implications for patients with neuropsychiatric illness, as links have recently been drawn between GSK-3 and schizophrenia, depression and bipolar disorder.

One of the genes associated with schizophrenia appears to use GSK-3 as an intermediary to exert its effects on nerve cells. In addition, lithium, a popular treatment for bipolar disorder, acts, in part, by shutting down GSK-3. “I don’t believe anyone would have imagined that deleting GSK-3 would have such dramatic effects on neural stem cells,” said senior study author William D. Snider, M.D., professor of neurology and cell and molecular physiology, and director of the UNC Neuroscience Center. “People will have to think carefully about whether giving a drug like lithium to children could have negative effects on the underlying structure of the nervous system.”

In a study appearing online October 4th in the journal *Nature Neuroscience,* Snider and his colleagues created a mouse model in which both forms of the GSK-3 gene – designated alpha and beta – had been deleted. They decided to go after GSK-3 – which stands for glycogen synthase kinase 3 – because it is one of the most studied kinases or signaling molecules in all of biology.

The researchers used a "conditional knock-out" strategy to remove GSK-3 at a specific time in the development of the mouse embryo, when a type of cell called a radial progenitor cell had just been formed.

As the brain develops, neural stem cells evolve through three different stages -- neural epithelial cells, radial progenitor cells and intermediate neural precursors. The radial progenitor cells are especially important because they are thought to provide the majority of the neurons of the developing brain but also differentiate themselves to give rise to all the cellular elements of the brain. The researchers discovered that deleting GSK-3 during this second phase of development caused the radial progenitor cells to be locked in a constant state of proliferation.

"It was really quite striking," said Snider. "Without GSK-3, these neural stem cells just keep dividing and dividing and dividing. The entire developing brain fills up with these neural stem cells that never turn into mature neurons."

GSK-3 is known to coordinate signals for proliferation and differentiation within nerve cells through multiple "signaling pathways." Thus, the researchers looked to see what effect deleting the molecule had on some of these pathways. They found that every one of the pathways that they studied went awry.

Snider and his colleagues now want to see if adding GSK-3 back to their genetically engineered mice can convert the proliferating stem cells into neurons, possibly resulting in three to four times as many neurons in the mutants as normal.

"I find that quite interesting because I can't think of any other manipulation that potentially would enable you to simply dial up and down the number of neurons that are generated in the brain," said Snider.

Funding for the studies led at UNC came from the National Institutes of Health. Study co-authors from Snider's laboratory at UNC include lead author Woo-Yang Kim, Ph.D., postdoctoral research associate; Xinshuo Wang, graduate student and Yaohong Wu, chief technician. Researchers from the laboratory of James R. Woodgett, Ph.D. at the University of Toronto also collaborated on the project.

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

http://www.sciencedaily.com/releases/2009/10/091004141221.htm

There's Still Time To Cut The Risk Of Climate Catastrophe, Study Shows

To illustrate the findings of their model, MIT researchers created a pair of 'roulette wheels.' This wheel depicts their estimate of the range of probability of potential global temperature change over the next 100 years if no policy change is enacted on curbing greenhouse gas emissions. (Credit: MIT Joint Program on the Science and Policy of Global Change)

ScienceDaily (Oct. 5, 2009) — A new analysis of climate risk, published by researchers at MIT and elsewhere, shows that even moderate carbon-reduction policies now can substantially lower the risk of future climate change. It also shows that quick, global emissions reductions would be required in order to provide a good chance of avoiding a temperature increase of more than 2 degrees Celsius above the pre-industrial level — a widely discussed target. But without prompt action, they found, extreme changes could soon become much more difficult, if not impossible, to control.

Ron Prinn, co-director of MIT's Joint Program on the Science and Policy of Global Change and a co-author of the new study, says that "our results show we still have around a 50-50 chance of stabilizing the climate" at a level of no more than a few tenths above the 2 degree target. However, that will require global emissions, which are now growing, to start downward almost immediately. That result could be achieved if the aggressive emissions targets in current U.S. climate bills were met, and matched by other wealthy countries, and if China and other large developing countries followed suit with only a decade or two delay. That 2 degree C increase is a level that is considered likely to prevent some of the most catastrophic potential effects of climate change, such as major increases in global sea level and disruption of agriculture and natural ecosystems.

"The nature of the problem is one of minimizing risk," explains Mort Webster, assistant professor of engineering systems, who was the lead author of the new report. That's why looking at the probabilities of various outcomes, rather than focusing on the average outcome in a given climate model, "is both more scientifically correct, and a more useful way to think about it."

Too often, he says, the public discussion over climate change policies gets framed as a debate between the most extreme views on each side, as "the world is ending tomorrow, versus it's all a myth," he says. "Neither of those is scientifically correct or socially useful."

"It's a tradeoff between risks," he says. "There's the risk of extreme climate change but there's also a risk of higher costs. As scientists, we don't choose what's the right level of risk for society, but we show what the risks are either way."

The new study, published online by the Joint Program in September, builds on one released earlier this year that looked at the probabilities of various climate outcomes in the event that no emissions-control policies at all were implemented — and found high odds of extreme temperature increases that could devastate human societies. This one examined the difference that would be made to those odds, under four different versions of possible emissions-reduction policies.

Both studies used the MIT Integrated Global Systems Model, a detailed computer simulation of global economic activity and climate processes that has been developed and refined by the Joint Program on the Science and Policy of Global Change since the early 1990s. The new research involved hundreds of runs of the model with each run using slight variations in input parameters, selected so that each run has about an equal probability of being correct based on present observations and knowledge. Other research groups have estimated the probabilities of various outcomes, based on variations in the physical response of the climate system itself. But the MIT model is the only one that interactively includes detailed treatment of possible changes in human activities as well — such as the degree of economic growth, with its associated energy use, in different countries.

Quantifying the odds

By taking a probabilistic approach, using many different runs of the climate model, this approach gives a more realistic assessment of the range of possible outcomes, Webster says. "One of the common mistakes in the [scientific] literature," he says, "is to take several different climate models, each of which gives a 'best guess' of temperature outcomes, and take that as the uncertainty range. But that's not right. The range of uncertainty is actually much wider."

Because this study produced a direct estimate of probabilities by running 400 different probability-weighted simulations for each policy case, looking at the actual range of uncertainty for each of the many factors that go into the model, and how they interact. By doing so, it produced more realistic estimates of the likelihood of various outcomes than other procedures — and the resulting odds are often significantly worse. For example, an earlier study by Tom Wigley of the National Center for Atmospheric Research estimated that the Level 1 emissions control policy — the least-restrictive of the standards studied -would reduce by 50 percent the odds of a temperature increase of more than 2 degrees C, but the more detailed analysis in the new study finds only a 20 percent chance of avoiding such an increase.

One interesting finding the team made is that even relatively modest emissions-control policies can have a big impact on the odds of the most damaging climate outcomes. For any given climate model scenario, there is always a probability distribution of possible outcomes, and it turns out that in all the scenarios, the policy options have a much greater impact in reducing the most extreme outcomes than they do on the most likely outcomes.For example, under the strongest of the four policy options, the average projected outcome was a 1.7 degrees C reduction of the expected temperature increase in 2100, but for the most extreme projected increase (with 5 percent probability of occurring) there was a 3.2 degree C reduction. And that's especially significant, the authors say, because the most damaging effects of climate change increase drastically with higher temperature, in a very non-linear way.

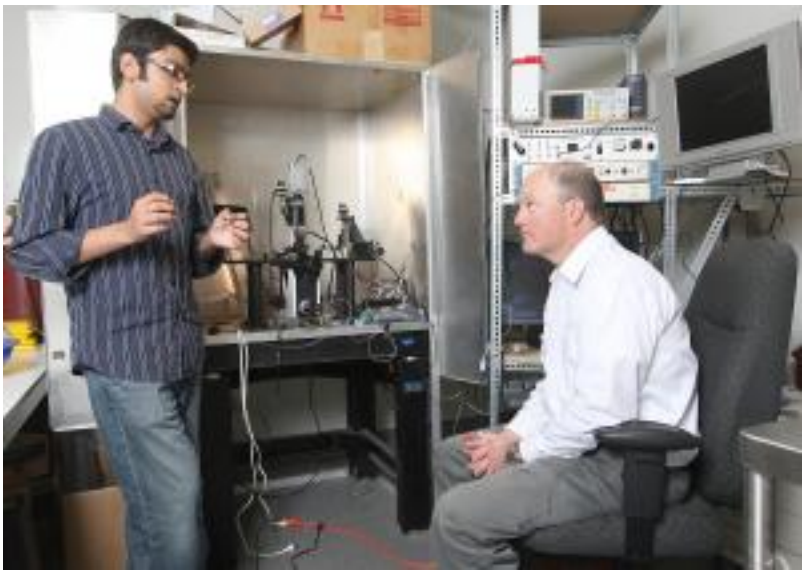
"These results illustrate that even relatively loose constraints on emissions reduce greatly the chance of an extreme temperature increase, which is associated with the greatest damage," the report concludes.

