Infoteca's E-Journal

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Tips From a Maestro of the Spray Can

By JAN ELLEN SPIEGEL

FAIRFIELD

JASMINE JOHNSON is sprawled on the floor of the Thomas J. Walsh Gallery at Fairfield University here, her red high-tops in the air as she intently sketches on a two-foot-square sky blue canvas.

Nathaniel Jefferson is on a nearby bench, equally intent as he mulls the possibilities of a green canvas. Israel Medina, who goes by Tony, is outside in the cold, energetically spraying paint to transform a pink canvas propped against a tree.

“The wheels are turning,” says the artist John Matos, surveying the work.

These three art students from Bridgeport high schools will be joined by two schoolmates the following day as they work on a project designed by Mr. Matos, who goes by the name Crash (as a student he crashed his high school’s computer).

A child of South Bronx housing projects, Mr. Matos was younger than these teenagers when he began honing his art in the 1970s by breaking into a subway yard at night and spray painting the cars for hours in the dark and cold.

On this January day, in more law-abiding fashion, he has brought top-of-the-line spray paint, acrylics and brushes for the students to use on a mural that is to be part of a retrospective of his work here. Nearly three-dozen Crash pieces are scattered about the gallery. Photos of subway cars represent his beginnings, but mostly there are huge, brightly colored, mainly spray-painted canvases that are Mr. Matos’s signature cross between graffiti and Pop Art. The retrospective is a first for Mr. Matos, now 48, and a sobering reminder, along with the flecks of gray in his hair, that he has been at his craft for 35 years.

“It’s fascinating, but it’s spooky,” Mr. Matos said while taking a break in the gallery office. He said he had never imagined this back in his subway days, although he had “felt that there was something powerful there.”

His plan for the students is a three-day project he has named the Fairfield Square: 16 two-by-two squares arranged four-by-four on the gallery's back wall. He has painted 10; the rest will be done by the students, who will also rearrange the squares.

"So you're not just adding to it," he tells them. "The piece is more about you guys than what you think."

The students are at once awed and unfazed by Mr. Matos as he describes his early days, when he would wear his jacket inside-out and use roach spray and the grease from bags of egg rolls to remove any telltale spots of paint.

"I used to come home like sparkling clean," he tells them. "But smelled like roach spray."

Talking to a visitor as they worked, Jasmine, 15, the only one who had Googled Mr. Matos, said his paintings were "awesome," but said she would be sticking with brushes and acrylics for her square. Tony, 18, said he saw spray painting as art if "there's nobody in the place and nobody's really taking care of the place and it's all abandoned."

But trying to duplicate Mr. Matos's subtleties proved frustrating, and at the end of the first day, after struggling with unfamiliar cans, one of which clogged, Tony was not pleased with his drippy arrow. Mr. Matos's technique, apparent in the few minutes he worked on one of the squares, is a light touch — though he has a permanent circle on his right forefinger from years of pressing spray can triggers. He uses an aerobic, full-arm motion — faster for thinner lines, slower for thicker. He cautions against getting too close to the canvas.

"It's a very hard medium to handle," he said, during a break the next day. "But when you got it, you can pretty much do anything with it. I've had people ask me and challenge me, 'This is not spray paint — airbrush or something?' No, this is spray paint."

Mr. Matos usually sketches before painting freehand, making limited use of stencils and straightedges. He also does watercolors and drawings, and will paint just about anything: vases, cloth, handbags, furniture, and guitars, perhaps the best known.

A gift to his friend Eric Clapton of a painted Fender Stratocaster turned into multiple series of painted Fender guitars dubbed Crashocasters — one of which is on display here.

The exhibition came about because Mr. Matos's daughter Anna is an art history student at Fairfield; the retrospective was suggested by two of her professors: Diana Dimodica Mille, who is also director of the Walsh gallery, and Philip Eliasoph. Ms. Matos, now a junior, worked as an intern at the gallery last year, pulling most of it together — no restrictions from Dad.

"It's the art of the common people," she said as the gallery crew hung her father's works. "It was just a way to be heard. I think it went from a youthful rebellion kind of thing to making your stamp on the world."

Ms. Mille hatched the idea of working with high school students, but left the specifics to Mr. Matos.

"I didn't expect the seriousness with which the high school students approached this," Ms. Mille said. "I didn't expect quite the thrill that it produced in them."

Day 3 brought a crisis. A family illness meant Mr. Matos was not present for rearranging the mural. No matter. With Jasmine standing on a bench acting as traffic cop, the teenagers did the job, deciding that Mr. Matos had included the letters for "Crash" in his squares and devising a plan around them.

They were right. Nearly a week later, an hour before the show opened, Tony, who said he had learned a lot during the project, was making one final change as Mr. Matos got his first view of the finished artwork.

“I love it,” Mr. Matos said, confirming that, yes, he did put his name in the squares.

“I’m just glad that they just took it and they ran with it,” he said.

“That’s a lot of sophistication,” he added, and, looking around him, acknowledged that what he saw was also a validation for a style that remains an outlaw in the world of fine art.

“We shouted loud enough and we were heard,” he says. “It’s still effective. It’s still effective.”

“Crash: From the 4 Train to Fenders — A Retrospective,” through Feb. 28, Thomas J. Walsh Gallery, Quick Center for the Arts at Fairfield University, 1073 North Benson Road. (203) 254-4000, ext. 2969; fairfield.edu/crash

http://www.nytimes.com/2010/02/21/nyregion/21artct.html?ref=design

'Constructive Spirit'
History Lesson in Abstraction, Cutting Across the Americas
By HOLLAND COTTER

NEWARK — Art museums are in the business of sorting out history. And it often falls to our smaller institutions to tackle the initial, broad-stroke cuts. Over the years the Newark Museum has taken on this path-clearing role with relish, particularly when the histories are transcultural in scope. It does so again in "Constructive Spirit: Abstract Art in South and North America, 1920s-50s," the capstone exhibition of the museum's centennial.

In this case, a chunk of the history is in Newark's collection. Throughout the first half of the 20th century, the museum assiduously bought, sometimes straight from artists' studios, a type of American painting and sculpture known as geometric abstraction. It's attractive stuff: intimate in scale and coolly design-savvy, but shot through with political and personal content.

For all its virtues, such art never found a wide audience. Dismissed as decorative and un-American in the isolationist 1930s, it was all but submerged in the flood tide of Abstract Expressionism. Newark was left with superlative holdings in an art no one knew or cared much about.

Appreciation has grown since and is bound to increase with this show. The inclusion of household names — Alexander Calder, Arshile Gorky, Ad Reinhardt — will help. But it's the presence of sparkling, less-noticed contemporaries like John Ferren, Raymond Jonson, Alice Trumbull Mason, John McLaughlin, George L. K. Morris and Charmion von Wiegand that turns a history lesson into an event, one that simultaneously broadens and sharpens the profile of American modernism.

That profile grows broader still, immeasurably so, with the show's inclusion of paintings and sculptures, all borrowed from other collections, by artists who were exploring similar abstract modes in South America during the same period. Several of them, and even a few specific works, were in "The Geometry of Hope: Latin American Abstract Art From the Patricia Phelps de Cisneros Collection," at the Grey Art Gallery at New York University in 2007.

But it's the equitable mixing of art from North and South America, and the influential exchanges such mixing implies, that makes the Newark show especially exciting.

It opens with the protean South American figure Joaquín Torres-García, who sets the basic geographic and stylistic coordinates for much that follows. Born in Montevideo, Uruguay, in 1874, he spent much of his early adulthood in France and Spain sampling European modernism, taking particular interest in the abstract geometric styles associated with utopian movements like Russian Constructivism and Dutch Neo-Plasticism.

Right in the middle of this decades-long European sojourn, though, he took an important break. In 1920 he moved to Manhattan and spent two years there soaking up New York's still raw globalist energy. This was just the stimulus he needed to create what he considered a new kind of New World Art. And it was in pursuit of that goal that he eventually returned to Uruguay for the second half of his productive career.

To get a vivid sense of Torres-García's Manhattan experience, I highly recommend a visit to a second show, "Nexus New York: Latin/American Artists in the Modern Metropolis" at El Museo del Barrio in Manhattan (through Feb. 28). But to understand his role as a pivotal link between the Americas, and between the Americas and Europe, two paintings by him in the Newark show may suffice.

In "New York Street Scene" (1920), the European-derived geometric model is firmly in place, but it has been packed with details of New York life: enclosing walls; shop signs; traffic jams; pedestrians, most of them dark-skinned, heading every which way. It's an image of chaos, but compartmentalized and contained.

The second painting, "Locomotive With Constructive House," dates from 1934, the year he returned to Montevideo. Here, geometry and abstraction predominate; you can take the blocks of primary colors as a cityscape, or not. And when Torres-García later fills them, it is with half-abstract, emblematic things: pictographs evoking the ancient and aboriginal cultures of South America.

Together the two pictures suggest some of the elements common to artists working in a geometric mode in North and South America: a blending of local and trans-Atlantic sources; a fundamentally urban sensibility; and an awareness of art's use as a vehicle for abstract ideas and muted feelings.

An urban vision is the theme of the show's first section. It's there in a 1934 painting of rainbow-hued machine parts by the New York artist Paul Kelpe and in Theodore Roszak's copper-and-steel "Airport Structure" (1932), which looks like a cross between a radio tower and a kitchen appliance. And we find it again in the striking 1936 painting "Constructivist Forms" by the Argentine artist Hector Ragni, with a single rectangular upright slab as assertively blank as an International-style modernist monument, and also in the interlocking units of Geraldo de Barros's "Movement Counter Movement," which suggests a floating space station.

The dynamic of nationalism versus internationalism was naturally a burning one. To varying personal degrees, artists in both North and South America wanted their work to be of its time and place, but also part of a larger world; to be culturally specific, but with universal reach.

The Uruguayan painter Rosa Acle, like Torres-García, filled her modernist grids with pre-Columbian symbols. The New Mexican artist Joe Hilario Herrera, who was an American Indian, embedded Pueblo references in his abstract paintings. Jonson, who was not an American Indian, did the same — for him the Southwest was transcendentalist terrain — while von Wiegand cooked up a distinctive strain of abstraction that was equal parts Mondrian and Tibetan Buddhist mandalas.

The Brazilian artist Lygia Clark insisted that her geometric painting was true abstraction, with no representational content; later, however, she developed untraditional forms of malleable, wearable

sculpture and sometimes designed them to have therapeutic properties. And much of the most interesting material in the Newark show is art that directly engages its environment.

Like Clark, Calder and the Argentine artist Gyula Kosice made sculptures that physically moved. Jesús Rafael Soto, working in Caracas, Venezuela, and Irene Rice Pereira, in New York, created multilayered reliefs that turned optically kinetic as viewers moved in front of them. The “paintings” of Abraham Palatnik, a Brazilian, consisted of colored lights placed behind cloth to create a kind of Lava-lamp effect that eventually took on wraparound dimensions.

And Mary Ellen Bute, who came to art through courses in stage lighting at Yale and worked in New York from 1934 to 1953, produced a whole series of abstract film animations using geometric sculptures as subjects. Remarkably, her animations sometimes ran as shorts preceding Hollywood movies at Radio City Music Hall.

Abstraction was a loaded genre for female artists, who were — still are — working in a man’s world. As the art historian Aliza Edelman points out in the catalog, geometric art could be tactically used to disguise gender, or to reveal it in innovative ways. Mason, a New York founder of the American Abstract Artists group, spent a career resisting stylistic or ideological grooves.

The spirit of her 1942 “Oil Composition” is characteristic: she breaks up what there is of a rectilinear grid by pushing a big, pale potato-shaped form straight through its center. Around the same time, Lidy Prati was making rigorously geometric paintings reflecting scientific and mathematical ideas current at the time in Buenos Aires. But she, too, was a subversive. She developed a vocabulary of linear forms so small that they feel like a secret language — as if geometric abstraction had been converted into some kind of private expressive code.

Mason and Prati are marvelous artists, though too different in styles, ideas and biographies to allow for more than superficial comparisons. And the Newark show, organized by Mary Kate O’Hare, associate curator of American art at the museum, doesn’t ask us to make them. It discourages facile thinking. One major purpose of the exhibition seems to be to eliminate old views of North and South American modernism as representing a qualitative face-off, a competition for importance that one team must, inevitably, lose.

This makes total sense. At the same time, I have to say that the South Americans in the Newark show, playing so freely with movement, chance and light, take the prize for inventiveness. They really feel like artists of the future, and of a future that is still in the future. But that’s just how the American story appears, at least to one set of eyes, here. It could be told very differently and surely will be in exhibitions to come, though it is thanks to big thinking on the part of an adventurous small museum that the possibility for retelling is even there at all.

“Constructive Spirit: Abstract Art in South and North America, 1920s-50s” continues through May 23 at the Newark Museum, 49 Washington Street; (973) 596-6550.

http://www.nytimes.com/2010/02/19/arts/design/19constructive.html?ref=design

The Torrent That Flowed in Picasso's Final Years

By CAROL VOGEL

The post-World War II years were a particularly prolific period for Picasso. He began spending most of his time in the south of France surrounded by bullfighters and poets, master craftsmen and fellow artists like Matisse.

In the view of John Richardson, Picasso's biographer, this period in the artist's life has not been properly explored. So he and the artist's grandson, Bernard Ruiz-Picasso, are teaming up to organize their second exhibition at the Gagosian Gallery, this time in London.

The show, "Pablo Picasso: The Mediterranean Years (1945-1961)," will run June 4 through Aug. 28 at the gallery's Britannia Street space, where they are hoping to repeat the same success they had last year in New York when Mr. Richardson and Mr. Ruiz-Picasso organized "Picasso: Mosqueteros," focusing on the artist's late paintings and prints. (The exhibition will not be coming to New York, gallery officials said.)

"Mosqueteros," which opened in March at one of Gagosian's Chelsea spaces, drew crowds eager to glimpse Picasso's images of musketeers and matadors, twisted couples and haunted women. By the exhibition's end on June 6 more than 100,000 visitors had seen it.

For this new show Mr. Richardson, a Gagosian adviser, and Mr. Ruiz-Picasso are moving back in time. "During World War II his paintings were very funereal and dreary, as though they were contained within gray walls," Mr. Richardson said in a telephone interview. "But when he suddenly goes to the south of France, to the Cote d'Azur, it becomes a protean period of incredible virtuosity, where he revolutionizes

sculptures, revolutionizes engraving techniques, revolutionizes ceramics and comes up with paintings that pit him against the great masters of the past."

During these years Picasso fathered two more children — Claude and Paloma — with Françoise Gilot, his young art-student mistress; he later married Jacqueline Roque. It was during those years that he painted canvases filled with images of his young children and Gilot, and then of Roque. More important, he revisited the classics, working on a series inspired by "Women of Algiers," Delacroix's famed painting of Algerian concubines now in the Louvre, and another based on "Las Meninas" by Velázquez. "It was Jacob wrestling with the angel," Mr. Richardson said of these series.

The show, which will feature about 100 works, will be more varied than the first exhibition. Besides paintings, drawings and prints, it will include ceramics and sculptures of all kinds: bronze, wood, those that incorporate found objects and some cut from metal. Loans are coming primarily from family members like Mr. Ruiz-Picasso, but there will be a few museum loans too.

"It was a crucial period," Mr. Ruiz-Picasso said by phone from his home in France, explaining that a lot of his family's works have not been shown publicly until now. And only some things will be for sale.

THEIR OWN BRUCENNIAL

Some years the Whitney Biennial takes itself so seriously that curators' descriptions can sound like a parody of that love-to-hate-it survey of contemporary American art.

Now a six-year-old New York collective, the Bruce High Quality Foundation, is presenting a takeoff of its own, the Brucennial. Organized by Vito Schnabel, 23, a son of the artist Julian Schnabel, it will open Thursday, the same day as the Whitney Biennial.

The Brucennial — at 350 West Broadway in SoHo, in a space being lent by the real estate developer and collector Aby Rosen — will supposedly include 420 artists from 911 countries. Or so says a news release, which adds that they are "working in 666 disciplines to reclaim education as part of an artists' ongoing practice beyond the principals of any one institution or experience."

There is also a theme, "Miseducation," chosen, said one of the group's members, each of whom identifies himself as Bruce, because "we wanted a theme that was general enough to include almost anything."

"And the idea is that education for artists is an ongoing life process," he added, "and we wanted people to reflect on their own notions about what education might mean."

Some Brucennial artists will also have work in the Biennial, but most will not. "I do think it's competing with the Biennial," Mr. Schnabel said. "The artists are ones that the Bruce High Quality Foundation think are important."

When asked about the difference between the Brucennial and the Biennial, the same Bruce said: "There are four times as many artists. And it is organized by the artists themselves. It's not a top-down operation." He was referring to the fact that, unlike the curators at the Biennial, the collective members did not visit studios, instead relying on word-of-mouth to gather participants.

Another difference is that while there is an unspoken commercial aspect to the Whitney Biennial — for emerging artists, inclusion can ultimately lead to higher prices for their work — it is a museum exhibition, not an art fair. At the Brucennial, however, things will be for sale.

"It's up to each artist," Mr. Schnabel said. "There won't be a price list, and you won't be seeing red dots."

NEW APPRAISALS CHIEF

In an effort to beef up its appraisal business — and grab some of it away from the auction houses — the Art Dealers Association of America has hired Karen E. Carolan, the former director of the Internal Revenue Service's art appraisal division and former chairwoman of its Art Advisory Panel. She was appointed executive director of the association's appraisals services department. "This is a long-term initiative," said Lucy Mitchell-Innes, president of the dealers group.

While the association already has a team of appraisers, it is hoping to increase the business that comes primarily from estates and collectors making donations to nonprofit institutions. Performing appraisals not only brings in revenue, it is also a good way to learn where works of art are, which can often lead to future sales. That's partly why the auction houses are so keen to help clients with appraisals for everything from estate taxes to insurance and gift taxes.

While Sotheby's and Christie's usually charge fees for appraisals, it is often waived for collectors whose works they hope to sell in the future. Art dealers, like those in the association, charge a fee too, another revenue stream the group hopes to increase.

MUSEUM CHIEF TO RETIRE

Marianne Stockebrand, director of the Chinati Foundation, the contemporary art museum in Marfa, Tex., is planning to retire. The museum, located on a former Army base, was founded by the artist Donald Judd with financing from the Dia Art Foundation. Over the years it has shown not only Judd's work in depth but also that of other contemporary artists, including John Chamberlain and Dan Flavin.

A search for her replacement will begin immediately, and Ms. Stockebrand, who has been director since 1993, will continue running the institution until a successor is announced, said William Jordan, a member of Chinati's board who will head the search committee. Ms. Stockebrand said she intends to stay in Marfa and will assume the title of director emeritus.

http://www.nytimes.com/2010/02/19/arts/design/19vogel.html?ref=design

Disaster Awaits Cities in Earthquake Zones

By ANDREW C. REVKIN

ISTANBUL — As he surveys the streets of this sprawling mega-city, Mustafa Erdik, the director of an earthquake engineering institute here, says he sometimes feels like a doctor scanning a crowded hospital ward.

It is not so much the city's modern core, where two sleek Trump Towers and a huge airport terminal were built to withstand a major earthquake that is considered all but inevitable in the next few decades. Nor does Dr. Erdik agonize over Istanbul's ancient monuments, whose yards-thick walls have largely withstood more than a dozen potent seismic blows over the past two millenniums.

His biggest worry is that tens of thousands of buildings throughout the city, erected in a haphazard, uninspected rush as the population soared past 10 million from the 1 million it was just 50 years ago, are what some seismologists call "rubble in waiting."

"Earthquakes always find the weakest point," said Dr. Erdik, a professor at Bogazici University here.

Istanbul is one of a host of quake-threatened cities in the developing world where populations have swelled far faster than the capacity to house them safely, setting them up for disaster of a scope that could, in some cases, surpass the devastation in Haiti from last month's earthquake.

Roger Bilham, a seismologist at the University of Colorado who has spent decades studying major earthquakes around the world, including the recent quake in Haiti, said that the planet's growing, urbanizing population, projected to swell by two billion more people by midcentury and to require one billion dwellings, faced "an unrecognized weapon of mass destruction: houses."

Without vastly expanded efforts to change construction practices and educate people, from mayors to masons, on simple ways to bolster structures, he said, Haiti's tragedy is almost certain to be surpassed sometime this century when a major quake hits Karachi, Pakistan, Katmandu, Nepal, Lima, Peru, or one of a long list of big poor cities facing inevitable major earthquakes.

In Tehran, Iran's capital, Dr. Bilham has calculated that one million people could die in a predicted quake similar in intensity to the one in Haiti, which the Haitian government estimates killed 230,000. (Some Iranian geologists have pressed their government for decades to move the capital because of the nest of surrounding geologic faults.)

As for Istanbul, a study led by Dr. Erdik mapped out a situation in which a quake could kill 30,000 to 40,000 people and seriously injure 120,000 at the very minimum.

The city is rife with buildings with glaring flaws, like ground floors with walls or columns removed to make way for store displays, or a succession of illegal new floors added in each election period on the presumption that local officials will look the other way. On many blocks, upper floors jut precariously over the sidewalk, taking advantage of an old permitting process that governed only a building's footprint.

Worse, Dr. Erdik said, as with a doctor's patients, not all of the potentially deadly problems are visible from the outside, and thousands more buildings are presumed to be at risk. "Little details are very important," he said. "To say that a building is in bad condition is easy. To say that one is safe is hard."

Some of Turkey's biggest builders have readily admitted to using shoddy materials and bad practices in the urban construction boom. In an interview last year with the Turkish publication Referans, Ali Agaoglu, a Turkish developer ranked 468th last year on the Forbes list of billionaires, described how in the 1970s, salty sea sand and scrap iron were routinely used in buildings made of reinforced concrete.

"At that time, this was the best material," he said, according to a translation of the interview. "Not just us, but all companies were doing the same thing. If an earthquake occurs in Istanbul, not even the army will be able to get in."Echoing other engineers and planners trying to reduce Istanbul's vulnerability, Dr. Erdik said that the best hope, considering the scale of the problem, might well be that economic advancement would happen fast enough that property owners could replace the worst housing stock before the ground heaved.

"If the quake gives us some time, we can reduce the losses just through turnover," Dr. Erdik said. "If it happens tomorrow, there'll be a huge number of deaths."

But when a potent quake hit 50 miles away in 1999, killing more than 18,000 people, including 1,000 on the outskirts of Istanbul, the city was reminded that time might not be on its side. That earthquake occurred on the North Anatolian fault, which runs beneath the Marmara Sea, just a few miles from the city's crowded southern flanks.

The fault, which is very similar to the San Andreas fault in California, appears to have a pattern of successive failures, meaning the section near Istanbul is probably primed to fail, said Tom Parsons, who has studied the fault for the United States Geological Survey.

Istanbul stands out among threatened cities in developing countries because it is trying to get ahead of the risk.

A first step was an earthquake master plan drawn up for the city and the federal government by Dr. Erdik's team and researchers at three other Turkish universities in 2006. Such a plan is a rarity outside of rich cities like Tokyo and Los Angeles.

Carrying out its long list of recommendations has proved more challenging, given that the biggest source of political pressure in Istanbul, as with most crowded cities, is not an impending earthquake but traffic, crime, jobs and other real-time troubles.

Nonetheless, with the urgency amplified by the lessons from Haiti's devastation, Istanbul is doing what it can to gird for its own disaster.

The effort to prepare is coming from the top, with tighter building codes, mandatory earthquake insurance and loans from international development banks for buttressing or replacing vulnerable schools and other public buildings. But a push is also coming from the bottom, as nonprofit groups, recognizing the limits of centralized planning, train dozens of teams of volunteers in poor districts and outfit them with radios, crowbars and first-aid kits so they can dig into the wreckage when their neighborhoods are shaken.

Mahmut Bas, who leads the city's Directorate of Earthquake and Ground Analysis, is charged with consolidating and coordinating everything from building inspections to emergency response. Yet the bureaucracy is almost as sprawling and inefficient as the dizzying web of smog-shrouded streets, clogged with an estimated six million vehicles.

Mr. Bas said collapsing buildings were just one of many threats. One prediction about a potent quake concluded that 30,000 natural gas lines were likely to rupture. "If just 10 percent catch fire, that's 3,000 fires," he said, adding that the city's fire stations are able to handle at most 30 to 40 fires in one day.

Still, keeping vital structures standing — those fire stations, hospitals and schools — remains the prime priority.

Under a program financed with more than $800 million in loans from the World Bank and the European Investment Bank, and more in the pipeline from other international sources, Turkey is in the early stages of bolstering hundreds of the most vulnerable schools in Istanbul, along with important public buildings and more than 50 hospitals.

With about half of the nearly 700 schools assessed as high priorities retrofitted or replaced so far, progress is too slow to suit many Turkish engineers and geologists tracking the threat. But in districts where the work has been done or is under way — those closest to the Marmara Sea and the fault — students, parents and teachers express a sense of relief tempered by the knowledge that renovations only cut the odds of calamity.

"I hope it's enough," said Serkan Erdogan, an English teacher at the Bakirkoy Cumhuriyet primary school close to the Marmara coast, where $315,000 was spent to add reinforced walls, jackets of fresh concrete and steel rebar around old columns and to make adjustments as simple as changing classroom doors to open outward, easing evacuations.

"The improvements are great, but the building may still collapse," he said. "We have to learn how to live with that risk. The children need to know what they should do."

In a fifth-grade classroom, the student training that goes with the structural repairs was evident as Nazan Sati, a social worker, asked the 11-year-olds what they would do if an earthquake struck right at that moment.

At first a forest of hands shot toward the ceiling. Ms. Sati quickly told them to show, not tell. In a mad, giggling scramble, the students dove beneath their desks.

But the threat for children, and their parents, also lies outside the school walls, in mile upon mile of neighborhoods filled with structures called gecekondu, meaning "landed overnight," because they were constructed seemingly instantly as hundreds of thousands of migrants from rural regions flowed into the city seeking work in the past decade or two.

That kind of construction is commonplace in many of the world's most unstable seismic zones. Dr. Bilham at the University of Colorado has estimated that an engineer is involved in just 3 percent of the construction under way around the world.

Peter Yanev, who has advised the World Bank and the insurance industry on earthquake engineering and is the author of "Peace of Mind in Earthquake Country," noted that in Turkey and other developing countries, even when someone with an engineering degree was involved, that was no guarantee of safe construction because there was little specialized training or licensing.

In the face of such problems, efforts are under way in Istanbul's crowded working-class and poor neighborhoods to train and equip several thousand volunteers to be ready to respond when, not if, the worst happens.On a sunny Saturday morning, Mustafa Elvan Cantekin, who directs the Neighborhood Disaster Support Project, navigated back streets to meet with one team deep in the city's Bagcilar district, where one estimate projects that some 4,200 people would be likely to die in a major earthquake.

Dr. Cantekin, a Turkish engineer educated at Texas A&M University and tested in the 1999 earthquake zone, has helped create 49 neighborhood teams in the city, each with a shipping container loaded with crowbars, generators, stretchers and other emergency gear.

Through the project, paid for by a Swiss development agency and private companies, he has traveled to Morocco, Jordan and Iran to help initiate programs there based on Istanbul's.

A map on his lap showed that the neighborhood was on the border of red and orange danger zones delineating the worst seismic risks. He pointed to one building after another where there was no permanent roof but instead columns poking skyward in anticipation of a landlord finding a new tenant and adding yet another unlicensed floor — and another layer of risk.

As his car crawled through mazes of traffic-choked streets, Mr. Cantekin said the harsh reality for the dozens of small communities within a mega-city, as with the residents of shattered towns in Sichuan Province in China after the 2008 earthquake there, was that they would have to be self-reliant when the quake hit.

"China has the biggest civil defense capability in the world, but it still took three or four days to reach the collapsed towns," he said. "If there is the big one here, you are all alone to cope with whatever you have, at least for the first 72 hours."

Outside a community center where children sat at computers playing Farmville on Facebook, Mr. Cantekin inspected the container contents with the team leader, Cuma Cetin, 36, a father of five and a factory worker.

"We're not waiting for the disaster," Mr. Cetin said as he and his team, dressed in orange coveralls, accompanied Mr. Cantekin while he pointed out fatal flaws in nearby buildings.

Along an avenue that was a stream bed four decades ago, in a spot where houses were built on sediment instead of bedrock and thus particularly vulnerable, Mr. Cantekin led the team into a ground-floor area beneath four stories of apartments with laundry flapping in the breeze on balcony after balcony.

The columns holding up this part of the building are too thin, he said, pointing to cracks that have already scarred the concrete surface.

"This is one of the first to go," Mr. Cantekin said, before they walked on to the next one.

http://www.nytimes.com/2010/02/25/science/earth/25quake.html?ref=science

A Sticky Little Lizard Inspires a New Adhesive Tape

By ARIANNE COHEN

KEEP your eye on the shelves of your local hardware store, where in the next few years you may be able to find new tape from an unlikely source: the gecko.

“Geckos have millions of microscopic hairs on their toes, each with hundreds of tips that adhere to surfaces, with no residue left behind,” said Kellar Autumn, a biology professor at Lewis & Clark College in Portland, Ore. “Their hairs can stay attached indefinitely.”

Mr. Autumn and scientists at the University of California, Berkeley, were responsible for the research that enabled Mark Cutkosky, a professor of mechanical engineering at Stanford, to develop a prototype for a tape based on gecko adhesion. The tape, which is reusable, was so strong, Mr. Autumn said, that when they tested it, he was able to stick his 50-pound, 8-year-old daughter to a window with it.

That was a little more than two years ago; there are now at least 50 patent applications pending in gecko-adhesion technology, Mr. Autumn said, and he holds several patents himself.

“Imagine hanging a picture on the wall with reusable gecko tape that doesn’t leave a residue or damage the wall — it’s like a thumbtack, but doesn’t leave a hole,” he said. “The technology is ready to move from research to development. I think we are no more than three to five years from the first commercial products.”

There are plenty of conventional adhesives readily available right now in hardware stores — many of which have been reformulated and improved in recent years — that are designed for use on almost every conceivable surface.

One of the most common is blue painter’s tape. This offspring of masking tape is stickier but leaves less residue, making it ideal for interior paint jobs.

The best-known brand is made by 3M and sells for about $5 a roll at most home-supply stores. “It doesn’t leave any residue behind and doesn’t damage the wall,” said Ronald Fearing, a professor of electrical engineering at the University of California, Berkeley, who developed the first prototype and contributed to the research on gecko adhesion. There is also red painter’s tape for use on exterior walls, and purple tape for use on delicate fabric wallcoverings (each about $8 a roll).

Of course, one of the most popular tapes is duct tape. Tim Nyberg, who has co-written seven books on the subject, including “The Jumbo Duct Tape Book” and “Duct Shui,” calls it a panacea.

“It’s easy to use, you can rip it with your bare hands, and it doesn’t come with any instructions, so it doesn’t limit creativity,” he said.

Though a best seller, duct tape is generally not recommended by adhesive experts because it is difficult to remove and leaves a sticky residue.

Dick Orloff, who has worked as a tape chemist at National Adhesives (now a unit of the National Starch and Chemical Company) for 40 years, recommends using foil tape instead. Also called flue tape, it leaves less residue and is heat resistant and “good for repairing holes around heating ducts,” he said. It is available at most hardware stores for about $5 a roll.

Gaffer tape is used by production companies to stick cords to a stage floor, but it has other uses as well. In garages without built-in overhead lighting, it can be used to create a makeshift pendant light, holding in place an electrical cord running across the ceiling. For media centers with multiple cords coming out the back, it can be used to tape the wires to the floor or wall, to prevent tripping. Gaffer tape is also easy to remove and doesn’t leave residue. It is made by various manufacturers and sells for $5 to $8 a roll at camera stores.

Foam tape is often used for hanging posters, but Stephen Cornell, the owner of Brownies Hardware in San Francisco, warns customers against it.

“Foam poster tape is great stuff, but it’s going to take off part of the wall with it,” he said. Instead, he suggests Command, 3M’s line of semi-permanent wall hooks and Velcro patches. The hooks and patches have an adhesive that won’t damage the wall if the removal instructions are followed properly. Most of them come in packages with multiple pairs for $3 to $8.

For emergencies ranging from pipe leaks to radiator malfunctions, Mr. Cornell recommends Silicone X-Treme Tape by MOCAP.

“It doesn’t stick to anything but itself,” he said. “Let’s say a water pipe is spurting water. You can put this right around the pipe with one wrap.” At $6 for 10 feet, it’s not cheap, but it is heat resistant and can stretch to three times its length.

For less harrowing circumstances, like holes in fabric window treatments, iron-on tapes can work wonders. HeatnBond UltraHold Iron-On Adhesive is a popular one and is available at Jo-Ann Fabric and Craft Stores for $11.

Fiberglass wall-repair tape is the best choice for things like small holes in drywall, Mr. Cornell said. It can be concealed with plaster or by hanging a picture over the patch, and costs about $2 to $3 a roll at hardware stores.

Once you’ve selected a tape, be sure to read the instructions, said Dick Streeper, who has been a lab manager at 3M in St. Paul for 30 years.

"Nine out of 10 times, when customers say, 'Your tape is not working,' the problem is not following the instructions," Mr. Streeper said. "Most times, the customer hasn't prepared the surface. Typically, water is the kiss of death for any adhesive. If it's wet, nothing will stick to it except mussels in the ocean."

Dirt can also be a problem.

"Typically dirt will coat the adhesive and prevent it from forming a bond," he said. One trick: applying a layer of paint primer, which helps make a surface sticky, especially if it's a porous material like wood.

Applying pressure for at least 20 seconds can help, too. "The pressure causes the adhesive to 'wet out' and flow onto the surface," Mr. Streeper said.

When fixing broken objects, keep in mind that tape is not always the best choice. Glues "are better for repairing things than tapes, as a general rule," said Mr. Orloff, the tape chemist. "You won't see the glue, and some porous surfaces like wood, ceramics and some metals are much better bonded with a liquid adhesive."

And yes, it is O.K. to admit to tape failure.

"I usually use drywall screws and then patch the hole up," said Mr. Autumn, the biology professor. "And each time I do that, I think, God, there's got to be another way. We're really close to gecko tape."

http://www.nytimes.com/2010/02/25/garden/25fix.html?ref=science

When It Comes to Salt, No Rights or Wrongs. Yet.

By JOHN TIERNEY

Suppose, as some experts advise, that the new national dietary guidelines due this spring will lower the recommended level of salt. Suppose further that public health officials in New York and Washington succeed in forcing food companies to use less salt. What would be the effect?

A) More than 44,000 deaths would be prevented annually (as estimated recently in The New England Journal of Medicine).

B) About 150,000 deaths per year would be prevented annually (as estimated by the New York City Department of Health and Mental Hygiene).

C) Hundreds of millions of people would be subjected to an experiment with unpredictable and possibly adverse effects (as argued recently in The Journal of the American Medical Association).

D) Not much one way or the other.

E) Americans would get even fatter than they are today.

Don't worry, there's no wrong answer, at least not yet. That's the beauty of the salt debate: there's so little reliable evidence that you can imagine just about any outcome. For all the talk about the growing menace of sodium in packaged foods, experts aren't even sure that Americans today are eating more salt than they used to.

When you don't know past trends, predicting the future is a wide-open game.

My personal favorite prediction is E, the further fattening of America, but I'm just guided by a personal rule: Never bet against the expansion of Americans' waistlines, especially not when public health experts get involved.

The harder the experts try to save Americans, the fatter we get. We followed their admirable advice to quit smoking, and by some estimates we gained 15 pounds apiece afterward. The extra weight was certainly a worthwhile trade-off for longer life and better health, but with success came a new challenge.

Officials responded by advising Americans to shun fat, which became the official villain of the national dietary guidelines during the 1980s and 1990s. The anti-fat campaign definitely made an impact on the marketing of food, but as we gobbled up all the new low-fat products, we kept getting fatter. Eventually, in 2000, the experts revised the dietary guidelines and conceded that their anti-fat advice may have contributed to diabetes and obesity by unintentionally encouraging Americans to eat more calories.

That fiasco hasn't dampened the reformers' enthusiasm, to judge from the growing campaign to impose salt restrictions. Pointing to evidence that a salt-restricted diet causes some people's blood pressure to drop, the reformers extrapolate that tens of thousands of lives would be saved if there were less salt in everybody's food.

But is it even possible to get the public to permanently reduce salt consumption? Researchers have had a hard enough time getting people to cut back during short-term supervised experiments.

The salt reformers say change is possible if the food industry cuts back on all the hidden salt in its products. They want the United States to emulate Britain, where there has been an intensive campaign to pressure industry as well as consumers to use less salt. As a result, British authorities say, from 2000 to 2008 there was about a 10 percent reduction in daily salt consumption, which was measured by surveys that analyzed the amount of salt excreted in urine collected over 24 hours.

But the British report was challenged in a recent article in The Clinical Journal of the American Society of Nephrology by researchers at the University of California, Davis, and Washington University in St. Louis. The team, led by Dr. David A. McCarron, a nephrologist at Davis, criticized the British authorities for singling out surveys in 2008 and 2000 while ignoring nearly a dozen similar surveys conducted in the past two decades.

When all the surveys in Britain are considered, there has been no consistent downward trend in salt consumption in recent years, said Dr. McCarron, who has been a longtime critic of the salt reformers. (For more on him and his foes, go to nytimes.com/tierneylab.) He said that the most notable feature of the data is how little variation there has been in salt consumption in Britain — and just about everywhere else, too.

Dr. McCarron and his colleagues analyzed surveys from 33 countries around the world and reported that, despite wide differences in diet and culture, people generally consumed about the same amount of salt. There were a few exceptions, like tribes isolated in the Amazon and Africa, but the vast majority of people ate more salt than recommended in the current American dietary guidelines.

The results were so similar in so many places that Dr. McCarron hypothesized that networks in the brain regulate sodium appetite so that people consume a set daily level of salt. If so, that might help explain one apparent paradox related to reports that Americans are consuming more daily calories than they used to. Extra food would be expected to come with additional salt, yet there has not been a clear upward trend in daily salt consumption evident over the years in urinalysis studies, which are considered the best gauge because they directly measure salt levels instead of relying on estimates based on people's recollections of what they ate. Why no extra salt? One prominent advocate of salt reduction, Dr. Lawrence Appel of Johns Hopkins University, said that inconsistent techniques in conducting the urinalysis surveys may be masking a real upward trend in salt consumption.

But Dr. McCarron called the measurements reliable and said they could be explained by the set-point theory:

As Americans ate more calories, they could have eased up on some of the saltier choices so that their overall sodium consumption remained constant. By that same logic, he speculated, if future policies reduce the average amount of salt in food, people might compensate by seeking out saltier foods — or by simply eating still more of everything.

The salt reformers dismiss these speculations, arguing that with the right help, people can maintain low-salt diets without gaining weight or suffering other problems. But even if people could be induced to eat less salt, would they end up better off? The estimates about all the lives to be saved are just extrapolations based on the presumed benefits of lower blood pressure.

If you track how many strokes and heart attacks are suffered by people on low-salt diets, the results aren't nearly as neat or encouraging, as noted recently in JAMA by Michael H. Alderman, a hypertension expert at Albert Einstein College of Medicine. A low-salt diet was associated with better clinical outcomes in only 5 of the 11 studies he considered; in the rest, the people on the low-salt diet fared either the same or worse.

"When you reduce salt," Dr. Alderman said, "you reduce blood pressure, but there can also be other adverse and unintended consequences. As more data have accumulated, it's less and less supportive of the case for salt reduction, but the advocates seem more determined than ever to change policy."

Before changing public policy, Dr. Alderman and Dr. McCarron suggest trying something new: a rigorous test of the low-salt diet in a randomized clinical trial. That proposal is rejected by the salt reformers as too time-consuming and expensive. But when you contemplate the potential costs of another public health debacle like the anti-fat campaign, a clinical trial can start to look cheap.

http://www.nytimes.com/2010/02/23/science/23tier.html?ref=science

Transplants That Do Their Job, Then Fade Away
By DENISE GRADY

Jonathan Nuñez was 8 months old when a liver transplant saved his life. Three years later, his body rejected the transplant, attacking it so fiercely that it wasted away and vanished, leaving barely a trace.

That result, seemingly a disaster, was exactly what his doctors had hoped for. They had deliberately withdrawn Jonathan's antirejection medicine because he no longer needed the transplant. His own liver had — as planned — regenerated.

Jonathan, a 4-year-old with a shy smile and a love of dinosaurs, is among a small number of children in the United States who have undergone a highly unusual type of transplant surgery, one that — for the few who are eligible — offers a tremendous advantage: a normal life, free from antirejection drugs, which suppress the immune system and increase the risk of infections, cancer and other problems. Normally, transplant patients must take these powerful drugs for life. In standard transplants, the diseased organ is completely removed and a new one put in its place. What is different about the operation Jonathan and the other children had is that only part of the recipient's liver is removed, and it is replaced with part of a donor's liver. At first, to prevent rejection, the patient takes the usual drugs.

Then, doctors watch and wait. The liver has an extraordinary ability to regenerate, especially in children, and the hope is that while the transplant is doing its job, what remains of the patient's own liver will regenerate and start working again. The process can take a year or more; in Jonathan's case, it took three.

If the liver does regenerate and grow large enough, doctors begin to withdraw the antirejection medicines. The patient's immune system reactivates and, in most cases, gradually destroys the transplant, which is no longer needed. Life goes back to normal, free from a daily schedule of pills and their risks and expense.