Webster emphasizes that "this is a problem of risk management," and says that while the technical aspects of the models are complex, the results provide information that's not much different from decisions that people face every day. People understand that by using their seat belts and having a car with airbags they are reducing the risks of driving, but that doesn't mean they can't still be injured or killed. "No, but the risk goes down. That's the return on your decision. It's not something that's so unfamiliar to people. We may make sure to buy a car with airbags, but we don't refuse to leave the house. That's the nature of the kind of tradeoffs we have to make as a society."

Adapted from materials provided by Massachusetts Institute of Technology. Original article written by David L. Chandler, MIT News Office.

http://www.sciencedaily.com/releases/2009/10/091002120414.htm

New Multi-use Device Can Shed Light On Oxygen Intake



Mohammad Rameez Chatni, at left, and Marshall Porterfield developed the self-referencing optrode that can measure oxygen intake in real time. (Credit: Purdue Agricultural Communications photo/Tom Campbell)

ScienceDaily (Oct. 5, 2009) — A fiber-optic sensor created by a team of Purdue University researchers that is capable of measuring oxygen intake rates could have broad applications ranging from plant root development to assessing the effectiveness of chemotherapy drugs.

The self-referencing optrode, developed in the lab of Marshall Porterfield, an associate professor of agricultural and biological engineering, is non-invasive, can deliver real-time data, holds a calibration for the sensor's lifetime and doesn't consume oxygen like traditional sensors that can compete with the sample being measured. A paper on the device was released on the early online version of the journal *The Analyst* this week.

"It's very sensitive in terms of the biological specimens we can monitor," Porterfield said. "We don't only measure oxygen concentration, we measure the flux. That's what's important for biologists."

Mohammad Rameez Chatni, a doctoral student in Porterfield's lab, said the sensor could be used broadly across disciplines. Testing included tumor cells, fish eggs, spinal cord material and plant roots.

Cancerous cells typically intake oxygen at higher rates than healthy cells, Chatni said. Measuring how a chemotherapy drug affects oxygen intake in both kinds of cells would tell a researcher whether the treatment was effective in killing tumors while leaving healthy cells unaffected.

Plant biologists might be interested in the sensor to measure oxygen intake of a genetically engineered plant's roots to determine its ability to survive in different types of soil.

"This tool could have applications in biomedical science, agriculture, material science. It's going across all disciplines," Chatni said.

The sensor is created by heating an optical fiber and pulling it apart to create two pointed optrodes about 15 microns in diameter, about one-tenth the size of a human hair. A membrane containing a fluorescent dye is placed on the tip of an optrode.

Oxygen binds to the fluorescent dye. When a blue light is passed through the optrode, the dye emits red light back. The complex analysis of that red light reveals the concentration of oxygen present at the tip of the optrode.

The optrode is oscillated between two points, one just above the surface of the sample and another a short distance away. Based on the difference in the oxygen concentrations, called flux, the amount of oxygen being taken in by the sample is calculated.

It's the intake, or oxygen transportation, that Porterfield said is important to understand.

"Just knowing the oxygen concentration in or around a sample will not necessarily correlate to the underlying biological processes going on," he said.

Porterfield said future work will focus on altering the device to measure things such as sodium and potassium intake as well. The National Science Foundation funded the research.

Adapted from materials provided by Purdue University. Original article written by Brian Wallheimer.

http://www.sciencedaily.com/releases/2009/09/090922095812.htm

'Trash Can' Nuclear Reactors Could Power Human Outpost On Moon Or Mars

The Stirling engine test configuration upon removal from the vacuum chamber. (Credit: NASA/MSFC/E. Given)

ScienceDaily (Oct. 4, 2009) — NASA has made a series of critical strides toward the development of new nuclear reactors the size of a trash can that could power a human outpost on the moon or Mars.

Three recent tests at different NASA centers and a national lab have successfully demonstrated key technologies required for compact fission-based nuclear power plants for human settlements on other worlds.

NASA's Marshall Space Flight Center in Huntsville, Ala., offers a one-of-a-kind test facility which, without using nuclear materials, enables engineers to simulate the nuclear power process of heat transfer from a reactor to a power converter.

"The recent tests bear out that Fission surface power system could be an important source of energy for exploration on the moon and Mars," said Mike Houts, project manager for nuclear systems at Marshall. "This power system could provide an abundant source of reliable, cost-effective energy and may be used anywhere on the lunar surface."

For this particular test series, the Marshall reactor simulator was linked to a Stirling engine, developed by NASA’s Glenn Research Center in Cleveland. The Stirling engine, named for 19th-century industrialist and inventor Robert Stirling, converts heat into electricity.

The Marshall reactor simulator included a specialized pump, provided by the U.S. Department of Energy, and a coolant loop filled with a mixture of sodium and potassium. The coolant loop provided heat to the Stirling engine at conditions very similar to an actual fission-based surface power system. The joint testing helped resolve potential integration issues and provided information and experience needed to reduce technology risks associated with this system concept.

The testing of the Stirling engine with the Marshall reactor simulator may well be a key factor in demonstrating the readiness of fission surface power technology, and could provide NASA with an efficient and robust system to produce power in the harsh environment on the moon and Mars.

NASA's current plan for human space exploration is to return astronauts to the moon by 2020 on expeditions that could lead to a permanent outpost for exploring the lunar surface and testing technologies that could aid a manned mission to Mars.

The space agency has been studying the feasibility of using nuclear fission power generators to support future moon bases. Engineers performed tests in recent weeks as part of a joint effort by NASA and the Department of Energy.

Nuclear fission power plants work by splitting the nuclei of atoms in a sustainable, controllable reaction that releases heat, which can then be funneled through a power converter to transfer that energy into usable electricity.

"A small fission-based nuclear reactor coupled with a Stirling engine could provide up to 40 kilowatts of usable energy, enough to support a moon base or Mars outpost," said Houts. That's about the same amount of power needed to supply eight houses on Earth, NASA officials have said. The test series was conducted as part of the fission-based surface power project, within NASA's Exploration Technology Development Program, which is tasked with developing advanced technologies that will enable NASA to conduct future human exploration missions, while reducing mission risk and cost.

The next step for NASA's fission power project is to combine its radiator, engine and alternator successes into a single non-nuclear power plant demonstration. That test is slated to begin in 2012, NASA officials said.

Adapted from materials provided by NASA/Marshall Space Flight Center.

http://www.sciencedaily.com/releases/2009/10/091004020806.htm

Potential Key To Curing Tuberculosis

Reuben Peters is leading the team of scientists from Iowa State; the University of Illinois; and Cornell University, that is attempting to find ways to minimize tuberculosis. (Credit: Image courtesy of Iowa State University)

ScienceDaily (Oct. 4, 2009) — Researchers at Iowa State University have identified an enzyme that helps make tuberculosis resistant to a human's natural defense system. Researchers have also found a method to possibly neutralize that enzyme, which may someday lead to a cure for tuberculosis.

Tuberculosis is caused by *Mycobacterium tuberculosis* and is a contagious disease that is on the rise, killing 1.5 to 2 million people worldwide annually.

Reuben Peters, associate professor in the department of biochemistry, biophysics and molecular biology, is leading the team of scientists from Iowa State; the University of Illinois, Urbana-Champaign; and Cornell University, Ithaca, New York, that is attempting to find ways to minimize the disease. The group had their research published in the Aug. 28 issue of the *Journal of Biological Chemistry*, and their research is also scheduled to be the cover article in an upcoming issue of the *Journal of the American Chemical Society*. When most infections are introduced into humans, the body defends itself with certain cells -- called macrophage cells -- that kill the invading micro-organisms. The macrophage cells engulf and destroy these microbes, such as the *Mycobacterium tuberculosis.*

Peters found that the *Mycobacterium tuberculosis* produces a defensive molecule that prevents the macrophage cells from destroying them. Peters and his team named the defensive molecule edaxadiene.

Peters' next step was to try to find molecules that bind with the edaxadiene-producing enzymes from tuberculosis and neutralize them. This makes the tuberculosis cells unable to produce edaxadiene. Without edaxadiene, tuberculosis cells would have a reduced ability to resist being killed by the macrophage cells.

Peters thinks he may have already found one.

"We have inhibitors that bind tightly to one of the enzymes that make edaxadiene in a test tube," said Peters.

Finding an inhibitor that works outside of the test tube, and in humans, and is stable, and can be ingested safely by humans, and can help kill tuberculosis is a process that may take a decade.

But Peters sees a huge reward at the end of the process.

"This is the project where I tell my students, 'If we can make even just a 1 percent impact, we can save 15,000 - 20,000 lives a year.' That is really a significant contribution towards alleviating human suffering," said Peters.

Peters' group found the molecule by comparing the genetic makeup of tuberculosis -- which kills humans -- to the type that kills cattle but doesn't seem to have any effect on humans -- *Mycobacterium bovis*.

"Their genetic sequences are more than 99.9 percent identical," said Peters. "However, whereas, tuberculosis causes disease in humans, the bovis variety is much less infectious in humans, although it does cause disease in cattle."

One of the small differences in the genetic information between the two mycobacteria may hold the key to why one infects humans while the other does not.

"The bovis mycobacterium is missing only one nucleotide in the gene for one of the edaxadiene-producing enzymes, but that turns out to be very important as it prevents that enzyme from functioning," he said.

"The critical piece for this idea is that *Mycobacterium bovis* doesn't make edaxadiene, and doesn't affect humans much, whereas *Mycobacterium tuberculosis* does make edaxadiene and is infectious in humans," Peters said.

"We think this is the big difference between the two mycobacterium, mainly because this is the only difference I know of that seems to affect their infection process," he added.

"This work presents tantalizing evidence that edaxadiene helps the tuberculosis bacterium evade the body's defenses," said Warren Jones, who oversees enzymology grants at the National Institutes of Health's National Institute of General Medical Sciences, which funded the research. "By exploring ways to block the production of this molecule, Dr. Peters is pioneering a new approach for combating this deadly pathogen."

One of the hurdles that will confront Peters in finding human cures is that the effect of edaxadiene may be specific to humans, so the normal testing process may be difficult.

The normal testing sequence involves testing in the laboratory, then on smaller animals, then larger animals, and then to humans.

Since edaxadiene may be important for the ability of tuberculosis to infect humans, rather than animals, preventing production of edaxadiene by tuberculosis may not have much effect in animals, which will be challenging for the process of bringing a cure to drugstore shelves, according to Peters.

Peters added that he is eager to take on the next challenge in the fight against tuberculosis.

Peters' research team includes Francis Mann, doctoral student; Meimei Xu, associate scientist, both in ISU's department of biochemistry, biophysics and molecular biology; Sladjana Prisic, formerly a doctoral student in ISU's department of biochemistry, biophysics and molecular biology; Huayou Hu and Robert Coates, both from the University of Illinois; and David Russell from Cornell.

Adapted from materials provided by Iowa State University.

http://www.sciencedaily.com/releases/2009/10/091001164237.htm

New Electronic Concept: How Hybrid Motors Could Become Cheaper

The new, compact converter system integrates a DC/DC converter and an inverter, and integrates the drive motor magnetically and electrically in both functions. (Credit: Image courtesy of ETH Zurich)

ScienceDaily (Oct. 4, 2009) — Not all that long ago, hybrid vehicles were still really exotic. Now, you see them more and more frequently on our roads. However, hybrid cars are not mass-produced as their production costs are still relatively high. A researcher from ETH Zurich has now developed a new concept as part of her doctoral thesis that integrates power electronic functions and an electric motor, which could reduce the costs of producing hybrid cars.

Ever since Hollywood stars like Leonardo DiCaprio and Cameron Diaz began to drive up to the red carpet in their hybrid cars, hybrids have become increasingly interesting to the conventional car market. As the public climate debate continues, hybrid cars with a combination of a combustion engine and an electric motor have increasingly become the focus of research projects.

Hanna Plesko, a doctoral student at Power Electronic Systems Laboratory, may well come to ETH Zurich on public transport every morning, but she devotes the rest of her day to drive systems for cars – or more precisely, power electronic converters for hybrid cars, as they are the subject of her doctorate, which she is due to finish in December. “And I don’t even own a car!” she laughs.

Hybrid drives still costly

The production of hybrid drives is still very expensive. “It’s rumored that hybrid vehicles can improve your image, but in some cases the automobile companies have difficulties to cover their costs”, says Plesko. This begs the question as to how hybrid vehicles can be constructed more cost-effectively. A substantial proportion of the costs is swallowed up by the electric motor and the power electronic energy management system, in which inverters and DC/DC converters play a crucial role. However, Plesko’s approach is based on a new concept where these components, i.e. the power electronics and the electric motor perform several functions simultaneously. The multiple use of the electronic parts and the motor also saves volume.

Combination with motor has its advantages

In conventional hybrid vehicles, batteries not only power the electric motor, but also the radio, ventilation and the lights. Unlike the electrical drive system, for which a high DC voltage of 200 – 600 V has to be converted into a three-phase AC voltage, a low DC voltage of 12 V is sufficient to power a car radio. Inverters, which convert the direct current into an alternating current, and DC/DC converters, which transfer the power between the two batteries for the two voltage levels, are therefore important power electronic components in hybrid or electric vehicles. For current hybrid vehicles, these converters are located outside the electric motor. In the research group "Future Automotive Power Electronics" headed by senior scientist Jürgen Biela, Plesko has developed a system for her doctoral thesis that integrates the inverter, the DC/DC converter and the electric motor functionally. By condensing the functions of the drive and the DC/DC converter in combination, certain electronic components and the motor lamination stack can be shared. Large quantities of such functionally integrated systems will be cheaper as fewer raw materials are needed. Moreover, Plesko's design is less complex, making it easier to produce.

For her prototype, Plesko used a motor with an output power of 3 kW. 50 kW would have been more realistic, but the test set-up was not designed for such high power levels. However, she is convinced that her design will also work for real engine power. Two patents have been applied for.

Adapted from materials provided by ETH Zurich.

http://www.sciencedaily.com/releases/2009/09/090927164027.htm

New Mathematical Model Suggests How The Brain Might Stay In Balance

ScienceDaily (Oct. 4, 2009) — The human brain is made up of 100 billion neurons — live wires that must be kept in delicate balance to stabilize the world's most magnificent computing organ. Too much excitement and the network will slip into an apoplectic, uncomprehending chaos. Too much inhibition and it will flatline. A new mathematical model describes how the trillions of interconnections among neurons could maintain a stable but dynamic relationship that leaves the brain sensitive enough to respond to stimulation without veering into a blind seizure.

Marcelo O. Magnasco, head of the Laboratory of Mathematical Physics at The Rockefeller University, and his colleagues developed the model to address how such a massively complex and responsive network such as the brain can balance the opposing forces of excitation and inhibition. His model's key assumption: Neurons function together in localized groups to preserve stability. "The defining characteristic of our system is that the unit of behavior is not the individual neuron or a local neural circuit but rather groups of neurons that can oscillate in synchrony," Magnasco says. "The result is that the system is much more tolerant to faults: Individual neurons may or may not fire, individual connections may or may not transmit information to the next neuron, but the system keeps going."

Magnasco's model differs from traditional models of neural networks, which assume that each time a neuron fires and stimulates an adjoining neuron, the strength of the connection between the two increases. This is called the Hebbian theory of synaptic plasticity and is the classical model for learning. "But our system is anti-Hebbian," Magnasco says. "If the connections among any groups of neurons are strongly oscillating together, they are weakened because they threaten homeostasis. Instead of trying to learn, our neurons are trying to forget." One advantage of this anti-Hebbian model is that it balances a network with a much larger number of degrees of freedom than classical models can accommodate, a flexibility that is likely required by a computer as complex as the brain.

In work published this summer in *Physical Review Letters*, Magnasco theorizes that the connections that balance excitation and inhibition are continually flirting with instability. He likens the behavior to an indefinitely large number of public address systems tweaked to that critical point at which a flick of the microphone brings on a screech of feedback that then fades to quiet with time.

This model of a balanced neural network is abstract — it does not try to recreate any specific neural function such as learning. But it requires only half of the network connections to establish the homeostatic balance of exhibition and inhibition crucial to all other brain activity. The other half of the network could be used for other functions that may be compatible with more traditional models of neural networks, including Hebbian learning, Magnasco says.