"I think we need to promote this idea," said Dr. Tomoaki Kato, Jonathan's surgeon. He works at NewYork-Presbyterian Hospital/Columbia University Medical Center, but performed Jonathan's transplant in 2006 at the University of Miami/Jackson Memorial Hospital.

"A lot of the transplant community is focused on how to get patients off immunosuppression, and this is one way," he added.

But only a tiny fraction of transplant patients are candidates for the operation: certain children with acute liver failure — probably fewer than 100 a year in the United States, where 525 under 18 had liver transplants last year. The operation is a difficult one. It is longer and more risky than a standard transplant, and surgeons caution that patients have to be selected carefully because not all can withstand the surgery.

The surgery was first tried in Europe in the early 1990s, and later in the United States. But the results were mixed — the liver did not always regenerate — and it never really caught on. (In medical journals, it is called auxiliary partial orthotopic liver transplantation.) Dr. Kato said the results may have been poor because the early attempts included adults.

“I think the key is children,” he said.

The best candidates are children with acute hepatic failure, a deadly condition in which the liver suddenly stops working, often for unknown reasons. Although the liver might be able to recover, it cannot do so fast enough to prevent brain damage and death from the toxins that build up. The only way to save the life of someone with this condition is to perform a transplant — or a partial one. Such partial transplants do not work for chronic liver diseases that cause scarring because it prevents the liver from regenerating.

All told, Dr. Kato has performed the surgery on seven children, ranging in age from 8 months (Jonathan) to 8 years, at Jackson Memorial. So far, the patient’s own liver has recovered in six of the seven children, and they no longer require antirejection drugs, Dr. Kato said, adding that he expected the need for the drugs to taper off soon for the seventh. In four, he described the transplant as “melting” away completely on its own, but two others, including Jonathan, needed surgery to remove a remnant or clear up an infection.

Dr. Kato’s first case was in 1997. That child spent three months in intensive care. “We didn’t think it was successful,” he said. But after two years, the liver had fully recovered.

“That gave us the idea this was something worth doing,” Dr. Kato said.

Other surgeons have tried the procedure. Dr. Alan Langnas, director of liver transplantation at the Nebraska Medical Center, said he had performed it on about 10 patients, mostly children, in the last 15 years. In some cases, he said, the patient’s liver did not regenerate. At least one required a second transplant.

“I think the success has always been a little mixed,” Dr. Langnas said. “It depends on the patient selection and how well their native liver recovers. But I think it is an important option for some patients.”

Dr. Simon Horslen, the medical director of liver and intestine transplant at Seattle Children’s Hospital, who was at the Nebraska center when the operations were done there, said: “In the right hands it’s a wonderful technique. It is a case of those of us who have experienced it having to convince others.”

Surgeons at Kings College in London have also performed the surgery, on 20 children ranging from 1 to 16 years old, during the last 20 years. Seventeen have survived. One needed a second transplant, but in 14, their own livers regenerated, and, so far, 11 have been able to stop taking antirejection drugs. In a recent article in a medical journal, the medical team from Kings College said the operation should be considered for children who need transplants for acute liver failure.

But Dr. J. Michael Millis, the chief of transplantation at the University of Chicago Medical Center, said, “This has not been particularly successful in most of the hands that have tried it.”

He added, “Even in Kato’s series, the operative time is almost double, so the patients have to spend almost twice as much time in the operating room, and I think that is actually the area that is the Achilles’ heel.” (A liver transplant usually takes about six hours.)

Long operations require that patients be given large amounts of intravenous fluid, something that children with liver failure generally cannot tolerate, Dr. Millis said, explaining that the fluid causes brain swelling that can kill them.

“I’ve been waiting for kids to do this on for a decade,” he said. “But by the time I get a liver that is suitable, they’re too sick. I have to get them in and out of the operating room and back to intensive care as quickly as possible, with minimal fluids.”

Dr. Langnas had similar concerns. “Sometimes these kids are so sick, they literally have hours or a day to live,” he said. “Under those circumstances, we want to not take any chances.”

Jonathan Nuñez, whose family lives in Miami, had a textbook case of acute liver failure. At 8 months, he was perfectly happy and healthy, then he suddenly turned cranky and sleepy. He cried too much, ate too little and began vomiting. He turned yellow, and his stomach and legs swelled. The diagnosis was acute liver failure, cause unknown. The only hope was a transplant.At Jackson Memorial, Dr. Kato suggested a partial transplant. Jonathan’s mother, Yailin Nuñez, said she and her husband immediately said yes, because it offered at least a chance that Jonathan would be able to live a normal life, without immunosuppressants.

Children with acute liver failure shoot to the top of the list, and Jonathan got a transplant one day after being listed. He had a rocky recovery, more so than most of Dr. Kato’s patients. Severe rejection episodes required high doses of steroids. Other complications took him in and out of the hospital for three months.

He stabilized, but his own liver did not seem to be regenerating; at one point it even shrank. Ms. Nuñez never gave up hope, but after about two years, Dr. Kato started to doubt that Jonathan’s liver would ever recover, and he even contemplated removing it to prevent problems. Then it began to grow.

By last September, Jonathan’s liver was large enough to work on its own. He no longer needed the transplant. Doctors began decreasing antirejection drugs, and Jonathan’s immune system did the rest. In September, the transplant had been plainly visible on his CT scan. By November, it was gone.

But the transplant atrophied so fast that one spot where it had been connected to the small intestine did not have a chance to close properly. An abscess formed, causing fevers and making Jonathan quite sick. He needed antibiotics and a procedure to drain the infection. Two months later, on Jan. 28, at NewYork-Presbyterian Morgan Stanley Children’s Hospital, Dr. Kato operated to remove the abscess completely. A few days later, Jonathan and his family flew home to Miami.

“At the end of the day, I’m so glad,” Ms. Nuñez said. “I feel so fortunate that my son’s liver regenerated. The complications have been a struggle, and not knowing what caused his liver failure haunts me to this day. But he can live a normal life without immunosuppression. That’s what matters. There is hope out there when you’re given devastating news.”

“When it works, it’s cool,” Dr. Langnas said.

“In Seattle, they are considering it,” Dr. Horslen said

http://www.nytimes.com/2010/02/23/health/23liver.html?ref=science

Evidence That Little Touches Do Mean So Much
By BENEDICT CAREY

Psychologists have long studied the grunts and winks of nonverbal communication, the vocal tones and facial expressions that carry emotion. A warm tone of voice, a hostile stare — both have the same meaning in Terre Haute or Timbuktu, and are among dozens of signals that form a universal human vocabulary.

But in recent years some researchers have begun to focus on a different, often more subtle kind of wordless communication: physical contact. Momentary touches, they say — whether an exuberant high five, a warm hand on the shoulder, or a creepy touch to the arm — can communicate an even wider range of emotion than gestures or expressions, and sometimes do so more quickly and accurately than words.

"It is the first language we learn," said Dacher Keltner, a professor of psychology at the University of California, Berkeley, and the author of "Born to Be Good: The Science of a Meaningful Life" (Norton, 2009), and remains, he said, "our richest means of emotional expression" throughout life.

The evidence that such messages can lead to clear, almost immediate changes in how people think and behave is accumulating fast. Students who received a supportive touch on the back or arm from a teacher were nearly twice as likely to volunteer in class as those who did not, studies have found. A sympathetic touch from a doctor leaves people with the impression that the visit lasted twice as long, compared with estimates from people who were untouched. Research by Tiffany Field of the Touch Research Institute in Miami has found that a massage from a loved one can not only ease pain but also soothe depression and strengthen a relationship.

In a series of experiments led by Matthew Hertenstein, a psychologist at DePauw University in Indiana, volunteers tried to communicate a list of emotions by touching a blindfolded stranger. The participants were able to communicate eight distinct emotions, from gratitude to disgust to love, some with about 70 percent accuracy.

"We used to think that touch only served to intensify communicated emotions," Dr. Hertenstein said. Now it turns out to be "a much more differentiated signaling system than we had imagined."

To see whether a rich vocabulary of supportive touch is in fact related to performance, scientists at Berkeley recently analyzed interactions in one of the most physically expressive arenas on earth:

professional basketball. Michael W. Kraus led a research team that coded every bump, hug and high five in a single game played by each team in the National Basketball Association early last season.

In a paper due out this year in the journal Emotion, Mr. Kraus and his co-authors, Cassy Huang and Dr. Keltner, report that with a few exceptions, good teams tended to be touchier than bad ones. The most touch-bonded teams were the Boston Celtics and the Los Angeles Lakers, currently two of the league's top teams; at the bottom were the mediocre Sacramento Kings and Charlotte Bobcats.

The same was true, more or less, for players. The touchiest player was Kevin Garnett, the Celtics' star big man, followed by star forwards Chris Bosh of the Toronto Raptors and Carlos Boozer of the Utah Jazz. "Within 600 milliseconds of shooting a free throw, Garnett has reached out and touched four guys," Dr. Keltner said.

To correct for the possibility that the better teams touch more often simply because they are winning, the researchers rated performance based not on points or victories but on a sophisticated measure of how efficiently players and teams managed the ball — their ratio of assists to giveaways, for example. And even after the high expectations surrounding the more talented teams were taken into account, the correlation persisted. Players who made contact with teammates most consistently and longest tended to rate highest on measures of performance, and the teams with those players seemed to get the most out of their talent.

The study fell short of showing that touch caused the better performance, Dr. Kraus acknowledged. "We still have to test this in a controlled lab environment," he said.

If a high five or an equivalent can in fact enhance performance, on the field or in the office, that may be because it reduces stress. A warm touch seems to set off the release of oxytocin, a hormone that helps create a sensation of trust, and to reduce levels of the stress hormone cortisol.

In the brain, prefrontal areas, which help regulate emotion, can relax, freeing them for another of their primary purposes: problem solving. In effect, the body interprets a supportive touch as "I'll share the load."

"We think that humans build relationships precisely for this reason, to distribute problem solving across brains," said James A. Coan, a a psychologist at the University of Virginia. "We are wired to literally share the processing load, and this is the signal we're getting when we receive support through touch."

The same is certainly true of partnerships, and especially the romantic kind, psychologists say. In a recent experiment, researchers led by Christopher Oveis of Harvard conducted five-minute interviews with 69 couples, prompting each pair to discuss difficult periods in their relationship.

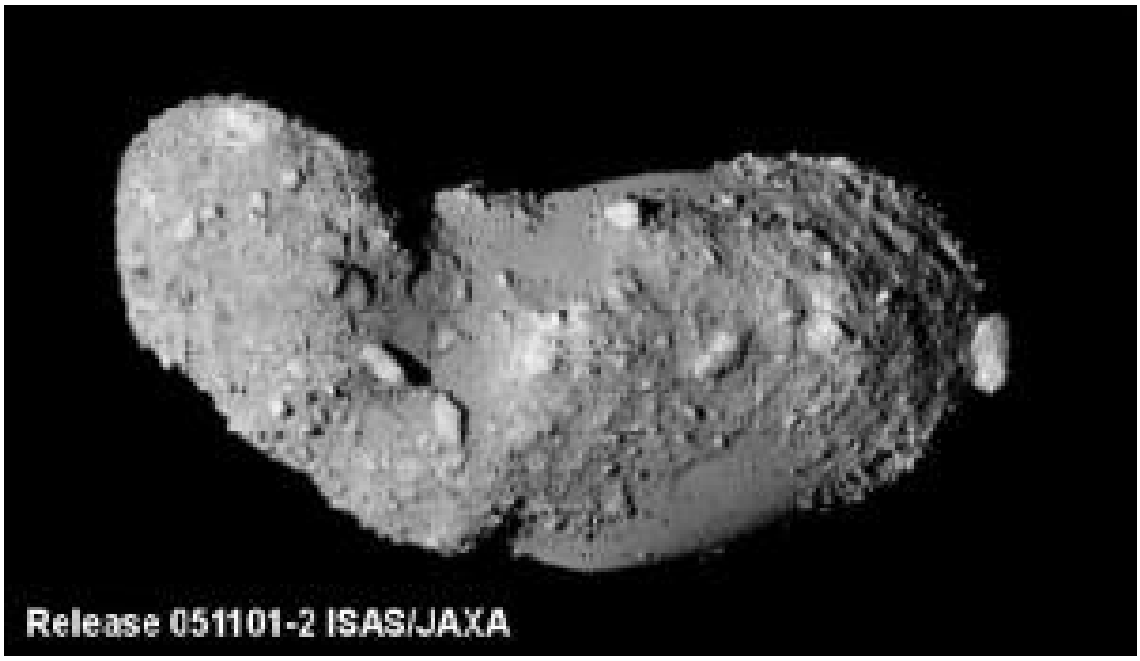
The investigators scored the frequency and length of touching that each couple, seated side by side, engaged in. In an interview, Dr. Oveis said that the results were preliminary.

"But it looks so far like the couples who touch more are reporting more satisfaction in the relationship," he said.

Again, it's not clear which came first, the touching or the satisfaction. But in romantic relationships, one has been known to lead to the other. Or at least, so the anecdotal evidence suggests.

http://www.nytimes.com/2010/02/23/health/23mind.html?ref=science

Asteroid Astronomers Get Unprecedented Amount of Telescope Time



A close-up of near-Earth asteroid Itokawa taken from the Japanese Hayabusa spacecraft. This asteroid is one of many that will be studied by Dr Lowry as part of the observational program at ESO. (Credit: Courtesy of JAXA)

ScienceDaily (Feb. 25, 2010) — UK planetary science will be among those to benefit from an exceptional award of 82 nights of European Southern Observatory (ESO) telescope time made to an international team of astronomers led by Dr Stephen Lowry from the University of Kent.

This award, spread over 4 years, will enable Dr Lowry and his team to study how near-Earth asteroids (NEAs) react to a phenomenon known as the YORP effect [see below]. It will also boost the national and international research profile of the University's Astronomy, Astrophysics and Space Sciences programmes.

ESO is the foremost intergovernmental astronomy organisation in Europe and the world's most productive astronomical observatory. It provides state-of-the-art research facilities to astronomers and is supported by most European countries, including the UK. Each year, about 2,000 proposals are made for the use of ESO telescopes, requesting between four and six times more nights than are available. Generally, an allocation of one to two nights in any given six-month period is considered to be a success for individual research astronomers.

Dr Lowry explained: 'With a provision of 82 nights telescope time, we expect to be able to monitor a large sample of near-Earth asteroids over many years and to look for signs of the YORP effect acting on them. We can also perform detailed studies of their surface properties to help understand the processes that drive the effect.'

Dr Lowry also explained the benefits for UK planetary science. 'Over the next four years we expect some exciting results, leading to major developments in the field of near-Earth asteroid science. This will not only lead to additional awards of telescope time for studies in this area by UK astronomers, but will also boost the international profile of planetary science in the UK.'

Professor Paul Strange, Head of the University's School of Physical Sciences, commented: 'I congratulate Dr Lowry on obtaining this award. Such a large allocation of telescope time could only be gained by a

truly world-class research project. This is a huge boost to the profile of planetary science in the School of Physical Sciences at Kent and to the South East Universities Physics Network of which Kent is a key member.'

Professor Peter Jeffries, Dean of the Faculty of Sciences, added: 'This important award recognises our commitment to the international research effort in Planetary Science. Stephen was appointed to Kent as part of our contribution to the South East Universities Physics Network. We are proud that his work has been recognised in this way and look forward to some exciting observations as a result of this exceptional access to telescope time.'

The project will be conducted in collaboration with astronomers from Europe and the US. Team members include: Dr Simon Green, Dr Stephen Wolters and Ben Rozitis (Open University); Professor Alan Fitzsimmons and Samuel Duddy (Queen's University of Belfast); Dr Colin Snodgrass (Max Planck Institute for Solar System Research, Germany); Ryan Laird (University of Kent); and Dr Paul Weissman and Dr Michael Hicks (NASA's Jet Propulsion Laboratory, California, USA).

Background: the YORP Effect

The Yarkovsky-O'Keefe-Radzievskii-Paddack (YORP) effect is believed to alter the way small asteroids in the solar system rotate. YORP is a torque due to sunlight hitting the surfaces of asteroids and meteoroids and warming their surfaces, leading to a gentle recoil effect as the heat is emitted. By analogy, if one were to shine light on a propeller over a long enough period, it would start spinning.

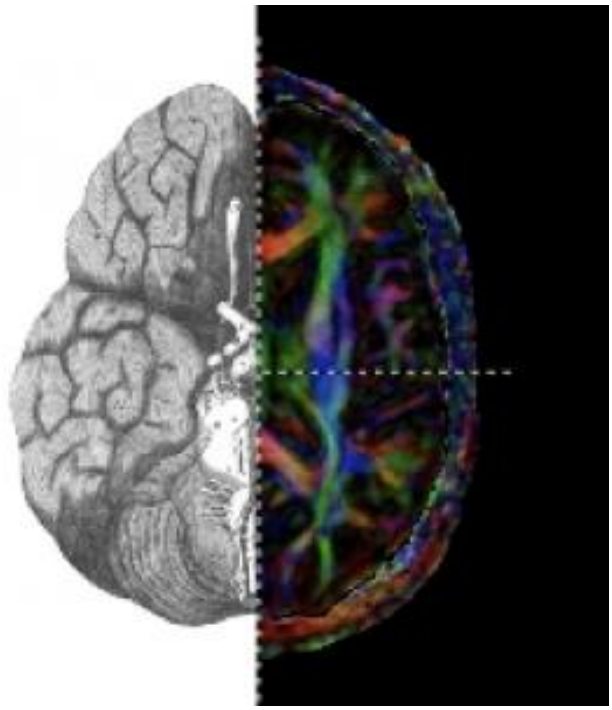
Although this is an almost immeasurably weak force, astronomers believe it may be responsible for spinning some asteroids up so fast that they change shape or break apart, perhaps leading to the formation of binary asteroids. Others may be slowed down so that they take many days to rotate once. The YORP effect also plays an important role in changing the orbits of asteroids between Mars and Jupiter, including their delivery to planet-crossing orbits.

Dr Lowry and colleagues were the first to observe the effect in action on a small asteroid known as 2000 PH5. Despite its importance, the effect has been detected on just 2 other asteroids since then, mostly due to the challenges in securing the telescope time needed.

Story Source:

Adapted from materials provided by University of Kent.
http://www.sciencedaily.com/releases/2010/02/100224134143.htm

Technology and Culture Determine Our View of the Brain



What does the brain look like? What do we really know about our brains? (Credit: Image courtesy of University of Groningen)

ScienceDaily (Feb. 25, 2010) — What does the brain look like? What do we really know about our brains? For centuries, we've been telling ourselves time and again that we now have an objective view of our brains. However, objectivity depends on technological developments, human actions and social and cultural factors, to name but a few. This has been revealed by research by Sarah de Rijcke, who will be awarded a PhD by the University of Groningen on 18 February 2010.

In her research, De Rijcke charted how over the past four centuries humans have regarded the brain. She studied numerous documents from all over Europe and the US -- illustrations, manuals, atlases, articles, lab reports, diary fragments, correspondence between researchers, manuals of image technology, lab setups, microscope instructions, scan technology, print technology, etc.

Human contribution

Today, we consider knowledge objective if it has been created with the best equipment, supported by statistics, and without too much human contribution, De Rijcke has established. Current brain scans thus appear to be the apex of objective registration of both neuroanatomy and brain function. This is despite the fact that contemporary scans are not static photos but actually interactive tools -- researchers use computer software to examine the information in scans in more and more new ways.

Drawings are better than photographs

The idea that scientists are not allowed to personally 'colour' their research material and have to behave with reserve emerged in the nineteenth century. The Spanish Nobel prizewinner Santiago Ramón y Cajal (1852-1934) is illustrative for this transitional period. Cajal continued to draw nerve cells by hand for his entire career, even though photography had been invented and he was also a successful amateur photographer. Cajal thought that neurons could not be depicted in photographic images -- he thought that

a complete picture could only exist in the head of the researcher. By drawing them, a researcher could make them abstract and isolate meaningful details.

"Channel from God"

In addition to Cajal's research and registration methods, Rijcke also concentrated on the work of several members of the seventeenth-century British Royal Society. Sixteenth-century scholars had still regarded themselves as channels from God, and wanted to display the beauty of God's creation in their work. In the seventeenth century, true-to-nature acquired a different meaning; the members of the Royal Society no longer wanted to 'polish away' irregularities in the brain. Their research emphasized the importance of experiments and the presence of witnesses at experimental demonstrations, among other things.

In fifty years' time

The aids and technologies used over the course of the centuries, from the microscope to colouring techniques, photography and contemporary PET and CT scanners, have strongly influenced how we regard the brain. And the process remains ongoing. De Rijcke: 'In fifty years time we may well scoff at the enormous scanners we use today. Scans may well not make as much noise as they do now; and perhaps you won't have to lie in a scanner at all. By that time we'll probably have a completely different view of objectivity as well.'

Story Source:

Adapted from materials provided by University of Groningen.
http://www.sciencedaily.com/releases/2010/02/100212210216.htm

More Tropical Cyclones in Past Could Play Role in Warmer Future

Cyclone Nargis, from METOP-A channel 2 visible imagery (2008-05-02). (Credit: NOAA)

ScienceDaily (Feb. 25, 2010) — More frequent tropical cyclones in Earth's ancient past contributed to persistent El Niño-like conditions, according to a team of climate scientists led by Yale University. Their findings, which appear in the Feb. 25 issue of the journal *Nature*, could have implications for the planet's future as global temperatures continue to rise due to climate change.

The team used both cyclone and climate models to study the frequency and distribution of tropical cyclones (also known as hurricanes or typhoons) during the Pliocene epoch, a period three to five million years ago when temperatures were up to four degrees Celsius warmer than today.

The team found that there were twice as many tropical cyclones during this period, that they lasted two to three days longer on average than they do now, and that, unlike today, they occurred across the entire tropical Pacific Ocean.

"The Pliocene is the best analog we have in the past for what could happen in our future," said Christopher Brierley, a Yale postdoctoral associate and an author of the study. "We wondered whether all these storms could have contributed to the warmer climate."

In fact, the team discovered a positive feedback cycle between tropical cyclones and upper-ocean circulation in the Pacific that explains the increase in storms and appears to have led to permanent El Niño-like conditions.

Today, cold water originating off the coasts of California and Chile skirts around the region of tropical cyclone activity on its way to the Equator, where it results in a "cold tongue" that stretches west off the coast of South America. During the Pliocene, however, the team found that this cold water could not

avoid being hit by one of the many tropical cyclones, which would churn up and mix warmer water into it. This warming at the Equator led to changes in the atmosphere that in turn created more tropical storms -- and the cycle would repeat.

The team hopes to study how much mixing could result from tropical cyclones in today's ocean waters -- something that is hard to incorporate in global climate models, said Alexey Fedorov, an associate professor at Yale and lead author of the paper.

Fedorov cautioned that there is not necessarily a direct link between what happened during the Pliocene and what might happen in the future, as the team's results for this epoch differed in many respects from current projections for future global warming. For example, the existing consensus is that, while the number of intense hurricanes will increase, the overall number will actually decrease.

"However, unless we understand the causes of these differences, we will not be sure whether our projections are correct," Fedorov said. "Changes in the frequency and distribution of these storms could be a significant component of future climate conditions."

Other authors of this paper include Kerry Emanuel of the Massachusetts Institute of Technology.

Funding for this study was provided by the National Science Foundation, the Department of Energy Office of Science, and the David and Lucile Packard Foundation.

Story Source:

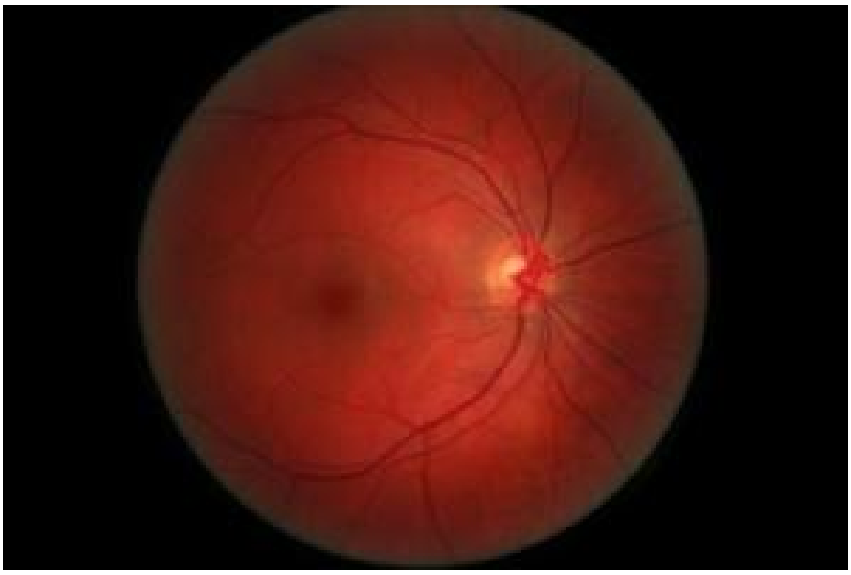
Adapted from materials provided by Yale University.

Journal Reference:

1. Alexey V. Fedorov, Christopher M. Brierley & Kerry Emanuel. **Tropical cyclones and permanent El Niño in the early Pliocene epoch**. *Nature,* 2010; 463 (7284): 1066 DOI: 10.1038/nature08831

http://www.sciencedaily.com/releases/2010/02/100224165225.htm

More Evidence on Benefits of High Blood Pressure Drugs in Diabetic Eye Disease



The largest study to date of proteins in the retina, above, indicates that high blood pressure drugs may be useful in preventing diabetic eye disease. (Credit: Wikimedia Commons, Danny Hope)

ScienceDaily (Feb. 25, 2010) — Scientists in Massachusetts are reporting new evidence that certain high blood pressure drugs may be useful in preventing and treating diabetic retinopathy, the leading cause of vision loss in people with diabetes. The study, the largest to date on proteins in the retina, could lead to new ways to prevent or treat the sight-threatening disease, they say.

The findings are in the American Chemical Society's *Journal of Proteome Research*, a monthly publication.Edward Feener and colleagues point out that diabetic retinopathy is a common complication of diabetes, which affects millions of people worldwide. It involves damage to blood vessels in the retina, the light sensitive tissue in the back of the eye. Previous studies suggested that drugs used to treat high blood pressure, including ACE inhibitors and angiotensin receptor blockers (ARBs), may help prevent the condition.

The scientists analyzed proteins from the retinas laboratory mice with normal blood pressure and diabetes and compared them to those of non-diabetic mice. They identified 65 abnormal proteins in the diabetic mice out of more than 1,700 proteins in the study. Treatment with the ARB medication, candesartan, prevented the abnormal changes in more than 70 percent of the proteins.

Story Source:

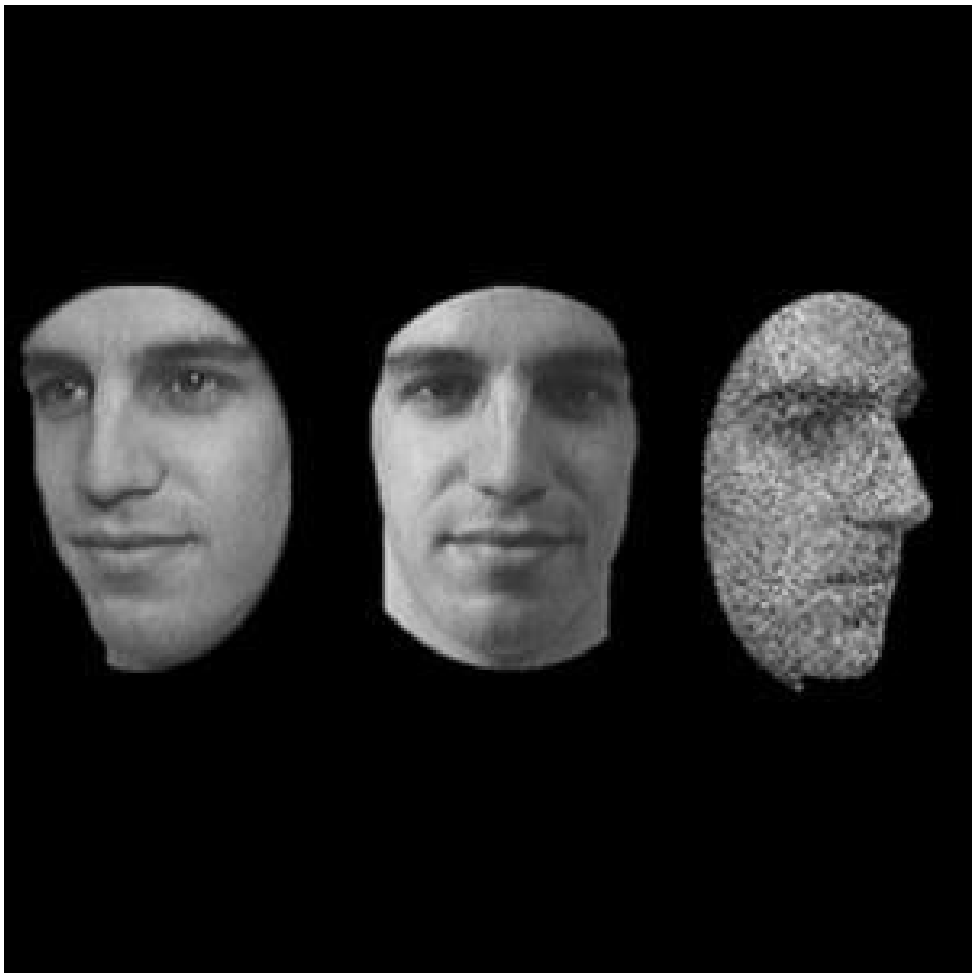
Adapted from materials provided by American Chemical Society, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Gao et al. **Angiotensin AT1 Receptor Antagonism Ameliorates Murine Retinal Proteome Changes Induced by Diabetes**. *Journal of Proteome Research*, 2009; 8 (12): 5541 DOI: 10.1021/pr9006415

http://www.sciencedaily.com/releases/2010/02/100224132647.htm

Genes Responsible for Ability to Recognize Faces



Cambridge Face Memory Test. (Credit: Image courtesy of University College London)

ScienceDaily (Feb. 24, 2010) — The ability to recognise faces is largely determined by your genes, according to new research at UCL (University College London).

Published February 22 in the *Proceedings of the National Academy of Sciences*, scientists found that identical twins were twice as similar to each other in terms of their ability to recognise faces, compared to non-identical twins.

Researchers also found that the genetic effects that allow people to recognise faces are linked to a highly specific mechanism in the brain, unrelated to other brain processes such as the ability to recognise words or abstract art.

"Face recognition is a skill that we depend on daily and considerable variability exists in the ability to recognize faces. Our results show that genetic differences are responsible for the great majority of the difference in face recognition ability between people," said Dr Brad Duchaine from UCL's Institute of Cognitive Neuroscience, a co-author of the paper.

The study consisted of 164 identical twins, who share all of their genes, and 125 non-identical same-sex twins, who share 50% of their genes. All the participants took the Cambridge Face Memory Test*, which measures ability to learn six faces and then recognise them in novel poses and lighting.

Scientists examined the similarity between scores for both types of twin pairs. The correlation for identical twin pairs was 0.70, whereas the correlation for non-identical twins was less than half that, at 0.29. This difference indicates that the similarity in identical twin pairs is due to their shared genes, rather than shared family environment.

"We are excited about this finding because the brain mechanisms carrying out face recognition are fairly well understood, meaning that the high heritability of face recognition could provide a good opportunity to connect genes to brain mechanisms and then to behaviour," added Dr Duchaine.

The study also investigated whether these brain processes were specific to recognising faces, or more general recognition processes. Twins and a large cohort of non-twins did the Cambridge Face Memory Test and two other tests; one which required recognizing previously learned words and the other required recognizing previously learned abstract art. The results showed that these abilities were only weakly related to face recognition ability.

* An online version of the Cambridge Face Memory Test is available for members of the public to test themselves: http://www.faceblind.org/facetests/index.php

Story Source:

Adapted from materials provided by University College London.

http://www.sciencedaily.com/releases/2010/02/100222161845.htm

First Images from European Space Agency's Water Mission

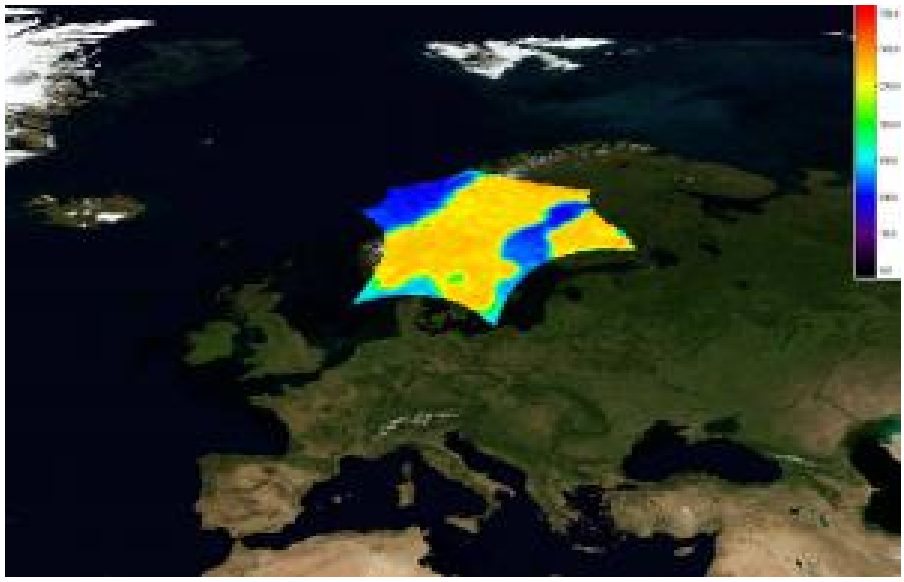


Image of brightness temperature over Scandinavia captured by SMOS. (Credit: ESA)

ScienceDaily (Feb. 24, 2010) — In less than four months since launch, the first calibrated images are being delivered by ESA's SMOS mission. These images of 'brightness temperature' translate into clear information on global variations of soil moisture and ocean salinity to advance our understanding of the water cycle.

Launched on 2 November, the Soil Moisture and Ocean Salinity (SMOS) mission is improving our understanding of Earth's water cycle by making global observations of soil moisture over land and salinity over oceans. By consistently mapping these two variables, SMOS will not only advance our understanding of the exchange processes between Earth's surface and atmosphere, but will also help to improve weather and climate models.

In addition, the data from SMOS will have several other applications in areas such as agriculture and water resource management.

SMOS captures images of 'brightness temperature', which then require substantial processing to realise information on soil moisture and ocean salinity. Brightness temperature is a measure of the radiation emitted from Earth's surface. During the commissioning phase, considerable effort is put into improving the quality of these images of brightness temperature before using them as input for the soil moisture and ocean salinity data products. ESA is now in a position to show the first results, which are very encouraging.

Since it was launched, engineers and scientists from various institutes in Europe have been busy commissioning the SMOS satellite and instrument. This commissioning phase, which will continue until the end of April, initially involved testing the Proteus platform -- a generic 'satellite bus' developed by the French space agency CNES and Thales Alenia Space -- and the all-important MIRAS instrument developed by EADS-CASA in Spain under contract to ESA. Both platform and instrument have shown excellent performance during their first four months in orbit.

Achim Hahne, ESA's SMOS Project Manager, said, "Our development team is extremely happy and proud to see the real performance of the SMOS system in orbit. We are only half-way through the in-orbit commissioning phase and it is rewarding to see these first very promising calibrated products delivered by SMOS."

Among other tasks, commissioning also includes testing the system that sends the data to the ground and the process through which the data is distributed, as well as calibrating the data products delivered by MIRAS -- the Microwave Imaging Radiometer with Aperture Synthesis instrument.

MIRAS produces a snapshot of brightness temperature every 1.2 seconds. The image of Scandinavia shows one snapshot acquired by SMOS. From these images of brightness temperature, it is possible to derive how much moisture there is in the surface layers of soil and how much salt there is in the surface waters of the oceans. High brightness temperatures translate into dry soils and low brightness temperatures into wet areas. This is why bodies of water show up as cold spots.

Calibration and validation are a major undertaking in any Earth observation mission. Once the data get to the ground, they need to be checked that they make sense and can be used for scientific research. The last three months have been dedicated to performing these calibration activities in order to assess the performance of the mission.

This first calibration step is important to ensure the instrument meets the required performance. The process also includes making corrections for errors caused by, for example, temperature variations in the instrument's antenna receivers or light reflected from the Sun and Moon. The effect is instantly visible in the calibrated image of Australia, where geophysical features, such as lakes, are clearly visible, compared to the uncalibrated image.

The image showing Brazil highlights the rainforest, which is relatively stable and bright, and the Amazon River is seen in lower brightness temperatures.

Susanne Mecklenburg, who, as ESA's SMOS Mission Manager, will formally take over the reins of the mission at the end of commissioning said, "It is exciting to see these first data products, which are already of excellent quality, even though we haven't completed all the calibration activities yet. We also had very positive feedback from the scientists who have already started using the data."

Yann Kerr, who first proposed the mission to ESA, added, "SMOS has delivered its first products earlier than expected and of a quality better than the specifications."

The acquisition of these calibrated images marks a very important step in the progress of the SMOS mission and also demonstrates the excellent quality and availability of the data, which will soon be available to the science community.

Jordi Font, the mission's Lead Investigator for ocean salinity, said, "For the ocean products, a lot of work still has to be done before the release of operational data. The low sensitivity to variations in salinity requires very accurate instrument calibration and data processing to achieve the mission's measurement goals for ocean salinity. However, the excellent performance of MIRAS, and the work being done in commissioning means we are very close to obtaining good results for measuring salinity."

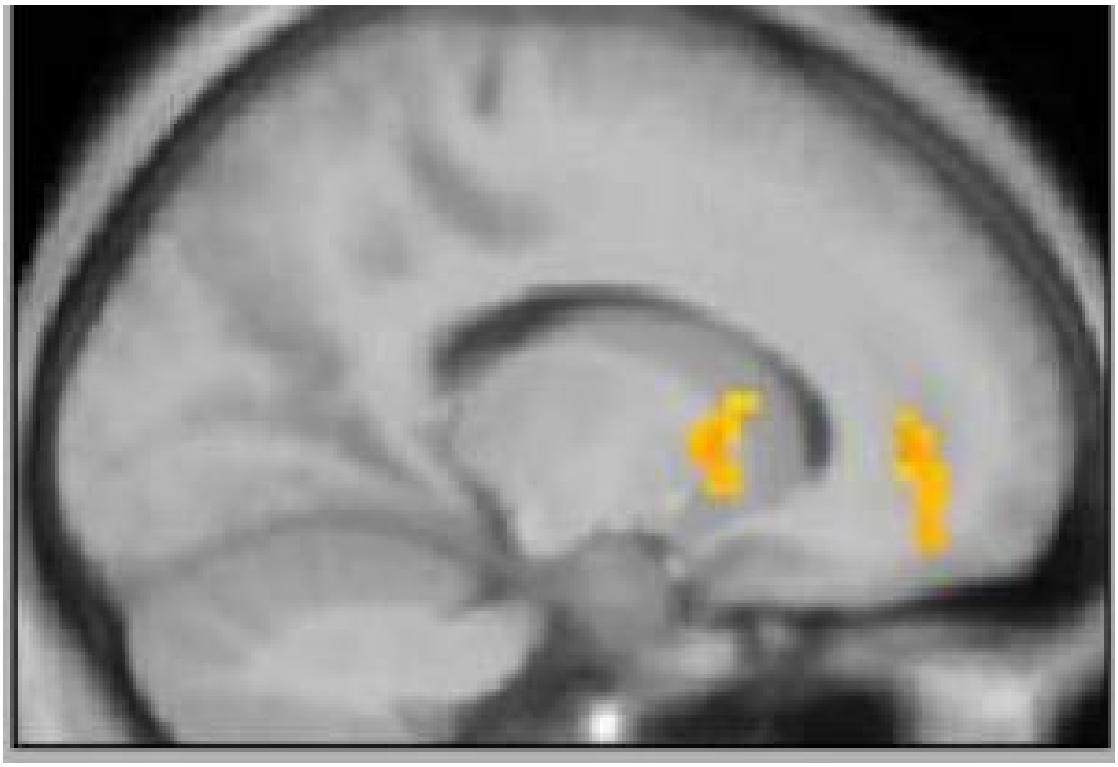
The commissioning phase will continue to the end of April, after which the mission will be operational. However, the science team will continue to asses the quality of the data products throughout the lifetime of the mission. An airborne validation campaign is under way in Australia, comparing in situ measurements with those taken by the satellite. In addition, extensive airborne campaigns will be carried out in Germany, Spain and France in the spring.

Story Source:

Adapted from materials provided by European Space Agency.

http://www.sciencedaily.com/releases/2010/02/100223100708.htm

Scientists Find First Physiological Evidence of Brain's Response to Inequality



This saggital view of the brain shows activity in both the ventromedial prefrontal cortex and the ventral striatum. (Credit: Elizabeth Tricomi, Rutgers University)

ScienceDaily (Feb. 24, 2010) — The human brain is a big believer in equality -- and a team of scientists from the California Institute of Technology (Caltech) and Trinity College in Dublin, Ireland, has become the first to gather the images to prove it.

Specifically, the team found that the reward centers in the human brain respond more strongly when a poor person receives a financial reward than when a rich person does. The surprising thing? This activity pattern holds true even if the brain being looked at is in the rich person's head, rather than the poor person's.

These conclusions, and the functional magnetic resonance imaging (fMRI) studies that led to them, are described in the February 25 issue of the journal *Nature*.