Developing a systematic theory of how neurons communicate could provide a key to some of the basic questions that researchers are exploring through experiments, Magnasco hopes. "We're trying to reverse-engineer the brain and clearly there are some concepts we're missing," he says. "This model could be one part of a better understanding. It has a large number of interesting properties that make it a suitable substrate for a large-scale computing device."

Journal reference:

1. Magnasco et al. **Self-Tuned Critical Anti-Hebbian Networks**. *Physical Review Letters*, 2009; 102 (25): 258102 DOI: 10.1103/PhysRevLett.102.258102

Adapted from materials provided by Rockefeller University.

http://www.sciencedaily.com/releases/2009/09/090927152049.htm

Loss Of Top Predators Causing Surge In Smaller Predators, Ecosystem Collapse

The loss of primary, or "apex" predators is causing an explosion in secondary, or "mesopredators" around the world, a new study concludes. In this image, the extermination of wolves may allow coyote populations to surge, which in turn can suppress feral cat populations, leading to more rodents, etc. These cascading effects are poorly understood but are causing ecosystem disruptions around the world, scientists say.

ScienceDaily (Oct. 4, 2009) — The catastrophic decline around the world of "apex" predators such as wolves, cougars, lions or sharks has led to a huge increase in smaller "mesopredators" that are causing major economic and ecological disruptions, a new study concludes.

The findings, published October 1 in the journal *Bioscience*, found that in North America all of the largest terrestrial predators have been in decline during the past 200 years while the ranges of 60 percent of mesopredators have expanded. The problem is global, growing and severe, scientists say, with few solutions in sight.

An example: in parts of Sub-Saharan Africa, lion and leopard populations have been decimated, allowing a surge in the "mesopredator" population next down the line, baboons. In some cases children are now being kept home from school to guard family gardens from brazen packs of crop-raiding baboons.

"This issue is very complex, and a lot of the consequences are not known," said William Ripple, a professor of forest ecosystems and society at Oregon State University. "But there's evidence that the explosion of mesopredator populations is very severe and has both ecological and economic repercussions."

In case after case around the world, the researchers said, primary predators such as wolves, lions or sharks have been dramatically reduced if not eliminated, usually on purpose and sometimes by forces such as habitat disruption, hunting or fishing. Many times this has been viewed positively by humans, fearful of personal attack, loss of livestock or other concerns. But the new picture that's emerging is a range of problems, including ecosystem and economic disruption that may dwarf any problems presented by the original primary predators.

"I've done a lot of work on wildlife in Africa, and people everywhere are asking some of the same questions, what do we do?" said Clinton Epps, an assistant professor at OSU who is studying the interactions between humans and wildlife. "Most important to understand is that these issues are complex,

the issue is not as simple as getting rid of wolves or lions and thinking you've solved some problem. We have to be more careful about taking what appears to be the easy solution."

The elimination of wolves is often favored by ranchers, for instance, who fear attacks on their livestock. However, that has led to a huge surge in the number of coyotes, a "mesopredator" once kept in check by the wolves. The coyotes attack pronghorn antelope and domestic sheep, and attempts to control them have been hugely expensive, costing hundreds of millions of dollars.

"The economic impacts of mesopredators should be expected to exceed those of apex predators in any scenario in which mesopredators contribute to the same or to new conflict with humans," the researchers wrote in their report. "Mesopredators occur at higher densities than apex predators and exhibit greater resiliency to control efforts."

The problems are not confined to terrestrial ecosystems. Sharks, for instance, are in serious decline due to overfishing. In some places that has led to an explosion in the populations of rays, which in turn caused the collapse of a bay scallop fishery and both ecological an economic losses.

Among the findings of the study:

- Primary or apex predators can actually benefit prey populations by suppressing smaller predators, and failure to consider this mechanism has triggered collapses of entire ecosystems.
- Cascading negative effects of surging mesopredator populations have been documented for birds, sea turtles, lizards, rodents, marsupials, rabbits, fish, scallops, insects and ungulates.
- The economic cost of controlling mesopredators may be very high, and sometimes could be accomplished more effectively at less cost by returning apex predators to the ecosystem.
- Human intervention cannot easily replace the role of apex predators, in part because the constant fear of predation alters not only populations but behavior of mesopredators.
- Large predators are usually carnivores, but mesopredators are often omnivores and can cause significant plant and crop damage.
- The effects of exploding mesopredator populations can be found in oceans, rivers, forests and grasslands around the world.
- Reversing and preventing mesopredator release is becoming increasingly difficult and expensive as the world's top predators continue to edge toward obliteration.

"These problems resist simple solutions," Ripple said. "I've read that when Gen. George Armstrong Custer came into the Black Hills in 1874, he noticed a scarcity of coyotes and the abundance of wolves. Now the wolves are gone in many places and coyotes are killing thousands of sheep all over the West."

"We are just barely beginning to appreciate the impact of losing our top predators," he said.

At OSU, Ripple and colleague Robert Beschta have done extensive research and multiple publications on the effect that loss of predators such as wolves and cougars have on ecosystem disruption, not only by allowing increased numbers of grazing animals such as deer and elk, but also losing the fear of predation that changes the behavior of these animals. They have documented ecosystem recovery in Yellowstone National Park after wolves were reintroduced there.

Collaborators on this study included researchers from OSU, the University of California at Berkeley and New Mexico State University at Las Cruces. It was supported by the U.S. Department of Agriculture and the National Science Foundation.

Adapted from materials provided by Oregon State University.

http://www.sciencedaily.com/releases/2009/10/091001164102.htm

Inventors Offer Ecofriendly Substitutes For Polystyrene

ARS food technologist Artur Klamczynski (left) and ARS plant physiologist Greg Glenn have developed a way to use corn, potato, or wheat starches as an eco-friendly alternative to petroleum for making rigid foam inserts for shipping cartons. (Credit: Photo by Peggy Greb.)

ScienceDaily (Oct. 4, 2009) — Rigid, custom-fit foam pieces like those that keep computer monitors firmly in place inside cardboard boxes during shipping could be made with eco-friendly starch from potatoes, wheat or corn, instead of from petroleum, according to Agricultural Research Service (ARS) research plant physiologist Gregory M. Glenn. Opting for starch in place of petroleum-derived polystyrene would lessen America's dependence on petroleum.

Glenn works at the ARS Western Regional Research Center in Albany, Calif. For nearly two decades, he has been developing and patenting innovative, "green" techniques for transforming commonplace plant starches—like the silky white cornstarch kept in kitchen cupboards everywhere—into convenient, biodegradable foamed goods like shipping liners, dinnerware and more.

Co-inventor Simon K. Hodson collaborated with Glenn in developing two recent technologies. Both approaches yield strong, durable, and versatile biofoams that look like familiar polystyrene foam goods. Like those conventional foams, the biofoams can be manufactured to a range of densities and can be die-cut or molded into a seemingly limitless array of shapes, sizes and thicknesses.

Both patent-applied-for technologies for making biofoams rely on an extruder—a standard piece of equipment—to heat and mix starch and other all-natural compounds. With one option, the extruder squeezes out long strings, called "thermoplastic melt," that are later cut into small beads about half the size of a marble.

At various points in the process, the beads puff and expand, such as when they are put into the cavity of a heated mold to press them into the desired shape. Expanded beads eventually touch one another, creating a strong matrix that's much like the bead matrix of polystyrene foams.