"This is the latest picture in our gallery of human nature," says Colin Camerer, the Robert Kirby Professor of Behavioral Economics at Caltech and one of the paper's coauthors. "It's an exciting area of research; we now have so many tools with which to study how the brain is reacting."

It's long been known that we humans don't like inequality, especially when it comes to money. Tell two people working the same job that their salaries are different, and there's going to be trouble, notes John O'Doherty, professor of psychology at Caltech, Thomas N. Mitchell Professor of Cognitive Neuroscience at the Trinity College Institute of Neuroscience, and the principal investigator on the *Nature* paper.

But what was unknown was just how hardwired that dislike really is. "In this study, we're starting to get an idea of where this inequality aversion comes from," he says. "It's not just the application of a social rule or convention; there's really something about the basic processing of rewards in the brain that reflects these considerations."

The brain processes "rewards" -- things like food, money, and even pleasant music, which create positive responses in the body -- in areas such as the ventromedial prefrontal cortex (VMPFC) and ventral striatum.

In a series of experiments, former Caltech postdoctoral scholar Elizabeth Tricomi (now an assistant professor of psychology at Rutgers University) -- along with O'Doherty, Camerer, and Antonio Rangel, associate professor of economics at Caltech -- watched how the VMPFC and ventral striatum reacted in 40 volunteers who were presented with a series of potential money-transfer scenarios while lying in an fMRI machine.

For instance, a participant might be told that he could be given $50 while another person could be given $20; in a second scenario, the student might have a potential gain of only $5 and the other person, $50. The fMRI images allowed the researchers to see how each volunteer's brain responded to each proposed money allocation.

But there was a twist. Before the imaging began, each participant in a pair was randomly assigned to one of two conditions: One participant was given what the researchers called "a large monetary endowment" ($50) at the beginning of the experiment; the other participant started from scratch, with no money in his or her pocket.

As it turned out, the way the volunteers -- or, to be more precise, the reward centers in the volunteers' brains -- reacted to the various scenarios depended strongly upon whether they started the experiment with a financial advantage over their peers.

"People who started out poor had a stronger brain reaction to things that gave them money, and essentially no reaction to money going to another person," Camerer says. "By itself, that wasn't too surprising."

What was surprising was the other side of the coin. "In the experiment, people who started out rich had a stronger reaction to other people getting money than to themselves getting money," Camerer explains. "In other words, their brains liked it when others got money more than they liked it when they themselves got money."

"We now know that these areas are not just self-interested," adds O'Doherty. "They don't exclusively respond to the rewards that one gets as an individual, but also respond to the prospect of other individuals obtaining a reward."

What was especially interesting about the finding, he says, is that the brain responds "very differently to rewards obtained by others under conditions of disadvantageous inequality versus advantageous inequality. It shows that the basic reward structures in the human brain are sensitive to even subtle differences in social context."

This, O'Doherty notes, is somewhat contrary to the prevailing views about human nature. "As a psychologist and cognitive neuroscientist who works on reward and motivation, I very much view the brain as a device designed to maximize one's own self interest," says O'Doherty. "The fact that these basic brain structures appear to be so readily modulated in response to rewards obtained by others highlights the idea that even the basic reward structures in the human brain are not purely self-oriented."

Camerer, too, found the results thought provoking. "We economists have a widespread view that most people are basically self-interested, and won't try to help other people," he says. "But if that were true, you wouldn't see these sort of reactions to other people getting money."

Still, he says, it's likely that the reactions of the "rich" participants were at least partly motivated by self-interest -- or a reduction of their own discomfort. "We think that, for the people who start out rich, seeing another person get money reduces their guilt over having more than the others."

Having watched the brain react to inequality, O'Doherty says, the next step is to "try to understand how these changes in valuation actually translate into changes in behavior. For example, the person who finds out they're being paid less than someone else for doing the same job might end up working less hard and being less motivated as a consequence. It will be interesting to try to understand the brain mechanisms that underlie such changes."

The research described in the *Nature* paper, "Neural evidence for inequality-averse social preferences," was supported by grants from the National Science Foundation, the Human Frontier Science Program, the Gordon and Betty Moore Foundation, and the Caltech Brain Imaging Center.

Story Source:

Adapted from materials provided by California Institute of Technology.

Journal Reference:

1. Tricomi et al. **Neural evidence for inequality-averse social preferences**. *Nature*, 2010; 463 (7284): 1089 DOI: 10.1038/nature08785

http://www.sciencedaily.com/releases/2010/02/100224132453.htm

Sound of Melanoma: Ultrasound Can Help Doctors Find Cancer More Accurately

Viator uses the photoacoustic method, a tabletop device scans a lymph node biopsy with laser pulses. This method could help doctors identify the stage of melanoma with more accuracy. (Credit: Image courtesy of University of Missouri-Columbia)

ScienceDaily (Feb. 24, 2010) — Knowing the stage of a patient's melanoma is important when choosing the best course of treatment. When the cancer has progressed to the lymph nodes, a more aggressive treatment is needed. Examining an entire lymph node for cancer takes much effort and time. Now, a new technique might help make the process more efficient.

University of Missouri researchers in the Christopher S. Bond Life Sciences Center are studying how photoacoustics, or a laser-induced ultrasound, could help scientists locate the general area of the lymph node where melanoma cells could be residing. This new technology could help doctors identify the stage of melanoma with more accuracy.

"This method can be used to determine if the cancer has spread from stage 2, where the melanoma is still just in the skin lesion, to stage 3, where the melanoma has spread to the lymph nodes," said John Viator, assistant professor in the Department of Biological Engineering and Department of Dermatology. "If the cancer is still at stage 2, a simple procedure can remove that lesion. If the cancer has progressed from the initial skin lesion into the lymphatic region and possibly the bloodstream, doctors have to make serious decisions about patient care. The cancer may have possibly spread to other organs, such as the liver, lungs or brain."

Currently, pathologists must perform several specific and detailed tests to determine if there is cancer in the lymph nodes. This new technology could make the search less time-consuming by identifying a general area of the lymph node that might contain cancer.

"It's very similar to identifying a prize inside a cake," Viator said. "Instead of looking through the entire cake, we can use our ultrasound to pinpoint a slice or two that might contain the 'prize.' In the case of the lymph nodes, when you get a signal, this alerts the pathologist that this is an area of the node that might contain cancer cells. At that point, a pathologist would be able to narrow down the search, saving time and money."

In the photoacoustic method, a tabletop device scans a lymph node biopsy with laser pulses. About 95 percent of melanoma cells contain melanin, the pigment that gives skin its color, so they react to the laser's beam, absorbing the light. The laser causes the cells to heat and cool rapidly, which makes them expand and contract. This produces a popping noise that special sensors can detect. This method would examine the entire biopsy and identify the general area of the node that has cancer, giving pathologists a better idea of where to look for the cancer.

"This method is quicker and simpler and could be used to improve the efficiency of how doctors determine if the cancer has spread from the original skin lesion into the lymphatic system," Viator said. "This technology could be an important tool in our fight against cancer."

In the study, Viator took human cancer cells and placed them inside canine lymph nodes. Then, using the laser, he determined the best ways to locate the cancer cells. The next step is to try the procedure using human lymph nodes.

The study, "Photoacoustic Detection of Melanoma Micrometastatis in Sentinel Lymph Nodes," was published in the *Journal of Biomedical Engineering.*

Story Source:

Adapted from materials provided by University of Missouri-Columbia.

Journal Reference:

1. Devin McCormack, Mays Al-Shaer, Benjamin S. Goldschmidt, Paul S. Dale, Carolyn Henry, Chris Papageorgio, Kiran Bhattacharyya, and John A. Viator. **Photoacoustic Detection of Melanoma Micrometastasis in Sentinel Lymph Nodes**. *Journal of Biomechanical Engineering*, 2009; 131 (7): 074519 DOI: 10.1115/1.3169247

http://www.sciencedaily.com/releases/2010/02/100223174604.htm

Stem Cells Restore Sight in Mouse Model of Retinitis Pigmentosa

Picasso's Le Rêve painting, as seen through the eyes of a person with age-related macular degeneration. (Credit: Image courtesy of Columbia University Medical Center)

ScienceDaily (Feb. 24, 2010) — An international research team led by Columbia University Medical Center successfully used mouse embryonic stem cells to replace diseased retinal cells and restore sight in a mouse model of retinitis pigmentosa. This strategy could potentially become a new treatment for retinitis pigmentosa, a leading cause of blindness that affects approximately one in 3,000 to 4,000 people, or 1.5 million people worldwide.

The study appears online ahead of print in the journal *Transplantation* (March 27, 2010 print issue).

Specialized retinal cells called the retinal pigment epithelium maintain vision. Retinitis pigmentosa results from the death of retinal cells on the periphery of the retina, leading to "tunnel vision," where the field of vision is narrowed considerably and everything outside the "tunnel" appears blurred or wavy.

"This research is promising because we successfully turned stem cells into retinal cells, and these retinal cells restored vision in a mouse model of retinitis pigmentosa," said Stephen Tsang, M.D., Ph.D., assistant professor of ophthalmology, pathology and cell biology, Columbia University Medical Center, and lead author of the paper. "The transplanted cells not only looked like retinal cells, but they functioned like them, too."

In Dr. Tsang's study, sight was restored in one-fourth of the mice that received the stem cells. However, complications of benign tumors and retinal detachments were seen in some of the mice, so Dr. Tsang and colleagues will optimize techniques to decrease the incidence of these complications in human embryonic stem cells before testing in human patients can begin.

"Once the complication issues are addressed, we believe this technique could become a new therapeutic approach for not only retinitis pigmentosa, but age-related macular degeneration, Stargardt disease, and other forms of retinal disease that also feature loss of retinal cells," said Dr. Tsang.

In age-related macular degeneration, retinal cells in the center of the retina degenerate and cause the center part of vision to become blurry or wavy. In 2010, macular degeneration is prevalent in nine million Americans and its incidence is expected to double by 2020. It is estimated that 30 percent of the population will have some form of macular degeneration by the time they reach the age of 75.

Replacement of damaged retinal cells in patients with macular degeneration is currently offered in some hospitals, but the therapy is limited by a shortage of donor retinal pigment epithelium cells. By using stem cells and turning them into retinal pigment epithelium cells, the supply is virtually unlimited.

Similar approaches to macular degeneration have demonstrated efficacy in other rodent models, but since these models are of rare, unique pathophysiologies of retinal degeneration, they may not be generalizable to most human forms of retinal degeneration, e.g., age-related macular degeneration, retinitis pigmentosa or Stargardt disease.

"It's a good thing that more models are being tried, as this shows there may be real potential for stem cells to treat different causes of the loss of retinal pigment epithelium in humans," said Dr. Tsang.

Methods

The research methods used in this study were developed by Columbia researchers, past and present, including:

- Dr. Peter Gouras (ophthalmology) pioneered retinal cell transplantation where stem cells are placed underneath the retina. Co-authors on this paper, Drs. Nan-Kai Wang (a former retinal fellow now at the Chang Gung Memorial Hospital, the Chang Gung University College of Medicine and National Taiwan University in Taiwan) and Joaquin Tosi (ophthalmology) used this technique to place transplanted stem cells underneath the retina.
- Dr. Gouras also developed many of the non-invasive methods used to assess neuronal function in mouse visual system, such as electroretinography, which measures the retina's response to light.
- The strategies for embryonic stem cell use were developed at Columbia by Dr. Elizabeth J. Robertson (now at Oxford). In collaboration with Dr. Pamela L. Schwartzberg (now at the National Institutes of Health), and Dr. Stephen P. Goff (biochemistry, molecular biophysics and microbiology), Dr. Robertson combined embryonic stem cells with homologous recombination to achieve gene targeting, producing the first gene-targeted mice.
- The techniques employed to engineer stem cells were developed at Columbia by Drs. Goff and Virginia E. Papaioannou (genetics).
- Co-author Dr. Victor Chyuan-Sheng Lin (pathology) tapped Dr. Martin Chalfie's (biological sciences) Nobel Prize winning work on green fluorescent protein, to turn the stem cells used in this research yellow, enabling the team to use imaging to see them non-invasively in the mice.
- Dr. Takayuki Nagasaki (ophthalmology) developed an advanced imaging technique, known as fundus autofluorescence imaging, which enabled the researchers to examine the mouse eye using non-invasive methods.

"I am fortunate that this diverse expertise exists at the same university -- Columbia is one of the few places in the world where this research could be conducted," said Dr. Tsang. "And our multidisciplinary approach to basic science research is unique."

This research was supported by grants from the National Institutes of Health, Research to Prevent Blindness, New York, NY, the Foundation Fighting Blindness, the Dennis W. Jahnigen Career

Development Scholars Award Program of American Geriatics Society, the Schneeweiss Stargardt Fund, and Professor Gertrude Neumark Rothschild.

Story Source:

Adapted from materials provided by Columbia University Medical Center.

Journal Reference:

1. Wang et al. **Transplantation of Reprogrammed Embryonic Stem Cells Improves Visual Function in a Mouse Model for Retinitis Pigmentosa**. *Transplantation*, 2010; DOI: 10.1097/TP.0b013e3181d45a61

http://www.sciencedaily.com/releases/2010/02/100224132737.htm

Physicists Discover Odd Fluctuating Magnetic Waves

Brown University physicist Vesna Mitrovic and colleagues have discovered magnetic waves that fluctuate when exposed to certain conditions in a superconducting material. The find may help scientists understand more fully the relationship between magnetism and superconductivity. (Credit: Lauren Brennan/Brown University)

ScienceDaily (Feb. 24, 2010) — At the quantum level, the forces of magnetism and superconductivity exist in an uneasy relationship. Superconducting materials repel a magnetic field, so to create a superconducting current, the magnetic forces must be strong enough to overcome the natural repulsion and penetrate the body of the superconductor. But there's a limit: Apply too much magnetic force, and the superconductor's capability is destroyed.

This relationship is pretty well known. But why it is so remains mysterious. Now physicists at Brown University have documented for the first time a quantum-level phenomenon that occurs to electrons subjected to magnetism in a superconducting material. In a paper published in *Physical Review Letters*, Vesna Mitrovic, joined by other researchers at Brown and in France, report that at under certain conditions, electrons in a superconducting material form odd, fluctuating magnetic waves. Apply a little more magnetic force, and those fluctuations cease: The electronic magnets form repeated wave-like patterns promoted by superconductivity.

The discovery may help scientists understand more fully the relationship between magnetism and superconductivity at the quantum level. The insight also may help advance research into superconducting magnets, which are used in magnetic resonance imaging (MRI) and a host of other applications. "If you don't understand [what is happening at] the quantum [level], how can you design a more powerful magnet?" asked Mitrovic, assistant professor of physics.

When a magnetic field is applied to a superconducting material, vortices measured in nanometers (1 billionth of a meter) pop up. These vortices, like super-miniature tornadoes, are areas where the magnetic field has overpowered the superconducting field state, essentially suppressing it. Crank up the magnetic field and more vortices appear. At some point, the vortices are so widespread the material loses its superconducting ability altogether.

At an even more basic level, sets of electrons called Cooper pairs (named for Brown physicist Leon Cooper, who shared a Nobel Prize for the discovery) form superconductivity. But scientists believe there

also are other electrons that are magnetically oriented and spin on their own axes like little globes; these electrons are tilted at various angles on their imaginary axes and move in a repeating, linear pattern that resembles waves, Mitrovic and her colleagues have observed.

"These funny waves most likely appear because of superconductivity, but the reason why is still unsettled," Mitrovic said.

Adding to the mystery, Mitrovic and fellow researchers, including Brown graduate student Georgios Koutroulakis and former Brown postdoctoral associate Michael Stewart, saw that the waves fluctuated under certain conditions. After nearly three years of experiments at Brown and at the national magnetic field laboratory in Grenoble, France, Mitrovic's team was able to produce the odd waves consistently when testing a superconducting material -- cerium-cobalt-indium5 (CeCoIn5) -- at temperatures close to absolute zero and at about 10 Tesla of magnetic force.

The waves appeared to be sliding, Mitrovic said. "It's as if people are yanking on the wave," she added. Mitrovic and her colleagues also observed that when more magnetic energy is added, the fluctuations disappear and the waves resume their repeating, linear patterns.

The researchers next want to understand why these fluctuations occur and whether they crop up in other superconducting material.

The research was funded by the National Science Foundation and a European Community grant, as well as the Alfred P. Sloan Foundation.

Story Source:

Adapted from materials provided by Brown University.
http://www.sciencedaily.com/releases/2010/02/100223161835.htm

Zen Meditation: Thicker Brains Fend Off Pain

Woman meditation. People can reduce their sensitivity to pain by thickening their brain, according to a new study. Researchers made their discovery by comparing the grey matter thickness of Zen meditators and non-meditators. (Credit: iStockphoto/Yanik Chauvin)

ScienceDaily (Feb. 24, 2010) — People can reduce their sensitivity to pain by thickening their brain, according to a new study published in a special issue of the American Psychological Association journal, *Emotion*. Researchers from the Université de Montréal made their discovery by comparing the grey matter thickness of Zen meditators and non-meditators. They found evidence that practicing the centuries-old discipline of Zen can reinforce a central brain region (anterior cingulate) that regulates pain.

"Through training, Zen meditators appear to thicken certain areas of their cortex and this appears to be underlie their lower sensitivity to pain," says lead author Joshua A. Grant, a doctoral student in the Université de Montréal Department of Physiology and Institut universitaire de gériatrie de Montréal. "We found a relationship between cortical thickness and pain sensitivity, which supports our previous study on how Zen meditation regulates pain."

As part of this study, scientists recruited 17 meditators and 18 non-meditators who in addition had never practiced yoga, experienced chronic pain, neurological or psychological illness. Grant and his team, under the direction of Pierre Rainville of the Université de Montréal and the Institut universitaire de gériatrie de Montréal, measured thermal pain sensitivity by applying a heated plate to the calf of participants and followed by scanning the brains of subjects with structural magnetic resonance imaging. According to MRI results, central brain regions that regulate emotion and pain were significantly thicker in meditators compared to non-meditators.

"The often painful posture associated with Zen meditation may lead to thicker cortex and lower pain sensitivity," says Grant, noting that meditative practices could be helpful in general for pain management, for preventing normal age-related grey matter reductions or potentially for any condition where the grey matter is compromised such as stroke.

This study was supported jointly by a Canadian Institutes of Health Research and a Mind and Life Institute Varela Grant.

Story Source:

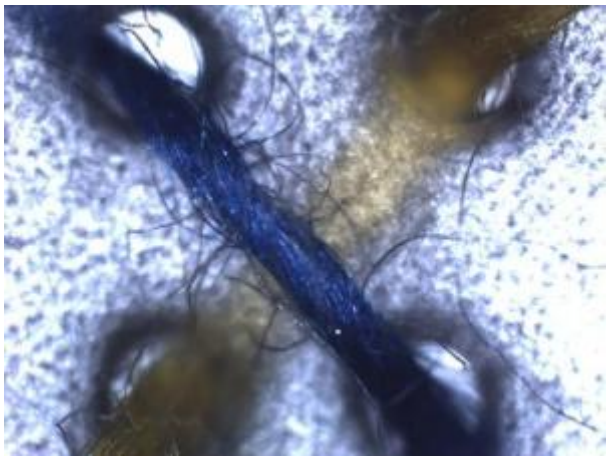
Adapted from materials provided by University of Montreal, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Grant et al. **Cortical thickness and pain sensitivity in Zen meditators.**. *Emotion*, 2010; 10 (1): 43 DOI: 10.1037/a0018334

http://www.sciencedaily.com/releases/2010/02/100224103357.htm

Stitching Together 'Lab-on-a-Chip' Devices With Cotton Thread and Sewing Needles



Cotton thread, shown in this close-up image, provides a simple way to transport fluids for low-cost "lab-on-a-chip" tests for detecting disease and other purposes. (Credit: Wei Shen)

ScienceDaily (Feb. 24, 2010) — Scientists in Australia are reporting the first use of ordinary cotton thread and sewing needles to literally stitch together a microfluidic analytical device -- microscopic technology that can transport fluids for medical tests and other purposes in a lab-on-a-chip. The chips shrink room-sized diagnostic testing equipment down to the size of a postage stamp, and promise revolutionary applications in medicine, environmental sensing, and other areas.

Their study is in *ACS Applied Materials & Interfaces*, a monthly journal.

Wei Shen and colleagues note that the development of low-cost "lab-on-a-chip" diagnostic tests has become an attractive area of research. Existing devices require etching microscopic channels onto slivers of silicon, glass, ceramics, or metal in a costly, complicated process. The scientists set out to find an alternative, and did so with cotton thread, which wicks fluids along its tiny fibers.

They stitched thread into paper to form microfluidic sensors capable of detecting and measuring substances released in the urine of patients with several human medical conditions. "The fabrication of thread-based microfluidic devices is simple and relatively low cost because it requires only sewing needles or household sewing machines," the report said. "Our results demonstrate that thread is a suitable material for fabricating microfluidic diagnostic devices for monitoring human health, environment and food safety, especially for the population in less-industrialized areas or remote regions."

Story Source:

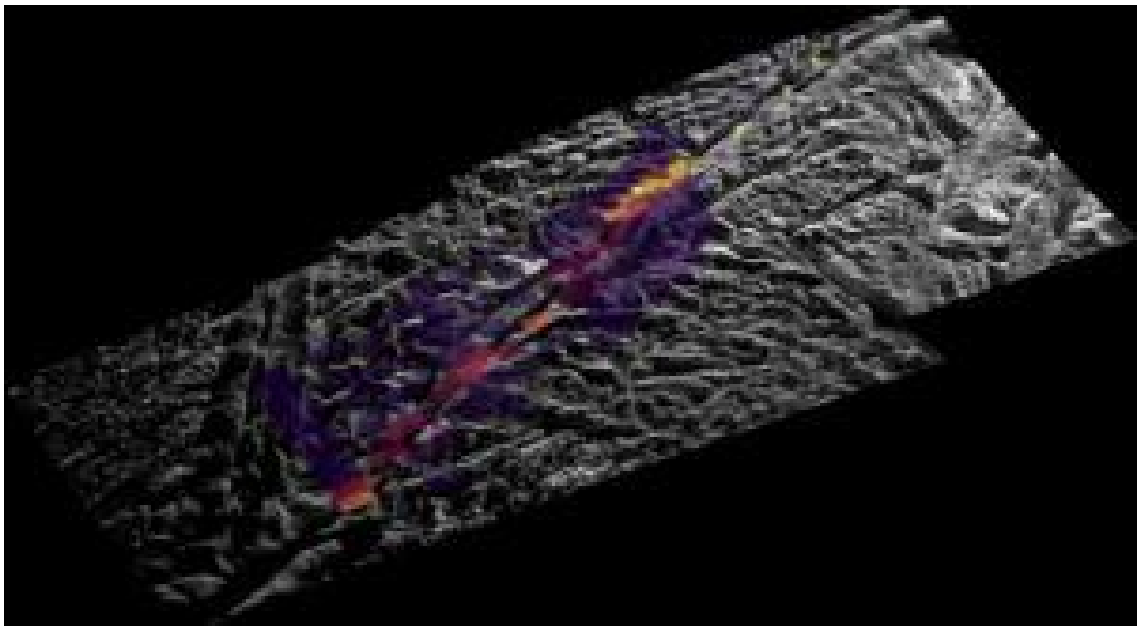
Adapted from materials provided by American Chemical Society, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Li et al. **Thread as a Versatile Material for Low-Cost Microfluidic Diagnostics**. *ACS Applied Materials & Interfaces*, 2010; 2 (1): 1 DOI: 10.1021/am9006148

http://www.sciencedaily.com/releases/2010/02/100218125522.htm

Cassini Finds Plethora of Plumes, Hotspots on Saturn's Moon Enceladus



In this unique mosaic image combining high-resolution data from the imaging science subsystem and composite infrared spectrometer aboard NASA's Cassini spacecraft, pockets of heat appear along one of the mysterious fractures in the south polar region of Saturn's moon Enceladus. (Credit: NASA/JPL/GSFC/SWRI/SSI)

ScienceDaily (Feb. 24, 2010) — Newly released images from last November's swoop over Saturn's icy moon Enceladus by NASA's Cassini spacecraft reveal a forest of new jets spraying from prominent fractures crossing the south polar region and yield the most detailed temperature map to date of one fracture.

The new images from the imaging science subsystem and the composite infrared spectrometer teams also include the best 3-D image ever obtained of a "tiger stripe," a fissure that sprays icy particles, water vapor and organic compounds. There are also views of regions not well-mapped previously on Enceladus, including a southern area with crudely circular tectonic patterns.

The images and additional information are online at http://www.nasa.gov/cassini and http://saturn.jpl.nasa.gov.

"Enceladus continues to astound," said Bob Pappalardo, Cassini project scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif. "With each Cassini flyby, we learn more about its extreme activity and what makes this strange moon tick."

For Cassini's visible-light cameras, the Nov. 21, 2009 flyby provided the last look at Enceladus' south polar surface before that region of the moon goes into 15 years of darkness, and includes the most detailed look yet at the jets.

Scientists planned to use this flyby to look for new or smaller jets not visible in previous images. In one mosaic, scientists count more than 30 individual geysers, including more than 20 that had not been seen before. At least one jet spouting prominently in previous images now appears less powerful.

"This last flyby confirms what we suspected," said Carolyn Porco, imaging team lead based at the Space Science Institute in Boulder, Colo. "The vigor of individual jets can vary with time, and many jets, large and small, erupt all along the tiger stripes."

A new map that combines heat data with visible-light images shows a 40-kilometer (25-mile) segment of the longest tiger stripe, known as Baghdad Sulcus. The map illustrates the correlation, at the highest resolution yet seen, between the geologically youthful surface fractures and the anomalously warm temperatures that have been recorded in the south polar region. The broad swaths of heat previously detected by the infrared spectrometer appear to be confined to a narrow, intense region no more than a kilometer (half a mile) wide along the fracture.

In these measurements, peak temperatures along Baghdad Sulcus exceed 180 Kelvin (minus 135 degrees Fahrenheit), and may be higher than 200 Kelvin (minus 100 degrees Fahrenheit). These warm temperatures probably result from heating of the fracture flanks by the warm, upwelling water vapor that propels the ice-particle jets seen by Cassini's cameras. Cassini scientists will be testing this idea by investigating how well the hot spots correspond with the jet sources.

"The fractures are chilly by Earth standards, but they're a cozy oasis compared to the numbing 50 Kelvin (-370 Fahrenheit) of their surroundings," said John Spencer, a composite infrared spectrometer team member based at Southwest Research Institute in Boulder, Colo. "The huge amount of heat pouring out of the tiger stripe fractures may be enough to melt the ice underground. Results like this make Enceladus one of the most exciting places we've found in the solar system."

Some of Cassini's scientists infer that the warmer the temperatures are at the surface, the greater the likelihood that jets erupt from liquid. "And if true, this makes Enceladus' organic-rich, liquid sub-surface environment the most accessible extraterrestrial watery zone known in the solar system," Porco said.

The Nov. 21 flyby was the eighth targeted encounter with Enceladus. It took the spacecraft to within about 1,600 kilometers (1,000 miles) of the moon's surface, at around 82 degrees south latitude.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging operations center is based at the Space Science Institute in Boulder, Colo. The composite infrared spectrometer team is based at NASA's Goddard Space Flight Center, Greenbelt, Md., where the instrument was built.

More details are also available at the imaging team's website http://ciclops.org and the composite infrared spectrometer team's website http://cirs.gsfc.nasa.gov.

Story Source:

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2010/02/100223162707.htm

'Rubbish patch' blights Atlantic
By Victoria Gill
Science reporter, BBC News, Portland

Scientists have discovered an area of the North Atlantic Ocean where plastic debris accumulates.

The region is said to compare with the well-documented "great Pacific garbage patch".

Kara Lavender Law of the Sea Education Association told the BBC that the issue of plastics had been "largely ignored" in the Atlantic.

She announced the findings of a two-decade-long study at the Ocean Sciences Meeting in Portland, US.

The work is the conclusion of the longest and most extensive record of plastic marine debris in any ocean basin.

Scientists and students from the SEA collected plastic and marine debris in fine mesh nets that were towed behind a research vessel.

" **We know that many marine organisms are consuming these plastics and we know this has a bad effect on seabirds in particular** "
Dr Kara Lavender Law, Sea Education Association

The nets dragged along were half-in and half-out of the water, picking up debris and small marine organisms from the sea surface.

The researchers carried out 6,100 tows in areas of the Caribbean and the North Atlantic - off the coast of the US. More than half of these expeditions revealed floating pieces of plastic on the water surface.

These were pieces of low-density plastic that are used to make many consumer products, including plastic bags.

Dr Lavender Law said that the pieces of plastic she and her team picked up in the nets were generally very small - up to 1cm across.

"We found a region fairly far north in the Atlantic Ocean where this debris appears to be concentrated and remains over long periods of time," she explained.

"More than 80% of the plastic pieces we collected in the tows were found between 22 and 38 degrees north. So we have a latitude for [where this] rubbish seems to accumulate," she said.

The maximum "plastic density" was 200,000 pieces of debris per square kilometre.

"That's a maximum that is comparable with the Great Pacific Garbage Patch," said Dr Lavender Law.

But she pointed out that there was not yet a clear estimate of the size of the patches in either the Pacific or the Atlantic.

"You can think of it in a similar way [to the Pacific Garbage Patch], but I think the word 'patch' can be misleading. This is widely dispersed and it's small pieces of plastic," she said.

The impacts on the marine environment of the plastics were still unknown, added the researcher.

"But we know that many marine organisms are consuming these plastics and we know this has a bad effect on seabirds in particular," she told BBC News.

Nikolai Maximenko from University of Hawaii, who was not involved in the study, said that it was very important to continue the research to find out the impacts of plastic on the marine ecosystem.

He told BBC News: "We don't know how much is consumed by living organisms; we don't have enough data.

"I think this is a big target for the next decade - a global network to observe plastics in the ocean."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8534052.stm

Published: 2010/02/24 11:50:30 GMT

Ocean robot 'plans experiments'

By Victoria Gill
Science reporter, BBC News, Portland

Scientists in the US are using an underwater vehicle that can "plan its own experiments" on the seafloor.

The "Gulper AUV" is programmed to look for the information that scientists want and plan its own route, avoiding hazardous currents and obstacles.

The research team described this advance at the Ocean Sciences meeting in Portland.

The group explained how it could "train" the robot to bring the best science back to the surface.

Thom Maughan from the Monterey Bay Aquarium Research Institute (MBARI) in California was one of the engineers on the project.

He explained how the autonomous underwater vehicle (AUV) used a piece of software called "T rex", which operates in a similar way to the software used to control Nasa's Mars Exploration Rovers - helping them to avoid obstacles on the surface of the Red Planet.

One main difference between the two pieces of software is that for the Mars rovers, the software ran in the control centre on Earth. With this marine vehicle, it runs onboard the robotic vehicle.

"You can tell it what to do before you put it in the water," Dr Maughan said.

"We tell it, 'here's the range of tasks that we want you to perform', and it goes off and assesses what is happening in the ocean, making decisions about how much of the range it will cover to get back the data we want."

Researchers at MBARI used the Gulper AUV to monitor potentially harmful algal blooms.

Kim Fulton-Bennett from MBARI explained: "We used to send out a ship for a full day every few weeks to manually take these measurements. Now we just take the AUV outside the harbour and send it on its way.

"About 24 hours later, it comes back, we hoist it on board, and download the data."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8535335.stm

Published: 2010/02/24 18:19:16 GMT

Ovarian transplant double success

By Helen Briggs
Health reporter, BBC News

A mother has become the first in the world to give birth to a second child after an ovary transplant operation, doctors in Denmark have revealed.

Baby Lucca and sister Aviaja are among just nine children born through the procedure, where ovarian tissue is removed, frozen and transplanted.

Their mother was robbed of her fertility by cancer treatment.

Experts say the technique could help others facing treatment that might damage their ovaries.

Aviaja, who was born in 2007, was conceived following IVF but Lucca, born in September 2008, was conceived naturally.

Their mother, Stinne Holm Bergholdt, aged 32, said it was a surprise to find out she was pregnant a second time because she thought she would need fertility treatment again.

" **These results support cryopreservation of ovarian tissue as a valid method of fertility preservation** "
Prof Claus Andersen

She said: "We had an appointment at the fertility outpatient clinic to talk about the possibility of a second baby, but it turned out that I was already pregnant - naturally.

"It was a very nice surprise to find out that my body was now functioning normally and that we were having a baby without having to go through the fertility treatment. It was indeed a miracle!"

Separate pregnancies

Her doctor, Professor Claus Yding Andersen, said it was the first time in the world that a woman had had two children from separate pregnancies as a result of transplanting frozen/thawed ovarian tissue.

He said the ovarian tissue was continuing to function more than four years after being transplanted back into her body.

More tissue remains frozen in liquid nitrogen, and could remain functional for as long as 40 years, he added.

He said: "These results support cryopreservation of ovarian tissue as a valid method of fertility preservation and should encourage the development of this technique as a clinical procedure for girls and young women facing treatment that could damage their ovaries."

Dr Melanie Davies, a spokesperson for the Royal College of Obstetricians and Gynaecologists, said the results appeared encouraging but there had been a mere handful of successful cases so far.

She said: "This is very encouraging news that a woman has succeeded in having two children from one fairly simple operative procedure and storing her ovarian tissue but it's early days."

The case is reported in the medical journal, Human Reproduction. Mrs Bergholdt, who works at the University of Southern Denmark in Odense, is also an author of the paper.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8534227.stm

Published: 2010/02/24 16:48:55 GMT

Way to 'boost' breast cancer drug

UK scientists say they have discovered why some women fail respond to breast cancer treatment, and it is a gene error they believe they can fix.

Tamoxifen is given to most women diagnosed with breast cancer to prevent the cancer returning.

But not all women respond to the drug - experts estimate a third get no benefit.

The work in the journal Cancer Research suggests the problem is too much of a gene called FGFR1.

This discovery could lead to new treatments for these women as scientists "switch off" the action of FGFR1, enabling Tamoxifen to work.

The team of scientists in the Breakthrough Breast Cancer Research Centre at The Institute of Cancer Research have already shown this is possible in the lab.

They introduced a drug which "switched off" the action of FGFR1.

Once FGFR1 was stopped, hormone-based treatments like Tamoxifen could get back to work in destroying cancer cells, they found.

The researchers believe this could ultimately help thousands of women each year.

They say one in 10 breast cancer patients has too much of the FGFR1 gene.

Dr Nick Turner, who led the research, said: "Understanding how this gene can cause Tamoxifen resistance reveals a new drug target for treating breast cancers in patients who would otherwise have a poor outcome.

"There are a number of drugs in development that stop FGFR1 working, and clinical studies are investigating whether these drugs work against cancers with too many copies of this gene.

"The next step is to set up a clinical trial to see whether a drug that blocks the action of this gene can counteract hormone therapy resistance in breast cancer patients.

"If these trials confirm our lab work we could be on the verge of a potentially exciting new treatment for breast cancer."

Dr Lesley Walker of Cancer Research UK, the charity which helped fund the work, said: "Cracking the problem of resistance to treatments such as Tamoxifen would be a major advance in treating breast cancer."

Breast cancer is the most common cancer in the UK affecting more than 45,500 women each year.

Tamoxifen blocks the female sex hormone oestrogen that fuels the growth of some breast tumours.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8530305.stm

Published: 2010/02/23 17:57:46 GMT

GPS vulnerable to hacker attacks

By Jason Palmer
Science and technology reporter, BBC News

Technology that depends on satellite-navigation signals is increasingly threatened by attack from widely available equipment, experts say.

While "jamming" sat-nav equipment with noise signals is on the rise, more sophisticated methods allow hackers even to program what receivers display.

At risk are not only sat-nav users, but also critical national infrastructure.

A UK meeting outlining the risks was held at the National Physical Laboratory in Teddington on Tuesday.

The meeting was organised by the government-funded Digital Systems Knowledge Transfer Network.

"GPS gives us transportation, distribution industry, 'just-in-time' manufacturing, emergency services operations - even mining, road building and farming, all these and a zillion more," David Last, a consultant engineer and former president of the Royal Institute of Navigation, told the conference.

"But what few people outside this community recognise is the high-precision timing that GPS provides to keep our telephone networks, the internet, banking transactions and even our power grid online."

" **You can consider GPS a little like computers before the first virus - if I had stood here before then and cried about the risks, you would've asked 'why would anyone bother?'** "
David Last, former president of the Royal Institute of Navigation

Professor Last recalled the New Year's Day failure of a single satellite in 2004 and how it wreaked havoc with sat-nav readings.

"Satellite failures, though dramatic, are not the main problem," he said.

"The Achilles heel of GPS is the extremely weak signals that reach the receiver."

Each satellite in a sat-nav constellation is putting out less power than a car headlight, illuminating more than a third of the Earth's surface at a distance of more than 20,000 km.

What that means, and what has brought this group of policy-makers, academics and industry figures together, is that the signals can be easily swamped by equipment back on Earth.

Criminal intent

This can be done unintentionally by, for example, pirate television stations, or with a purpose in mind.

Military systems have been doing this "jamming" - flooding an area with a signal at the GPS frequency - for years in a bid to frustrate enemy navigation systems.

But small jamming devices are increasingly available on the internet.

Low-power, hand-held versions that cost less than £100 can run for hours on a battery and confuse sat-nav receivers tens of kilometres away.

Higher-power versions can do far worse, and at both GPS and mobile phone frequencies.

What is more, receivers can be "spoofed" - not simply blinded by a strong, noisy signal, but fooled into thinking their location or the time is different because of fraudulent broadcast GPS signals.

"You can now buy a low-cost simulator and link it to Google Earth, put on a route and it will simulate that route to the timing that you specify," said Professor Last.

"A GPS receiver overcome by it will behave as if you're travelling along that route."

The approach still costs in the thousands and is the preserve of what Professor Last calls the "real techies", but he guessed that the tools could be in the hands of criminals within a year or two.

One obvious reason to do the jamming or spoofing is that high-value cargo is tracked with GPS, as are armoured cars and many rental cars, so that confusing the tracking signal could spell a successful heist.

Sat-nav-based pricing for toll roads and road usage charges could be spoofed, and a company's employees may even use the devices to block the tracking devices imposed on company cars.

But jamming and spoofing, Professor Last said, were irresistible to the hacker type who did it for fun.

"You can consider GPS a little like computers before the first virus - if I had stood here before then and cried about the risks, you would've asked 'why would anyone bother?'.

"It's the same market as the hackers."

But the hackers' fun poses a particular danger to ships, which have systems that increasingly use sat-nav directly but also feed GPS signals into other equipment.

Some at the conference argued that with the growing maritime use of sat-nav, crews were less able to revert to classic methods of map-reading and "dead reckoning".

Alan Grant of the General Lighthouse Authorities (GLA) carried out an experiment in 2008 to assess the degree to which ships would be affected by a jamming signal.

GALILEO UNDER CONSTRUCTION
- A European Commission and European Space Agency project
- At least 22 satellites to launch in batches in coming years
- Will work alongside US GPS and Russian Glonass systems
- Promises real-time positioning down to less than a metre
- Guaranteed under all but most extreme circumstances
- Suitable for safety-critical roles where lives depend on service

Using a relatively low-power jamming signal off the eastern English coast, he found that ships coming into the jamming area suddenly read locations anywhere from Ireland to Scandinavia - but with ranges dependent on the ship itself.

"The level of disruption depends on the ship - the make and model of the kit, how it's been integrated, and down to the strength of the jamming signal," he said.

But he suggested the more dangerous case is that of a jamming signal causing only small errors that would not so obviously give themselves up as false information.

The immediate solution to the problem is not clear, since the existing US GPS and Russian Glonas systems, and the forthcoming European sat-nav effort Galileo, are equally susceptible.

Some at the conference suggested the relative security of the eLoran ground-based system that is already in place, but which existing consumer devices do not pick up.

There is no reason to believe, however, that widespread adoption of eLoran or any other standard would preclude eventual jamming efforts to thwart it.

"Navigation is no longer about how to measure where you are accurately - that's easy," Professor Last said. "Now it's all about how to do so reliably, safely and robustly."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8533157.stm

Published: 2010/02/23 20:45:35 GMT

Joyce Carol Oates: A Love Letter to Libraries in Longhand

Posted: 26 Feb 2010 12:06 AM PST

Author Joyce Carol Oates.
"I try to write in the morning very intensely,
from 8:30 to 1 p.m...I hand write and then I type.
I don't have a word processor. I write slowly."
(By Landon Nordeman for *Smithsonian Magazine.*)

Contrary to Thomas Wolfe's dictum You Can't Go Home Again, in an article in the current issue of *Smithsonian Magazine*, "Joyce Carol Oates Goes Home Again," the eponymous author begs to differ. Joyce Carol Oates regales readers with a reverie on things changed and unchanged in the town of her birth, and reacquaints herself with the landmarks and buildings of a place that has continued to haunt her psyche and inform her prose.

Oates has a prolific pen, primarily publishing novels, but also short stories, poetry, plays, and articles. She has published well over 50 books. In the past few months alone, she has brought out two novels [A Fair Maiden (2010) and Little Bird Of Heaven (2009)]. Not bad for a 71-year-old, who published her first book way back in 1963. Compared to her, Charles Dickens was a punk, with only a measly 14 completed novels to his credit, though to be fair, his final curtain came at age 58.

Oates, like Dickens, has a strong sense of locale: "Writers, particularly novelists, are linked to place. It's impossible to think of Charles Dickens and not to think of Dickens' London; impossible to think of James Joyce and not to think of Joyce's Dublin; and so with Thomas Hardy, D. H. Lawrence, Willa Cather, William Faulkner, Eudora Welty, Flannery O'Connor-each is inextricably linked to a region....

We are all regionalists in our origins, however 'universal' our themes and characters, and without our cherished hometowns and childhood landscapes to nourish us, we would be like plants set in shallow soil. Our souls must take root-almost literally."

Oates, born in 1938, has, in the *Smithsonian* article, created a mesmerizing account of her early life in

Lockport, a small town, in upstate New York. Among the places she discusses is the Lockport Public Library, which she fondly remembers visiting when she was seven or eight years old. For the young Joyce Carol Oates, the local public library was "A Garden of Earthly Delights."

She was first taken to the public library by her grandmother in the mid-1940's. This library pilgrimage was for her a "vivid and hallucinatory dream," not unlike her experiences at in the local movie house, aptly named The Palace Theatre. "In the shadowy opulence of the Palace, as in an unpredictably unfolding dream, I fell under the spell of movies, as I'd fallen under the spell of books a few years earlier."

She remembers the library as "a beautiful building like no other I've seen close up." The library itself was a Great Depression-era WPA project that "transformed" the city. In precise detail, drawing on the memories of a child, now filtered through some 60 years of life, she rhapsodizes that the structure of the library "has something of the look of a Greek temple; not only is its architecture distinctive, with elegantly ascending steps, a portico and four columns, a facade with six large, rounded, latticed windows and, on top, a kind of spire, but the building is set back from the street behind a wrought-iron fence with a gate, amid a very green jewel-like lawn."

As opposed to the somewhat off-putting upstairs portion of the library for the "grown-ups," she reverently describes the more accessible downstairs "library for children" as a sensuous olfactory experience: a " cheery, brightly lit space... [with] an inexpressible smell of floor polish, library paste, books-that particular library smell that conflates, in my memory, with the classroom smell of floor polish, chalk dust, books so deeply imprinted in my memory. For even as a young child I was a lover of books and of the spaces in which, as indeed in a sacred temple, books might safely reside."

She describes her library as a sacrosanct temple devoted to the higher religion of the printed word. She recalls the children's area as a visual feast: "what is most striking... are the shelves and shelves of books-bookcases lining the walls-books with brightly colored spines-astonishing to a little girl whose family lives in a farmhouse in the country where books are almost wholly unknown. That these books are available for children-for a child like me-all these books!-leaves me dazed, dazzled." She recalls the experience tactilely: there was "no greater happiness than to make my way along the seemingly infinite shelves of books,... drawing my forefinger across the spines."

On this first visit, she has a divine revelation, "a special surprise," when she is told that she can "'withdraw' books from this library," all with the simple passport of a library card, through "some magical provision" by her grandmother, Mrs. Blanche Woodside, who met the simple qualification of Lockport residency.

This first transcendent experience is why the local library has become "an illumination in my life." She goes on in delirious, deliberately dreamlike terms: "In that dimension of the soul in which time is collapsed and the past is contemporaneous with the present" the library setting remains for her an epiphany, especially as she grew up in a hardscrabble, rural community that was "lacking a common cultural or aesthetic tradition." And, coming on the heels of the Great Depression, which instilled in her a strong work ethic,

"I was mesmerized by books and by what might be called 'the life of the mind': the life that was not manual labor, or housework, but seemed in its specialness to transcend these activities." As a self-described "farm girl," she naturally had her "farm chores," but she diligently included reading in her "alone" activities, when she wasn't exploring "the fields, woods and creek side," or otherwise sowing her wild oats.

For Oates and other residents who eventually moved elsewhere, the Erie Canal location of Lockport became a seminal memory "so deep-set in what appears to be solid rock ... that [it] resurfaces in dreams. Where you find yourself in your most haunting dreams. These may be dreams of luminous beauty, or they may be nightmares-but they are the dreams most embedded in memory, thus encoded deep in the brain: the first memories to be retained and the last memories to be surrendered."

But her childhood is not a simplistic series of rosy recollections for Oates: "Lockport, well into the present, suggests a more innocent time imagined by Thornton Wilder or Edward Hopper, appropriated now by movie director David Lynch: the slightly sinister, surreal yet disarmingly 'normal'-seeming atmosphere of a quintessential American town trapped in a sort of spell or enchantment." The area not far from Lockport nurtured "the area's most 'known' resident...Timothy McVeigh, our homegrown terrorist/mass-murderer."

Oates profiled McVeigh for a piece in the *New Yorker* in 1995: "Like me, McVeigh grew up in the countryside beyond Lockport....Like me, he would have been identified as 'from the country' and very likely, like me, he was made to feel, and may have exalted in feeling, marginal, invisible. He may have felt powerless, as a boy.

He may have been watchful, a fantasist. He may have told himself, *Wait! Your turn will come*." Not surprisingly, her just-published novel, *Little Bird of Heaven*, is "set in a ficticious [sic] upstate New York town that bears a strong resemblance to the Lockport of her childhood."

http://feedproxy.google.com/~r/BookPatrol/~3/vaFzB66jOTw/joyce-carol-oates-love-letter-to.html?utm_source=feedburner&utm_medium=email

In Obesity Epidemic, What's One Cookie?

By TARA PARKER-POPE
Stuart Bradford

The basic formula for gaining and losing weight is well known: a pound of fat equals 3,500 calories.

That simple equation has fueled the widely accepted notion that weight loss does not require daunting lifestyle changes but "small changes that add up," as the first lady, Michelle Obama, put it last month in announcing a national plan to counter childhood obesity.

In this view, cutting out or burning just 100 extra calories a day — by replacing soda with water, say, or walking to school — can lead to significant weight loss over time: a pound every 35 days, or more than 10 pounds a year.

While it's certainly a hopeful message, it's also misleading. Numerous scientific studies show that small caloric changes have almost no long-term effect on weight. When we skip a cookie or exercise a little more, the body's biological and behavioral adaptations kick in, significantly reducing the caloric benefits of our effort.

But can small changes in diet and exercise at least keep children from gaining weight? While some obesity experts think so, mathematical models suggest otherwise.

Saul Loeb/Agence France-Presse — Getty Images The first lady, Michelle Obama, spoke last month at the White House about her "Let's Move" initiative, which aims to change the way children eat and play.

As a recent commentary in The Journal of the American Medical Association noted, the "small changes" theory fails to take the body's adaptive mechanisms into account. The rise in children's obesity over the past few decades can't be explained by an extra 100-calorie soda each day, or fewer physical education classes. Skipping a cookie or walking to school would barely make a dent in a calorie imbalance that goes

"far beyond the ability of most individuals to address on a personal level," the authors wrote — on the order of walking 5 to 10 miles a day for 10 years.

This doesn't mean small improvements are futile — far from it. But people need to take a realistic view of what they can accomplish.

"As clinicians, we celebrate small changes because they often lead to big changes," said Dr. David Ludwig, director of the Optimal Weight for Life program at Children's Hospital Boston and a co-author of the JAMA commentary. "An obese adolescent who cuts back TV viewing from six to five hours each day may then go on to decrease viewing much more. However, it would be entirely unrealistic to think that these changes alone would produce substantial weight loss."

Why wouldn't they? The answer lies in biology. A person's weight remains stable as long as the number of calories consumed doesn't exceed the amount of calories the body spends, both on exercise and to maintain basic body functions. As the balance between calories going in and calories going out changes, we gain or lose weight.

But bodies don't gain or lose weight indefinitely. Eventually, a cascade of biological changes kicks in to help the body maintain a new weight. As the JAMA article explains, a person who eats an extra cookie a day will gain some weight, but over time, an increasing proportion of the cookie's calories also goes to taking care of the extra body weight. Eventually, the body adjusts and stops gaining weight, even if the person continues to eat the cookie.

Similar factors come into play when we skip the extra cookie. We may lose a little weight at first, but soon the body adjusts to the new weight and requires fewer calories.

Regrettably, however, the body is more resistant to weight loss than weight gain. Hormones and brain chemicals that regulate your unconscious drive to eat and how your body responds to exercise can make it even more difficult to lose the weight. You may skip the cookie but unknowingly compensate by eating a bagel later on or an extra serving of pasta at dinner.

"There is a much bigger picture than parsing out the cookie a day or the Coke a day," said Dr. Jeffrey M. Friedman, head of Rockefeller University's molecular genetics lab, which first identified leptin, a hormonal signal made by the body's fat cells that regulates food intake and energy expenditure. "If you ask anyone on the street, 'Why is someone obese?,' they'll say, 'They eat too much.' "

"That is undoubtedly true," he continued, "but the deeper question is why do they eat too much? It's clear now that there are many important drivers to eat and that it is not purely a conscious or higher cognitive decision."

This is not to say that the push for small daily changes in eating and exercise is misguided. James O. Hill, director of the Center for Human Nutrition at the University of Colorado Denver, says that while weight loss requires significant lifestyle changes, taking away extra calories through small steps can help slow and prevent weight gain.

In a study of 200 families, half were asked to replace 100 calories of sugar with a noncaloric sweetener and walk an extra 2,000 steps a day. The other families were asked to use pedometers to record their exercise but were not asked to make diet changes.

During the six-month study, both groups of children showed small but statistically significant drops in body mass index; the group that also cut 100 calories had more children who maintained or reduced body mass and fewer children who gained excess weight.

The study, published in 2007 in Pediatrics, didn't look at long-term benefits. But Dr. Hill says it suggests that small changes can keep overweight kids from gaining even more excess weight.

"Once you're trying for weight loss, you're out of the small-change realm," he said. "But the small-steps approach can stop weight gain."

While small steps are unlikely to solve the nation's obesity crisis, doctors say losing a little weight, eating more heart-healthy foods and increasing exercise can make a meaningful difference in overall health and risks for heart disease and diabetes.

"I'm not saying throw up your hands and forget about it," Dr. Friedman said. "Instead of focusing on weight or appearance, focus on people's health. There are things people can do to improve their health significantly that don't require normalizing your weight."

Dr. Ludwig still encourages individuals to make small changes, like watching less television or eating a few extra vegetables, because those shifts can be a prelude to even bigger lifestyle changes that may ultimately lead to weight loss. But he and others say that reversing obesity will require larger shifts — like regulating food advertising to children and eliminating government subsidies that make junk food cheap and profitable.

"We need to know what we're up against in terms of the basic biological challenges, and then design a campaign that will truly address the problem in its full magnitude," Dr. Ludwig said. "If we just expect that inner-city child to exercise self-control and walk a little bit more, then I think we're in for a big disappointment."

http://well.blogs.nytimes.com/2010/03/01/in-obesity-epidemic-whats-one-cookie/?nl=health&emc=healthupdateema1

Screening May Save Athletes

By NICHOLAS BAKALAR

They are young, strong, competitive athletes, in top physical condition. Yet about 90 of them drop dead every year, often in the heat of competition, victims of sudden cardiac death. Now a new study suggests that there is a cost-effective way to lower the death rate significantly: screening athletes with an electrocardiogram. But starting such a screening program in the United States is controversial.

An earlier observational study, published in The Journal of the American Medical Association in 2006, confirmed the value of EKG screening. For almost 30 years, the Italian Ministry of Health has required screening for competitive athletes and tracked the results. Using those data, the study found that screening reduced the number of cardiac deaths by 89 percent among athletes 14 to 35 years old, making the rate similar to that among nonathletes of the same age.The success of the Italian approach has led the European Society of Cardiology and the International Olympic Committee to recommend EKG screening for all competitive athletes. But the American Heart Association suggests only a medical history and physical exam.

While the usefulness of preventive screening for some diseases has been widely debated, the main argument against electrocardiograms for young athletes is not that they do not work, but that they would be too expensive for the number of deaths they would prevent. But an analysis published this week in The Annals of Internal Medicine calls that argument into question. Using estimates from the Italian data, the authors of the new study created a computer simulation of how American athletes 14 to 22 years old would be affected by screening. They found that compared with no screening at all, screening with only a medical history and a physical examination saves just 0.56 life-years per 1,000 athletes, and costs about $111 per person. But adding an EKG would save 2.06 more life-years per 1,000 athletes at an additional cost of $89 per athlete, including all secondary examinations and treatment. This makes the cost of EKG screening $42,900 per life-year saved, on average, a number comparable to doing kidney dialysis ($20,000 to $80,000 per life-year saved). Other experts found the work impressive. “It’s as fair a statement as I’ve ever seen on the cost-effectiveness of EKG screening,” said Dr. Robert J. Myerburg, a cardiologist and professor of medicine at the University of Miami.

Still, some remain dubious about instituting widespread screening in the United States. “Most studies in competitive athletes report that 90 percent of fatalities from cardiac causes occur in men,” said Dr. Bernard R. Chaitman, a professor of medicine at St. Louis University. “Therefore, it is not likely to be cost-effective to routinely screen the entire population of U.S. athletes, and a more selective approach makes more sense.”Dr. Euan A. Ashley, the senior author of the study, said that in any case, establishing cost-effectiveness was not the end of the story. “That something is cost-effective does not mean that there is the money available to do it,” he said. An editorial published with the study noted that among other problems, testing only athletes would probably be considered discriminatory, so any screening program would face the daunting challenge of giving EKGs to all 75 million children under 18.

Whether such screening is worth the effort and money can be a purely personal question, as it is for the families of two teenage athletes in central New Jersey who died last year from hypertrophic cardiomyopathy, a condition that would almost certainly have been discovered if they had been screened with an electrocardiogram. Their deaths prompted calls to encourage cardiovascular screening. The American Heart Association is not opposed to screening, but only to making it mandatory. For Dr. Ashley, an assistant professor of medicine at Stanford, this seems a reasonable approach.

“What we’ve done is modeled the U.S. data using our best estimates from the Italian effects,” he said. “This answers the question of cost-effectiveness. But individual groups, local groups, high schools or colleges with this information in hand can make a rational decision about whether to use EKGs.”

http://www.nytimes.com/2010/03/02/health/02heart.html?ref=research

A Drug Trial Cycle: Recovery, Relapse, Reinvention

By AMY HARMON

ORLANDO, Fla. — On a sunny afternoon last June, Dr. Keith Flaherty stood before a large room packed with oncologists from around the world and described the extraordinary recovery of the melanoma patients in the experimental drug trial he was leading.

It was a moment he had looked forward to for months. Beyond a breakthrough for melanoma, the results were a promising sign for an approach to treatment for all forms of cancer that he and others had championed as more effective and less toxic than standard chemotherapy.

But even as he flashed the slide of his favorite graph, showing tumors shrinking in nearly every patient, his mind was on what had happened to them since.

In the weeks leading up to the annual oncologists' conference here, several of the patients on the trial of the drug known as PLX4032 had relapsed. One had died. Another, Christopher Nelson, who had made what seemed like a miraculous recovery in March, had lost his appetite again. Dr. Flaherty feared what he might see on Mr. Nelson's scan when he returned to his office at the University of Pennsylvania.

The drug's ability to stop the melanoma, on average, he told the crowd, "appears to be approximately six months."

"I was hoping we'd get more time," said Dr. Grant McArthur, one of the six oncologists on the trial team, voicing the thought on everybody's mind when the group met at the conference. None of them had a financial stake in the drug.

Dr. Flaherty, whose perpetual optimism about this kind of treatment, known as targeted therapy, raised eyebrows among some colleagues, declined to dwell on the drug's limitations. However briefly, PLX4032 had held off the cancer by blocking a particular protein in its cells that was spurring them to multiply. If such targeted drugs were ever to provide a lasting benefit, many oncologists believed they would need to be combined with others, much as cocktails of protease inhibitors have worked against H.I.V.

"We just need," Dr. Flaherty said, "to find the right combination."

If they acted quickly enough, they might even be able to help the trial's participants. Many were still in remission. Those who had relapsed were searching for another treatment, acutely aware that their time was running out: most melanoma patients die within a year after the cancer spreads.

The problem, which had bedeviled targeted therapies for other cancers, was that while PLX4032 blocked the protein made by one mutated gene, a second mutation now seemed to be driving the cancer's growth. If that mutation could be identified, they believed, its protein could also be blocked, in a game of biological Whac-a-Mole that just might be possible to win.

The most expedient approach would be to test PLX4032 in combination with other experimental drugs that targeted other mutations, including those seen in Dr. Flaherty's relapsing patients.

But a drug that gave a patient even a few months of life could generate billions in revenue. And the standard practice among pharmaceutical companies, which say they typically invest nearly a billion dollars developing and testing a single drug, is to get each drug approved individually before testing it with others, especially those of competitors that are still experimental. Even small Phase 1 trials can cost over a million dollars. And one drug that was safe and effective, they worried, might be tainted by association with another that proved to have toxic side effects.

As Roche, the pharmaceutical giant that had licensed PLX4032, made plans to test the drug in larger trials in hopes of quick Food and Drug Administration approval, Dr. Flaherty's colleagues in the laboratory would search for the new mutation in the tumor samples of patients who had relapsed, trying to understand why the drug had stopped working.

For his part, the doctor would try to keep his patients alive. And he would work to convince the pharmaceutical industry that the fastest path to finding a combination that really worked would require changing their standard operating procedure.

A Bitter Pill

At 4:40 p.m. June 25, Mr. Nelson, 43, waited with his wife, Sharlene, in the melanoma clinic at Penn. Dr. Flaherty was running late.

Mr. Nelson credited Dr. Flaherty with snatching him from the jaws of death four months earlier. The name of the protein fueling his cancer had become part of his personal lexicon: it was called B-RAF, he told his poker buddies. Mrs. Nelson had recounted dozens of times the story of his turnaround on the Roche drug that blocked it.

"It's a miracle drug," she would say.

They sat side by side. To pass the time, Mr. Nelson tried to remember all the adjectives their 10-year-old daughter, Julia, had come up with for her Father's Day card the week before, each starting with one of the letters in "Christopher."

"C" was for caring, "H" was for helpful. "E" was for 'elderly person,' " Mr. Nelson recalled. "I'm like, 'Thanks.' "

As he finished with other patients, Dr. Flaherty found himself rehearsing what to say to the Nelsons. He relayed bad news almost daily; it was part of his job. But this, somehow, was worse.

When he arrived, he sat and faced them, meeting Mr. Nelson's eyes.

"The cancer," he said, "is starting to wake up again."

Mr. Nelson, always ready with a quip, said nothing.

“But this drug,” Mrs. Nelson started, her voice breaking. “This drug could push it back just in the first two weeks — you would think it would just keep pushing!”

Then Dr. Flaherty gave them a new hope. One theory, he told them, was that the mutant B-RAF protein was managing to activate another protein on the same pathway in the cancer’s cells. And a space was about to open up in the trial of a new drug designed to block the second protein.

Its developer, GlaxoSmithKline, required Mr. Nelson to wait at least a month to clear his system of the Roche medication. And Dr. Flaherty himself was moving to Boston the next month, where he would oversee targeted therapy development across all cancer types at Massachusetts General Hospital at Harvard. He was entrusting Mr. Nelson’s care to a colleague, and would be in close touch.

Mrs. Nelson took her husband’s hand.

“O.K.,” she said. “We have a plan.”

Pressuring the Industry

He had done his best for the Nelsons, Dr. Flaherty thought as he hailed a cab to the airport that evening to fly to Chicago, where he would give a talk on targeted therapy.

But over dinner alone near his hotel, he second-guessed himself. What if Mr. Nelson’s cancer was not being fueled by the protein the Glaxo drug was trying to block? There were other likely drivers, which lay on a different pathway. And many cancer biologists suspected that both pathways needed to be blocked to stamp out the melanoma.

What bothered him more than anything was that he had to guess. The scientists studying the tumor samples were proceeding slowly. Without the cooperation of the drug companies, it was impossible to know which was the best therapy for his patient.

Even if some combination of targeted drugs could put melanoma into a long hibernation — and that was still not clear, he knew — it might take a cocktail of five or more such drugs to treat any given case. And it can take 10 years for even one drug to reach the market.

“If they do it the way they’ve always done it,” Dr. Flaherty complained in e-mail messages and calls to colleagues, “it will delay by years how quickly we can figure this out.”

Such frustration, he knew, went beyond melanoma specialists, especially as it grew clear that there were so many new targeted drugs to be tested and that no single one was likely to hold off any given cancer for more than a limited time.

Unable to obtain drugs from the companies themselves, some researchers were paying to have the equivalent of designer knockoffs made so they could test the most logical combinations in laboratory animals. One such experiment had arrested the growth of lung cancer in mice, and clinical researchers were “climbing the walls,” a colleague told him, because the companies who owned the two drugs had no plans yet to combine them in a human trial.

Over the summer, Dr. Flaherty urged the leading melanoma researchers to form an alliance to make it easier and cheaper for drug companies to conduct several trials at one time, advising them which were the most promising.

Years earlier, he had secured the backing of a patient advocacy group, the Melanoma Research Foundation, for the idea. Forging cooperation among academic researchers had been more difficult, given that they compete for jobs and grant money. And many still believed that a different approach, which boosted patients' immune systems, was more likely to produce a cure.

But the results of the PLX4032 trial offered the most substantial support to date for the targeted approach in an aggressive and common cancer. For many oncologists, it seemed to add a moral imperative to the demand for swift testing of the drugs in combination. And on a steamy morning in August, leading melanoma researchers from across the country gathered at a meeting in Boston to discuss it.

"This is the most important meeting for melanoma patients that's happened in years," said Dr. Lynn Schuchter, chief of oncology at the University of Pennsylvania.

The stories of those who had recovered and relapsed on the Roche drug gave the meeting its momentum. An avid golfer in New Jersey had played three rounds in the rain when the tumor under his arm receded enough to let him swing a club. One woman, 30, who had been told before joining the trial that she should "focus on the quality, not the quantity" of her days, was informed that her scans were cancer-free.

The average time the drug halted tumor growth had stretched to almost nine months. Yet Mark Bunting, the airline pilot who had once declared himself the trial's "leader of the pack," had been rushed into emergency surgery when a new tumor had pierced his bowel. And Mr. Nelson's initiation to the Glaxo trial had been delayed while he received radiation for tumors that had appeared in his brain.

The doctors agreed to hammer out the legalities of pooling resources among institutions, and Dr. Flaherty agreed to approach the companies on behalf of the alliance.

Their first choice would be to test Roche's B-RAF drug with another one the company owned. Glaxo had two drugs designed to block the same proteins. Novartis, Pfizer and Bristol-Myers Squibb also had drugs that might work best with a competitor's. If they had needed any more incentive, the doctors were increasingly urged on by the frustrations of their patients.

"Why can't they put them together and do it in one shot?" Mrs. Nelson wanted to know when she and her husband arrived at Penn in early October to start the Glaxo trial. "Wouldn't that give him a better chance?"

Mr. Nelson's latest CT scan showed the cancer throughout his body. Twelve tumors, though inactive, remained in his brain. Another protruded from his neck. Because of a concern that the drug could cause vision problems, he had been examined by an ophthalmologist.

"My eyes are perfect, by the way," he told his wife, trying to make light.

A Plea Rejected

Dr. Flaherty could tell by whom Roche sent to his first meeting with the company that he would make little headway. Any strategic decisions, he knew, would be made at a higher level.

Over sandwiches in a Midtown Manhattan office, a Roche official told him that the best interest of patients would be served by getting its B-RAF drug approved for sale as quickly as possible. "That has to be our focus right now," she insisted.

The request by Dr. Meenhard Herlyn, a prominent melanoma research scientist, to conduct preliminary tests of the drugs in the laboratory met with the same response.

"You know," Dr. Flaherty said finally, "other companies will be ready to do this."

But his habitual breakneck pace was slower as he walked toward Pennsylvania Station with Dr. Herlyn, who had traveled from Philadelphia.

"That was a waste," Dr. Herlyn said flatly. As they parted ways, Dr. Flaherty, for once, was at a loss for a more positive spin.

A Death in the Family

At an appointment in mid-November, the tumors on Mr. Nelson's neck and inside his heart had shrunk. "Aren't you excited?" Mrs. Nelson crowed.

Maybe, Mr. Nelson thought, he could make it to a poker tournament the next month after all. Or to his son's 17th birthday on Jan. 18. Or maybe not.

"I'm happy, Sharl," he said slowly. "But how long do you think it will last?"

A few weeks later, when Dr. Flaherty again made the pitch for a combination trial, this time at a meeting with Glaxo, an executive hinted that the company would sponsor such a trial soon. The company had a pragmatic reason: Roche was likely to get its B-RAF drug approved first, but Glaxo might take the lead if it had a combination that could do a better job. It was becoming clearer that some targeted drugs might find a market only if combined.

"The culture is changing," the Glaxo executive agreed.

It would be too late, however, for Mr. Nelson. On Jan. 5, Mrs. Nelson wheeled him on a stretcher to his appointment at Penn. Three days later, an ambulance took him to hospice at a local hospital.

"Take me to Atlantic City instead," Mr. Nelson joked with the driver. "I'll pay you extra."

At his wake, Mrs. Nelson told relatives she felt blessed that he had lived longer than expected. They had celebrated their 21st wedding anniversary. With the children, he had ridden every water ride at Six Flags Great Adventure.

"It's a year I would never trade in," she said.

One year, Dr. Flaherty thought, when he heard the news. Certainly no triumph. But it was something. Something to be built on.

Novartis and Bristol-Myers had agreed to schedule teleconferences for later in the month to talk about combination trials. He checked the dates on his electronic calendar. A meeting with Pfizer was also pending.

http://www.nytimes.com/2010/02/24/health/research/24trial.html?ref=research

Processing Alex Katz, From Sketch to Finish

By BENJAMIN GENOCCHIO

Alex Katz is one of those artists who have enjoyed tremendous commercial and museum success but whose art historical importance remains an open question. He is not a bad painter, just not original enough — or even good enough — to suggest that his will be a lasting contribution to American art. Critics tend to complain that his colorful portraits of friends and family are flat, static and unremarkable.

If you're not a fan of Mr. Katz's brand of Day-Glo realism, there is probably little to change your mind in "Alex Katz: Seeing, Drawing, Making" at the Parrish Art Museum. Although it is a decent-size exhibition, with more than 50 paintings, prints and drawings spanning three decades, few if any of the works on display can be counted among his best.

Yet grumbling about the quality of artwork sort of misses the point, for this is a show about the artist's creative process. On display are preliminary sketches, drawings and cartoons, often paired with the finished pieces. Much of the material comes from the archive of the artist, who divides his time between New York City and Maine, and has rarely been publicly exhibited. That gives the show an immediate interest.

Looking at how an idea evolves from a sketch into a finished painting can be instructive and fun. It reveals both the initial inspiration and then the process by which an artist figures out how to translate a raw image into a more complete work of art. Questions of perspective, scale and focus come into play, as well as the issue of color. Making a painting is never as easy as it might look.

In general, Mr. Katz begins with a rapid pen or pencil drawing or sometimes even an oil sketch that defines a subject or motif, commonly a lone figure or object in the landscape. He then builds on the initial idea with successive drawings and large-format cartoons that he affixes to a primed canvas and punctures with a tool (a Renaissance technique called pouncing, invented for frescoes) to map the basic outline of the motif on the surface. Then he begins to paint.

Perhaps the best illustration of the artistic process here comes in a series of works in various media titled "Sunset" or "Study for Sunset," all from 1984. First there is a small, delicate pencil drawing showing a man and a woman staring into each other's eyes. Next is a larger cartoon to scale, and then an oil study, and finally a finished lithograph.

Mr. Katz tends to stick fairly closely to his preparatory sketches. His paintings of a wooden picnic table on grass by the water are almost identical to his initial ink drawings. The only visible difference is in color and scale, along with the introduction of shadows for a greater sense of verisimilitude.

You can also see a direct correspondence between a series of 1983 lithographs of a young female dancer striking a pose with arms extended and some nearby preparatory graphite and charcoal sketches on brown paper. The paintings that the cartoons also refer to are missing from this show, but the prints give you a good sense of the way in which the artist freely translates a motif from one medium to another.

Mr. Katz and the choreographer Paul Taylor began working together in 1960, and they have remained close friends and collaborators. Showing here are a half-dozen simple but dynamic little sketches from the mid-1980s of dancers in Mr. Taylor's company, each capturing bodies in motion. Swiftly made, they are marvelously evocative and energetic. They are my favorite pieces in this show.

From these simple outline sketches the artist developed much larger and considerably more refined pencil drawings, among them "Study for Last Look 1" (1986), showing here, revealing how Mr. Katz focuses and simplifies the image that he will include in the finished piece. Also on display is "Last Look (4 of 5)" (1986), the large cartoon template that he used for the final painting.

Process-oriented exhibitions can be tricky, for without quality objects they tend to feel disposable. "Alex Katz: Seeing, Drawing, Making" narrowly avoids this fate. Though this is by no means the artist at his best, the exhibition has just enough good work to make it a stimulating experience.

"Alex Katz: Seeing, Drawing, Making," Parrish Art Museum, 25 Job's Lane, Southampton, through April 4. Information: (631) 283-2118 or parrishart.org.

http://www.nytimes.com/2010/02/28/nyregion/28artsli.html?ref=design

The Teen Brain: It's Just Not Grown Up Yet

by Richard Knox

Richard Knox/NPR

Neurologist Francis Jensen examining a teenage patient. Jensen decided to study the teenage brain when her own sons became teenagers. Now Jensen lectures to teens and parents about how teenagers' brains are different.

Neurologist Francis Jensen examining a teenage patient. Jensen decided to study the teenage brain when her own sons became teenagers. Now Jensen lectures to teens and parents about how teenagers' brains are different.
March 1, 2010

When adolescence hit Frances Jensen's sons, she often found herself wondering, like all parents of teenagers, "What were you thinking?"

"It's a resounding mantra of parents and teachers," says Jensen, who's a pediatric neurologist at Children's Hospital in Boston.

Like when son number one, Andrew, turned 16, dyed his hair black with red stripes and went off to school wearing studded leather and platform shoes. And his grades went south.

"I watched my child morph into another being, and yet I knew deep down inside it was the same Andrew," Jensen says. Suddenly her own children seemed like an alien species.

Jensen is a Harvard expert on epilepsy, not adolescent brain development. As she coped with her boys' sour moods and their exasperating assumption that somebody else will pick up their dirty clothes, she decided to investigate what neuroscientists are discovering about teenagers' brains that makes them behave that way.

Jensen's older son Andrew Murphy, now a physics major at Wesleyan, is the reason his mother first started studying the teenage brain. She wanted to find out what was causing his maddening teenage behavior.

Jensen's older son Andrew Murphy, now a physics major at Wesleyan, is the reason his mother first started studying the teenage brain. She wanted to find out what was causing his maddening teenage behavior.

Teenage Brains Are Different

She learned that that it's not so much *what* teens are thinking — it's *how*.

Jensen says scientists used to think human brain development was pretty complete by age 10. Or as she puts it, that "a teenage brain is just an adult brain with fewer miles on it."

But it's not. To begin with, she says, a crucial part of the brain — the frontal lobes — are not fully connected. Really.

"It's the part of the brain that says: 'Is this a good idea? What is the consequence of this action?' " Jensen says. "It's not that they don't have a frontal lobe. And they can use it. But they're going to access it more slowly."

That's because the nerve cells that connect teenagers' frontal lobes with the rest of their brains are sluggish. Teenagers don't have as much of the fatty coating called myelin, or "white matter," that adults have in this area.

Think of it as insulation on an electrical wire. Nerves need myelin for nerve signals to flow freely. Spotty or thin myelin leads to inefficient communication between one part of the brain and another.

Jensen's younger son Will Murphy is now a Harvard student. He says he learned a lot about his teenage brain from his mother.

Jensen's younger son Will Murphy is now a Harvard student. He says he learned a lot about his teenage brain from his mother.

A Partially Connected Frontal Lobe

Jensen thinks this explains what was going on inside the brain of her younger son, Will, when he turned 16. Like Andrew, he'd been a good student, a straight arrow, with good grades and high SAT scores. But one morning on the way to school, he turned left in front of an oncoming vehicle. He and the other driver were OK, but there was serious damage to the car.

"It was, uh, totaled," Will says. "Down and out. And it was about 10 minutes before morning assembly. So most of the school passed by my wrecked car with me standing next to it."

"And lo and behold," his mother adds, "who was the other driver? It was a 21-year-old — also probably not with a completely connected frontal lobe." Recent studies show that neural insulation isn't complete until the mid-20s.

This also may explain why teenagers often seem so maddeningly self-centered. "You think of them as these surly, rude, selfish people," Jensen says. "Well, actually, that's the developmental stage they're at. They aren't yet at that place where they're thinking about — or capable, necessarily, of thinking about the effects of their behavior on other people. That requires insight."

And insight requires — that's right — a fully connected frontal lobe.

Teen Brains Are Not Fully Connected

The brain's "white matter" enables nerve signals to flow freely between different parts of the brain. In teenagers, the part that governs judgment is the last to be fully connected.

But that's not the only big difference in teenagers' brains. Nature made the brains of children and adolescents excitable. Their brain chemistry is tuned to be responsive to everything in their environment. After all, that's what makes kids learn so easily.

But this can work in ways that are not so good. Take alcohol, for example. Or nicotine, cannabis, cocaine, ecstasy ...

"Addiction has been shown to be essentially a form of 'learning,' " Jensen says. After all, if the brain is wired to form new connections in response to the environment, and potent psychoactive drugs suddenly enter that environment, those substances are "tapping into a much more robust habit-forming ability that adolescents have, compared to adults."

So studies have shown that a teenager who smokes pot will still show cognitive deficits days later. An adult who smokes the same dose will return to cognitive baseline much faster.

This bit of knowledge came in handy in Jensen's own household.

"Most parents, they'll say, 'Don't drink, don't do drugs,'" says Will, son number two. "And I'm the type of kid who'd say 'why?' "

When Will asked why, his mom could give him chapter and verse on drugs and teen brains. So they would know, she says, "that if I smoke pot tonight and I have an exam in two days' time, I'm going to do worse. It's a fact."

There were other advantages to having a neuroscientist mom, Will says. Like when he was tempted to pull an all-nighter.

"She would say, 'read it tonight and then go to sleep,'" he says. "And what she explained to me is that it will take [what you've been reading] from your short-term memory and while you sleep you will consolidate it. And actually you will know it better in the morning than right before you went to sleep."

It worked every time, he says.

It also worked for Andrew, the former Goth. He's now a senior at Wesleyan University, majoring in physics.

"I think she's great! I would not be where I am without her in my life!" Andrew says of his mom.

For any parent who has survived teenagers, there are no sweeter words.

http://www.npr.org/templates/story/story.php?storyId=124119468&sc=nl&cc=hh-20100301

The Aging Brain Is Less Quick, But More Shrewd

by Michelle Trudeau

March 1, 2010

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Lifelong learning and brain stimulation can help increase memory and decision-making ability, according to neuroscientists.

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Lifelong learning and brain stimulation can help increase memory and decision-making ability, according to neuroscientists.
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For baby-boomers, there is both good news and bad news about the cognitive health of the aging brain.

Brain researcher Gary Small from UCLA conveys the bad news first: "Reaction time is slower," he says. "It takes us longer to learn new information. Sometimes it takes us longer to retrieve information, so we have that tip-of-the-tongue phenomenon — where you almost have that word or that thought. That's typical of the middle-age brain."

As we age, our ability to multi-task diminishes. "We're quick, but we're sloppy when we're in middle-age. We make more errors when we're in middle age," says Small.

The Older, But Wiser, Brain

But Small has found that it's not all bad news. He points to a continued improvement in complex reasoning skills as we enter middle age. Small suggests that this increase may be due to a process in the brain called "myelination." Myelin is the insulation wrapped around brain cells that increases their conductivity — the speed with which information travels from brain cell to brain cell. And the myelination doesn't reach its peak until middle age. By this point, says Small, "the neuro-circuits fire more rapidly, as if you're going from dial-up to DSL." Complex reasoning skills improve, and we're able to anticipate problems and reason things out better than when we were young.

And, Small adds, there's another area of improvement as we age: empathy — the ability to understand the emotional point of view of another. Empathy increases as we age.

'Your Brain On Google'

One of the great discoveries from recent neuroscience research is that the human brain is always changing, from moment to moment and throughout life. It continues to develop, and even continues to grow new brain cells.

"An old myth in neuroscience," says Small, "is that once a brain cell dies off you can't replace it." But many studies have now shown, he adds, that there is, in fact, brain cell growth throughout life. So, he says, the brain can continue to learn throughout the middle age years and beyond.

In a recent study that Small refers to as "your brain on Google," healthy, middle-aged volunteers, all novices on the computer, were taught how to do a Google search. They were told then to practice doing online searches for an hour a day, for seven days. After the week's practice, the volunteers came back into Small's lab and had their brains scanned while doing a Google search.

The scans revealed significant increases in brain activity in the areas that control memory and decision-making.

"The area of the brain that showed the increases was the frontal lobe, the thinking brain, especially in areas that control decision making and working memory," Small says. One interpretation of his findings, he says, is that with practice, a middle-age brain can very quickly alter its neuron-circuitry, can strengthen the neuron circuits that control short-term memory and decision making.

Physical Fitness Helps Brain, Too

Research by neuroscientist Art Kramer, from the University of Illinois, highlights the plasticity — the ability to grow and change — of the aging brain. In his studies on physical exercise, Kramer has found that memory can improve with treadmill workouts.

"Over a six-month to one-year period," Kramer says, "three days a week, working up to an hour a day, people improved in various aspects of both short-term and long-term memory."

After treadmill training, the "aging couch potatoes," as Kramer calls them, were given brain scans. Those who'd trained had larger hippocampi, the brain area key for memory. Other brain regions too — central for decision-making, planning and multi-tasking — were also larger in the treadmill exercisers. "There are a number of regions," says Kramer, "that on MRI scans tend to show not just stability but increases as a function of exercise in middle-age and older brains."

Such research studies underscore that both physical exercise and cognitive brain training contribute to brain health. And these two scientists not only talk the talk, they also, quite literally, walk the walk. Kramer, 56, goes to the gym four or five days a week, getting aerobic exercise on a stationary bike and strength training by lifting weights. Small, 58, does a *New York Times* crossword and numbers puzzle every morning, as well as a series of toning and stretching exercises and at least 20 minutes of aerobic exercise each day.

http://www.npr.org/templates/story/story.php?storyId=124118077&sc=nl&cc=hh-20100301

Egg shells illustrate human story

By Jonathan Amos
Science correspondent, BBC News

Inscribed ostrich shell fragments found in South Africa are among the earliest examples of the use of symbolism by modern humans, scientists say.

The etched shells from Diepkloof Rock Shelter in Western Cape have been dated to about 60,000 years ago.

Details are reported in the Proceedings of the National Academy of Sciences.

The researchers, who have investigated the material since 1999, argue that the markings are almost certainly a form of messaging - of graphic communication.

"The motif is two parallel lines, which we suppose were circular, but we do not have a complete refit of the eggs," explained Dr Pierre-Jean Texier from the University of Bordeaux, Talence, France.

"The lines are crossed at right angles or oblique angles by hatching. By the repetition of this motif, early humans were trying to communicate something. Perhaps they were trying to express the identity of the individual or the group," he told BBC News.

Symbolic thought - the ability to let one thing represent another - was a giant leap in human evolution, and sets our species apart from the rest of the animal world.

Understanding when and where this behaviour first emerged is a key quest for scientists studying human origins.

Arguably the earliest examples of conceptual thought are the pieces of shell jewellery discovered at Skhul Cave in Israel and from Oued Djebbana in Algeria. These artefacts are 90,000-100,000 years old.

Shell beading from 75,000 years ago is also found at Blombos Cave in South Africa, as well as a number of ochre blocks that have engravings not dissimilar to those at Diepkloof.

However, the significance of the Diepkloof finds may lie in their number, which proves such markings could not have been simple doodlings.

"What is extraordinary at Diepkloof is that we have close to 300 pieces of such engravings, which is why we are speaking of a system of symbolic representation," Dr Texier said.

The team, which includes Dr Guillaume Porraz from the University of Tubingen, tried themselves to recreate the markings using pieces of flint.

"Ostrich egg shells are quite hard. Doing such engravings is not so easy. You have to pass through the outer layer to get through to the middle layer," Dr Texier explained.

The team's experiments also suggest that the colouration of the fragments is natural and not the result of the application of pigments.

The group was able to reproduce similar hues by baking pieces of shell near a fire.

Professor Chris Stringer, of London's Natural History Museum, said the find was important.

"Here we've got something that we can compare with later material that clearly does have important signalling value in the populations," he told BBC News.

"It's a very nice link between the Middle Stone Age, the later Stone Age and even recent populations in South Africa. One question now is whether this is a special site, or as we excavate more sites will we find this material is more widespread?"

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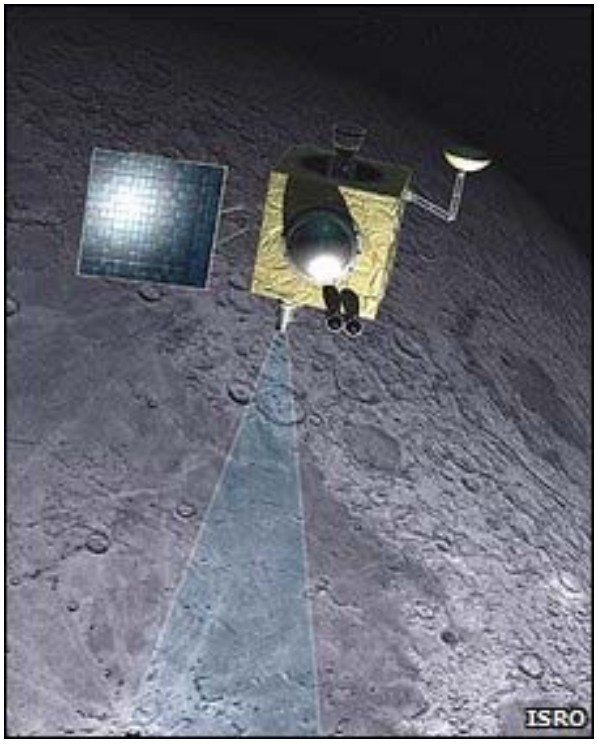
Ice deposits found at Moon's pole

By Paul Rincon
Science reporter, BBC News, The Woodlands, Texas

A radar experiment aboard India's Chandrayaan-1 lunar spacecraft has identified thick deposits of water-ice near the Moon's north pole.