The biofoams aren't waterproof, but a moisture barrier, made from plant sources such as corn, can be added, ensuring that the finished foam is still derived exclusively from renewable, biodegradable resources.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2009/10/091002101943.htm

Scientist Builds Imager That Identifies, Locates Individual Cancer Cells

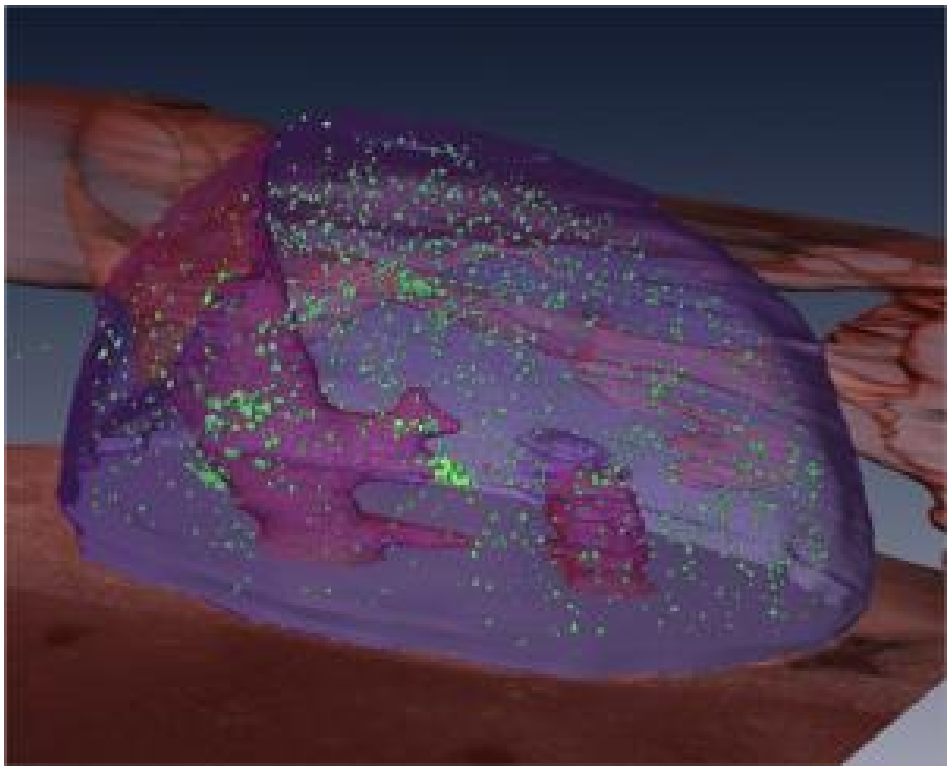


Image of cancer cells, labeled with green fluorescent protein, in the adrenal gland of a mouse. (Credit: Dave Wilson et al. / Image courtesy of Case Western Reserve University)

ScienceDaily (Oct. 4, 2009) — Dave Wilson was dissatisfied with blurry, low-sensitivity optical images of diseased tissues. So, four years ago he set out to create a better imager.

Now, Wilson, a professor of biomedical engineering at Case Western Reserve University, can identify a single cancer cell in preclinical imaging studies. And he can pinpoint exactly where the cell is located in a three-dimensional image.

Called cryo-imaging, the system enables Wilson and collaborators to identify single molecules, count the number of cells in an organ, compare a normal heart to an abnormal heart and more. The incredibly detailed images can show the effectiveness of different drug therapies, gene therapies and cellular therapies in preclinical testing, Wilson said.

The cryo-imaging system literally disassembles real tissue layer by layer then reassembles the details into a cyber model.

"You can't meet this resolution from outside the body," Wilson said.

In a paper published in the *Annals of Biomedical Engineering*, Wilson and co-authors describe cryo-imaging and the extensive software they wrote to enable them to zero in on single cells.

The images are in color, which provides more detail than the gray scale used in other devices, such as Magnetic Resonance Imaging, he said.

In this specific model, the software assembled images of the internal organs, showing the location of individual metastatic cancer cells in the adrenal gland.

If you're only interested in the central nervous system, the vascular system or something less than a complete specimen, the imager has the capability of giving you exactly what you want, Wilson said. As the computer assembles the images, it sends text message updates to researchers.

James Basilion, an associate professor of radiology and biomedical engineering at Case Western Reserve, did not work on Wilson's imager but has seen the results.

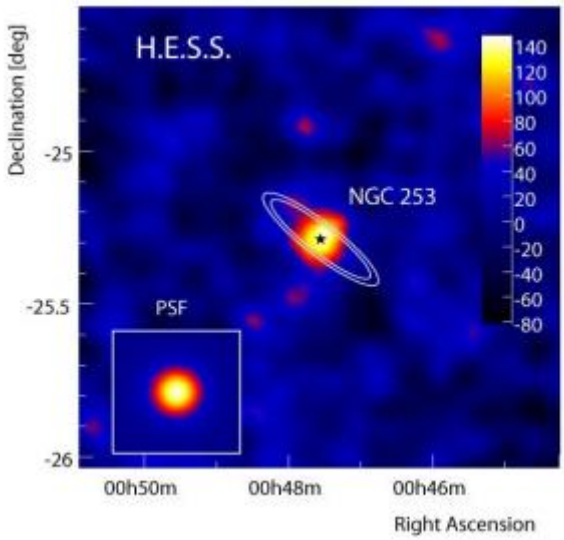
"This device provides superb resolution and sensitivity to identify fluorogenic compounds or cells virtually anywhere within a specimen," Basilion said. "No longer do we need to 'guess' which cells are taking up agents from radiological biodistribution studies. We now can visualize them."

Wilson launched his research with a Third Frontier grant from the state of Ohio. As he made progress, he was funded with about $1.5 million in grants from the National Institutes of Health. He has founded a start-up company, called BioInVision Inc., in Mayfield Village, Ohio, to commercialize the imaging system.

Adapted from materials provided by Case Western Reserve University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/09/090928131026.htm

Heart Of A Galaxy Emits Gamma Rays



Heart of a galaxy emitting gamma rays: This image taken with H.E.S.S. shows the heart of the NGC 253 galactic system. The black star marks the optical centre and the white contours indicate the shape of the galaxy. The H.E.S.S. telescope system perceives the centre of the galaxy as a point - as the comparison with a simulated artificial point source in the inset ("PSF") shows. (Credit: H.E.S.S. Collaboration)

ScienceDaily (Oct. 4, 2009) — Quite a few distant galaxies turn out to be cosmic delivery rooms. Large numbers of massive stars are born in the hearts of these starburst galaxies, and later explode as supernovae. In the remnants they leave behind, particles are accelerated to very high energies. Astrophysicists have now used the H.E.S.S. telescopes to make detailed measurements of the gamma rays from the NGC 253 galaxy. As predicted, these high-energy rays originate from the region of maximum supernova activity close to the centre.

Results of the research are reported in *Science Express*, September 24, 2009.

At a distance of some twelve million light years away, NGC 253 is one our closest spiral galaxies outside the so-called local group of our Milky Way and its companions. Observations in the visible light as well as in the infrared and radio frequency ranges had already shown there was a small region at the centre of NGC 253 which gave birth to a very high number of stars. This region exhibits a very high density of interstellar dust and gas.

The high-mass stars born in this region use up their nuclear fuel relatively quickly and stagger into an energy crisis at the end of their life. The nucleus collapses while the star destroys itself in one final explosion. Such a supernova suddenly flares up a million or even a billion times brighter than before. The charged particles accelerated to very high energies in the remnants of such explosions react with the surrounding medium or with electromagnetic fields to generate extremely high-energy gamma quanta.

Between 2005 and 2008, astrophysicists used the H.E.S.S. telescope system in Namibia over a total observation period of 119 hours to detect the expected gamma rays at energies exceeding 220 GeV (billion electronvolts). The source of these rays lies precisely at the optical centre of NGC 253 and appears as a point to H.E.S.S. This makes it the weakest source discovered to date in the very high-energy gamma radiation range.

The flux of radiation from the starburst region of NGC 253 measured by H.E.S.S. implies an enormous cosmic ray density - more than 1,000 times higher than at the centre of the Milky Way. Moreover, the

high gas density makes the conversion of cosmic rays into gamma rays around one order of magnitude more efficient. Accordingly, the central region of NGC 253 shines around five times as brightly in the light of gamma rays as all the rest of the galaxy together.

The four H.E.S.S. telescopes, each with a mirror area of 108 square metres, observe weak bluish and extremely short flashes of light. This so called Cherenkov radiation is emitted by showers of particles created when high-energy gamma quanta collide with molecules in Earth's atmosphere. H.E.S.S. stands for High Energy Stereoscopic System and has been in operation since the beginning of 2004. Since this time it has made many important discoveries, such as the first astronomical image of a supernova remnant in the high-energy gamma radiation range, or the detection of galaxies with active nuclei in the light of gamma rays. The fifth, much larger telescope that is currently under construction will significantly improve the sensitivity of the system and extend the observable energy range. The H.E.S.S. collaboration under the overall lead management of the Max Planck Institute for Nuclear Physics involves more than 150 researchers from Germany, France, Great Britain, Poland, Czech Republic, Ireland, Austria, Sweden, Armenia, South Africa and Namibia.