The US space agency's (Nasa) Mini-Sar experiment found more than 40 small craters containing water-ice.

But other compounds - such as hydrocarbons - are mixed up in lunar ice, according to new results from another Moon mission called LCROSS.

The findings were presented at a major planetary science conference in Texas.

The craters with ice range from 2km to 15km (one to nine miles) in diameter; how much there is depends on its thickness in each crater. But Nasa says the ice must be at least a couple of metres thick to give the signature seen by Chandrayaan-1.

Dr Paul Spudis, from the Lunar and Planetary Institute in Houston, estimated there was at least 600 million metric tonnes of water-ice held within these impact craters.

The equivalent amount, expressed as rocket fuel, would be enough to launch one space shuttle per day for 2,200 years, he told journalists at the 41st Lunar and Planetary Science Conference.

What all these craters have in common are large areas of their interiors that never see sunlight.

Extreme cold

Temperatures in some of these permanently darkened craters can drop as low as 25 Kelvin (-248C; -415F) - colder than the surface of Pluto - allowing water-ice to remain stable.

"It is mostly pure water-ice," said Dr Spudis. "It could be under a few tens of centimetres of dry regolith (lunar soil)."

This protective layer of soil could prevent blocks of pure ice from vaporising even in some areas which are exposed to sunlight, he explained.

In February, President Barack Obama cancelled the programme designed to return Americans to the Moon by 2020.

However, Dr Spudis said: "Now we can say with a fair degree of confidence that a sustainable human presence on the Moon is possible. It's possible using the resources we find there.

"The results from these missions, that we have seen in the last few months, are totally revolutionising our view of the Moon."

Chandrayaan-1 was India's contribution to the armada of unmanned spacecraft to have been launched to the Moon in recent years. Japan, Europe, China and the US have all sent missions packed with instruments to explore Earth's satellite in unprecedented detail.

In Nasa's LCROSS mission, a rocket and a probe were smashed into a large crater at the lunar south pole, kicking up water-ice and water vapour.

Spectral measurements of material thrown up by the LCROSS impact indicate some of the water-ice was in a crystalline form, rather than the "amorphous" form in which the water molecules are randomly arranged.

Water source

"There's not one flavour of water on the Moon; there's a range of everything from relatively pure ice all the way to adsorbed water," said the mission's chief scientist Anthony Colaprete, from Nasa's Ames Research Center.

"And here is an instance inside Cabeus crater where it appears we threw up a range of fine-grained particulates of near pure crystalline water-ice."

Overall, results from recent missions suggest there could be several sources for lunar ice.

One important way for water to form is through an interaction with the solar wind, the fast-moving stream of particles that constantly billows away from the Sun.

Space radiation triggers a chemical reaction in which oxygen atoms already in the soil acquire hydrogen nuclei to make water molecules and the simpler hydrogen-oxygen (OH) molecule. This "adsorbed" water may be present as fine films coating particles of lunar soil.

In a cold sink effect, water from elsewhere on the lunar surface may migrate to the slightly cooler poles, where it is retained in permanently shadowed craters.

Scientists have also reported the presence of hydrocarbons, such as ethylene, in the LCROSS impact plume. Dr Colaprete said any hydrocarbons were likely to have been delivered to the lunar surface by comets and asteroids - another vital source of lunar water.

However, he added, some of these chemical species could arise through "cold chemistry" on interstellar dust grains accumulated on the Moon.

In addition to water, researchers have seen a range of other "volatiles" (compounds with low boiling points) in the impact plume, including sulphur dioxide (SO2) and carbon dioxide (CO2).

The results from the Mini-Sar instrument are due to be published in the journal Geophysical Research Letters. The team is currently analysing results for craters at the Moon's south pole.

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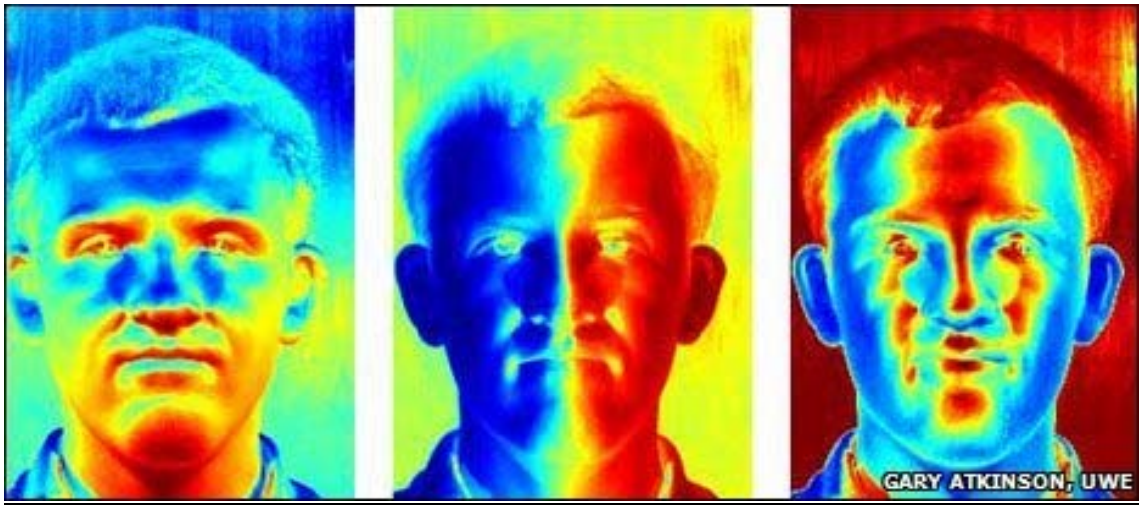
New scan could nose out criminals

By Doreen Walton
Science reporter, BBC News

We already have iris and fingerprint scanning but noses could be an even better method of identification, says a study from the University of Bath, UK.



The researchers scanned noses in 3D and characterised them by tip, ridge profile and the nasion, or area between the eyes.

They found 6 main nose types: Roman, Greek, Nubian, hawk, snub and turn-up.

Since they are hard to conceal, the study says, noses would work well for identification in covert surveillance.

The researchers say noses have been overlooked in the growing field of biometrics, studies into ways of identifying distinguishing traits in people.

"Noses are prominent facial features and yet their use as a biometric has been largely unexplored," said the University of Bath's Dr Adrian Evans.

"Ears have been looked at in detail, eyes have been looked at in terms of iris recognition but the nose has been neglected."

The researchers used a system called PhotoFace, developed by researchers at the University of the West of England, Bristol and Imperial College, London, for the 3D scans.

Several measurements by which noses can be recognised were identified and the team developed recognition software based on these parameters.

"This initial work is nowhere as good as iris identification but the nose has pros and cons," said Dr Evans.

"There's no magic biometric that solves all your problems. Irises are a powerful biometric but can be difficult to capture accurately and can be easily obscured by eyelids or glasses. People can easily cover up their ears, with their hair for example.

"Of course you can have a broken nose or wear a false nose or have plastic surgery but to have nose surgery to change your identity is fairly drastic.

"Irises are very good for recognition but you can put in dilation drops which change the iris completely. No technique is infallible," he said.

The research is based on a study of 40 noses and the data base has now been expanded to 160 for further tests to see if the software can pick out people from a larger group and distinguish between relatives.

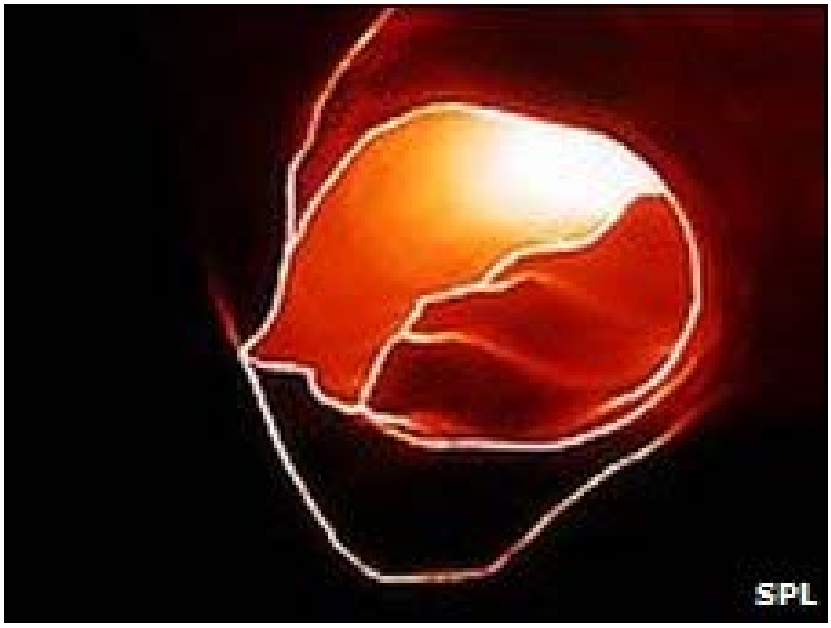
Dr Evans hopes the method can be proven to be effective on this larger sample. "The technique certainly shows potential, perhaps to be used in combination with other identification methods," he said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8543292.stm

Published: 2010/03/02 00:22:42 GMT

Diets 'can help blocked arteries'

Three diets - Mediterranean, low-fat and low-carbohydrate - are equally effective in helping reverse blocked arteries, say Israeli researchers.



The study of 140 people, reported in the journal Circulation, found diet could reduce the fatty build up in arteries.

The Ben-Gurion University team found that by the end of the two-year study, the arterial wall had been cut by 5%.

Experts said the study was interesting, but diet was not a "magic bullet".

Atherosclerosis is a progressive condition in which the arteries thicken with fatty deposits, increasing the risk of heart attacks and strokes.

" **It was very interesting to see that these very different diets had a similar effect** "
Iris Shai, study author

The authors of this Israeli study, which was carried out in collaboration with researchers in the US, Canada and Germany, set out to see if this natural part of ageing can be reversed through diet.

Volunteers followed one of three diets - a low-fat diet, a low-carbohydrate diet or a Mediterranean diet, which is based on eating lots of fruit and vegetables, and using olive oil as the main source of fat.

They were asked to stick to the diet for two years, and record what they ate in food diaries.

The study was carried out among overweight volunteers, mostly men, who were aged 40 to 65.

Using three-dimensional imaging, the researchers measured the volume of the wall of the carotid artery, the large artery in the neck which takes blood up to the brain. This was done at the start of the study and again after two years.

Clogged arteries

Lead researcher Iris Shai said: "It was very interesting to see that these very different diets had a similar effect.

"Some people suggest that low-carbohydrate diets are more likely to clog arteries, but we did not see that."

The research paper suggested the link could be related to falling blood pressure caused by the change in diet.

" **This study shows you can do something to reduce plaque build-up, even without pills** "
Dr Charles Knight, British Cardiovascular Society

The findings were welcomed by UK experts.

Dr Charles Knight, secretary of the British Cardiovascular Society and a consultant cardiologist, said although the study was "relatively small" and was not able to follow through to find out how many people eventually had heart attacks or strokes, the results were nevertheless "very interesting".

He pointed out that the study adds weight to the growing body of research that suggests that atherosclerosis is a modifiable disease.

Ten to 15 years ago, it was thought that fatty build-up in the arteries was irreversible, but since then drugs trials have shown that it is possible for fatty deposits to be cut.

"This study shows you can do something to reduce plaque build-up, even without pills," Dr Knight said.

"It sends an effective message from a public health perspective."

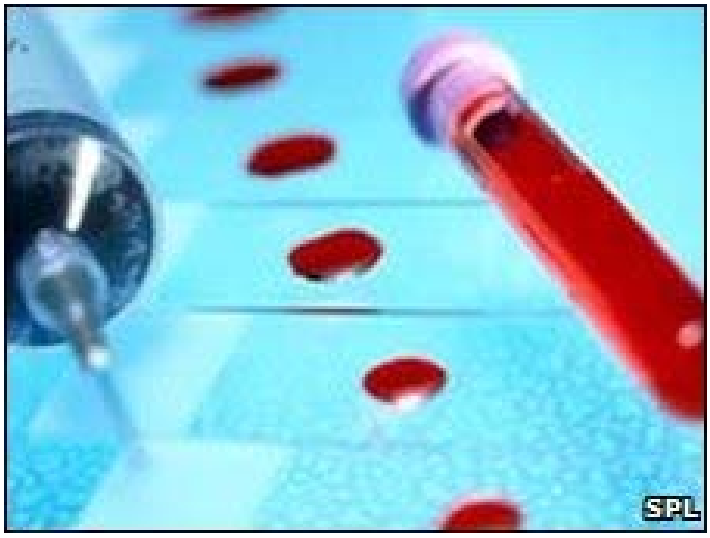
However, he warned that the scale of reduction in the volume of artery walls was relatively small and that changing diet, although helpful, was "no magic bullet".

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8543372.stm

Published: 2010/03/02 01:42:40 GMT

Gene test aid to cancer treatment

Scientists have developed a gene test which predicts how well chemotherapy will work in cancer patients.



Starting with 829 genes in breast cancer cells, the team whittled down the possibilities to six genes which had an impact on whether a drug worked.

They then showed that these genes could be used to predict the effectiveness of a drug called paclitaxel in patients.

It is hoped the approach, reported in The Lancet Oncology, can be replicated for other cancers and treatments.

The international project, including researchers from Cancer Research UK's London Research Institute, opens the way for breast cancer treatment to be targeted to those who will benefit the most.

To find which genes, if missing or faulty, could prevent the drug from working, they deleted them one by one from cancer cells in the laboratory.

They eventually highlighted the six genes which if absent or not working prevent paclitaxel from properly killing breast cancer cells.

Spare treatment

More than 45,500 women are diagnosed with breast cancer in the UK each year - and it is estimated that around 15% of these women will be prescribed paclitaxel.

The researchers estimate they could potentially spare half of the patients currently receiving this drug from treatment which would not be effective.

Study leader, Dr Charles Swanton, head of translational cancer therapeutics at the Institute, said one of the great challenges in cancer medicine is determining which patients will benefit from particular cancer drugs, which are in themselves toxic and carry severe side effects.

" **The challenge is to apply these methods to other drugs in cancer medicine** "
Dr Charles Swanton, study leader

"Our research shows it is now possible to rapidly pinpoint genes which prevent cancer cells from being destroyed by anti-cancer drugs and use these same genes to predict which patients will benefit from specific types of treatment."

Further studies will now be done to see if the technique can be developed into a simple diagnostic test to be given to patients to help inform doctors about whether or not to prescribe paclitaxel.

He said the challenge will be to apply these methods to other drugs in cancer medicine.

"These could include treatments that are currently deemed too expensive to fund on the NHS - however, in the future, treating only the patients that will benefit from certain treatments will save the NHS money in the long term."

Dr Lesley Walker, Cancer Research UK's director of cancer information, said: "New techniques such as these can enable drugs to be tailored to individual patients, and this could potentially improve cancer survival in the long term.

"Health professionals may in the future be able to use this information to direct treatment to patients most likely to benefit, and avoid giving treatment that is less likely to be effective to patients with drug resistant cancers."

Story from BBC NEWS:
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Published: 2010/03/01 00:21:24 GMT

Pain 'should be seen as disease'

By Jane Dreaper
Health correspondent, BBC News

Chronic pain needs to be recognised as a disease in its own right, experts say.

The hospital doctors and academics argue this would lead to more momentum for official strategies and funding to help patients.

Nearly 8m people in the UK are suffering ongoing problems with pain.

But only 2% of them end up seeing specialists - and a quarter believe their doctors do not know how to treat their pain, research shows.

Prescriptions worth a total of £584m are written every year for painkillers.

And pain - including back problems - is the second most common reason cited by incapacity benefit claimants for not working.

" **There is a cultural problem where it's thought that there is a benefit from suffering** "
Irene Tracey, of Oxford University

Dr Beverly Collett, a consultant in pain medicine from University Hospitals of Leicester and chairman of the Chronic Pain Policy Coalition campaign group , said: "This problem has huge ramifications for society as a whole. Pain is difficult to treat.

"Many patients are seeking reasons for what is behind the pain - but in the vast majority of cases, you can't find one.

"We are trying to get it taken more seriously - and there's a push, particularly in Europe, to say it is a disease in its own right."

Researchers are examining the idea that changes in the spinal cord and brain have the effect of maintaining pain in sufferers, making it an ongoing problem that can lead to depression or anxiety.

Experts believe more training would help GPs in assessing the severity of patients' pain.

Distraction

Non-medical interventions such as physiotherapy and encouraging patients to stay active can also play a role, with some work showing that distraction can help patients avoid feeling pain.

Professor Steve McMahon, from the Wolfson Centre of Age Related Diseases at King's College London, said the number of new drugs developed to treat pain in the past decade was "very small".

But he said there was interest in the latest trials of a drug called Tanezumab, which might help treat knee and hip pain resulting from osteoarthritis.

Another expert, Irene Tracey, Nuffield professor of anaesthetic science at Oxford University, said: "There is a cultural problem where it's thought that there is a benefit from suffering.

"We have to get over this. It's not acceptable for people to suffer significant pain in the 21st century."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8543561.stm

Published: 2010/03/01 13:48:30 GMT

Lasers lift dirt of ages from art

By Doreen Walton
Science reporter, BBC News

Physicists have applied the same laser techniques commonly used for tattoo removal to clean several famous works of art, including wall paintings.

Laser cleaning is well established for stone and metal artefacts already.

It has now been successfully applied to the wall paintings of the Sagrestia Vecchia and the Cappella del Manto in Santa Maria della Scala, Siena, Italy.

The results are described in the journal of the American Chemical Society.

A team led by Dr Salvatore Siano at the Applied Physics Institute-CNR in Florence, Italy, studied the results on several works of art.

Among them are Lorenzo Ghiberti's gilded bronze panels Porta del Paradiso, or Gate of Paradise, and Donatello's Renaissance bronze statue of David.

Dr Siano said the work on the Gate of Paradise was the most important so far. "This was the first time a well recognised masterpiece was treated with laser cleaning," he said.

The team says the technique is now having a significant impact in the field of cultural heritage conservation.

Wall paintings are the most recent application, and were a real test of the developing method, as Dr Siano explained: "This is a more delicate situation than metals or stone as the pigment is much more fragile."

The researchers point out that laser cleaning of artworks began about a decade before the techniques became well known for removal of tattoos from skin or removal of paints in industrial applications.

Not micro-sandblasting

So why is laser cleaning preferable to traditional chemical or mechanical methods? Dr Siano said the absence of chemical agents makes the process more predictable.

"Using chemicals means using something that can react all the time, even after one or two years.

"And if you compare it with mechanical means, the laser is able to distinguish what must be removed in a way that is much more selective than traditional techniques."

The difficulty is in choosing the right laser and sometimes, if it doesn't exist, having to build it. "When the laser doesn't exist you design the laser," said Dr Siano.

The pulse frequency and duration have to be very precisely selected for each task.

"The pulse duration is really crucial because it determines the time for the localised heating. Sometimes a long heating is harmful and sometimes a short heating is harmful," explained Dr Siano.

It is crucial the laser is deployed in the right hands. "A laser can be used for very fine cleaning with precise discrimination but it can also be used to destroy the layer.

"This is not just micro-sandblasting," said Dr Siano, who also teaches the technique to students at the Restoration School of the Opificio delle Pietre Dure in Florence.

"If the restorer doesn't have experience it's better to avoid their intervention," he warned.

Problems have had to be overcome. Discoloration of stone and metal after laser cleaning slowed the spread of the technique. The team says this has been addressed with a new generation laser and careful selection of the parameters set.

Underwater irradiation has been found to be very effective for archaeological silver which has developed a mineral shell. "In water you can increase the effect of the laser; it's a kind of underwater micro-explosion or micro-fragmentation.

"It's a very effective method. If you use a scalpel you have no way of ensuring discrimination between the encrustation layer and the original surface underneath."

Dr Siano's team has not yet tested the method on any easel paintings but it is something he is thinking about. "We need more observation and more insight before starting on anything, for example, by Botticelli.

"But maybe they don't need any cleaning anyway," he quickly corrected himself. Despite their successes, the team clearly do not want to imply any of the masterpieces are in particular need of the laser's attention.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/8534969.stm

Published: 2010/02/26 11:57:25 GMT

Heart warning in obese children

Obese children as young as three years old show signs of future heart disease, say US researchers.

A study of 16,000 children and teenagers showed the most obese had signs of an inflammatory marker which can predict future heart disease.

In all, 40% of obese three-to-five-year olds had raised levels of C-reactive protein compared with 17% of healthy weight children, Pediatrics reported.

But more work is needed to prove the link with heart disease in later life.

The study, carried out by a team at the University of North Carolina (UNC), looked at children aged one to 17.

Overall, nearly 70% were a healthy weight, 15% were overweight, 11% were obese and 3.5% were very obese.

In the older age groups, the proportion of those in the very obese category with high levels of C-reactive protein (CRP) increased even further.

By age 15-17, 83% of the very obese had increased CRP compared with 18% of the healthy weight children.

Inflammation

CRP is found in the blood, and high levels are a sign of inflammation in the body.

Because the damage seen in heart disease is caused by inflammation in artery walls, CRP can be used as a general marker for the risk of heart disease.

In adults, studies have linked high levels with a future risk of heart attacks.

" **This study tells us that very young, obese children already have more inflammation than children who are not obese, and that's very concerning** "
Study author, Dr Eliana Perrin

The researchers also looked at two other markers of inflammation in obese children and found levels were higher in one from the age of six and the other from the age of nine.

Study leader Dr Asheley Cockrell Skinner, an assistant professor of paediatrics at the UNC School of Medicine, said the findings were a surprise.

"We're seeing a relationship between weight status and elevated inflammatory markers much earlier than we expected."

Co-author Dr Eliana Perrin added: "In this study we were unable to tease apart whether the inflammation or the obesity came first, but one theory is that obesity leads to inflammation which then leads to heart and vessel disease later on.

"A lot more work needs to be done before we figure out the full implication of these findings.

"But this study tells us that very young, obese children already have more inflammation than children who are not obese, and that's very concerning."

Judy O'Sullivan, a cardiac nurse at the British Heart Foundation, said it was an interesting finding but whether inflammatory markers in children were related to an increased risk of heart disease later in life needed further research.

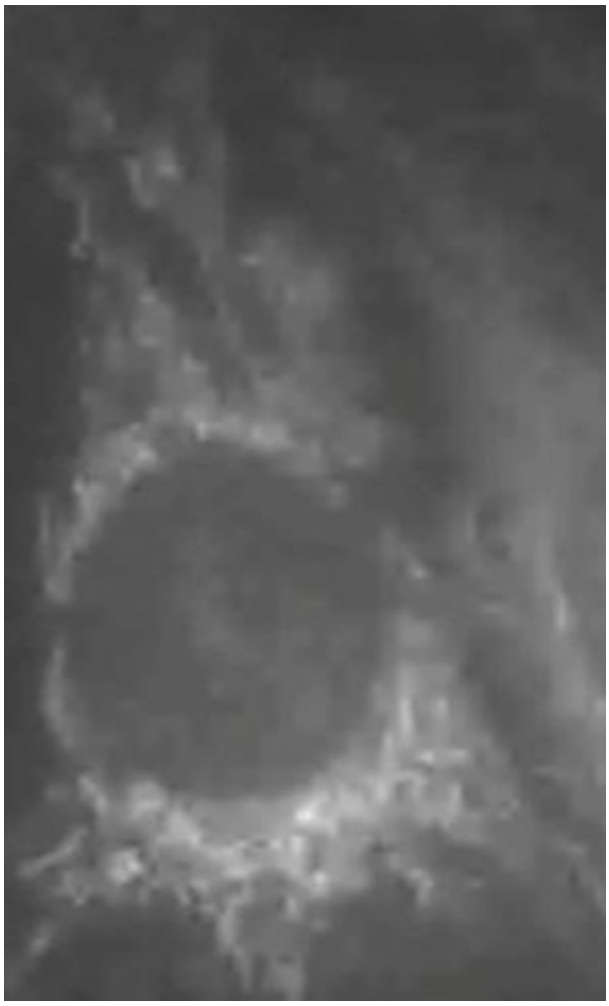
"Nevertheless, this study reinforces the importance of ensuring children maintain a healthy weight right from the start, to keep them healthy throughout their lives.

"Children should be encouraged to adopt a healthy lifestyle and as part of this, regular physical activity and a balanced diet should be viewed as vital components."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8538426.stm

Published: 2010/03/01 05:35:07 GMT

Imaging Studies Reveal Order in Programmed Cell Death



Death wave. New imaging research finds order in what was thought to be the random timing or sudden collapse in apoptosis. A mitochondrial protein, cytochrome-c, is pictured dissipating in an orderly wave around the nucleus (black center) in a cascade that ends in cell death.

ScienceDaily (Mar. 3, 2010) — Every day, about 10 billion cells in a human body commit suicide. Cells infected by virus, that are transformed or otherwise dysfunctional altruistically sacrifice themselves for the greater good. Now, new imaging experiments have revealed a previously unseen order to this process, showing closely related cells dying in synchrony as a wave of destruction sweeps across their mitochondria, snuffing out the main source of energy that keeps cells alive.

In experiments published recently in *The Journal of Cell Science* and Biophysical Journal, researchers inSanford M. Simon's Laboratory of Cellular Biophysics at Rockefeller University photographed the deaths of individual cells, showing an orderly series of events in the staged shut-down of the cell. The experiments revealed that the likelihood of death, as well as the timing, depends on how closely cells are related, not on their proximity to one another or their stage in the cell cycle. The findings rule out, for instance, the hypothesis that cells die in a localized cascade accelerated by the secretion of toxic molecules from dying cells nearby.

"What we saw is that, regardless of their location, only the sister cells remained linked in the timing of their deaths," says Simon. "It suggests that there is not some nonspecific toxic effect here, but that the variability is in the molecular makeup of the cells -- the variability in the population."

Apoptosis is crucial not just in the routine maintenance of life but also in early development -- when some cells, such as those that would otherwise form webbing between human fingers, are programmed to die -- and in the tuning and trimming of the nervous system. "I like to think of it as sculpting, chipping away pieces at a time to create the form," Simon says. A better understanding of apoptosis could help explain certain developmental disorders. What's more, cell death, or the lack thereof, is important in the pathology of some cancers, in which mutant cells fail to die and grow out of control, forming tumors and spreading throughout the body. One potential therapeutic goal would be to learn how to trigger cell death in targeted populations, like tumors.

Investigating the population dynamics of cell death led to the examination, on a much faster timescale, of what was happening inside individual cells during apoptosis. Using single-cell microscopy and fluorescent tags that probe for cell function or for proteins that leave the mitochondria during apoptosis, graduate fellow Patrick Bhola and Postdoctoral Associate Alexa Mattheyses took pictures as the proteins dispersed through the membrane of one mitochondrion and the process spread in a wave to the other mitochondria in a cell. Some scientists had assumed that this happened simultaneously to all mitochondria throughout the cell. "This spatial coordination means that there is an upstream signal for release that is spatially localized within individual cells," says Mattheyses.

"The idea in general was to look at individual events in the cells and see if we could get any insights that we could not get looking macroscopically at whole populations of them," Simon says. Simon's close-up, observational approach has recently yielded new insights into how cells import and export protein cargoes across the cell membrane and how individual HIV particles are born, among other things. Now the microscopy techniques are enabling a deeper understanding of apoptosis, says Bhola. "It's one of those things where if you can't see what's going on, you tend to assume it's random or all at once," he says. "But when you get a good look, you find it happens in a very organized fashion."

Story Source:

Adapted from materials provided by Rockefeller University.

Journal References:

1. Bhola et al. **Spatial and Temporal Dynamics of Mitochondrial Membrane Permeability Waves during Apoptosis**. *Biophysical Journal*, 2009; 97 (8): 2222 DOI: 10.1016/j.bpj.2009.07.056
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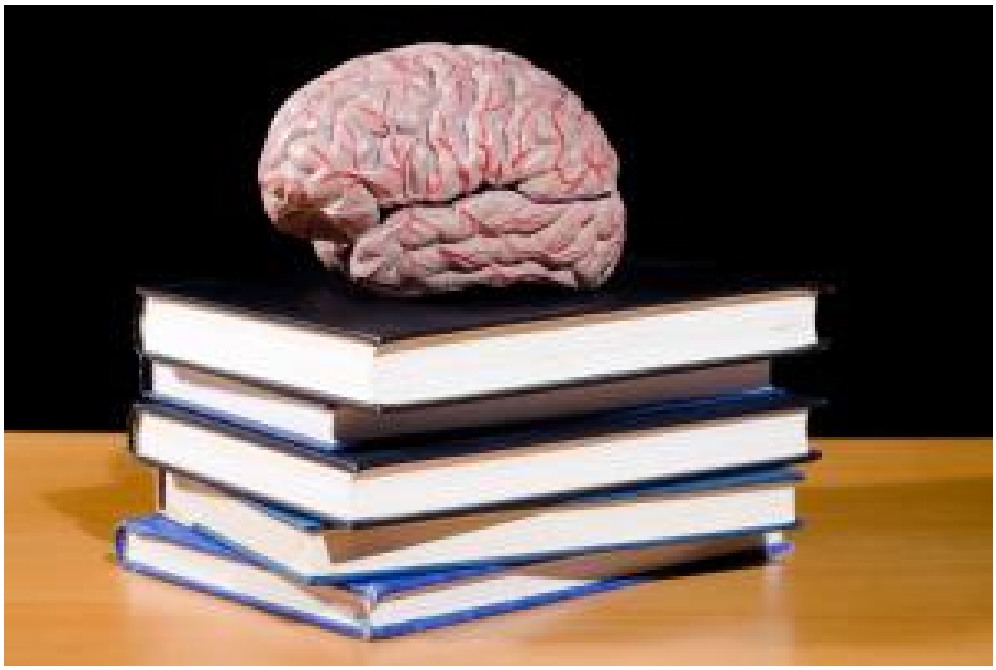
http://www.sciencedaily.com/releases/2010/02/100227184921.htm

Learning Keeps Brain Healthy: Mental Activity Could Stave Off Age-Related Cognitive and Memory Decline



New findings suggest that learning promotes brain health -- and, therefore, that mental stimulation could limit the debilitating effects of aging on memory and the mind. (Credit: iStockphoto)

ScienceDaily (Mar. 3, 2010) — UC Irvine neurobiologists are providing the first visual evidence that learning promotes brain health -- and, therefore, that mental stimulation could limit the debilitating effects of aging on memory and the mind.

Using a novel visualization technique they devised to study memory, a research team led by Lulu Chen and Christine Gall found that everyday forms of learning animate neuron receptors that help keep brain cells functioning at optimum levels.

These receptors are activated by a protein called brain-derived neurotrophic factor, which facilitates the growth and differentiation of the connections, or synapses, responsible for communication among neurons. BDNF is key in the formation of memories.

"The findings confirm a critical relationship between learning and brain growth and point to ways we can amplify that relationship through possible future treatments," says Chen, a graduate researcher in anatomy & neurobiology.

Study results appear in the early online edition of the *Proceedings of the National Academy of Sciences* for the week of March 1.

In addition to discovering that brain activity sets off BDNF signaling at the sites where neurons develop synapses, researchers determined that this process is linked to learning-related brain rhythms, called theta rhythms, vital to the encoding of new memories.

Theta rhythms occurring in the hippocampus involve numerous neurons firing synchronously at a rate of three to eight times per second. These rhythms have been associated with long-term potentiation, a cellular mechanism underlying learning and memory.

In rodent studies, the team found that both unsupervised learning and artificial application of theta rhythms triggered BDNF signaling at synapse creation sites.

"This relationship has implications for maintaining good brain health," says Gall, a professor of anatomy & neurobiology. "There is evidence that theta rhythms weaken as we age, and our discoveries suggest that this can result in memory impairment. On the other hand, they suggest that staying mentally active as we age can keep neuronal BDNF signaling at a constant rate, which may limit memory and cognitive decline."

Researchers are now exploring whether learning-induced growth signals decrease with age and, if so, whether this can be reversed with a new family of experimental drugs.

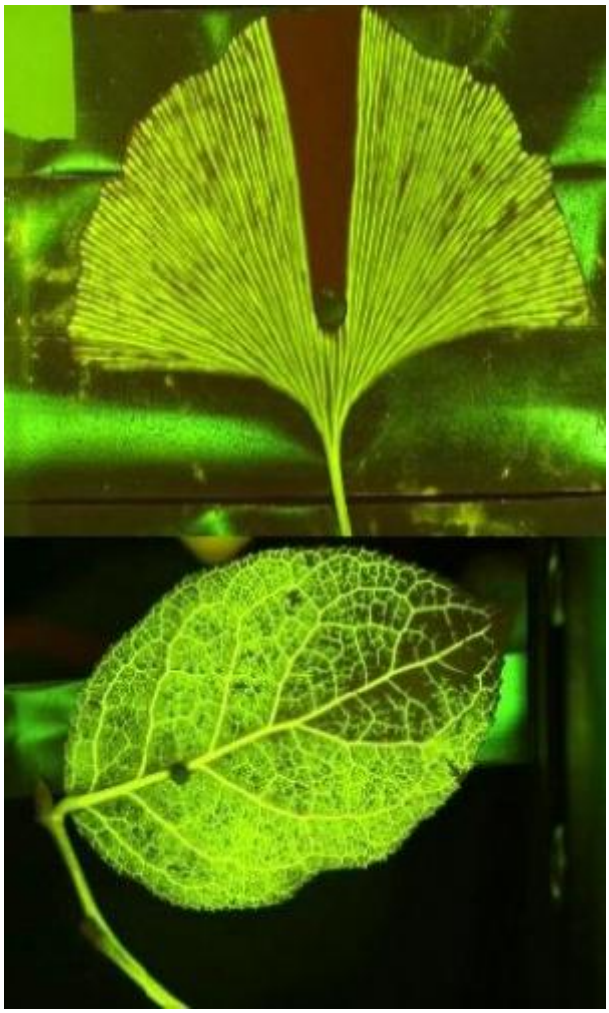
UCI psychiatry & human behavior professor Gary Lynch, postdoctoral fellow Christopher Rex, and undergraduate researchers Yas Sanaiha and Danielle Pham also worked on the study, which received support from the National Institutes of Health and the National Institute of Mental Health.

Story Source:

Adapted from materials provided by University of California - Irvine.

http://www.sciencedaily.com/releases/2010/03/100302151242.htm

Leaf Veins Inspire a New Model for Distribution Networks



Running in circles. New research shows that a distribution network of interconnected loops like the one in the lemon leaf (bottom) is better able to handle damage (green hole) and fluctuating loads than the more straightforward -- and evolutionarily more ancient -- distribution system in the gingko (top). (Credit: Image courtesy of Rockefeller University)

ScienceDaily (Mar. 3, 2010) — A straight line may be the shortest path from A to B, but it's not always the most reliable or efficient way to go. In fact, depending on what's traveling where, the best route may run in circles, according to a new model that bucks decades of theorizing on the subject. A team of biophysicists at Rockefeller University developed a mathematical model showing that complex sets of interconnecting loops -- like the netted veins that transport water in a leaf -- provide the best distribution network for supplying fluctuating loads to varying parts of the system. It also shows that such a network can best handle damage.

The findings could change the way engineers think about designing networks to handle a variety of challenges like the distribution of water or electricity in a city.

Operations researchers have long believed that the best distribution networks for many scenarios look like trees, with a succession of branches stemming from a central stalk and then branches from those branches and so on, to the desired destinations. But this kind of network is vulnerable: If it is severed at any place, the network is cut in two and cargo will fail to reach any point "downstream" of the break.

By contrast, in the leaves of most complex plants, evolution has devised a system to distribute water that is more supple in at least two key ways. Plants are under constant attack from bugs, diseases, animals and the weather. If a leaf's distribution network were tree-like and damaged, the part of the leaf downstream of the damage would starve for water and die. In some of the Earth's more ancient plants, such as the gingko, this is the case. But many younger, more sophisticated plants have evolved a vein system of interconnected loops that can reroute water around any damage, providing many paths to any given point, as in the lemon leaf. Operations researchers have appreciated that these redundancies are an effective hedge against damage. What's most surprising in the new research, according to

Marcelo O. Magnasco, head of the Laboratory of Mathematical Physics at Rockefeller University, is that the complex network also does a better job of handling fluctuating loads according to shifts in demand from different parts of the system -- a common real-world need within dynamic distribution networks.

"For decades, people have believed that the tree-like network was optimal for fluctuating demand," Magnasco says. "These findings could seriously shake things up. People will have to take another look at how they design these kinds of systems."

In a paper published as the cover story of the January 29 *Physical Review Letters*, Magnasco, lead researcher Eleni Katifori, a fellow at Rockefeller's Center for Studies in Physics and Biology, and colleagues lay out a model that assigns a cost to each section of leaf vein proportional to how much water it can carry. They looked for networks that suffered the least strain in the face of two challenges common in both leaves and human-built networks: damage to a randomly chosen segment of the network and changes in the load demanded by different parts of the network. In both scenarios, they found the most robust system was a complex, hierarchical network of nested loops, similar to the fractal-like web of veins that transport water in leaves. This loopy network design is also found in the blood vessels of the retina, the architecture of some corals and the structural veins of insect wings.

Katifori is now extending the research to delve more deeply into how distribution networks handle fluctuating loads, guided by nature's own solution in the leaf.

"It is tempting to ignore the loops, because the central veins stand out and have a tree-like form," Katifori says. "But they are all connected, and the loops are right there to see, if you just look at the leaf."

Story Source:

Adapted from materials provided by Rockefeller University.

Journal Reference:

1. Katifori et al. **Damage and Fluctuations Induce Loops in Optimal Transport Networks**. *Physical Review Letters*, 2010; 104 (4): 048704 DOI: 10.1103/PhysRevLett.104.048704

http://www.sciencedaily.com/releases/2010/02/100227214036.htm

Teens With More Screen Time Have Lower-Quality Relationships

A new study finds that teens who spend more time watching television or using computers appear to have poorer relationships with their parents and peers. (Credit: iStockphoto/Candice Popik)

ScienceDaily (Mar. 2, 2010) — Teens who spend more time watching television or using computers appear to have poorer relationships with their parents and peers, according to a report in the March issue of *Archives of Pediatrics & Adolescent Medicine,* one of the JAMA/Archives journals.

Over the past 20 years, teens have used an ever-expanding array of screen-based tools for communication and entertainment, according to background information in the article. "The availability and attractiveness of screen time activities has provoked excitement about the opportunities afforded by these options, as well as concern about whether these displace other activities that are important for health and development," the authors write. "One area of interest is how screen time may affect the quality of relationships with family and friends."

Rosalina Richards, Ph.D., of the University of Otago, Dunedin, New Zealand, and colleagues studied 3,043 adolescents age 14 to 15 in 2004. The teens completed a confidential questionnaire about their free-time habits, as well as an assessment of their attachment to parents and peers.

Overall, the more time teens spent watching television or playing on a computer, the more likely they were to report low attachment to parents (in other words, difficulty forming a relationship or emotional bond). The risk of having low attachment to parents increased 4 percent for every hour spent viewing television and 5 percent for every hour spent playing on a computer. Conversely, teens who spend more time reading and doing homework reported a higher level of attachment to parents.

The researchers also assessed interview responses from 976 individuals who were age 15 years in 1987 to 1988. Among these teens, more time spent viewing television was associated with lower attachment to both parents and peers. For every additional hour of television, teens had a 13 percent increased risk of low attachment to their parents and a 24 percent increased risk of low attachment to peers.

"Recommendations that children watch less television are sometimes met with the concern that being unable to discuss popular shows or characters may inhibit peer relationships," the authors write. "The findings herein do not suggest that less television viewing is detrimental to adolescent friendships."

There are several potential mechanisms underlying the relationship between increased screen time and poorer relationships, they note. For instance, teens who have televisions in their bedroom not only spent more time watching but also may share fewer meals with family members. "However, it is also possible that adolescents with poor attachment relationships with immediate friends and family use screen-based activities to facilitate new attachment figures such as online friendships or parasocial relationships with television characters or personalities," the authors write.

"Given the importance of attachment to parents and peers in adolescent health and development, concern about high levels of screen time among adolescents is warranted," they conclude. "With the rapid advance of screen-based options for entertainment, communication and education, ongoing research is needed to monitor the effect that these technologies have on social development and psychological and physical well-being among adolescents."

Story Source:

Adapted from materials provided by JAMA and Archives Journals.

Journal Reference:

1. Rosalina Richards; Rob McGee; Sheila M. Williams; David Welch; Robert J. Hancox. **Adolescent Screen Time and Attachment to Parents and Peers**. *Arch Pediatr Adolesc Med*, 2010; 164 (3): 258-262 [link]

http://www.sciencedaily.com/releases/2010/03/100301165614.htm

The brain scanner that feels your pain

- 03 March 2010 by **Jessica Hamzelou**

Magazine issue 2750.