Journal reference:

1. F. Acero, F. Aharonian et al. **Detection of Gamma Rays from a Starburst Galaxy**. *Science*, 2009; DOI: 10.1126/science.1178826

Adapted from materials provided by Max-Planck-Gesellschaft.

http://www.sciencedaily.com/releases/2009/10/091002093805.htm

Ancient Earth's Magnetic Field Was Structured Like Today's Two-pole Model

The well-exposed layering of basalt flows in formations near Lake Superior is aiding scientific understanding of the geomagnetic field in ancient times. Nicholas Swanson-Hysell, a Princeton graduate student, examines the details of the top of a lava flow. (Credit: Photo by Catherine Rose)

ScienceDaily (Oct. 3, 2009) — Princeton University scientists have shown that, in ancient times, the Earth's magnetic field was structured like the two-pole model of today, suggesting that the methods geoscientists use to reconstruct the geography of early land masses on the globe are accurate. The findings may lead to a better understanding of historical continental movement, which relates to changes in climate.

By taking a closer look at the 1.1 billion-year-old volcanic rocks on the north shore of Lake Superior, the researchers have found that Earth's ancient magnetic field was a geocentric axial dipole -- essentially a large bar magnet centered in the core and aligned with the Earth's spin axis.

Some earlier studies of these rocks had led other teams to conclude that the magnetic field of the ancient Earth had a far more complex structure -- some proposing the influence of four or even eight poles -- implying that present models of the supercontinents that relied on paleomagnetic data and an axial dipole assumption were wrong.

The report, which will appear in the October issue of *Nature Geoscience*, says that previous efforts to interpret the ancient geomagnetic field in rocks from North America were confused by the rapid migration of the continent toward the equator in the distant past.

The researchers "neatly lay to rest the long-standing controversy over the nature of Earth's magnetic field 1.1 billion years ago," writes geoscientist Joseph Meert of the University of Florida in an essay that accompanies the report.

"In this paper, we show that Earth's magnetic field has been more stable in the past than originally believed," said Adam Maloof, an assistant professor of geosciences at Princeton and one of the paper's authors.

The Earth's magnetic field wraps around the globe, shielding life from harmful cosmic rays. It is emanated by the Earth's iron core and is shaped by a multitude of factors, including the spinning of the Earth and circulatory motion influenced by the Earth's rotation and temperature differences between the inner core's outer layers and the lower mantle.

The researchers obtained magnetic measurements from a thick stack of lava flows in the Lake Superior region. The lavas erupted when geologic forces attempted to tear apart central North America forming the Keweenawan Rift. The researchers used the tiny magnetic minerals within the volcanic rocks to record the orientation of the geomagnetic field at the time the rocks erupted onto the Earth's surface. By knowing how those grains pointed to the magnetic field of that time, the scientists could deduce the latitude where they were located when the lava flows erupted and cooled. The grains pointed to where "paleo-north" was for each rock.

Studying layers of the basaltic lava flows, they used the information to track how the Earth's magnetic poles have "flipped" over the eons, with the North Magnetic Pole becoming the South Magnetic Pole and vice versa. The team studied three of these reversals that occurred over a few million years.

The scientists plan to use the data to better understand how continents moved in the distant past, massing to form supercontinents. "We needed to be able to have a working model of how the geomagnetic field behaved in the past if we are going to talk about where plates have moved, how fast they've moved and how ancient supercontinents were configured," said Nicholas Swanson-Hysell, a graduate student at Princeton and the first author on the paper.

Knowing the proper location of continents is key to understanding the climate of any era, Maloof said, because the shape and location of continents affect ocean currents, global average temperatures and wind patterns. And by understanding in detail what Earth's climate was like in ancient times, he noted, scientists can better comprehend the climate of today and make more accurate projections for the future.

According to scientific reconstructions, a supercontinent known as Rodinia existed between 1 billion and 800 million years ago. The extreme cooling of the global climate about 700 million years ago and the rapid evolution of primitive life during subsequent periods are often thought to have been triggered by the breaking up of Rodinia.

Rodinia predated a more recently created supercontinent called Pangaea, which came together about 300 million years ago. Scientists have pieced Rodinia together by comparing rocks with similar geological features that are now widely dispersed.

Knowing that they have confirmed the structure of the Earth's magnetic field at that time gives Maloof and Swanson-Hysell the confidence to learn more about the supercontinent and that epoch.

"For the past 30 years, scientists have feared that the geometry of Earth's field was complex and varied," Maloof said. "Such a complex field made it very hard for people to reconstruct the ancient geography of the planet because they could not rely on a predictable field. We show that these fears were unfounded -- at least for 1.1 billion years ago -- and that the evidence for a complex ancient field was an artifact of the way rocks had been sampled."

Other researchers on the paper included: Benjamin Weiss of the Massachusetts Institute of Technology; and David Evans of Yale University.

The research was funded by the National Science Foundation, Sigma Xi, Agouron Institute and Princeton University.

Adapted from materials provided by Princeton University.

http://www.sciencedaily.com/releases/2009/10/091002132350.htm

Is Garbage The Solution To Tackling Climate Change?

Garbage dump. Waste-based biofuel could cut global emissions by over 80%. (Credit: iStockphoto/Ryerson Clark)

ScienceDaily (Oct. 3, 2009) — Converting the rubbish that fills the world's landfills into biofuel may be the answer to both the growing energy crisis and to tackling carbon emissions, claim scientists in Singapore and Switzerland. New research published in Global Change Biology: Bioenergy, reveals how replacing gasoline with biofuel from processed waste could cut global carbon emissions by 80%.

Biofuels produced from crops have proven controversial because they require an increase in crop production which has its own severe environmental costs. However, second-generation biofuels, such as cellulosic ethanol derived from processed urban waste, may offer dramatic emissions savings without the environmental catch.

"Our results suggest that fuel from processed waste biomass, such as paper and cardboard, is a promising clean energy solution," said study author Associate Professor Hugh Tan of the National University of Singapore. "If developed fully this biofuel could simultaneously meet part of the world's energy needs, while also combating carbon emissions and fossil fuel dependency."

The team used the United Nation's Human Development Index to estimate the generation of waste in 173 countries. This data was then coupled to the Earthtrends database to estimate the amount of gasoline consumed in those same countries.

The team found that 82.93 billion litres of cellulosic ethanol could be produced from the world's landfill waste and that by substituting gasoline with the resulting biofuel, global carbon emissions could be cut by figures ranging from 29.2% to 86.1% for every unit of energy produced.

"If this technology continues to improve and mature these numbers are certain to increase," concluded co-author Dr. Lian Pin Koh from ETH Zürich. "This could make cellulosic ethanol an important component of our renewable energy future."

Journal reference:

1. Shi et al. **The biofuel potential of municipal solid waste**. *GCB Bioenergy*, 2009; DOI: 10.1111/j.1757-1707.2009.01024.x

Adapted from materials provided by Wiley - Blackwell, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/09/090929100654.htm

Quick Rebound From Marine Mass Extinction Event, New Findings Show

An artist's rendering of the asteroid impact that took place 65 million years ago and likely killed off nearly every large vertebrate species on the planet, including, many think, the dinosaurs. (Credit: Don Davis/NASA)

ScienceDaily (Oct. 3, 2009) — In 1980, Luis Alvarez and his collaborators stunned the world with their discovery that an asteroid impact 65 million years ago probably killed off the dinosaurs and much of the the world's living organisms. But ever since, there has been an ongoing debate about how long it took for life to return to the devastated planet and for ecosystems to bounce back.

Now, researchers from MIT and their collaborators have found that at least some forms of microscopic marine life — the so called "primary producers," or photosynthetic organisms such as algae and cyanobacteria in the ocean — recovered within about a century after the mass extinction. Previous research had indicated the process might have taken millions of years.

It has taken so long to uncover the quick recovery because previous studies looked mostly at fossils in the layers of sediment from that period, and apparently the initial recovery was dominated by tiny, soft-bodied organisms such as cyanobacteria, which do not have shells or other hard body parts that leave fossil traces. The new research looked instead for "chemical fossils" — traces of organic molecules (compounds composed of mostly carbon and hydrogen) that can reveal the presence of specific types of organisms, even though all other parts of the organisms themselves are long gone.

The new research, published in the Oct. 2 issue of *Science*, was led by Julio Sepúlveda, an MIT postdoc who carried out part of the work while still a graduate student at the University of Bremen, Germany, and MIT Professor of Geobiology Roger Summons, among others.

The team had two major advantages that helped to make the new findings possible. One was a section of the well-known cliff face at Stevns Klint, Denmark, that happens to have an unusually thick layer of sediment from the period of the mass extinction — about 40 centimeters thick, compared to the few cm thickness of the layers that Alvarez originally studied from that period at Gubbio (Italy) and Stevns Klint (Denmark). And team members tapped one of the most powerful Gas Chromatograph-Mass Spectrometers (GC-MS) in the world, a device that can measure minute quantities of different molecules

in the rock. MIT's advanced GC-MS is one of only a few such powerful instruments currently available at U.S. universities.

When people look at microfossils in the sediments from the period but are unable to detect the chemical biomarkers with the level of sensitivity the MIT team was able to achieve, they "miss a big part of the picture," Sepúlveda says. "Many of these microorganisms" that were detected through molecular signatures "are at the base of the food chain, but if you don't look with biochemical techniques you miss them."

The analysis clarified the sequence of events after the big impact. Immediately after the impact, certain areas of the ocean were devoid of oxygen and hostile to most algae, but close to the continent, microbial life was inhibited for only a relatively short period: in probably less than 100 years, algal productivity showed the first signs of recovery. In the open ocean, however, this recovery took much longer: previous studies have estimated that the global ocean ecosystem did not return to its former state until 1 to 3 million years following the impact.

Because of the rebound of primary producers, Sepúlveda says "very soon after the impact, the food supply was not likely a limitation" for other organisms, and yet "the whole ecology of the system remained disrupted" and took much longer to recover.

The findings provide observational evidence supporting models suggesting that global darkness after the impact was rather short. "Primary productivity came back quickly, at least in the environment we were studying," says Summons, referring to the near-shore environment represented by the Danish sediments.

"The atmosphere must have cleared up rapidly," he says. "People will have to rethink the recovery of the ecosystems. It can't be just the lack of food supply" that made it take so long to recover.

The team hopes to be able to study other locations with relatively thick deposits from the extinction aftermath, to determine whether the quick recovery really was a widespread phenomenon after the mass extinction.

These findings seem to rule out one theory about how the global ecosystem responded to the impact, which held that for more than a million years there was a "Strangelove ocean" — a reference to the post-apocalyptic scenario in the movie Dr. Strangelove — in which all the primary producers remained absent for a prolonged period, Summons says.

In addition to Sepúlveda and Summons, the work was carried out by Jens Wendler of the Friedrich-Schiller University in Jena, Germany, and Kai-Uwe Hinrichs of the University of Bremen. The work was funded by the DFG, European Graduate College Europrox and the NASA Astrobiology and Exobiology Programs.

Journal reference:

1. Julio Sepúlveda, Jens E. Wendler, Roger E. Summons, and Kai-Uwe Hinrichs. **Rapid Resurgence of Marine Productivity After the Cretaceous-Paleogene Mass Extinction**. *Science*, 2009; DOI: 10.1126/science.1176233

Adapted from materials provided by Massachusetts Institute of Technology. Original article written by David L. Chandler, MIT News Office.

http://www.sciencedaily.com/releases/2009/10/091002120412.htm

Leg Movement Training In Preterm Infants Demonstrates Positive Changes In Motor Skills

Preterm infants who receive leg movement training display feet-reaching behaviors similar to that of full-term infants. (Credit: iStockphoto/Dmitry Naumov)

ScienceDaily (Oct. 3, 2009) — Preterm infants who receive leg movement training display feet-reaching behaviors similar to that of full-term infants, according to a randomized controlled trial reported in the October issue of *Physical Therapy (PTJ)*, the scientific journal of the American Physical Therapy Association (APTA). This finding supports feet-reaching play as an early intervention strategy to encourage interaction with physical objects in preterm infants who have movement problems within the first months of postnatal life.

Previous studies have shown that full-term infants make contact with toys using their feet before reaching with their hands. Studies also have shown that movement training advances feet reaching in full-term infants. Certain populations of preterm infants are known to be delayed in hand reaching; however, no studies have looked at feet-reaching in preterm infants.

"The presence of feet reaching and a positive training effect in this population would suggest a novel and easily implemented intervention strategy to encourage early object interaction in infants with special needs," said Jill C. Heathcock, PT, PhD, assistant professor in the Division of Physical Therapy at Ohio State University, and lead author of the study.

In this study, 27 preterm infants who were born at less than 33 weeks of gestational age and weighed less than 5 lbs 8 oz received either movement training or social training by their caregivers 5 days a week for 8 weeks. Movement training consisted of three feet games: general leg movement, moving the leg across the midline of the body, and distinct leg movements, such as holding an infant's hip at 90 degrees and encouraging knee motion to contact the toy with the foot. Caregivers of infants in the social training

group positioned their infant supine on the floor and sat near the infant's feet. The caregiver interacted with their infant visually and verbally, but did not touch or present objects to their infant.

During the 8-week training period, all infants were tested and videotaped for a total of five sessions. Infants were seated in a custom-made chair with a strap placed around the chest, allowing for free movement of the arms and legs. A toy was presented to the infant at his or her midline at hip height for 30 seconds. After each trial, the toy was removed from the infant's view and then repositioned in the midline for the next trial.

Both groups of infants showed an equal number of foot-toy contacts over each session. However, infants in the movement training group out-performed infants in the social training group over time and during the last session.

"Our results suggest that preterm infants display a new and potentially important ability to contact objects with their feet before their hands," said Heathcock. "This finding, coupled with a positive effect of training, provides clinicians with a new intervention strategy for encouraging object interaction within the first months of life in infants at risk for long-term motor impairments."

The study was funded in part by Heathcock's awards from the Foundation for Physical Therapy.

Adapted from materials provided by American Physical Therapy Association.
http://www.sciencedaily.com/releases/2009/10/091001101326.htm

Energy-from-waste powers US army

By Jason Palmer
Science and technology reporter, BBC News

A system that generates energy from rubbish is being sent by defence firm Qinetiq to the US army.

The PyTEC system heats mixed waste, releasing a gas that can be burned to produce five times more energy than is required to drive the system.

Qinetiq say that the system, already in use on British navy ship HMS Ocean, has been "containerised" for US army use.

The approach could see use in urban areas, reducing municipal waste volume by 95% while producing energy.

The process hinges on pyrolysis, in which waste subjected to high temperatures releases combustible gases.

In essence it is the same process that happens above a match; heating of the wood releases gases that burn in the presence of oxygen, producing the visible flame.

In pyrolysis, the heating occurs in the absence of oxygen, and the released gases are gathered and stored for later use.

" **We're reducing their logistical footprint, reducing the number of body bags, and reducing their fossil fuel usage** "
Pat McGlead Qinetiq

This is in contrast to simple incineration or gasification - another energy-from-waste approach that heats particular kinds of waste in the presence of oxygen to create combustible gases.

Typically, such systems require that the waste be of a singular type, and diced up before entering the gasification chamber.

Waste not

In the PyTEC system, a large screw-shaped column takes in up to 100kg per hour of untreated mixed waste - including glass and tin, particularly troublesome waste sources for thermal waste approaches.

The waste is heated, releasing gases that are removed and used to power a steam turbine.

What exits the system is a glassy substance just 5% the volume of the waste that entered, along with 400kW of power.

A similar system was installed on the UK navy ship HMS Ocean late last year.

"We've taken the plant that we developed for HMS Ocean and containerised it for the US army as a means to make it more mobile, more easily deployable and reducing their fossil fuel requirements," said Pat McGlead, waste management business development manager for Qinetiq.

The systems will be deployed to one of 55 "forward operating bases" in Iraq and Afghanistan - temporary outposts of 600 front-line soldiers that, until now, had no formal arrangements for waste disposal.

"That means they're going to have to have trucks on the roads (to carry the waste), and that means people are going to be exposed to land mines and so on - and it increases the use of fossil fuels," Mr McGlead told BBC News.

"By providing them with a self-contained waste management capability, we're reducing their logistical footprint, reducing the number of body bags, and reducing their fossil fuel usage."

In addition, the size and complexity reduction of the system for US army use means the approach could see application outside the military.

"We're finding more and more people in the commercial sector want to take ownership of their waste, and they want to reduce their carbon footprint, so they see energy from waste as a good way to go," Mr McGlead said.

"There are people that are interested in it for blocks of flats - it has a number of different applications."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/8290130.stm

Published: 2009/10/05 10:37:19 GMT

Educated women 'aid long life'

A well-educated woman positively influences both her own and her partner's chances of a long life, Swedish research suggests.

A man whose partner had only a school education has a 25% greater risk of dying early than if she had had a university education, it suggests.

The authors say educated women may be more likely to understand the various health messages their families needed.

The findings are based on a study of 1.5m working Swedes, aged 30 to 59.

The study, in the journal of Epidemiology and Community Healthcare, says that in the case of men, it is their income and social status that affect women's lifespan.