In agony or just faking it? (Image: Leonard Freed/Magnum Photos)

PAIN intensity, the most personal of experiences, can now be measured from the outside, say researchers who scanned the brains of young men who were fresh out of the operating theatre.

Their claim reopens the debate over whether pain can be measured objectively. It might even be possible to gauge the pain felt by newborn babies, fetuses, "locked-in" patients, who can't communicate with the outside world, and animals.

"The definition of pain is that it is subjective, and until now an objective measurement has remained elusive," says Morten Kringelbach of the University of Oxford, who has previously worked on a method of objective pain measurement and was not involved in the most recent work.

Functional MRI scans have been used before to identify brain areas that "light up" when someone is in pain. Because oxygenated and deoxygenated blood have different levels of magnetisation they look different under MRI. A technique for analysing fMRI scans called BOLD, for blood-oxygen-level dependent, exploits this difference to determine which areas are most active: high oxygen is a sign that a brain region is particularly active. While BOLD can reveal if the amount of oxygen flowing to a particular region has increased or decreased, it doesn't measure by how much.

Now Tara Renton of King's College London has used an alternative way of analysing fMRI scans called arterial spin labelling (ASL) to measure how much oxygenated blood is flowing through particular areas. ASL is not new but has only recently been applied to the study of pain.

In regions of the brain associated with feeling pain, Renton and her team found that the amount of oxygenated blood correlated with the intensity of pain described by 16 young men, just after they had had their wisdom teeth removed.

Renton, who described the findings at King's College London on 24 February but has not yet published them, says her team's ASL technique is the first objective measure of ongoing pain intensity. In earlier experiments, volunteers were pricked with a pin or touched with a hotplate. But a short sharp shock provides a simplistic view of pain that doesn't take into account the emotional response to longer-lasting pain, which can affect its perceived intensity, says Renton.

The group are developing their ASL-based technique as a potential alternative to existing methods of assessing the effectiveness of novel analgesics during clinical trials. At the moment, researchers have to rely on a subjective description: volunteers and patients are often asked to describe the level of their pain by placing it on a "visual analogue scale", from 1 to 10. But as Renton says, "a line on a page is really a rather inadequate measure of pain".

David Borsook, who leads the Pain and Analgesia Imaging and Neuroscience group at McLean Hospital in Boston, agrees. "Whilst it offers a reasonable guesstimate of the amount of pain a person is in, it's not objective, and there is great variation in responses."

Brain scans could help identify which areas are involved in an individual's pain, perhaps leading to personalised treatments that target those areas. An individual's brain activity might guide a choice between different drugs or counselling, say. "Right now there is little objective data for a clinician to use to choose one drug over another," says Robert Coghill, a neurobiologist at Wake Forest University School of Medicine in North Carolina. "Different patterns of activation might predict the success of different therapies."

Of course, some big challenges remain. "The response to pain may vary throughout the day, depending on what you're thinking about, and we don't know why," says Kringelbach. There are also bound to be vast differences in the level of brain activation that indicates a given degree of pain in one person compared with another. "The differences haven't been systematically examined yet," says Coghill.

Even if we can overcome these difficulties, can pain really be reduced to a mere blip on a brain scan? It is after all an experience that blends emotional and physical responses in a highly complex way. "The hunt for an objective measure of pain is a fool's errand," says Stuart Derbyshire, who researches pain at the University of Birmingham, UK. He adds that, since pain is a subjective experience, objective measurements don't really tell us that much anyway. "We will always need to rely on subjective measures," he says.

Richard Gracely at the University of Michigan, Ann Arbor, agrees. "It's like saying you can measure love, or the beauty of a painting, objectively. Pain is such a private, personal experience. You can only validate what you've measured by asking patients how much pain they're in, so why not just ask them in the first place?"

In some cases, though, it is not possible to ask. Jeffrey Mogil, who researches pain at McGill University in Montreal, Canada, says a technique like Renton's could be used to measure the level of pain in patients with locked-in syndrome or who are in a vegetative state.

Fetal brain scan

Another question is whether it might be used to help resolve the contentious question of whether fetuses feel pain. There are some obvious hurdles to scanning a fetus's brain. You can't stabilise its head inside the scanner, and blood flow is very low because it is so small. Borsook also worries about the high magnetic field produced by fMRI: "Nobody knows if it would be dangerous, but it might affect the developing brain in some way."

Despite these challenges most think some form of brain scanning is our best bet for measuring fetal pain. "I think in the not-too-distant future it will be feasible to image the fetus using ASL," says Coghill.

The new technique might also allow us to explore animal pain - both so that it can be compared with the human variety, and because it might be possible to test drugs for pain relief on animals. Mogil says that while there are behavioural indicators for pain in animals - for example, mice lick their paws when in pain - assessing ongoing pain is much harder.

Mogil also raises the intriguing idea of using objective pain measurement on someone who might want to hide the true extent of their suffering. "An opiate addict might exaggerate how much pain they're in, in order to be prescribed opiate painkillers, for example," he says.

An opiate addict might exaggerate how much pain they're in to be prescribed opiate painkillers

But Coghill warns against disregarding someone's description of pain in favour of an objective measure. "In the US, insurance companies would jump on an objective method of measuring pain, but this could mean that certain people with different patterns of activation lose out," he says. "We need to ensure that patients are never in a position where they are denied treatment."

He says that objective measurements of pain might be improved by finding indicators for how someone was dealing with it. But he emphasises that patient pain ratings should always have a role in pain assessment. "It's not impossible to have an objective measurement of pain, but this will ultimately need to be complemented by subjective reports."

Pain - A symptom or a disease?

There is still disagreement over whether it's possible to measure pain objectively. But attempts to do so are already driving calls for pain to be recognised as a disease in its own right, rather than a mere symptom.

On 1 March a group of UK pain researchers gathered in London to complain about the way pain is viewed and treated. They argued that far too many people in the world get no treatment for their pain, partly because we are just starting to understand the underlying causes, and partly because of cultural attitudes to pain.

Beverly Collett, consultant in pain medicine at the University Hospitals of Leicester, described the scale of the problem in the UK, where she says 7.8 million people are living with chronic pain. "Of these, 25 per cent will lose their jobs and 22 per cent will develop depression." The cost of pain is estimated at over €200 billion per year in Europe and $150 billion per year in the US.

Irene Tracey of the Pain Imaging Neuroscience Group at the University of Oxford says this suffering is unacceptable. She highlights cultural attitudes which encourage people to put up with pain, rather than seeking treatment - including sayings like "no pain, no gain".

She and Collett are calling for pain to be treated as a disease, rather than a symptom as is the case at the moment. This would hopefully emphasise its seriousness and lead to more extensive treatment.

Tracey and her colleague Catherine Bushnell recently reviewed the last 10 years of imaging research and concluded that chronic pain is associated with functional, structural and chemical changes in the brain, thus putting it into the realm of a disease state (*The Journal of Pain*, DOI: 10.1016/j.jpain.2009.09.001). "Chronic pain fits the definition of a disease," says Tracey.

She hopes that imaging techniques (see main story) will also be used to diagnose pain within the next 5 to 10 years. "It's very hard to unravel the complexities of pain from a verbal response," says Tracey. "The use of imaging to measure pain objectively is potentially very powerful."

http://www.newscientist.com/article/mg20527503.400-the-brain-scanner-that-feels-your-pain.html?full=true&print=true

Where do atheists come from?

- 03 March 2010 by **Lois Lee** and **Stephen Bullivant**

Magazine issue 2750.

Perhaps the capacity to believe in a supernatural agency is simply non-existent in atheists (Image: Jonathan Hordle/Rex Features)

HERE's a fact to flatter the unbelievers among you: the bright young things at the University of Oxford are among the most godless groups ever studied in the UK. Of 728 students surveyed in 2007, 48.9 per cent claimed not to believe in any god, with 49.6 per cent claiming no religious affiliation. And while a very small number of Britons typically label themselves as "atheist" or "agnostic" (most surveys put it at about 5 per cent), an astonishing 57.3 per cent of the Oxford sample did.

This may come as no surprise. After all, atheism is the natural stance of the educated and the informed, is it not? It is only to be expected that Oxford students should be wise to what their own professor Richard Dawkins calls "self-indulgent, thought-denying skyhookery" - and others call "faith". The old Enlightenment caricature, it seems, is true after all: where Reason reigns, God retires.

Of course, things are never quite that simple. Within the sample, for instance, the postgraduates (that is, the even-better educated) were notably more religious than the undergraduates, in terms of both belief in God and self-description. Although the greater number of non-Europeans in the postgraduate population is almost certainly a significant factor here, evidence from elsewhere backs the idea that there is no straightforward relationship between atheism and education.

Let's look at some results from the World Values Survey, an international attempt to assess the global state of socio-cultural, moral, religious and political values. The 2005 results show that while there is a clear positive correlation between education and lack of belief in God, the effect is slightly weaker, not stronger, among those with a university education (14.8 per cent were non-believers) compared with those whose highest attainment was secondary level (17.2 per cent).

What is more, the survey shows a far stronger correlation between education and certain "irrational" beliefs: for example, only 29.6 per cent of those without even an elementary education believe in telepathy, compared with 51.8 per cent of people with degree-level education.

Closer to home, an analysis of the 2008 British Social Attitudes (BSA) survey by David Voas of the University of Manchester reveals that the historical correlation between being educated and being "non-religious" has not only weakened but reversed. Looking at white British people, for example, the findings show that only around 25 per cent of men aged between 25 and 34 claiming "no religion" have degrees, compared with around 40 per cent of those describing themselves as religious. For women in the same age group, the difference is less marked but the trend is the same. The picture is more complicated across different ethnic groups, although the overall trend remains the same.

It appears that Enlightenment assumptions about the decline of religion as the population becomes more educated will no longer do - at least, not without considerable qualification. Why is it that, despite the long history of the study of religion, the picture seems to be getting more and not less confused about what it means to believe in God? We, and the scholars who gathered in December last year for a conference at Wolfson College, University of Oxford, think we may have the answer. The problems stem from a long-term, collective blind spot in research: atheism itself.

This oversight might seem remarkable (or remarkably obtuse on the part of the social scientists) but it is one with deep historical roots. Many of social science's 19th-century founders, including Sigmund Freud, Karl Marx, Émile Durkheim, Auguste Comte and Max Weber, were unbelievers, or "religiously unmusical", as Weber memorably put it. For them, religion was the great explicandum: how, they wondered, could so many people believe in something so absurd? What they failed to recognise was that their own, taken-for-granted, "lack" of belief might itself be amenable to inquiry.

Ironically, sociologists, psychologists, economists and, particularly, cognitive anthropologists have become so skilled at explaining why humans seem to have such a widespread bias towards theistic beliefs that a new question readily presents itself: if religion comes so naturally to us, why are so many people, especially in western Europe, apparently resistant to it? In the UK, for example, a sizeable 43 per cent said they had "no religion" in the 2008 BSA survey.

If religion comes naturally to us, why are so many people resistant to it?

Moreover, social scientists themselves consistently rank as the most atheistic of all academics: see a recent study by Neil Gross at the University of British Columbia, Vancouver, Canada, and Solon Simmons of the Institute for Conflict Analysis and Resolution at George Mason University, Arlington, Virginia (*Sociology of Religion, in press*).

What we need now is a scientific study not of the theistic, but the atheistic mind. We need to discover why some people do not "get" the supernatural agency many cognitive scientists argue comes automatically to our brains. Is this capacity non-existent in the non-religious, or is it rerouted, undermined or overwritten - and under what conditions?

Psychologically, we need to know how the self functions without theistic belief, and how our emotional resources might be altered by its absence. Anthropologically, we need to understand how people without religion make sense of their lives, how they find meaning, and how non-theistic systems of thought are embedded in, and shape, the different cultures in which they are present. Sociologically, we need to know how these alternative meaning-making systems are shared between societies, how they unite or divide us, and whether non-religious groups contain pro-social elements commonly associated with religion itself.

For all these reasons and more - not to mention the sheer thrill of entering uncharted waters - we set up the international and interdisciplinary Non-religion and Secularity Research Network in late 2008. The Wolfson meeting was the NSRN's inaugural conference, only the second event on this topic ever to be held in Europe. (The first was convened by the Vatican in 1969: make of that what you will.)

The conference presented the first fruits of research in this area - and discussed how much still needs to be done. One of the first tasks is to develop a common academic vocabulary. In this article, for instance,

we have danced between "atheistic", "non-theistic", "non-religious", "unbelieving" and "godless" as if they were synonyms. They're not.

Interesting findings have, however, begun to emerge; some providing insight into the relationship between education and atheism. Voas, also a keynote speaker at the Wolfson conference, says one reason why a greater number of religious people are degree-holders may be that "better educated people have typically reflected on religion and have the self-confidence to come down decisively, on one side or the other". The issue is not which idea - atheism or theism - is more stupid than the other, but that education helps us either to work out or simply to communicate our beliefs, no matter what they are.

He also notes the observation by another keynote presenter, Colin Campbell of the University of York, whose 1971 book *Toward a Sociology of Irreligion* had until very recently been a lone voice in the wilderness. Campbell argues that though the educated are often the first to articulate a new cultural perspective, if that perspective becomes popular, it will spread across the population. As a result, the education levels associated with that perspective naturally average out. So it is that the relationship between intelligence or education and cultural shifts may not be as significant as they first appear.

Everybody stands to benefit from wider and more systematic research of the atheistic or non-religious. The believers may take heart from the fact that the most comprehensive studies no longer suggest the unreligious are cleverer or more lettered than them. But the non-believers might also comfort themselves that they are no longer outside the mainstream. They have become a "normal" and significant part of many societies. And researchers ignore them at their peril.

Profile

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http://www.newscientist.com/article/mg20527506.100-where-do-atheists-come-from.html

A Convincing Mimic: Scientists Report Octopus Imitating Flounder in the Atlantic

Left: Macrotritopus defilippi in the aquarium; note the long thin arms characteristic of the species. Right: Macrotritopus defilippi swimming forward and mimicking the shape, speed, and behavior of flounder swimming. (Credit: Left: Photo by John Forsythe; Right: Photo by R. Hanlon)

ScienceDaily (Mar. 4, 2010) — On the open sand plains of the Caribbean seafloor, where soft-bodied animals are routinely exposed to predators, camouflage can be key to survival. Perhaps no group of animals is quite as adept at blending in with its surroundings as cephalopods, including cuttlefish and squid, which have evolved a unique skin system that can instantaneously change their appearance.

In the February 2010 issue of *The Biological Bulletin*, MBL Senior Scientist and cephalopod expert Roger Hanlon and his colleagues report the exceptional camouflage capabilities of the Atlantic longarm octopus, *Macrotritopus defilippi*, whose strategy for avoiding predators includes expertly disguising itself as a flounder. While Hanlon and others have documented two other species of octopuses imitating flounder in Indonesian waters, this is the first report of flounder mimicry by an Atlantic octopus, and only the fourth convincing case of mimicry for cephalopods.

Comparing still photographs and video footage from five Caribbean locations collected over the last decade, Hanlon and co-authors, MBL graduate students Anya Watson and Alexandra Barbosa, observed uncanny similarities between the small and delicate octopus and the peacock flounder, *Bothus lunatus*, one of the most common sand dwellers in the Caribbean. They compared not only coloration, which in each animal resembled the sandy seafloor, but swimming speed and form.

Just like flounder, the octopuses contoured their bodies to hug the wavy seafloor, tapering their arms behind them. They also swam with the same fits and starts as flounder at the same speeds. Interestingly, the octopuses mimicked flounder only when swimming, when movement would compromise their camouflage. How well the animals blended in with their background differed. The octopus showed more highly controlled and rapid skin patterning than the flounder, whose camouflage was slower and less precise.

"We were equally impressed with the remarkable camouflage of this small octopus species even when it was stationary yet entirely exposed on top of the open sand," says Hanlon. "The apparent match in

pattern, color, brightness, and even 3-dimensional skin texture was noteworthy even when compared to other changeable cephalopods. They also demonstrated an unusual form of disruptive camouflage."

So why do Atlantic longarm octopuses choose to imitate flounder as a way to avoid the threat of predators? More study of cephalopod mimicry is needed, but a possible explanation, according to Hanlon and his team, could be that predators who could easily take a bite out of the small, soft octopus might find a rigid flatfish like the flounder too much of a mouthful and avoid them.

This research was supported by grants from the Sholley Foundation, Office of Naval Research, Our World-Underwater Scholarship Society, and Fundacao para a Ciencia e a Tecnologia, Portugal.

Story Source:

Adapted from materials provided by Marine Biological Laboratory.

Journal Reference:

1. Hanlon, Roger T., Anya C. Watson, and Alexandra Barbosa. **A mimic octopus: in the Atlantic: flatfish mimicry and camouflage by Macrotritopus defilippi**. *The Biological Bulletin*, February 2010 [link]

http://www.sciencedaily.com/releases/2010/03/100303192448.htm

Shopping for Happiness? Get a Massage, Forget the Flat-Screen TV

ScienceDaily (Mar. 4, 2010) — Money can't buy you love, but it can buy satisfaction -- if you spend wisely.

Consumers found that satisfaction with "experiential purchases" -- from massages to family vacations -- starts high and increases over time. In contrast, spending money on material things feels good at first, but actually makes people less happy in the end, says Thomas Gilovich, Cornell University professor of psychology and Travis J. Carter, Cornell Ph.D. '10.

When it comes to material things, Gilovich and Carter found shoppers often second-guess their original buying decisions, comparing what they bought to other people's purchases -- or to better deals they missed.

But buying experiences provides greater satisfaction as time goes on, in part because of selective memory and because a consumer's experience is highly subjective, making it much harder to make negative comparisons. Consumers also find it easier to decide on experiences, spending money on the first option that meets a set of expectations rather than painstakingly comparing all options.

Still, there is hope for makers of CDs and flat-screen televisions. The research found that how people view a purchase -- as an expensive boxed-set or as hours of enjoyable music -- also influenced their level of satisfaction.

The original paper appeared in the January 2010 issue of the American Psychological Association's *Journal of Personality and Social Psychology*. Carter is now conducting post-doctoral work at the University of Chicago. The National Science Foundation funded the research.

Story Source:

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

Journal Reference:

1. Carter, Travis J.; Gilovich, Thomas. **The relative relativity of material and experiential purchases.**. *Journal of Personality and Social Psychology*, 2010; 98 (1): 146 DOI: 10.1037/a0017145

http://www.sciencedaily.com/releases/2010/03/100302171527.htm

How Trauma Leads to Inflammatory Response: Mitochondria May Be at Root of Dangerous Complications from Injury

Electron micrograph of a mitochondrion from mammalian lung tissue showing its matrix and membranes. (Credit: Courtesy of Wikimedia Commons)

ScienceDaily (Mar. 4, 2010) — Inflammation is at the root of most serious complications occurring after both infection and injury. But while the molecular course of events that leads from microbial infections to the inflammatory condition called sepsis is fairly well understood, it is far less clear how and why physical injury can result in a similarly dangerous inflammatory response.

Now a study led by investigators at Beth Israel Deaconess Medical Center (BIDMC) suggests that mitochondria -- the body's cellular "power plants" -- are released into the bloodstream following physical injury. And because mitochondria closely resemble the bacteria from which they originated, they appear to elicit a sepsis-like immune response, changing from a vital source of cellular injury to a dangerous "enemy within."

Appearing in the journal *Nature*, the findings could eventually lead to new strategies in the management of trauma as well as to the development of new tests to help clinicians discriminate between infective and non-infective inflammation.

"The body's vital organs can become dysfunctional when traumatic injury triggers the Systemic Inflammatory Response Syndrome, or SIRS," explains senior author Carl J. Hauser, MD, a trauma and critical care surgery specialist at BIDMC and Visiting Professor of Surgery at Harvard Medical School. "Trauma kills 5 to 10 million people worldwide per year and among U.S. individuals under age 35, trauma accounts for more deaths than all other illnesses combined. Inflammatory complications are directly responsible for about one-third of those deaths."

Hauser, whose laboratory studies focus on neutrophils, circulating white blood cells that can attack the body's organs, wanted to find out how neutrophils might be participating in this dangerous inflammatory cascade.

The mechanisms that underlie both SIRS and sepsis are rooted in the body's "innate immune" response. Unlike "acquired immunity," which develops over time, innate immunity is present from birth, ready to immediately respond whenever immune cells encounter molecular patterns typical of external pathogens such as bacteria or viruses. These "pathogen-associated molecular patterns," or PAMPS, are in turn, detected by pattern recognition receptor molecules (PRR).

"When an infection strikes, PAMPs activate PRR very rapidly, initiating a group of cellular responses collectively described as the 'Danger Response,'" explains Hauser. This response underlies both SIRS and sepsis, and can ignite early reactions to cell threats as well as act as an adjuvant for later acquired immune responses. However, as Hauser notes, infectious pathogens and PAMPs aren't the only cause of the Danger Response.

"Injured or necrotic tissues can activate very similar immune responses," he explains. "Blunt-force trauma can result in the death of significant amounts of tissue, as can burns, cancer chemotherapy, major surgeries and many other diseases. We wondered if tissues that die by such pathologic means, rather than via programmed cell death or apoptosis, were releasing into the body molecular debris not normally encountered by the immune system."

Some normally intra-cellular molecules can activate PRR, and when they do they are called Damage-Associated Molecular Patterns, or DAMPS. Hauser hypothesized that DAMPs might be triggering inflammatory responses after trauma in the same way that PAMPs triggered inflammation in the face of infection -- and that mitochondria might be ultimately responsible.

Mitochondria are structures within cells that burn nutritional energy sources using oxygen and convert it into the ATP that powers the cells. They function autonomously, having their own DNA which is separate and very different from the genetic material contained within the cell's nucleus, and their own machinery for protein synthesis. Because mitochondria share so many similarities with bacteria -- including their method of reproduction, the molecular nature of their DNA and their synthesis of n-formylated proteins -- it is believed that they were once free living bacterial saprophytes that survived by scavenging the waste products of eukaryotic cells. Over time mitochondria took up residence in the cell and became true symbionts, but many of their molecular signatures remained those of bacteria.

"Mechanical trauma disrupts cells, so we hypothesized that injury might be releasing mitochondria and their DAMPs into the circulatory system, activating immunity in the same way that infections do when they release PAMPS," explains Hauser.

To test this hypothesis, the investigators first assayed mitochondrial DNA (mtDNA) from blood samples obtained from a large group of patients who had suffered multiple trauma. As predicted, they found that mtDNA levels were increased but surprisingly, they found that levels were often thousands-of-fold above normal levels.

Through a series of subsequent experiments, the researchers showed that mitochondrial peptides acted as classical G-protein coupled chemoattractants, activating white blood cells through the FPR1 receptor (a receptor that normally senses bacterial proteins) and associated downstream kinases. They similarly showed that mtDNA activates white blood cells through the PRR known as toll-like receptor 9 (TLR9 normally senses bacterial DNA) and its downstream kinases. Interaction of these two DAMPs and their PRRs work synergistically to activate neutrophils. The investigators also found that injection of mitochondria into rats caused peritonitis and reproduced the pulmonary and hepatic inflammation typical of traumatic SIRS.

"This study suggests that mitochondria -- which can spill into the bloodstream following a physical injury -- look enough like the bacteria they originated from to elicit an immune response," notes Scott Somers, PhD, program director at the National Institute of General Medical Sciences. "This work offers important

insight into why the body's response to physical trauma mirrors that of bacterial sepsis, and may lead to new strategies for treating severely injured patients."

Adds Hauser, "Since external injuries and events causing sterile tissue death seem to have just as much potential for causing SIRS as does infection, many of the conditions that we've traditionally treated with antibiotics may turn out to not be infections and may, in fact, require very different types of treatment. Going forward, we hope to collaborate with researchers who are working to identify the origins of inflammation in other clinical conditions."

In addition to Hauser, coauthors include BIDMC investigators Qin Zhang, Mustafa Raoof, Yu Chen, Yuka Sumi, Tolga Sursal, Wolfgang Junger, and Kiyoshi Itagaki; and Karim Brohi of Queen Mary University of London.

This study was supported by a grant from the National Institute of General Medical Sciences.

Story Source:

Adapted from materials provided by Beth Israel Deaconess Medical Center.

Journal Reference:

1. Qin Zhang, Mustafa Raoof, Yu Chen, Yuka Sumi, Tolga Sursal, Wolfgang Junger, Karim Brohi, Kiyoshi Itagaki & Carl J. Hauser. **Circulating mitochondrial DAMPs cause inflammatory responses to injury**. *Nature*, 2010; 464 (7285): 104 DOI: 10.1038/nature08780

http://www.sciencedaily.com/releases/2010/03/100303131525.htm

New Insights to Master Signaling Switch Identified Using High Throughput Technology Platform

ScienceDaily (Mar. 4, 2010) — UCD Conway Institute of Biomolecular & Biomedical Research researchers and their collaborators in Sweden and the United States have identified a range of novel protein interactions involved in calcium signalling in brain cells and validated them using a high throughput screening technology.

The findings were recently published online in the scientific journal *Molecular & Cellular Proteomics* from The American Society of Biochemistry & Molecular Biology.

A great challenge in science today is identifying the structure, function and interactions of the proteins within our bodies. By unravelling the cascades of interactions that occur in cells between proteins, scientists may pinpoint where these processes fail in various diseases.

Calmodulin is present in all cells and found at higher levels in those that are growing rapidly. This protein controls the level of calcium in cells, which is fundamental to the processes of cell proliferation, learning and memory, growth and movement. When calmodulin interacts with other proteins, calcium levels increase within cells.

Dr David O'Connell, a senior postdoctoral researcher working with Conway Fellow, Professor Dolores Cahill used a human protein array system to identify up to 70 novel interactions where calmodulin bound tightly to other proteins. These interactions were then verified and validated using high throughput technology.

Commenting on the findings, Dr O'Connell said, "This technology provides us with a versatile tool to identify the primary targets of central signalling proteins that regulate large numbers of proteins across all cells of the body. It has significant advantages over other methods currently in use. Our results now provide a starting point to gain greater insight into calcium signalling in the brain".

O'Connell will now begin to collaborate with UCD Conway colleagues who have previously identified calmodulin interacting with proteins in the course of their research and are now intrigued at the prospect that the presence of the protein may actually point to the cell processes they are investigating being calcium dependent.

Science Foundation Ireland partially funded this project through a Walton Fellowship awarded to Professor Sara Linse, a protein structural chemist from Lund University, Sweden who collaborated on the project.

Story Source:

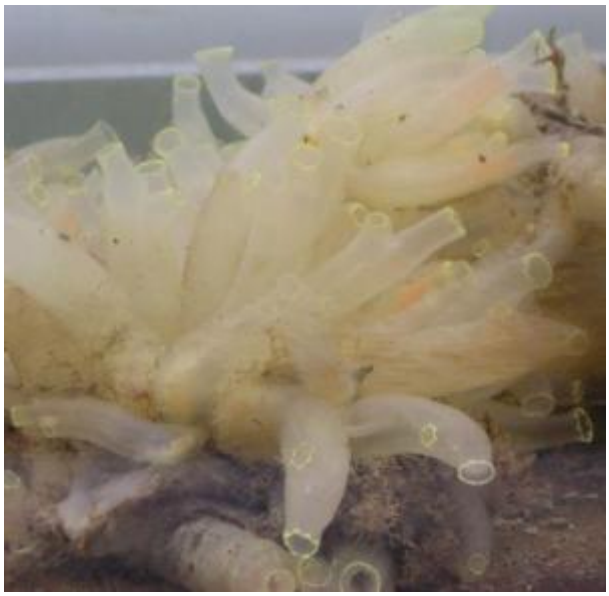
Adapted from materials provided by UCD Conway Institute of Biomolecular & Biomedical Research, via AlphaGalileo.

Journal Reference:

1. O'Connell et al. **Integrated protein array screening and high throughput validation of 70 novel neural calmodulin binding proteins**. *Molecular & Cellular Proteomics*, 2010; DOI: 10.1074/mcp.M900324-MCP200

http://www.sciencedaily.com/releases/2010/02/100222082922.htm

Sea Squirt Offers Hope for Alzheimer's Sufferers



Ciona intestinalis. (Credit: Image courtesy of Wikimedia Commons)

ScienceDaily (Mar. 3, 2010) — Alzheimer's disease affects an estimated 27 million people worldwide. It is the most common form of age-related dementia, possibly the most feared disease of old age. There is no cure, and the available drugs only help to relieve symptoms without slowing progression of the disease. One of the characteristic changes in the brains of Alzheimer's patients is the accumulation of plaques and tangles; currently, the best hope for curing or at least slowing the disease lies in developing drugs that target this buildup. Some drugs are already in clinical trials, but there is still a pressing need for more research, and for more and better drugs directed against both known and novel targets.

One of the big problems in rapidly screening potentially useful drugs has been the lack of a good model system in which Alzheimer's plaques and tangles appear quickly. However, Mike Virata and Bob Zeller, scientists working at San Diego State University, California, have come up with a new, and perhaps unlikely candidate; the humble sea squirt, *Ciona intestinalis*.

Sea squirts are tunicates, marine organisms protected by an outer hard tunic with a soft body inside. Adults spend their lives attached to one spot on underwater structures like the pilings of piers, sucking in water through one siphon, filtering out small plants to eat, and squirting the water back out through another siphon. However, as long ago as Darwin, it has been recognized that sea squirts may be our closest invertebrate relatives; in their immature, tadpole form, they resemble proper vertebrates, and they share about 80% of their genes with us.

Bob Zeller has been a fan of sea squirt tadpoles since starting work with them in the 1990s, when he helped develop a way of introducing foreign DNA into fertilized sea squirt eggs with almost 100% efficiency, opening the way for their use as model organisms. He and his colleague Mike Virata decided to see whether it would be possible to model Alzheimer's disease in the tiny animals, which share all the genes needed for the development of Alzheimer's plaques in humans.

Incredibly, dosing the sea squirt tadpoles with a mutant protein found in human families with hereditary Alzheimer's resulted in aggressive development of plaques in the tadpoles' brains in only a day, and these, along with the accompanying behavioral defects seen in the tadpoles, could be reversed by treating with an experimental anti-plaque forming drug. This is an important breakthrough, as all other invertebrates tested have been unable to process the plaque-forming protein, and vertebrates take months or years to

make plaques. These exciting results make it a real possibility that sea squirts are an excellent model for testing new drugs in the fight against Alzheimer's disease.

The study is published in Volume 3 Issue 5/6 of the research journal, *Disease Models & Mechanisms* (DMM), http://dmm.biologists.org/, published by The Company of Biologists, a non-profit organisation based in Cambridge, UK.

Story Source:

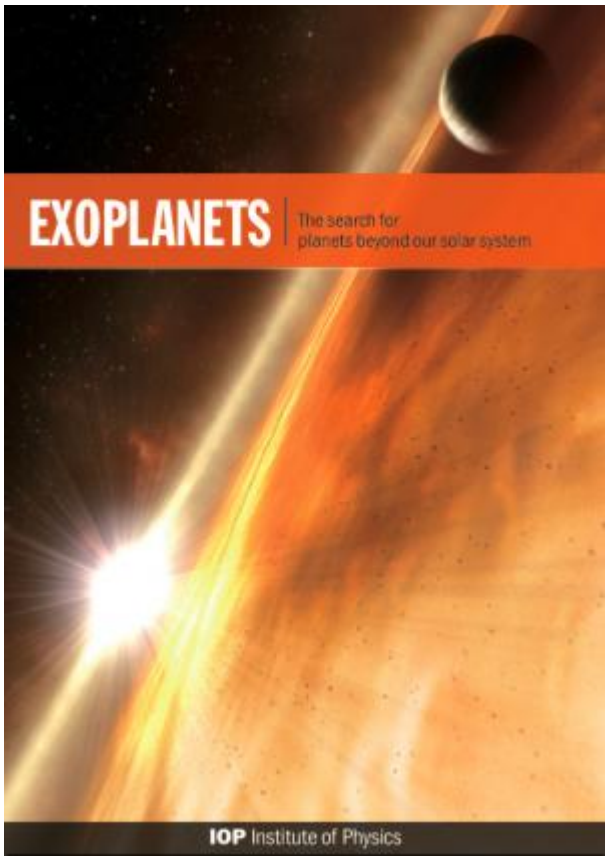
Adapted from materials provided by The Company of Biologists, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Michael J. Virata and Robert W. Zeller. **Ascidians: an invertebrate chordate model to study Alzheimer's disease pathogenesis**. *Disease Models & Mechanisms*, 2010; DOI: 10.1242/dmm.003434

http://www.sciencedaily.com/releases/2010/03/100302083451.htm

How to Hunt for Exoplanets



Cover of "Exoplanets -- The search for planets beyond our solar system". (Credit: Image courtesy of Institute of Physics)

ScienceDaily (Mar. 3, 2010) — A new report launched by the Institute of Physics (IOP) *Exoplanets -- The search for planets beyond our solar system* explains how new technological advances have seen the discovery of more than 400 exoplanets to date, a number expected to rise to thousands in the next few years.

The report details how new techniques and instruments are providing growing observational evidence that our home galaxy -- the Milky Way with its 100 billion stars -- could contain millions of solar systems.

Discovering a distant exoplanet should be almost impossible but astronomers have used their understanding of physics, combined with sophisticated instrumentation and data analysis, to detect signals indicating the presence of a planet.

The first exoplanets were discovered in 1991 using radial velocity measurements, the detecting and measuring of the gravitational tug that expolanets exert on their parent stars, which causes the stars to wobble.Other detection methods include transit observation (measuring the dimming of a star's brightness as a planet passes in front of it) or nulling interferometry (where light waves received by several telescopes are combined to give a proportionately higher-resolution image).

Today, direct detection of the visible and infrared light from giant planets in wide orbits is becoming increasingly possible.In particular, UK researchers have been heavily involved in a new adaptive optics system, the Gemini Plant Imager, which will enable vastly more sensitive searches for fainter planets in closer orbits -- and take us one step closer to discovering a second Earth.

Dr Robert Kirby-Harris, chief executive at IOP, said: "This report outlines exciting developments in detecting planets which might -- just might -- be able to support life in distant solar systems. It provides yet another illustration of how the techniques and knowledge provided by physics which help us to further our understanding of the universe."

The report (in PDF format) is available at: http://www.iop.org/activity/policy/Publications/file_40587.pdf

Story Source:

Adapted from materials provided by Institute of Physics.

http://www.sciencedaily.com/releases/2010/03/100302084145.htm

Elderly Patients Who Survive ICU Stay Have High Rate of Death in Following Years

ScienceDaily (Mar. 3, 2010) — An analysis of Medicare data indicates that elderly patients who are hospitalized in an intensive care unit (ICU) and survive to be discharged from the hospital have a high rate of death in the following three years, and that, in particular, patients who receive mechanical ventilation have a substantially increased rate of death compared with both hospital and general population controls in the first several months after hospital discharge, according to a study in the March 3 issue of *JAMA*.Although there has been a decrease over time in the risk of in-hospital death for patients who receive intensive care in the United States, little is known about subsequent outcomes for those discharged alive. "Patients older than 65 years now make up more than half of all ICU admissions," the authors write. "Information is needed to understand the patterns of mortality, morbidity, and health care resource use in the months and years that follow critical illness to allow for better targeting of follow-up care."

Hannah Wunsch, M.D., M.Sc., of Columbia University Medical Center and NewYork-Presbyterian Hospital/Columbia, New York, and colleagues examined the 3-year outcomes and health care resource use of ICU survivors, and identified subgroups of patients and periods in which patients are at highest risk of death, using a 5 percent sample of Medicare beneficiaries older than 65 years. A random half of all patients were selected who received intensive care and survived to hospital discharge in 2003 with 3-year follow-up through 2006. From the other half of the sample, 2 matched control groups were generated: hospitalized patients who survived to discharge (hospital controls) and the general population (general controls), individually matched on age, sex, race, and whether they had surgery (for hospital controls).

In the data analyzed for the study, 35,308 ICU patients survived to hospital discharge. The ICU survivors had a higher 3-year mortality (39.5 percent) than hospital controls (34.5 percent) and general controls (14.9 percent). The ICU survivors who did not receive mechanical ventilation had minimal increased risk compared with hospital controls (3-year mortality, 38.3 percent vs. 34.6 percent)."However, mortality for those who received mechanical ventilation was substantially higher than for the corresponding hospital controls (3-year mortality: 57.6 percent vs. 32.8 percent, respectively). This difference was primarily due to mortality during the first 2 quarters following hospital discharge (6-month mortality: 30.1 percent for ICU survivors vs. 9.6 percent for hospital controls)," the authors write.Discharge to a skilled care facility for ICU survivors (33.0 percent) and hospital controls (26.4 percent) also was associated with high 6-month mortality (24.1 percent for ICU survivors and hospital controls discharged to a skilled care facility vs. 7.5 percent for ICU survivors and hospital controls discharged home).

"The magnitude of the postdischarge use of skilled care facilities for both ICU survivors and hospital controls and the high long-term mortality for all of these patients call into question whether discharge to skilled care facilities is merely a marker for higher severity of illness with appropriate delivery of care. These patients could have been discharged prematurely from acute care hospitals, and needed a higher level of care than they received. It also is possible that these patients could have had better outcomes if discharged home, but were not able to be sent there due to lack of sufficient support from family or friends to act as caregivers. These findings highlight the need for a much more detailed understanding of the long-term care needs of these patients," the authors conclude.

Adapted from materials provided by JAMA and Archives Journals.

Journal Reference:

1. Hannah Wunsch; Carmen Guerra; Amber E. Barnato; Derek C. Angus; Guohua Li; Walter T. Linde-Zwirble. **Three-Year Outcomes for Medicare Beneficiaries Who Survive Intensive Care**. *JAMA*, 2010; 303 (9): 849-856 [link]

http://www.sciencedaily.com/releases/2010/03/100302162247.htm

Aerial Surveillance Technology Could Keep Soldiers Safer

A Reaper MQ-9 UAV (Unmanned Aerial Vehicle) prepares for a training mission. (Credit: Crown Copyright/MOD 2010/www.defenceimages.mod.uk)

ScienceDaily (Mar. 3, 2010) — New technology that enables aerial vehicles to plan and verify missions could mean there is less need for military personnel to conduct dangerous surveillance operations in war zones.

Developed for use in multiple unmanned aerial vehicles (MUAVs), the sophisticated autonomous computer framework -- the first of its kind -- allows one operator to control a number of vehicles from a safe position on the ground. It would also make surveillance missions significantly cheaper.

The EPSRC (Engineering and Physical Sciences Research Council) research project has been developed by scientists from Cranfield University, based at the Defence Academy of the United Kingdom. They are collaborating with a research team at Imperial College London.

UAVs are used regularly in defence scenarios, but having a team of vehicles means more "eyes," safer missions and more accurate results. It also means that if one vehicle is lost in action the others can carry on until the mission is complete. Launching a fleet of vehicles in crowded or dangerous skies, however, requires very sophisticated control and guaranteed performance of the vehicles.

The framework technology allows an operator to programme a mission objective, authorising the group of vehicles to decide the most efficient way to complete their task. Through a series of control algorithms the framework manages each vehicle's functions, such as navigation, guidance, path planning and decision making, and ensures the vehicles avoid colliding with one another or other objects.

Principal researcher Professor Antonios Tsourdos explains the importance of the framework's accuracy: "We have to be absolutely certain of the behaviour of the UAVs if they are operating over civilian areas or in a battle situation."

Other benefits of using the framework technology with MUAVs are that it increases the chances of a mission being conducted safely and successfully. "Missions sometimes have to be abandoned due to poor weather or on safety grounds, but pilotless vehicles can be used in more challenging situations and can also provide real-time feedback on current conditions," says Professor Tsourdos.

MUAVs using this framework technology can also be used by search and rescue services to look for lost people or vessels. It allows searches to be conducted without the loss of attention to detail or tiredness that occurs when humans work in challenging situations for extended periods.

Another novel use of the technology is within environmental surveillance. The team has modelled the MUAVs with chemical sensors attached to track the movements of contaminated cloud formations. The vehicles were able to successfully track a cloud and predict its movement pattern. This could revolutionise the way emergency services respond to explosions such as the Buncefield disaster in 2005, where a contaminated cloud posed a risk to the local population. The technology will give a more accurate idea of which areas are likely to be affected.

Other civil applications include mining, oil exploration, surveillance and reconnaissance for traffic control, fire extinction, oceanographic or geological surveys, and marine and border inspection.

The Cranfield researchers were part of a team that won the 2008 Ministry of Defence Grand Challenge competition and are leading the world in the development of this type of technology. Professor Tsourdos hopes the technology will be deployed regularly within five years.

Story Source:

Adapted from materials provided by Engineering and Physical Sciences Research Council.

http://www.sciencedaily.com/releases/2010/03/100302111910.htm

History Detectives' Investigate the Case of the Mylar Mystery

NASA's first communication satellite, Echo, was a giant mylar balloon, 100 feet in diameter, that could "bounce" a radio signal from one ground station to another. (Credit: NASA)

ScienceDaily (Mar. 3, 2010) — There is a mystery afoot at Goddard -- the case of the mylar mystery to be exact. On January 11, 2010, "History Detective" Tukufu Zuberi, from the PBS show "The History Detectives," came to Goddard to investigate a mystery. "The History Detectives" show asks viewers to submit unusual objects or clues with a possible historical interest and then selects one as the basis of investigating an historical mystery.