The researchers looked at data from the 1990 Swedish census and followed up information on causes of death, including cancer and circulatory diseases like heart disease and stroke from the cause of death registers up to 2003.

University education

A woman's education and social status were more important for a man's life chances than his own education, the findings indicate.

And a woman's education also affects her own mortality, with someone with a school education having a 53% greater risk of dying early than a university educated woman.

The authors said: "Education is of great importance through a direct influence on mortality as well as indirectly via occupation and income.

"Education may also have an indirect effect through its possible importance for choice of partner."

Dr Robert Erikson, who led the research, said: "Women traditionally take more responsibility for the home than men do and, as a consequence, women's education might be more important for the family lifestyle - for example, in terms of food habits - than men' s education.

"It's still the case that women tend to put the food on the table and in that way have a very direct influence.

"Women with higher education may also receive better medical treatment and their partners may benefit too."

Professor Alan Maryon-Davis, of the UK's Faculty of Public Health, said: "This study shows how closely education, lifestyle and long-term health are linked together.

"If we're serious about radically improving the health of the nation, we must fully invest in high-quality education at all levels."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8291667.stm

Published: 2009/10/05 23:26:34 GMT

Med-style diet 'can battle blues'

The Mediterranean diet, already thought to protect against heart disease and cancer, may also help to prevent depression, Spanish researchers say.

They found depression was more than 30% less likely to develop in people who followed a diet high in vegetables, fruit and cereals, and low in red meat.

They studied 10,094 healthy adults over four years, the Journal of the American Medical Association reports.

However, the team stressed additional, larger-scale studies were required.

Researchers at the Universities of Las Palmas and Navarra recruited university graduates to take part.

Dietary patterns

They completed questionnaires and the researchers calculated their adherence to the Mediterranean dietary pattern (MDP) for an average of four-and-a-half years.

MEDITERRANEAN DIET FEATURES
- A high intake of monounsaturated fatty acids like olive oil
- A moderate intake of alcohol and dairy products
- A low intake of meat
- A high intake of legumes, fruit and nuts, cereals, vegetables and fish

Participants who had a strong adherence to the MDP tended to be male, ex-smokers, married and older individuals.

They were more active physically and showed a higher total energy intake.

The researchers identified 480 new cases of depression during the follow-up period - 156 in men and 324 in women.

They found that those with the highest adherence to the MDP were more than 30% less likely to develop depression.

They took into account marital status, the number of children and factors associated with a healthy lifestyle and found the relationship did not change.

Even taking account of personality traits, such as competitiveness and anxiety, had no effect on the results.

'More research needed'

Professor Miguel Martinez-Gonzalez, of the University of Navarra, said the results would have to be confirmed in longer trials with more participants but they had found a strong inverse association between the Mediterranean diet and depression.

"Thirty per cent is a large reduction in the risk and this could be very important considering the large burden of disease represented by depression.

"We know how important the Mediterranean diet is in reducing cardiovascular risk factors and the same inflammatory proteins are also raised in patients with depression."

He said it was likely that the overall dietary pattern was more important than the effect of single components and "may exert a fair degree of protection against depression".

Dr Cecilia D'Felice, a clinical psychologist, said there was mounting evidence for the importance of diet in treating depression.

She said: "What we do know is that a diet high in olive oil will enhance the amount of serotonin or brain transmitter available to you.

"Most anti-depression drugs work to keep more serotonin available in the brain."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8290632.stm

Published: 2009/10/05 23:10:38 GMT

Are America's Winds Taking a Breather?

Wind speeds, expected to help propel the advance of renewable energy, may be slowing, a cautious new study suggests. Then again, they may be blowing even harder.

- By: Michael Haederle | September 29, 2009 | 05:00 AM (PDT)

.Shlomit Wolf

It's easy to take the wind for granted. We count on it for all kinds of things, like propelling sailboats, turning giant power-producing turbine blades and keeping kites aloft. But what if the wind doesn't blow as hard as it used to?

That possibility presents itself in a new, cautiously worded report suggesting that wind speeds may have been declining in the Midwest and northeastern states since the 1970s by 0.5 to 1 percent a year.

The finding is based on data collected from wind-measuring anemometers placed at weather stations throughout the United States. But it is only one component of the study, "Wind speed trends over the contiguous United States," recently published in the *Journal of Geophysical Research.* The team, led by Indiana University's Sara C. Pryor, also looked at a half dozen other data sets and climate models, which generally showed that wind speeds are not declining, and if anything may be on the increase.

That prompted some scientific head scratching: Are wind speeds really declining in North America? If so, what could be causing it? Is climate change to blame or simply natural variation in weather cycles?

The implications are sobering. If the winds actually are blowing less forcefully than in the past, it could affect everything from agriculture to wind-energy-generation schemes being contemplated as a green alterative to fossil fuel power.

"One of the things we're trying to express in the paper is that there is this discrepancy," Pryor says. "It's important to say the in situ [weather station] observations reflect wind speeds that may not be reasonably representative. These are stations largely at airports. These data are being collected largely for aviation safety and to some extent weather forecasting, so they're not really designed to be used for climatological analyses."

The wind speed data was collected between 1973 and 2005 at hundreds of sites around the country, said Eugene S. Takle, an Iowa State University climatologist who collaborated on the study.

"There are a lot of pitfalls in trying to understand and analyze these data," Takle said. For one thing, there have not always been uniform data collection procedures, and anemometer designs have changed through the years. "Now it's more standardized than it was in the past."

Changing land use is another complicating factor. Extensive urban development in recent decades may have led to new buildings and trees near the measurement sites. "That has a tendency to create friction to the wind, so that will slow it down," he said. A related theory is that as agriculture has declined in the eastern U.S., widespread natural reforestation has gradually reshaped the landscape.

Climate change is a more controversial possibility, Takle said. With warming temperatures, "we know that the period of ice on the Great Lakes has been declining," he said. Because open water is rougher than smooth ice, that could also cause a friction-related drop in wind speeds, he said.

"There has been a precedent for models showing wind speed decline from climate change," Takle said, noting that one study suggested that increasing levels of atmospheric carbon dioxide could cause wind speeds to drop.

Simulations run on various computer-driven climate models yield results that are "all over the map," Takle said. Like Pryor, he's puzzled by the discrepancies.

"Our view is it could have been a fluke. We would like to work together with people who have competing models. We're hoping this launches a new investigation of wind trends so we can get this sorted out."

In Pryor's view, wind speed researchers have historically been the "poor relations," compared to climate scientists who focus on temperature and precipitation. "Very few people have studied wind speeds," she said. "It picks up the difficulty in getting quality data."

While the weather station observations clearly point to a decline in northern U.S. wind speeds over three decades, Pryor is wary of leaping to conclusions about what is going on.

"I'm certainly not saying wind speeds haven't declined," she said, "but I think it's important to say that we have seen — certainly in Europe, where there are longer time series of up to 150 years — trends of similar magnitude over 30-year periods in the historical record.

"One of the points we make in the article is the declines don't have to be continued. We see quite natural variability that is of this magnitude. It doesn't have to be a climate change signal."

Some reasonably well-understood climactic cycles could also be involved, Pryor said. "We know that there are phenomena, such as ENSO (the El Nino-Southern Oscillation), that have time cycles of years or decades," she said. "The same with sun spot cycles of 22 years."

She added, "One of the things that can be true of our analysis in the U.S. is that we simply captured a period where the natural system was moving toward perhaps lower storm intensities, and that may in fact reverse in the future. I think we're a long way from seeing any kind of climate change signal in wind speeds, even if one exists."

If average wind speeds really were to decline, it could affect urban areas that rely on the wind to disperse air pollution. Farmers would also see less ventilation of their crops, which could cause added heat stress on the plants. It would also mean that estimates of wind power potential would have to be scaled back (one recent study found that an extensive network of land-based wind farms potentially could supply more than 16 times the current U.S. power consumption).

Pryor hopes to shed more light on this question. "There is another data set that records wind speeds not right at the surface but close to the surface, and so I'm analyzing those data," she said. "They should be relatively insensitive to land use change. What do we see in that data in terms of trends?"

She also wants to study how well regional and global climate models predict wind speeds. "Those models have been largely evaluated and validated on temperature and precipitation and they do a pretty good job," she said. "But now we need to expand the variables that we're evaluating. If we do that, obviously we'll better understand their performance."

http://www.miller-mccune.com/science_environment/winds-taking-a-breather-1487?utm_source=Newsletter77&utm_medium=email&utm_content=1006&utm_campaign=newsletters