In Goddard's case, Zuberi had one clue, a small, unassuming, silver sample of mylar with pink residue on one side. The mystery to be solved was whether or not this bit of mylar was from Goddard's Echo II satelloon project. Satelloons are a combination of satellites and balloons which were constructed out of bright, metallic mylar for increased visibility.

During the early 1960's, Goddard launched the Echo I and Echo II satelloon projects. The Echo projects were instrumental in letting the world see that the U.S. was a major force in the space race not very far behind Russia. Among the many contributions of the Echo programs are the first voice communication via satellite which was made by none other than then President Eisenhower and the first coast-to-coast telephone call using a satellite. In addition, the Echo programs resulted in advances in atmospheric density, solar pressure, gossamer structures, solar sailing, and transmitting videos via satellites.

History Detective Zuberi turned to retired NASA engineer and self-professed Echo satelloon historian Ron Muller for help in solving the mylar mystery. He received additional assistance in the form of testing from four members of Goddard's Materials Engineering Branch including Michael Viens, Alejandro Montoya, Debbie Thomas, and Marjorie Sovinski.

So, what did History Detective Zuberi and his Goddard colleagues determine? Was the silver bit of mylar from our Echo II satelloon project? For the answers to these and other questions regarding the case of the mylar mystery, stay tuned to watch a future episode of "The History Detectives" airing on PBS in the summer of 2010.

Story Source:

Adapted from materials provided by NASA/Goddard Space Flight Center.

http://www.sciencedaily.com/releases/2010/03/100302165926.htm

Artificial Bee Silk a Big Step Closer to Reality

Honeybee larvae produce silk to reinforce the wax cells in which they pupate and now CSIRO scientists have produced this silk artificially. (Credit: CSIRO)

ScienceDaily (Mar. 3, 2010) — CSIRO scientist Dr Tara Sutherland and her team have achieved another important milestone in the international quest to artificially produce insect silk.

They have hand-drawn fine threads of honeybee silk from a 'soup' of silk proteins that they had produced transgenically.

These threads were as strong as threads drawn from the honeybee silk gland, a significant step towards development of coiled coil silk biomaterials.

"It means that we can now seriously consider the uses to which these biomimetic materials can be put," Dr Sutherland said."We used recombinant cells of bacterium *E. coli* to produce the silk proteins which, under the right conditions, self-assembled into similar structures to those in honeybee silk.

"We already knew that honeybee silk fibres could be hand-drawn from the contents of the silk gland so used this knowledge to hand-draw fibres from a sufficiently concentrated and viscous mixture of the recombinant silk proteins.

"In fact, we had to draw them twice to produce a translucent stable fibre."Dr Sutherland said numerous efforts have been made to express other invertebrate silks in transgenic systems but the complicated structure of the silk genes in other organisms means that producing silk outside silk glands is very difficult.

"We had previously identified the honeybee silk genes and knew that that the silk was encoded by four small non-repetitive genes -- a much simpler arrangement which made them excellent candidates for transgenic silk production."

Possible practical uses for these silks would be tough, lightweight textiles, high-strength applications such as advanced composites for use in aviation and marine environments, and medical applications such as sutures, artificial tendons and ligaments.

Story Source:

Adapted from materials provided by CSIRO Australia.

Journal Reference:

1. Weisman et al. **Honeybee silk: Recombinant protein production, assembly and fiber spinning**. *Biomaterials*, 2010; 31 (9): 2695 DOI: 10.1016/j.biomaterials.2009.12.021

http://www.sciencedaily.com/releases/2010/03/100303092409.htm

Coffee Associated With Reduced Risk of Hospitalization for Heart Rhythm Disturbances

New research suggests that coffee drinkers may be less likely to be hospitalized for heart rhythm disturbances. (Credit: iStockphoto)

ScienceDaily (Mar. 3, 2010) — Coffee drinkers may be less likely to be hospitalized for heart rhythm disturbances, according to a new study by the Kaiser Permanente Division of Research in Oakland, Calif. The researchers, who note the findings may be surprising because patients frequently report palpitations after drinking coffee, are presenting the study at the American Heart Association's 50th Annual Conference on Cardiovascular Disease Epidemiology and Prevention in San Francisco on March 5, 2010.

While it has been established that very large doses of caffeine, the most active ingredient in coffee, can produce rhythm disturbances, there has been limited epidemiologic research about the caffeine doses people take. Previous data from a population study in Denmark compared heavy to light coffee drinkers with respect to risk of atrial fibrillation, the most common major rhythm disturbance, and found no statistically significant difference. This research presentation is believed to be the first large, multiethnic population study to look at all major types of heart rhythm disturbance, the researchers said.

The researchers followed 130,054 men and women and found that those who reported drinking four or more cups of coffee each day had an 18 percent lower risk of hospitalization for heart rhythm disturbances. Those who reported drinking one to three cups each day had a 7 percent reduction in risk, according to Arthur Klatsky, MD, the study's lead investigator and a senior consultant in cardiology at Kaiser Permanente Division of Research in Oakland, Calif.

"Coffee drinking is related to lower risk of hospitalization for rhythm problems, but the association does not prove cause and effect, or that coffee has a protective effect," Klasky said. Other explanations for the

association might include other traits of coffee drinkers such as exercise or dietary habits. Additionally, some people with heart rhythm problems often are not hospitalized.

"However, these data might be reassuring to people who drink moderate amounts of coffee that their habit is not likely to cause a major rhythm disturbance," Klatsky said. While this report is not sufficient evidence to say that people should drink coffee to prevent rhythm problems, it supports the idea that people who are at risk for rhythm problems, or who have rhythm problems, do not necessarily need to abstain from coffee, emphasized Klatsky.

The long-term observational study involved 130,054 men and women, 18 to 90 years old, with the majority less than 50 years old. About 2 percent (3,317) were hospitalized for rhythm disturbances; 50 percent of those were for atrial fibrillation, the most common heart rhythm problem. The 18 percent reduction in risk was consistent among men and women, different ethnic groups, smokers and nonsmokers. It also was similar for various rhythm problems such as paroxysmal supraventricular tachycardia, atrial flutter, and atrial fibrillation.

Fourteen percent of the people in the study drank less than one cup of coffee a day; 42 percent drank one to three cups of coffee a day; and 17 percent reported drinking four cups or more each day. Only 27 percent of the people in the study were not coffee drinkers.

While emphasizing that these observational data do not establish causality and a protective mechanism is unclear, researchers speculate that moderate doses of caffeine may affect rhythm disturbances by antagonism of adenosine, a nucleoside compound widely distributed in the body. In the heart adenosine has several effects on conduction of electrical impulses, muscle cell energetics, and heart muscle cell recovery that might predispose to rhythm problems. Caffeine antagonizes adenosine effects by blocking its chemical sites of action.

The researchers examined hospitalization data by elapsed time after the initial examination. For hospitalization within 10 years, the reduction in hospitalizations for people who consumed four cups of coffee or more each day reached 28 percent.

The researchers also studied persons in the group with or without symptoms or history of heart and respiratory disease. For both groups, consuming four cups of coffee daily appeared to be associated with fewer hospitalizations for rhythm disturbances.

For more information on studies related to coffee consumption, go to:
http://www.dor.kaiser.org/external/Arthur_Klatsky/

Co-authors are: Amatul Hasan, M.D..; Cynthia Morton, M.D.; Mary Anne Armstrong, M.A., biostatistician; and Natalia Udaltsova, Ph.D., programmer. Author disclosures are on the abstract. This study was supported by a grant from the Kaiser Foundation Research Institute and the Robert Wood Johnson Foundation.

Story Source:

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

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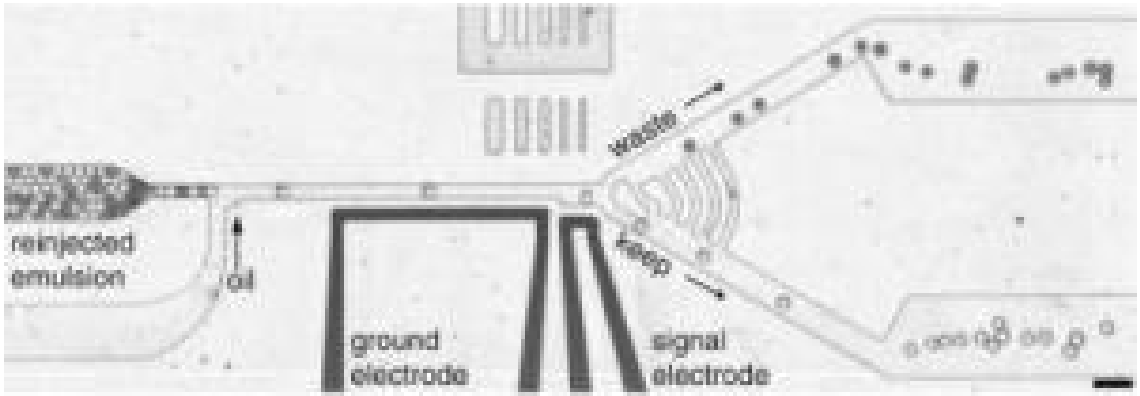
Sorting Device for Analyzing Biological Reactions Puts the Power of a Lab in a Researcher's Pocket



The microfluidic sorting device removes inactive and unwanted compounds, dumping the drops into a "bad egg" bin, and guides the others into a "keep" container. Specifically, as the drops flow through the channels they eventually encounter a junction (a two-channel fork). The device identifies the desired drops by using a laser focused on the channel before the fork to read a drop's fluorescence level. The drops with greater intensity of fluorescence (those exhibiting the highest levels of activity) are pulled towards the keep channel by the application of an electrical force, a process known as dielectrophoresis. (Credit: Courtesy of Jeremy Agresti, Harvard School of Engineering and Applied Sciences.)

ScienceDaily (Mar. 3, 2010) — Fictional candy maker Willy Wonka called his whimsical device to sort good chocolate eggs from bad, an eggucator. Likewise, by determining what enzymes and compounds to keep and which to discard, scientists are aiming to find their own golden eggs: more potent drugs and cleaner sources of energy.

Toward that end, Harvard researchers and a team of international collaborators demonstrated a new microfluidic sorting device that rapidly analyzes millions of biological reactions. Smaller than an iPod Nano, the device analyzes reactions a 1,000-times faster and uses 10 million-fold less volumes of reagent than conventional state-of-the-art robotic methods.

The scientists anticipate that the invention could reduce screening costs by 1 million-fold and make directed evolution, a means of engineering tailored biological compounds, more commonplace in the lab.

"Our finding is not so much a scientific discovery, but the first demonstration of a new technology," says project leader Jeremy Agresti, a former research associate in the lab of co-author David Weitz, Mallinckrodt Professor of Physics and of Applied Physics in the Harvard School of Engineering and Applied Sciences (SEAS) and Department of Physics. "What limits new areas of research in biology and biotechnology is the ability to assay or to do experiments on many different variables in parallel at once."

The team's technology, first reported in the February 8th online Early Edition of the *Proceedings of the National Academy of Sciences*, bypasses conventional limitations through the use of drop-based microfluidics, squeezing tiny capsules of liquid through a series of intricate tubes, each narrower than a single human hair."Each microscopic drop can trap an individual cell and thus it becomes like a miniature test tube," explains Amy Rowat, a postdoctoral fellow at SEAS. "The drops are coated with a surfactant, or stabilization molecule, that prevents the drops from coalescing with each other and also prevents the contents from sticking to the wall of the drops."

To sort, the system removes inactive and unwanted compounds, dumping the drops into a "bad egg" bin, and guides the others into a "keep" container. Specifically, as the drops flow through the channels they eventually encounter a junction (a two-channel fork). Left alone, the drops will naturally flow towards the path of least fluidic resistance, or the waste channel.

The device identifies the desired drops by using a laser focused on the channel before the fork to read a drop's fluorescence level. The drops with greater intensity of fluorescence (those exhibiting the highest levels of activity) are pulled towards the keep channel by the application of an electrical force, a process known as dielectrophoresis.

"Our concept was to build a miniature laboratory for performing biological experiments quickly and efficiently," explains collaborator Adam Abate, a postdoctoral fellow in applied physics at SEAS. "To do this we needed to construct microfluidic versions of common bench-top tasks, such as isolating cells in a compartment, adding reagents, and sorting the good from the bad. The challenge was to do this with microscopic drops flowing past at thousands per second."

"The sorting process is remarkably efficient and fast. By shrinking down the reaction size to 10 picoliters of volumes, we increased the sorting speed by the same amount," adds Agresti. "In our demonstration with horseradish peroxidase, we evolved and improved an already efficient enzyme by sorting through 100 million variants and choosing the best among them."

In particular, the researchers were struck by the ability to increase the efficiency of an already efficient enzyme to near its theoretical maximum, the diffusion limit, where the enzyme can produce products as quickly as a new substrate can bump into it.

Using conventional means, the sorting process would have taken several years. Such a dramatic reduction of time could be a boon for the burgeoning field of synthetic biology. For example, a biofuels developer could use the device to screen populations of millions of organisms or metabolic pathways to find the most efficient producer of a chemical or fuel. Likewise, scientists could speed up the pace of drug development, determining the best chemical candidate compounds and then evolving them based upon desired properties.

"The high speed of our technique allows us to go through multiple cycles of mutation and screening in a very short time," says Agresti. "This is the way evolution works best. The more generations you can get through, the faster you can make progress."Agresti, Rowat, and Abate's co-authors included Keunho Ahn from SEAS; Eugene Antipov and Alexander M. Klibanov, both from MIT; Jean-Christophe Baret and Andrew D. Griffiths, both from the Université de Strasbourg; and Manuel Marquez from YNano LLC.

The authors acknowledge the support by the Human Frontier Science Program; the National Science Foundation through the Harvard Materials Research Science and Engineering Center; the Centre National de la Recherche Scientifique; the Massachusetts Life Sciences Center; and the Agence National de la Recherche.

Story Source:

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

Journal Reference:

1. Jeremy J. Agresti, Eugene Antipov, Adam R. Abate, Keunho Ahn, Amy C. Rowat, Jean-Christophe Baret, Manuel Marquez, Alexander M. Klibanov, Andrew D. Griffiths, and David A. Weitz. **Ultrahigh-throughput screening in drop-based microfluidics for directed evolution**. *Proceedings of the National Academy of Sciences*, 2010; DOI: 10.1073/pnas.0910781107

http://www.sciencedaily.com/releases/2010/03/100302131715.htm

Canine Morphology: Hunting for Genes and Tracking Mutations

Researchers studying the dog genome have a new understanding of why domestic dogs vary so much in size, shape, coat texture, color and patterning. (Credit: iStockphoto/Nataliya Kuznetsova)

ScienceDaily (Mar. 3, 2010) — Why do domestic dogs vary so much in size, shape, coat texture, color and patterning? Study of the dog genome has reached a point where the molecular mechanisms governing such variation across mammalian species are becoming understood.

In an essay published in the March 2, 2010 issue of *PLoS Biology*, National Human Genome Research Institute (NHGRI) researchers discuss advances in understanding the genomic mechanisms controlling canine morphology.

There are more than 300 dog breeds in the world, including 170 recognized by the American Kennel Club. All are members of the species Canis familiaris. The authors review unique features of the canine genome that make it particularly good for genetic studies, and they show that breeds can be divided into five major groups derived from groups of ancient forebears. "Study of variation in the dog species, with its breeding structure, helps us hone in on the genomic factors for traits shared across species, including analogs for diseases that occur in the human population," said senior author Elaine Ostrander, Ph.D., chief of NHGRI's Cancer Genetics Branch.

This essay highlights the unique features of dog populations that offer advantages for genetic studies, as well as recent advances in canine genomics that show how genetic mechanisms may control breed-defining traits. For example, the hunt for genes for a prominent trait in more than one breed (such as short legs) is simplified because of the genetic diversity observed between breeds. Also it is easier to identify disease genes in dogs than in the much more diverse human population.

Several features of the dog genome may lead to the large differences between domestic dog breeds, generating a higher rate of new, non-lethal variants in the dog genome, which are then available to be selected upon by breeders. Several discoveries correlating a gene to a particular trait are discussed, from

the characteristic short legs of breeds like dachshunds and corgis, to the 30-fold differential in dog skeletal size, to fur texture and color.

"The dog genome is an extraordinary model for genomic study due to the combination of selective breeding practices and perhaps this species' unique capacity to undergo adaptive molecular changes," said co-author Abigail Shearin, a University of Pennsylvania veterinary student pursuing research training in the Ostrander Lab.

This work is supported by the intramural Program of the National Human Genome Research Institute and the Howard Hughes Scholars Program.

Story Source:

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

Journal Reference:

1. Shearin AL, Ostrander EA. **Canine Morphology: Hunting for Genes and Tracking Mutations**. *PLoS Biology*, 2010; 8(3): e1000310 DOI: 10.1371/journal.pbio.1000310

http://www.sciencedaily.com/releases/2010/03/100301201937.htm

Bringing Bison Back to North American Landscapes

Bison herd at Grand Teton. (Credit: Photo by Steve Zack, Wildlife Conservation Society)

ScienceDaily (Mar. 3, 2010) — The next 10 to 20 years could be extremely significant for restoring wild populations of American bison to their original roaming grounds. But for this to happen, more land must be made available for herds to roam free, government policies must be updated and the public must change its attitude towards bison, a new report says.

A new publication by the International Union for Conservation of Nature (IUCN), *American Bison: Status Survey and Conservation Guidelines 2010*, reports on the current status of American bison, in the wild and in conservation herds, and makes recommendations on how to ensure that the species is conserved for the future.

"Although the effort to restore bison to the plains of North America is considered to be one of the most ambitious and complex undertakings in species conservation efforts in North America, it will only succeed if legislation is introduced at a local and national level, with significant funding and a shift in attitude towards the animal," says Dr Simon Stuart, Chair of IUCN's Species Survival Commission.

Five hundred years ago, tens of millions of American bison roamed free on the plains of North America, from Alaska to northern Mexico. Now the American bison -- which includes both plains and wood bison -- is listed as Near Threatened on IUCN's Red List of Threatened Species™. As of 2008, there were approximately 400,000 bison in commercial herds in North America, some 93 percent of the continental population. But little progress has been made in recent decades to increase the number of animals in conservation herds, which are managed carefully for their genetic diversity and ecological roles. In 2008, there were 61 plains bison conservation herds in North America containing about 20,500 animals, and 11 conservation herds of wood bison, containing nearly 11,000 animals.

"While substantial progress in saving bison from extinction was made in the 20th century, much work remains to restore conservation herds throughout their vast geographical range," says University of Calgary Environmental Design Professor and co-editor of the study, Dr Cormack Gates, who is also co-Chair of the IUCN Bison Specialist Group. "The key is recognition that the bison is a wildlife species and to be conserved as wildlife, it needs land and supportive government policies."

The survival of bison populations is affected by many factors, including limited habitat and severe winters. Yet the greatest challenge is to overcome the common perception that the bison, which has had a profound influence on the human history of North America, socially, culturally and ecologically, no longer belongs on the landscape.

"The decimation of the American bison in the late 1800s inspired the first recovery of bison and an entire conservation movement that protected wildlife and wild places across North America," says Keith Aune, Senior Conservation Scientist, Wildlife Conservation Society. "The *IUCN Status Survey and Conservation Guidelines* provide a new framework for inspiring a second recovery of bison and restoring functional grassland ecosystems."

Bison have the best chance of full recovery as wildlife by being allowed to roam freely across hundreds of thousands or even millions of hectares. Making this possible poses one of the biggest challenges for restoring bison herds as both public and private landowners will need to give their support.

"The bison is the largest land mammal in North America, and yet it is perhaps the most neglected icon," says Steve Forrest, WWF Northern Great Plains Manager for Conservation Science. "These guidelines provide a roadmap for bringing the bison back to its rightful place as a keystone of the great plains."

American Bison: Status Survey and Conservation Guidelines 2010 was edited by Cormack Gates, Curtis Freese, Peter Gogan and Mandy Kotzman, and is the product of more than three years of cooperative effort by numerous contributors. Production of the report was made possible with funding from several non-governmental organizations and government agencies including the World Wildlife Fund, the Wildlife Conservation Society, the University of Calgary Faculty of Environmental Design, the American Bison Society, the US Geological Survey and the US National Parks Service.

Story Source:

Adapted from materials provided by University of Calgary.

http://www.sciencedaily.com/releases/2010/03/100302093330.htm

Prefrontal Cortex May Help Regulate Emotions

A new study suggests that the lateral prefrontal cortex is a brain region that may help people to control their emotional reactions to negative facial expressions from their romantic partners. (Credit: iStockphoto/Jodi Matthews)

ScienceDaily (Mar. 3, 2010) — Think back to your last fight with someone you love. How did you feel afterwards? How did you behave? Conflict with a loved one often leaves a person feeling terrible and then behaving badly. So much so that these scenarios have become soap opera clichés. After an argument, one partner may brood, slam the door, and then drive to a local bar to drown their sorrows in alcohol. These dramas rarely have happy endings. Given these stereotypes, how do people control their emotional reactions and prevent emotional storms and their attendant use of intoxicating substances?

A new study published in *Biological Psychiatry*, by Elsevier, suggests that the lateral prefrontal cortex (LPFC) is a brain region that may help people to control their emotional reactions to negative facial expressions from their romantic partners.

Christine Hooker and her colleagues recruited healthy, adult participants in committed relationships. The research subjects viewed positive, negative, and neutral facial expressions of their partners during a brain scan. In an online daily diary, participants reported conflict occurrence, level of negative mood, rumination, and substance use.

They found that LPFC activity in response to the laboratory-based affective challenge predicted self-regulation after an interpersonal conflict in daily life. When there was no interpersonal conflict, LPFC activity was not related to mood or behavior the next day. However, when an interpersonal conflict did occur, LPFC activity predicted mood and behavior the next day, such that lower activity was related to higher levels of negative mood, rumination, and substance use.

The study findings suggest that low LPFC function may be a risk-factor for mood and behavioral problems after a stressful interpersonal event.

The constructive management of negative emotional states that emerge inevitably within romantic relationships can be a critical facet of coping with the world. These relationships frequently serve as

emotional havens from the stresses of the working world. Yet these relationships also may augment rather than reduce life stress. When that happens, problematic behaviors such as over-eating and substance abuse may increase.

Dr. John Krystal, Editor of *Biological Psychiatry*, commented on the importance of these findings: "When activated in the context of intense emotion, it appears that the LPFC helps us to manage the intensity of negative emotions that emerge in social relationships. When this brain region does not efficiently activate or when the intensity of the conflict is very high, people need to learn behavioral strategies to cope with the emotional response. For some people this strategy can be as simple as counting to 10 before doing something that they might regret later."

This study raises an important question. How can clinicians enhance the function of the LPFC when its function is compromised? Cognitive and behavioral strategies may be important treatment components.

As Dr. Hooker explained, their findings "suggest that imaging can provide potentially useful information about who may be vulnerable to mood and behavioral problems after a stressful event. We hope that future research will build on this idea and explore ways that imaging can be used to inform people about their emotional vulnerabilities."

Story Source:

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

Journal Reference:

1. C. Hooker, A. Gyurak, S. Verosky, A. Miyakawa, Ö. Ayduk. **Neural Activity to a Partner's Facial Expression Predicts Self-Regulation After Conflict**. *Biological Psychiatry*, 2010; 67 (5): 406 DOI: 10.1016/j.biopsych.2009.10.014

http://www.sciencedaily.com/releases/2010/03/100302093332.htm

Online Cure for the Nursing Crisis
February 2, 2010

With the baby boom generation wading into retirement, America needs more nurses. Many current nurses need more education. And, increasingly, it appears online degree programs are going to play a critical role in providing it.

A report released last month from the Carnegie Foundation for the Advancement of Teaching asserting that all working nurses should be required to hold a bachelor's degree in the field prompted several retorts from the nursing world. Beverly Malone, CEO of the New York-based National League for Nursing, wrote that additional credentialing is valuable but should not be a legal requirement. Kim Tinsley, a board member at the National Organization of Associate Degree Nursing, argued that such a mandate would place an undue burden on aspiring nurses who couldn't afford to feed their families if they had to attend school for two extra years.

While the Carnegie recommendation is controversial, the number of registered nurses seeking advanced training is likely to rise. There is legislation pending in 18 states that would order nurses who hold only associate degrees return to school for a Bachelor of Science degree in nursing within 10 years of graduating from their associate's program. The American Association of Colleges of Nursing has been advocating for the legislation, in large part because one of the key aspects of the nursing shortage is a dearth of qualified faculty, and nurses who hold bachelor's are four times as likely to then pursue master's degrees and possibly turn to teaching.

So demand for bachelor's programs in nursing stands to rise — more specifically, demand for programs that allow students the flexibility to continue their nursing education without leaving work. "Online is increasingly the option for the student who does not have the ability to get on campus for a traditional course and who needs to balance home, work, and school," says Linda L. Strong, coordinator of the R.N. to B.S.N program at Sacred Heart University.

Rising demand, of course, means not only more students to educate, but an expansion of the market and more money to be made. "The pie is very much still growing," says Gerry Digiusto, a senior analyst at the higher-ed consulting firm Eduventures. And while forays into the potentially lucrative online education market can sometimes backfire, creating an online nursing degree program is a relatively low-risk venture. "Online programs have done their best in career oriented fields," Digiusto says. "And healthcare programs have had great success online."

As a result, nonprofit colleges have not been shy about vying for pieces of the pie, competing hard with the deep-pocketed for-profit institutions that typically dominate the online market.

This is not a new phenomenon; colleges have been moving their nursing programs online for almost as long as online education has existed. But they are doing so now at a fast rate: The number of fully online R.N. to B.S.N. programs in America has grown by more than a third in the last two years according to the American Association of Colleges of Nursing — from 96 in 2007, when the association first started collecting data on online program, to 129 in 2009. (This still represents a mere fraction of the 621 R.N. to B.S.N. programs that exist nationwide.)

Colleges that already have established nursing programs are particularly well-positioned to carve out pieces of the market, since they already have personnel and a curricular infrastructure in place, Digiusto says. They also have ties to graduates from their associate's degree tracks who may soon need to come back for a bachelor's.

Such is the case in New York, where, as the so-called "B.S.N. in 10" legislation looks to have good support in the state assembly and the senate, a handful of State University of New York (SUNY) campuses have created — or are preparing to create — online versions of their R.N. to B.S.N. programs.

"There are many, many graduates to tap within the state system," says Mary Pat Lewis, chair of the nursing school at SUNY-Delhi. Delhi, she says, polled graduates of its own associate's degree program and found "overwhelmingly" that they would enroll in an online B.S.N. program with their alma mater if the price was right.

So Delhi made it relatively inexpensive: $207 per credit hour (60 credit hours are typically required), lower than at least two of its for-profit competitors — Walden University, which rolled out its program last March, charges $255 per credit hour, and University of Phoenix charges $450 per credit hour for its fully online program. Delhi also chose not to charge differently for in-state and out-of-state students, and shortened the program to 12 months from the typical 18 in order to let more students matriculate. It currently enrolls 250 students from all over the country in the program, and claims to be profitable, with plans to expand.

"It's certainly an important part of our revenue growth strategy," said Joel Smith, a campus spokesperson.

Although nursing degrees require clinical training, it is possible to run fully online R.N. to B.S.N. programs because they accept transfer credits from registered nurses who have already logged the requisite clinic hours and only need to complete an academic curriculum to earn a bachelor's. Still, there are nearly as many "hybrid" R.N. to B.S.N. programs (50 to 99 percent online) in the country, 114, as fully online ones. The important difference is that fully online programs can compete for students all over the country, not their in own regions.

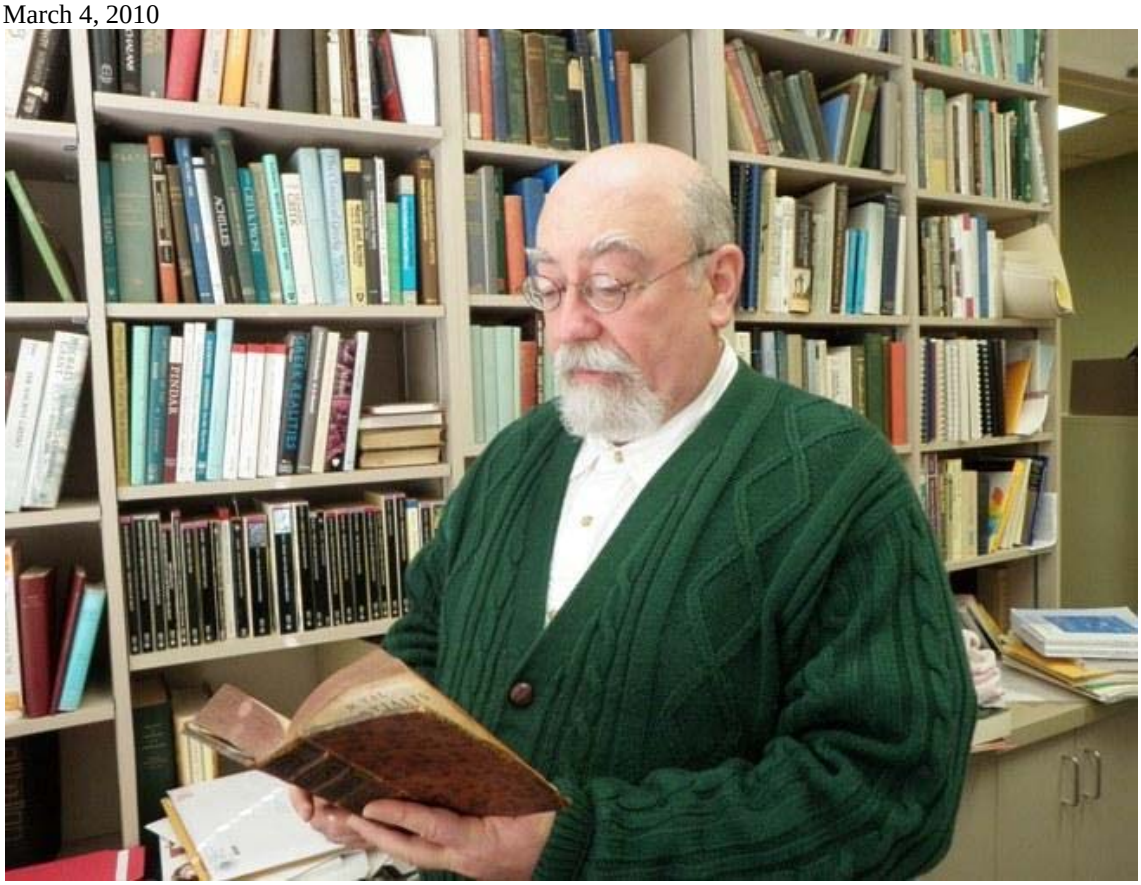
The University of Phoenix, which enrolls 6,675 students in its R.N. to B.S.N. program, says it does not feel at all threatened by its new nonprofit competitors. Supply is so out of proportion with demand that everyone stands to grow, says Angie Strawn, associate dean of the university's nursing school. "Given the high demand for qualified nurses and the limited number of spots available to incoming nursing students," she says, "we… view them as partners rather than competitors."

— Steve Kolowich

http://www.insidehighered.com/news/2010/02/02/nursing

Turning Off the Lights

March 4, 2010



In this era of financial turmoil in higher education, many arts and humanities programs have found themselves in the cross hairs of budget cutters. Some proposed cuts have quickly attracted national or even international opposition. Think of all the outrage, for example, about Brandeis University's plan (since put on hold) to sell off its noted collection of modern art, or of the budget cuts that for a time endangered the future of the Louisiana State University Press.

In both of those cases, and many others, prominent academics and scholarly associations organized petitions, lobbied key decision makers and shouted to anyone who would listen that these cuts simply could not be made. Thousands of students in California are expected to rally across the state today to protest various cuts to California's colleges and universities.

But there are also a lot of people and programs this year that are being eliminated with hardly any attention at all. These programs are on hit lists precisely because they are small, because they are not famous and thus they don't have thousands of supporters organizing petition drives and rallies.

Stephen Clark has since 1988 been the only classics professor at Centenary College, a liberal arts institution in Louisiana. This week, the college decided to eliminate the Latin program, which has been the focus of his career as a tenured professor. While there is an appeals process, the college earlier indicated that tenured professors in departments that are closed would probably lose their jobs.

At Centenary, much of the discussion about which programs to eliminate focused on size, and Clark makes no claims that Latin classrooms are packed. Enrollments of five to seven students are good for upper division courses and most years there are only a few majors, sometimes just one.

That focus on size (as opposed to whether a discipline *should* be taught) has a number of traditional disciplines in trouble at many institutions. The University of Nevada at Reno this week announced plans to eliminate German studies, French and Italian. Philosophy is under review at Indiana University of Pennsylvania. Baker University eliminated political science. Centenary isn't just eliminating Latin, but a bunch of other majors -- generally with low enrollments -- such as physics, performing arts and German studies. (For various reasons, German is taking a lot of hits this year.)

Centenary officials say they have nothing against the programs that are slated for elimination, but want to create funds to invest in growth in new areas. With about 860 students, the college needs to balance student interests with what it can support financially, they say. "We're trying to look into the future, and part of that is streamlining the program so we can invent new programs," says Rick DelaHaya, a spokesman.

What Clark's situation illustrates is that some number of professors this year are experiencing not only the potential loss of a job, but the experience of being the last to teach the subjects for which they feel passion that their institutions no longer share.

Clark says that he understands that the experience of being the sole professor in a discipline strikes many as odd. He recalls being at a national conference some years ago when a prominent classics professor asked him, "Don't you get lonely?" He says he never felt that way. Clark first got excited about Latin at Yale University as an undergraduate (where he originally focused on music), and earned his doctorate at the University of Iowa. "I made a commitment to Centenary early in my career," he says. "I felt I had intellectual material that would be useful at a liberal arts college."

He says that, of course, he would have preferred to have had colleagues in the field over the years. But he values his colleagues in other disciplines at Centenary, fellow Latin scholars he meets through disciplinary groups, and the independence that has left him with no fear of departmental politics.

"It has really been my Latin program to teach," he says. In fact, there wasn't a major when he arrived, and he primarily had students fulfilling language requirements, but he managed to get the major created after about a decade at the college. He is proud that some of his students have gone on to become academics, inspiring students elsewhere.

He has a four-four course load, typically assigned to teach one section of French in addition to his Latin courses. For many years, he added (without extra pay) a section on Greek because he felt that his classics students needed some exposure to that language as well.

Dee L. Clayman, president of the American Philological Association and a professor of classical studies at the Graduate Center of the City University of New York, says that the one-person classics program is a reality at many places.

And while she favors larger departments, she thinks that the emphasis of colleges on number of majors (which are bound to be low for a one-person department) undervalues the work of any sole classicist. "So many of our departments are so small, and yet they have an outsized role in the educational environment. They put everything in the humanities in a historical perspective," she says. Rather than talking about the small number of majors in a one-person department, number crunchers should think about "the one heroic person, who is almost always teaching more courses than the official number, and probably teaching intense intermediate and advanced courses on the model of independent studies."

Clark says that once students have learned the basics of Latin, much of the instruction is based on very close readings of texts, with students translating and analyzing. It is a very personal, direct instruction, line by line, passage by passage. While that may sound, well, old-fashioned, he says that he considers classics "as the model of the liberal arts," in which students know that they are not getting job training but learning "how to find insights" in a text removed from them by language, culture and time. In teaching

students those skills, Clark says, "we are preparing them for their careers, but not for some narrowly defined career."

"This is all about ways of thinking, of organizing the world, about equipping students with the real ability to communicate."

While Clark says he worries that "Centenary is about to lose a good deal" in eliminating Latin and other offerings, he does not speak with bitterness. The administrators are "thoughtful" and trying to do what they think is best for the college, Clark says. "I just feel that some very regrettable things are happening."

At 56, and with a need to stay in the Shreveport area because of his wife's job, Clark says he isn't confident he can remain a college professor. He will need to replace his income (about $52,000 a year) if his job disappears, and says he may have the most luck looking for Latin jobs teaching in high schools. "I think I'll find something. I'm not in a panic," he says. "Still, I was thinking walking up the stairs at the college today about missing the kind of real interchange I have here, teaching the great poets."

James May, of St. Olaf College, says that "as a provost who is faced daily with the challenges of budget, I can understand the need to cut costs and the impulse to go for small programs." He says that there are many classics programs with between one and three faculty members, especially at institutions like Centenary where they are part of larger language programs. "I realize that the small programs are the ones that will be most easily targeted, for lots of different reasons."

May happens to be a classicist himself, and he argues against the logic of focusing on such programs. "I think it's very difficult to make real strides in budget reduction by cutting one or two people in one department or another department," he says. So the budget gains from eliminating such departments aren't huge.

But May also makes an educational argument. "Anyone who knows a lot about the field of classical studies knows that it is the original interdisciplinary study -- and classicists are trained in language, literature, linguistics and history," he says. Colleges talk about wanting to promote interdisciplinarity and global awareness, May says. The ancient world "was a pretty global society," he notes, "and when you eliminate a person whose main thrust has been the study of antiquity, you are eliminating a natural interdisciplinary person."

Lindsey Monds, a senior Latin major at Centenary, says she understands that if the cuts there "are based on numbers," then Latin would be on the list. But she says that the loss will be real for future students who won't be able to experience what she is able to do now. She's read many of the classic works in English and says that does not substitute for reading and thinking about them in Latin. She says that the beauty and power of the language in, say, the death of Priam in the *Aeneid*, bring her to tears in Latin. "It is not as powerful in English."

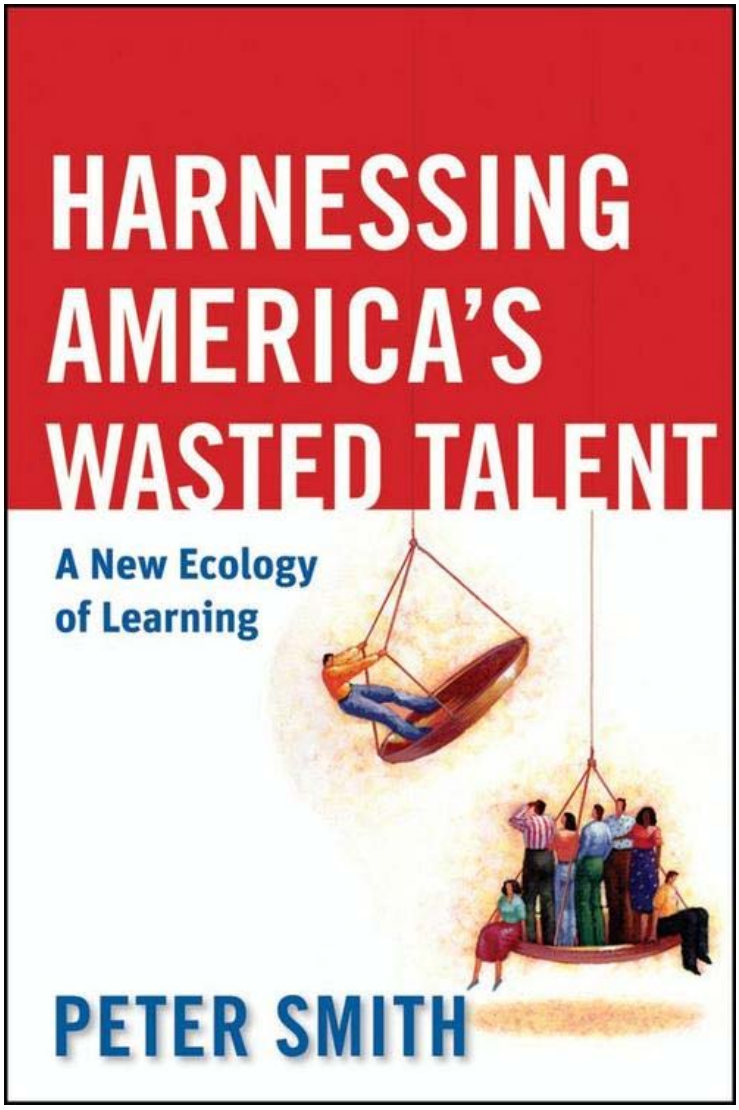
Something important is lost, she says, if she's the last Latin major. "It's really sad to me. It's as if somebody took away the reading of Shakespeare," she says. "Latin has been studied, these poets have been read, for as long as Jesus has been worshiped. That's a really long time."

— Scott Jaschik

http://www.insidehighered.com/news/2010/03/04/clark

'Harnessing America's Wasted Talent'

March 4, 2010



Peter P. Smith's career in and out of higher education has not followed the straight and narrow.

Amid forays into politics (as a member of Congress and lieutenant governor of Vermont) and international affairs (at UNESCO), Smith has been a higher education innovator, helping to found the statewide Community College of Vermont in 1970 and serving for 10 years as founding president of California State University's Monterey Bay campus, beginning in 1995.

In those jobs and his current one, as senior vice president for academic strategies and development at Kaplan Higher Education, Smith has pushed existing colleges and universities to better serve the adults and other students who have been least well served by traditional higher education. In his new book, *Harnessing America's Wasted Talent: A New Ecology of Learning* (Jossey-Bass), he argues that the country needs to reach deeper into its population than it historically has to produce a sufficient number of educated and skilled workers, and that the thousands of current colleges cannot do that job.

He responded via e-mail to questions about the book.

Q. You write that only a third of American ninth graders even take a shot at college, and that the country can't continue to function effectively, let alone compete economically and internationally, unless those in the "middle third" -- that is, those who finish high school but do not experience college -- get some postsecondary training. What have been the biggest factors preventing them from doing so until now?

A. The middle third also includes people who have some college experience, but no certificate or degree. I think of this phenomenon as a “failure to thrive” educationally. Many of the reasons described in the book – mode of teaching and learning, lack of recognition of transfer credit and learning done outside of school – contribute.

There is a huge expectations gap. Like the student named Bob, whom I mentioned in the book, people have been acculturated to believe that college is not for them, an expectation that is reinforced throughout high school. This ties directly to the lack of personalization and customization in the traditional model. The real low-hanging fruit here are the estimated one million high school graduates every year who are qualified but simply don’t go to college. So, we have to work on how we offer post-secondary education to capture this audience. We also have to work on communicating to the public that people have potential and capacity, and that college is for them.

Q. You argue that the existing higher education system (or, more accurately, "non-system," as you point out) won't be able to educate that middle third -- that it is both "maxed out" in terms of capacity and incapable of changing (or *unwilling* to change) the nature of teaching and learning to accommodate the different needs of today's learners. Why do the students you're most worried about hit a "dead end" in our current education system?

A. There is a long list of reasons why students hit a dead end, some of which colleges and universities cannot control. For example, when I was at California State University, Monterey Bay, we had to work very hard to keep first-generation Latino students in school because cultural norms called for them to live at home and work rather than attending college.

The metaphor that I would use to describe this challenge is swimming under water. The longer you are under water, the more it hurts. And, if your goal is to swim to the other end of the pool, but you have never known anyone who did it, it is easier to simply climb out of the water and walk away. On the other hand, if you believe you are meant to swim, it is easier to fight through the pain and reach your goal.

With first-generation learners, it is critical to connect with them personally, customize the learning to their needs, offer unwavering support, and respect their personal story and the learning that comes with it.

Q. An underlying theme of your book is that higher education has essentially failed to innovate sufficiently. Yet your own career path -- starting two different (and, at their time, innovative) types of institutions, and now working at a third that is part of a emerging sector trying new approaches -- would seem to challenge that view. How do those square?

A. In the first two cases, I watched as the rest of the field either ignored or explained their success as an exception. I am frankly astonished that there has never (to my knowledge, anyway) been a replication of the Community College of Vermont model. Cal State Monterey Bay is a terrific institution that incorporates several core “best practices” in its operations. But that institution is still subject to the same constraints that I described in the book. For example, with the current budget crisis in California, each CSU has faced employee furloughs and student body caps, leaving thousands without access to higher education. One reason that I chose to come to Kaplan Higher Education after my time at UNESCO is to experience a culture without these types of constraints.

At Kaplan Higher Education, we do have some fairly traditional practices, but we also have the capacity to innovate, develop, and continuously improve. For instance, if we want to implement diagnostics in the post-enrollment process, we can do so and then evaluate, refine, and improve our processes. The traditional model lacks this type of nimbleness and flexibility. Without the constraints inherent in the traditional model, we can model emerging best practices, help define them and, in effect, help lead the change we seek.

Q. Define the "personal learning" that you think is undervalued/under-recognized by the current higher education system. And do the current mechanisms that exist to account for knowledge gained outside the classroom (the Council for Adult and Experiential Learning's prior learning assessments, and the American Council on Education's military credit system, for instance) not get at this issue?

A. Students are rarely asked, in depth, what they want from their college education and are almost never engaged in an ongoing conversation about it with someone who can affect their higher education experience. Until institutions personally connect the learner with the curriculum and the college experience, the learner is vulnerable. And the "at risk" learner is always more vulnerable.

Additionally, the older one becomes the more experience one has to compare with what they are being taught. So, to fail to integrate someone's experience into the curriculum both trivializes and frustrates them. That's why starting with the assessment of prior learning is such an educationally important thing to do.

As one of the founding board members of CAEL, I agree wholeheartedly that its prior learning assessment and other approaches like the ACE military credit system are central to the issue. What people involved in both of these efforts, and others like them, will tell you is that the credits awarded are often honored "in the breach." That's a nice way of saying that they are not honored by other institutions and, in some cases, by other departments in the institution that awarded them. The biggest pain point for most of these approaches is that the credit will be included in a transcript, but not counted towards the degree.

What I am calling for in the book is the mainstreaming of these concepts and the development of a market that honors credit awarded by accredited institutions as progress towards a degree at other institutions.

Q. How much is this a credentialing problem? Are we as a society basically under credentialing (failing to give credentials for knowledge, etc., that isn't now recognized) or over credentialing (is there too much emphasis, by employers, etc., on credentials, rather than on the underlying knowledge that Americans have)?

A. Credentialing is part of the problem, but only part of it. As a society, we fail to recognize what people know. So, if a soldier returning from active duty service has not only courses but also experiences, why shouldn't those things be acknowledged and included in his degree plan?

Also, as educators, we do not adequately value reflection on the part of the learner. I view reflection as the process through which the learner distinguishes between their broad experience (in a course or in life) and what they learned because of it. This is where and when learning is realized. Employers want accurate information about the qualifications of people wishing to advance in or enter a profession. So, while a credential might well be the exponent of that, the learning outcome and a validated third-party guarantee that the learning occurred will be increasingly important.

Q. What are the developments (you call them "game changers") that make you believe the time is right to create an alternate path to a postsecondary education for these students?

A. You see evidence every day. When AARP solicits proposals for a learning platform for its members, the balance has shifted. When the Peer-to-Peer University moves into its second "term," the balance has

shifted. When StraighterLine is recognized for its courseware alone, the balance has shifted. When the global OpencourseWare Consortium gets three million hits a month, the balance has shifted.

In the book, I devoted a chapter to the "End of Scarcity" and its impact on higher education. It is difficult to overestimate the significance of this trend. Colleges are built and organized around scarcity – the expertise of faculty is in short supply, classrooms and labs are limited because they are expensive, and the authority to offer a course of study is limited. Additionally, reputation is built around who you exclude as much as it is who you include and who succeeds. In fact, the whole concept of meritocracy is built on the notion of scarcity because there is not enough room "at the top" for everyone.

Put this set of assumptions, and the practices that are in place because of them, up against the current reality. Excellent content is increasingly commodified and available. Time and place are no longer determinants of when a person can learn. And in the ultimate reversal, the educational challenge vis a vis the workforce can no longer winnow people out and validate merit. Instead, employers must help create merit because there are now more jobs that require higher education than there are people qualified for them. And this is projected to be the case for years to come.

Q. Explain the newfangled institution(s) that you envision -- Colleges for the 21st Century -- as a potential environment for these students. Do any existing colleges and universities (like your current employer) qualify? If so, which? If not, who would be likeliest to create them?

A. That is the big question. The reason I developed the characteristics of the Colleges for the 21st Century (C21C) and did not suggest a model is that I don't know what it will look like. As Justice Potter Stewart said when discussing pornography, "I can't define it, but I know it when I see it."

What won't change, however, are the elements in the higher education teaching-learning value proposition, although they might be rearranged. At its heart lies the transfer of information, the impact of that information on the receiver, and the assessment and reflection that assures the transfer is complete and meets a high standard. All of these things are organized around the human, intellectual, civic, and economic development of the learner. From a teaching-learning perspective, the focus will increasingly be on learning outcomes, the standards they reflect, and the process by which they are employed.

I believe that the services modeled by places like AcademyOne and its founder, David Moldoff, will change the back office of higher education profoundly, transforming learner mobility from a risk factor to a fact of life.

And I certainly hope (and expect) that when the list of C21Cs is first published that Kaplan Higher Education will be on it. And I believe that many in the market-driven sector will play roles in developing the concept of the C21C precisely because we are metric-driven laboratories of innovation. Having said that, Burck Smith has proven with StraighterLine that core change can come from any direction, not just those in the academy. In a world where learner choice and control is a driving force; where the learning platform, not the campus, is the basic architecture; and where the network, not the faculty, defines the process, new organizational structures will develop.

— Doug Lederman

http://www.insidehighered.com/news/2010/03/04/smith

The 'Prior Learning' Edge

March 1, 2010

With the number of high school-aged Americans beginning to ebb, President Obama's goal of dramatically increasing the number of U.S. citizens with postsecondary credentials is going to be impossible to achieve without significantly more adults returning to and graduating from college.

With that in mind, policy makers are scanning the educational landscape looking for techniques and tactics that might help draw adults into college and help them move through -- and a new study suggests that one such tool holds promise.

An examination of the educational records of more than 62,000 adult undergraduates at 48 colleges finds that students who had sought and been awarded academic credit by their institutions for "prior learning" earned in the military, corporate training and other non-classroom settings were more than twice as likely to graduate, and to persist even if they did not graduate, than were their peers who had not earned such credit.

In total, 56 percent of the students who entered the 48 institutions in 2001-2 and earned some "prior learning assessment" credit by 2008 went on to earn an associate or bachelor's degree in those seven years, compared to 21 percent of students who did not receive any PLA credit, according to the study, "Fueling the Race to Postsecondary Success: A 48-Institution Study of Prior Learning Assessment and Adult Student Outcomes."

"That's a sit-up-and-take-notice finding," said Jamie P. Merisotis, president and CEO of Lumina Foundation for Education, which financed the study by the Council for Adult and Experiential Learning. "CAEL's research confirms that prior-learning assessment can help adults move faster toward their associate's and baccalaureate degrees. We need to see more institutions offering this option and more adults participating in it."

The concept of "prior learning assessment" is decades old, and it has grown to include multiple types of mechanisms for measuring knowledge and skills that students have accumulated through various types of formal and less formal formats, such corporate training, work experience, and independent study. The most common types of assessments include standardized exams developed by the College Board (the College Level Examination Program exams and Advanced Placement exams), the American Council of Education's guides for recognizing credit for instructional programs offered in the military and by employers, and institutional reviews of individualized student portfolios.

More than half of all colleges award some kind of credit for prior learning, says Pamela Tate, CAEL's president and CEO, but vastly fewer offer it to significant numbers of students or conduct numerous types of evaluations (many recognize ACE military credits, for instance, but nothing else).

There are multiple reasons for that. Some kinds of evaluation are expensive to conduct (faculty members must be trained to review and assess portfolios, etc.). Faculty members at some institutions remain skeptical about the concept of rewarding credit for learning gained outside the classroom. And public institutions that are funded in large part by state formulas that reward them based on the number of students they enroll and the number of classroom hours those students take often do not see it as in their interests to award credit for learning gained elsewhere.

But with politicians and policy makers coalescing around the need to get more Americans into and through some kind of postsecondary training, credit awarded through prior learning assessments offers an opportunity to entice adults back to college with the prospect that they can build on learning they've already gained and reduce both the time and money they might have to expend to earn a credential.

CAEL and Lumina undertook the study, Tate said, to try to collect wide-scale data that might "prove what we already believed to be true -- that students [with prior learning credit] are more likely to graduate and persist." The study examined data from a broad range of institutions that (through membership in CAEL) award credit through at least one kind of prior learning assessment; the 48 colleges included 22 public four-year and two-year colleges (large ones such as Pennsylvania State University and Miami Dade College and smaller ones such as Northern Kentucky University), 24 private nonprofit colleges (such as DePaul, New York and Webster Universities), and two for-profit institutions, Capella University and the University of Phoenix.

Of the 62,475 students age 25 or older who entered the 48 institutions in 2001-2, 15,594 earned some "prior learning assessment" credit by 2008. (Standardized exams were the most common type of prior learning methods offered by the participating colleges, followed by portfolio assessments and ACE-evaluated military and corporate training programs. Virtually all institutions limit the amount of credit they accept toward degrees and some limit the awarding of such credit to certain departments or programs.)

The PLA students in the study were less likely than their peers to be women (52 vs. 59 percent), less likely to receive need-based aid, less likely to need remedial work, and more likely to have military experience. They were also slightly older than their peers.

Students with prior learning credits also performed better, across virtually all types of institutions and all demographics, as seen in the table below.

Percent of Students Who Earned Degree

Student Characteristics	Students With PLA Credits	Students Without PLA Credits
Institution Type		
Two-Year Institution	53%	13%
Four-Year	55	24
Private For-Profit	74	23
Private nonprofit	58	43
Public	49	14
Remediation Need		
Took Remedial Courses	58	17
Did Not Take Remedial Courses	55	28
GPA		
Students With 3.0 GPA or Higher	70	64
Students With 2.0-3.0 GPA	28	24
Financial Aid		
Received Financial Aid	82	24
Did Not Receive Aid	48	17

Among other findings in the study:

- Students who received prior learning credit earned their degrees more quickly than did their peers, saving on average between 2.5 and 10.1 months for bachelor's degrees and up to 4.5 months for associate degrees, depending on the amount of prior learning credit they had been awarded.
- The differences in the graduation rates for PLA and non-PLA students varied based on the policies of their institutions regarding prior learning credit. The gaps were largest at institutions

with more permissive policies. At colleges where prior learning credits can be used to gain advanced standing, for instance, students with such credit were four times likelier to graduate than were their peers (56 percent to 13 percent), while the gap was 48 to 35 percent.

- Even when students did not graduate, accumulation of prior learning credit appeared to help students stay in colleges. Fifty-six percent of the PLA students who entered college in 2001-2 but had not earned a degree by 2008 had accumulated 80 percent of the credits they needed for a degree; the comparable figure for non-PLA students was 22 percent.

While the study suggests that students who are awarded prior learning assessment credit progress through college and toward a degree more than their peers, its authors make clear that they are not close to showing a causal relationship, and that they are left with many questions.

"Do PLA students have higher graduation rates because PLA enhances the self-esteem and motivation of students by showing them that they have already mastered college-level learning? Is it also because PLA students already possess characteristics that are associated with better academic outcomes? What institutional policies are influencing whether and how students are using (or not using) PLA, and whether or not this helps them achieve a shorter time to degree?"

Those questions aside, CAEL's Tate hopes that the data will prompt more adult learners to seek credit for prior learning and more colleges to consider awarding such credit. The council is developing a plan, she said, to create a centralized system through which students could present the various documents (standardized test reports, corporate training results, etc.) to be reviewed and a national group of experts would assess them, with the goal of building an infrastructure for prior learning for individual institutions that cannot afford to do their own reviews.

"Our hope is to start a national center that will scale up the number of students getting credit," Tate said.

More fully tapping into the learning that American adults have derived outside the classroom could provide a wise and cost efficient way to speed progress toward the Obama administration's completion goals, said Peter Smith, senior vice president for academic strategies and development at Kaplan Higher Education and author of a new book, *Harnessing America's Wasted Talent: A New Ecology of Learning* (Wiley). "In a work force where there are roughly 60 million men and women with a high school diploma and, in many cases, some college, assessing this learning would recognize their unrecognized knowledge and tap their untapped potential both for college and for work advancement. And for people who value testing over deeper assessment, this data suggests the value of prolonged and interactive thought about what one has learned as a part of the learning experience."

— Doug Lederman

http://www.insidehighered.com/news/2010/03/01/prior

State of Humanities Departments

March 1, 2010

What is the state of the humanities? In many a budget cutting debate in the last year, scholars have worried about it, but national data have been limited.

In a major effort to fill that void, the Humanities Indicators Project is today releasing an analysis of statistics gathered from the departments of English, foreign languages, history, history of science, art history, linguistics and religion at 1,400 colleges and universities. A year ago, the project (part of the American Academy of Arts and Sciences) released a survey of previously existing statistics on the humanities in higher education.

The new information is originally collected data, most from the 2006-7 academic year, gathered in cooperation with various disciplinary associations. While the events of the last 18 or so months have no doubt shifted the numbers further in some categories, the aim of the project is not to collect these figures once, but to be able to analyze trends over time. Some of the data -- such as the analysis of the widespread use of non-tenure-track faculty -- are consistent with other reports, although the breadth of the study is new. In other cases, the project points to circumstances that haven't previously received much attention.

For instance, many observers of the humanities talk about these disciplines as educating a core group of undergraduate majors and many more undergraduates who take one or two courses to fulfill general education requirements. But the report find that in the three largest humanities disciplines -- English, foreign languages and history -- substantial number of students who are not majors are taking multiple courses to minor in those fields. In 2006-7, those fields had 122,100 majors in the colleges studied, and 100,310 minors.

At a time when many humanities professors are worried about the future of the tenure track, the data in the report will only add to those concerns -- especially because it predates the freezes on tenure-track hiring that have been instituted at so many colleges. Generally, the fields that have the highest percentages of tenured faculty members are among the smallest disciplines. And while the percentages vary, use of non-tenure-track faculty members is significant throughout. Further, the data back up a point made increasingly by activists for adjuncts: that significant numbers of academics are working full time, off the tenure track.

Faculty Distribution by Tenure Status, 2006-7

Field	Tenured	Tenure-Track, Not Tenured	Non-Tenure-Track, Full-Time	Non-Tenure-Track, Part-Time
Art History	52%	17%	7%	24%
English	38%	13%	18%	31%
Foreign languages	39%	13%	22%	26%
History	55%	19%	8%	18%
History of science	70%	18%	6%	6%
Linguistics	58%	17%	10%	15%
Religion	46%	18%	11%	25%

One subject of the debate over use of non-tenure-track faculty members is which courses they are assigned. Some administrators suggest that adjuncts are used only for introductory coursework, but the

data being released today show that while most upper division courses and graduate courses are taught by those who are tenured or are on the tenure-track, adjunct instructors are hardly rare in either graduate education or upper division courses. (Note: A small "other" category means that some of the numbers in the following tables do not add to 100 percent.)

Instructors of Record in Upper Division Undergraduate Courses

Field	Tenured or Tenure-Track	Full-Time, Non-Tenure Track	Part-Time, Non-Tenure Track	Grad Students
Art history	74%	9%	14%	n/a
English	79%	13%	7%	2%
Foreign languages	63%	20%	8%	5%
History	82%	7%	8%	n/a
Linguistics	75%	12%	10%	8%
Religion	66%	18%	14%	n/a

Instructors of Record in Graduate Courses

Field	Tenured or Tenure-Track	Full-Time, Non-Tenure Track	Part-Time, Non-Tenure Track
Art history	75%	14%	13%
English	90%	5%	7%
Foreign languages	79%	11%	5%
History	95%	3%	3%
Linguistics	93%	6%	4%
Religion	72%	18%	14%

The data collected show that -- even with the concerns about an eroding tenure track -- humanities departments have been hiring more people than have been retiring or dying. This may be an area where the averages could be changing significantly in the current recession, in which departments have had hiring limits imposed and some academics have delayed retirement.

Entering and Leaving Departments, 2007-8

Field	Proportion of Departments With Hiring or Recruiting Efforts	Number of Tenured, Tenure-Track or Permanent Faculty Members Hired	Number Who Leave, Retire or Die
Art history	38%	130	75
English	68%	920	640
Foreign languages	56%	1,260	545
History	65%	620	430
Linguistics	46%	65	45
Religion	48%	340	145

Tenure considerations are of course of great interest to those on the tenure track, and the report suggests that departments don't necessarily view publications and teaching as an either/or choice, with 64 percent saying that publications quality was "essential" to consider and 78 percent saying that teaching quality was. By far, the field with the highest percentage reporting that publications were essential in tenure reviews was linguistics, at 92 percent. Only 52 percent of English departments and 55 percent of religion departments felt that way.

The data on tenure decisions show that large percentages of those reviewed for tenure receive it. However, many more professors are leaving departments prior to a tenure decision than because they have been denied tenure. The tenure figures are average annual figures based on a two-year sample.

Tenure Approvals and Denials and Pre-Tenure Departures

Field	Faculty Granted Tenure	Faculty Denied Tenure	Faculty Leaving Prior to Tenure Decision
Art history	80	10	25
English	530	60	130
Foreign languages	400	75	180
History	440	10	130
Linguistics	35	1	10
Religion	110	10	45

On the curricular front, the survey finds far more departments reporting a senior thesis or capstone requirement than special programs for freshmen. Further, no consensus appears to have emerged on assessment at the departmental level.

Curricular and Undergraduate Assessment Programs

Field	Special Program for Freshmen	Senior Thesis or Capstone Course Required	Assessment Through Portfolios or Standardized Tests	Assessment Through Portfolios and Standardized Tests	Other Assessment Methods	No Assessment System
Art history	34%	73%	16%	36%	16%	32%
English	37%	74%	31%	28%	16%	25%
Foreign languages	30%	48%	26%	35%	13%	26%
History	29%	79%	28%	24%	11%	37%
Linguistics	17%	38%	10%	41%	5%	44%
Religion	23%	70%	19%	25%	14%	42%

The Web site for the project has full data reports on each discipline studied, as well as several essays on the project, details on the methodology and links to last year's compilation of data.

— Scott Jaschik

http://www.insidehighered.com/news/2010/03/01/humanities

'Pompeii-Like' Excavations Tell Us More About Toba Super-Eruption

Mapping of stone tool artefacts on a Middle Palaeolithic occupation surface under the Toba ash. (Credit: Image courtesy of University of Oxford)

ScienceDaily (Mar. 3, 2010) — Newly discovered archaeological sites in southern and northern India have revealed how people lived before and after the colossal Toba volcanic eruption 74,000 years ago.

The international, multidisciplinary research team, led by Oxford University in collaboration with Indian institutions, unveiled to a conference in Oxford what it calls 'Pompeii-like excavations' beneath the Toba ash.

The seven-year project examines the environment that humans lived in, their stone tools, as well as the plants and animal bones of the time. The team has concluded that many forms of life survived the super-eruption, contrary to other research which has suggested significant animal extinctions and genetic bottlenecks.

According to the team, a potentially ground-breaking implication of the new work is that the species responsible for making the stone tools in India was Homo sapiens. Stone tool analysis has revealed that the artefacts consist of cores and flakes, which are classified in India as Middle Palaeolithic and are similar to those made by modern humans in Africa. 'Though we are still searching for human fossils to definitively prove the case, we are encouraged by the technological similarities. This suggests that human populations were present in India prior to 74,000 years ago, or about 15,000 years earlier than expected based on some genetic clocks,' said project director Dr Michael Petraglia, Senior Research Fellow in the School of Archaeology at the University of Oxford.

An area of widespread speculation about the Toba super-eruption is that it nearly drove humanity to extinction. The fact that the Middle Palaeolithic tools of similar styles are found right before and after the Toba super-eruption, suggests that the people who survived the eruption were the same populations, using the same kinds of tools, says Dr Petraglia. The research agrees with evidence that other human ancestors,

such as the Neanderthals in Europe and the small brained Hobbits in Southeastern Asia, continued to survive well after Toba.

Although some scholars have speculated that the Toba volcano led to severe and wholesale environmental destruction, the Oxford-led research in India suggests that a mosaic of ecological settings was present, and some areas experienced a relatively rapid recovery after the volcanic event.

The team has not discovered much bone in Toba ash sites, but in the Billasurgam cave complex in Kurnool, Andhra Pradesh, the researchers have found deposits which they believe range from at least 100,000 years ago to the present. They contain a wealth of animal bones such as wild cattle, carnivores and monkeys. They have also identified plant materials in the Toba ash sites and caves, yielding important information about the impact of the Toba super-eruption on the ecological settings.

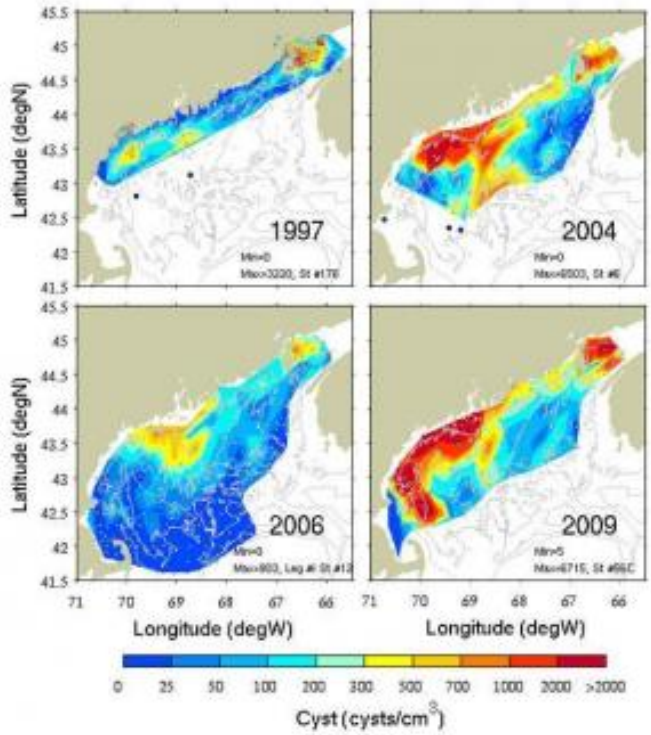
Dr Petraglia said: 'This exciting new information questions the idea that the Toba super-eruption caused a worldwide environmental catastrophe. That is not to say that there were no ecological effects. We do have evidence that the ash temporarily disrupted vegetative communities and it certainly choked and polluted some fresh water sources, probably causing harm to wildlife and maybe even humans.'

Story Source:

Adapted from materials provided by University of Oxford.

http://www.sciencedaily.com/releases/2010/02/100227170841.htm

Red Tide: Researchers Issue Outlook for a Significant New England Bloom of a Toxic Alga in 2010



Maps of the Gulf of Maine reveal the concentration of Alexandrium cysts buried in seafloor sediments, as detected by WHOI-led surveys in the fall of 1997, 2004, 2005, 2006, 2007, 2008 and 2009. Four of those surveys are shown. The cyst abundance in 2009 is higher than ever observed in these past surveys. Note also that the Alexandrium cyst "seedbed" extends further to the south than was ever observed before. (Credit: Don Anderson et al., Woods Hole Oceanographic Institution)

ScienceDaily (Mar. 3, 2010) — Scientists from the NOAA-funded Gulf of Maine Toxicity (GOMTOX) project have issued an outlook for a significant regional bloom of a toxic alga that can cause 'red tides' in the spring and summer of this year, potentially threatening the New England shellfish industry.

An abundant seed population in bottom sediments has set the stage for a significant bloom of the toxic alga *Alexandrium fundyense*. This organism swims in the water, and divides again and again to form a "bloom" or red tide, but it also produces dormant cells or cysts that fall to the ocean bottom at the end of these blooms.

A cyst survey conducted in late 2009 shows the highest amount of cysts the team has ever measured, more than 60 percent higher than what was observed prior to the historic red tide of 2005. The cyst bed also appears to have expanded to the south, and thus the 2010 bloom may affect areas such as Massachusetts Bay and Georges Bank sooner than has been the case in past years.

This year's bloom could be similar to the major red tides of 2005 and 2008, according to Woods Hole Oceanographic Institution (WHOI) biologist Don Anderson, principal investigator of the GOMTOX study. The 2005 bloom shut down shellfish beds from Maine to Martha's Vineyard (Mass.) for several months and caused an estimated $20 million in losses to the Massachusetts shellfish industry alone. The 2008 outbreak was similar in scale.

Although the algae in the water pose no direct threat to human beings, the toxins they produce can accumulate in filter-feeding organisms such as mussels and clams -- which can cause paralytic shellfish poisoning (PSP) in humans who consume them.

In order to protect public health, shellfish beds are closed when toxicities rise above a quarantine level -- often during the peak harvesting season. Due to effective monitoring by state agencies, there have been no illnesses from legally harvested shellfish in recent years -- despite some severe blooms during that time period. There have been, however, several severe poisonings of individuals who ignored closure signs.

WHOI oceanographers Dennis McGillicuddy and Anderson, and North Carolina State University (NCSU) Prof. Ruoying He are several years along in the development of a computer model to predict the intensity and location of blooms of the toxic algae *Alexandrium fundyense* in the Gulf of Maine. The model is initiated from the cyst abundance maps, and simulates Alexandrium germination, growth and dispersal using each year's winds, sunlight, rainfall, tides, and currents.

Scientists are reluctant to make a "forecast" of precisely where and when the regional bloom will make landfall because bloom transport depends on weather events that cannot be predicted months in advance.

"Our research has shown that cyst abundance in the fall is an indicator of the magnitude of the bloom in the following year," said GOMTOX member McGillicuddy. "However, even if there is a large bloom offshore, certain wind patterns and ocean currents in the late spring and summer are needed to transport it onshore where it can affect coastal shellfish."

Coastal exposure to the blooms is worst for scenarios in which the spring and summer weather is dominated by strong northeast winds, which tend to drive Alexandrium cells toward the New England coast. That occurred last year (2009), when an unusual series of northeast winds in late June and early July led to closure of almost the entire Maine coast to shellfishing. In contrast, when southwesterlies dominate, the algae tend to stay offshore.

GOMTOX researchers regularly share their field observations and models with more than 80 coastal resource and fisheries managers in six states as well as federal entities like NOAA, the Environmental Protection Agency, and the Food and Drug Administration.

Managers believe that a regional-scale, seasonal outlook can be useful in preparing for contingencies. This advanced warning, along with updates closer to and during the red tide season, can help state agencies prepare for monitoring red tides and assessing public health risks, and also give shellfish farmers and fishermen the opportunity to shift the timing of their harvest or postpone plans for seeding of aquaculture beds. Area restaurants may also benefit from advance warnings by making contingency plans for seafood supplies during the summer.

"Red tide is a chronic problem in the Gulf of Maine, and states have limited resources to handle it," said Darcie Couture, director of Biotoxin Monitoring for the Maine Department of Marine Resources. "When we get this information about the potential severity of a red tide season, and the dynamics of the bloom once the season has started, it gives us an advantage in staging our resources during an otherwise overwhelming environmental and economic crisis."

Ruoying He, representing scientists from the GOMTOX project, will present data and models on the projected bloom at the 2010 Ocean Sciences Meeting today in Portland, Ore.

The GOMTOX project, funded by NOAA's ECOHAB Program, is a collaboration of investigators from NOAA, WHOI, NCSU, University of Maine, University of Massachusetts Dartmouth, Rutgers University, the Food and Drug Administration, the Canadian Department of Fisheries and Oceans, Maine Department of Marine Resources, New Hampshire Department of Environmental Services, Massachusetts Division of Marine Fisheries, and the North Atlantic Clam Association. Other support for Alexandrium studies in the Gulf of Maine is provided by the National Institutes of Health and the National Science Foundation through the Woods Hole Center for Oceans and Human Health.

Story Source:

Adapted from materials provided by Woods Hole Oceanographic Institution.

http://www.sciencedaily.com/releases/2010/02/100224142042.htm

Mass Loss from Alaskan Glaciers Overestimated? Previous Melt Contributed a Third Less to Sea-Level Rise Than Estimated

NAU geographer Erik Schiefer surveys a debris-covered glacier margin. (Credit: Photo by Amanda Stan)

ScienceDaily (Mar. 3, 2010) — The melting of glaciers is well documented, but when looking at the rate at which they have been retreating, a team of international researchers steps back and says not so fast.

Previous studies have largely overestimated mass loss from Alaskan glaciers over the past 40-plus years, according to Erik Schiefer, a Northern Arizona University geographer who coauthored a paper in the February issue of *Nature Geoscience* that recalculates glacier melt in Alaska.

The research team, led by Étienne Berthier of the Laboratory for Space Studies in Geophysics and Oceanography at the Université de Toulouse in France, says that glacier melt in Alaska between 1962 and 2006 contributed about one-third less to sea-level rise than previously estimated.

Schiefer said melting glaciers in Alaska originally were thought to contribute about .0067 inches to sea-level rise per year. The team's new calculations put that number closer to .0047 inches per year. The numbers sound small, but as Schiefer said, "It adds up over the decades."

While the team looked at three-fourths of all the ice in Alaska, Schiefer noted, "We're also talking about a small proportion of ice on the planet. When massive ice sheets (such as in the Antarctic and Greenland) are added in, you're looking at significantly greater rates of sea-level rise."

Schiefer said the team plans to use the same methodologies from the Alaskan study in other glacial regions to determine if further recalibrations of ice melt are in order. These techniques use satellite imagery that spans vast areas of ice cover.

Previous methods estimated melt for a smaller subset of individual glaciers. The most comprehensive technique previously available used planes that flew along the centerlines of selected glaciers to measure ice surface elevations. These elevations were then compared to those mapped in the 1950s and 1960s. From this, researchers inferred elevation changes and then extrapolated this to other glaciers.

Two factors led to the original overestimation of ice loss with this method, Schiefer said. One is the impact of thick deposits of rock debris that offer protection from solar radiation and, thus, melting. The other was not accounting for the thinner ice along the edges of glaciers that also resulted in less ice melt.

Schiefer and his colleagues used data from the SPOT 5 French satellite and the Japanese ASTER instrument on NASA's Terra satellite and converted the optical imagery to elevation information. They

then compared this information to the topographical series maps of glacial elevations dating back to the 1950s.

While the team determined a lower rate of glacial melt during a greater than 40-year span, Schiefer said other studies have demonstrated the rate of ice loss has more than doubled in just the last two decades.

"With current projections of climate change, we expect that acceleration to continue," Schiefer said. This substantial increase in ice loss since the 1990s is now pushing up the rise in sea level to between .0098 inches and .0118 inches per year -- more than double the average rate for the last 40 years.

Working on the Alaskan glacial melt revision with Schiefer and Berthier were Garry Clarke of the University of British Columbia, Brian Menounos of the University of Northern British Columbia and Frédérique Rémy of the Université de Toulouse.

Story Source:

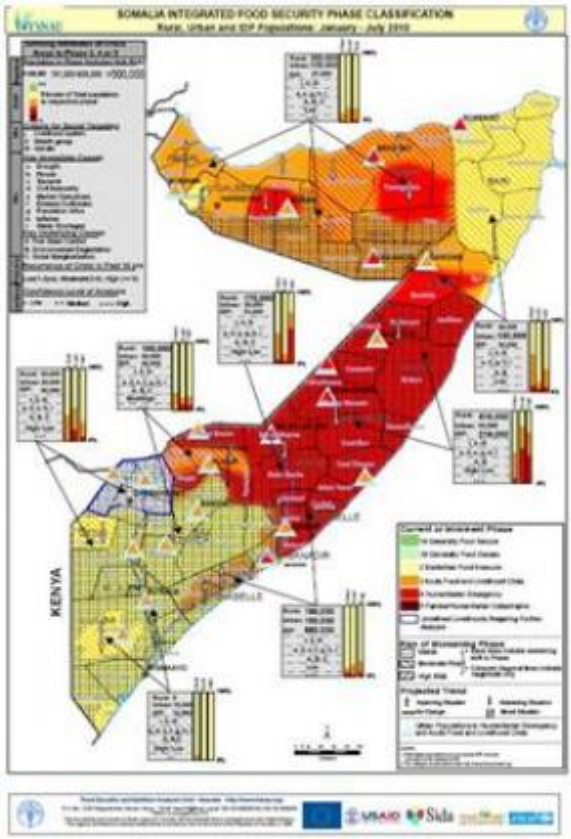
Adapted from materials provided by Northern Arizona University.

Journal Reference:

1. E. Berthier, E. Schiefer, G. K. C. Clarke, B. Menounos & F. Rémy. **Contribution of Alaskan glaciers to sea-level rise derived from satellite imagery**. *Nature Geoscience*, 2010; 3 (2): 92 DOI: 10.1038/ngeo737

http://www.sciencedaily.com/releases/2010/03/100302123124.htm

Where Will the Next Food Crisis Strike? Extended Geographical Monitoring Using Satellite Observation



Somalia's Integrated Food Security Phase classification map. (Credit: Image courtesy of European Commission Joint Research Centre)

ScienceDaily (Mar. 3, 2010) — The European Commission Joint Research Centre (JRC), the Food and Agriculture Organization of the United Nations (FAO) and the American Famine Early Warning Systems Network (FEWS NET) are working to innovate and reinforce their food security monitoring systems and to develop more efficient early warning tools. These efforts come as a response to the 2007-2008 global food crisis that increased significantly the number of countries under threat of famine.

Satellite observation is the key instrument that will allow to double in 2010 the number of countries monitored in real time for detecting first indications of adverse agricultural outcomes. The new Integrated Phase Classification (IPC) system facilitates and accelerates the reaction time to food security crises by allowing a common and internationally recognised classification of their severity.

According to the Food and Agriculture Organization, more than 1 billion people go to bed each night with an empty stomach. In addition, the latest global food crisis resulted in more countries being added to the list of food insecure populations. This is probably the most urgent and dramatic problem that humankind faces today. Food security is not only a crucial issue for developing countries and their more vulnerable inhabitants; it is also key to building a more stable, equal, wealthier and safer world.

Special programmes are run and significant funds are mobilised every year by the international community in an effort to combat the increasing number of food insecure populations. Identifying the times and places where aid is required is crucial to deliver targeted and effective responses. Here is where the scientific community comes into play by developing methodologies and tools to provide timely information and objective assessments of the food requirements, thus supporting the decision-making process with solid evidence.

The power of satellite imagery

Several organisations dealing with food security both in Europe and in the United States traditionally rely on satellite observations to support their assessment activities. As a consequence of the alarming spike in global food prices in 2008, many more countries are potentially threatened by food insecurity and need to be constantly monitored in order to detect early signs of adverse agricultural conditions. Satellite-based forecasting systems will therefore take on increased importance in the next years, allowing organisations to monitor a larger number of countries than it is currently possible to do with in-country offices.

The Joint Research Centre (JRC) will extend this year the real time monitoring system it has developed to forecast food crises. It will cover not only the Horn of Africa, but all the most food insecure countries in Sub-Saharan Africa. As the earth observation and agroclimatic data regularly received by the JRC are global, other countries outside Africa can also be monitored in case of food security crises.

This JRC operational system for regional crop monitoring and forecasting is based on satellite data and innovative agro-climatic models. More than 40 regional bulletins provide each year quantitative and qualitative yield forecasts for food insecure countries around the world, with a particular emphasis in Africa. In 2009, JRC provided for instance an early warning of the drought affecting Kenya, and correctly predicted a 15% below average maize yield one month before harvest.

In the United States, the Famine Early Warning Systems Network (FEWS NET) will extend this year its food security monitoring system from the current 20 to 50 additional countries around the world. The US Geological Survey (USGS), the National and Oceanic Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA) are establishing expedited procedures for processing of satellite data and model runs to support FEWSNET in this task.

Integrated Food Security Phase Classification (IPC): bringing scientific results closer to the decision making process

When it comes to taking decisions on committing aid resources, policy makers need to have clear and reliable information integrating all dimensions of food security (climate data, economic analysis, nutritional and health data) and a common language on the basis of which all stakeholders can agree on the analysis of the food security situation and possible response options.

The new Integrated Food Security Phase Classification (IPC), built on a large consensus and accepted internationally, makes it possible, avoiding at the same time contradictory results deriving from the use of different scales. Facilitating therefore the donors' response.

This common classification has been recently developed by seven organisations (JRC, FAO, FEWS NET, Care International, Oxfam GB, Save the children and World Food Programme) dealing with food security information management. It is a standardised scale that integrates the following parameters: food security, nutrition and livelihood information, leading to clear statements about the nature and severity of a crisis.

It covers the full spectrum of possible situations -- from 'food-secure' to humanitarian crisis -- and takes into account the multiple dimensions of food security, i.e. availability, access/livelihood and nutrition. It provides as well a comprehensive framework of concepts, indicators, scales or benchmarks and a common, internationally accepted language. This facilitates the technical consensus on diagnostic among experts and allows sending clearer and coherent messages to decision-makers. Appropriate reporting and mapping tools provide synthetic views on the severity, extension and nature of the food security concerns and their likely evolution in the near future.

In December 2009, the European Commission decided to allocate € 1 276 269 (more than 1.7 million US dollars) over a period of 14 months to the Food and Agriculture Organization of the United Nations (FAO).Together with the JRC, FEWS NET and the other organisations involved in the development of

the classification, the FAO will implement the second phase of the IPC initiative in at least 8 focus countries (6 of which located in Sub Saharan Africa) through improved technical development, field support and institutionalisation.

Further information

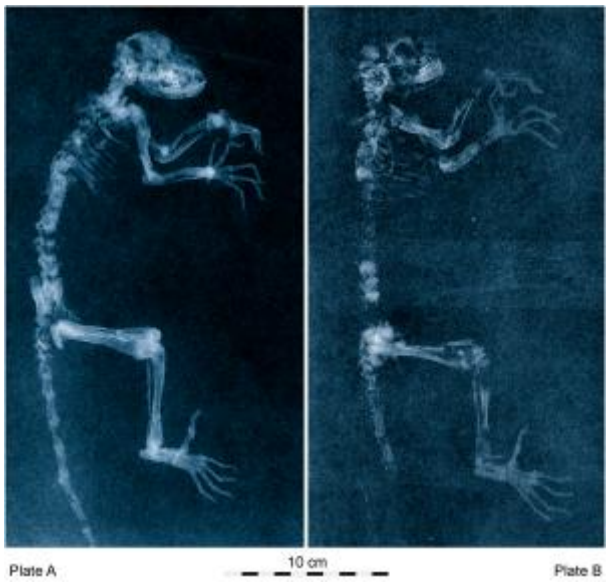
- Integrated Food Security Phase Classification (IPC): http://www.ipcinfo.org/
- EU's FOODSEC action: http://mars.jrc.ec.europa.eu/mars/About-us/FOODSEC
- Famine Early Warning Systems Network (FEWS NET): http://www.fews.net/Pages/default.aspx

Story Source:

Adapted from materials provided by European Commission Joint Research Centre, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2010/02/100221200859.htm

'Missing Link' Fossil Was Not Human Ancestor as Claimed, Anthropologists Say



Radiographs of the type specimen of Darwinius masillae, new genus and species, from Messel in Germany. (Credit: Franzen JL, Gingerich PD, Habersetzer J, Hurum JH, von Koenigswald W, et al. Complete Primate Skeleton from the Middle Eocene of Messel in Germany: Morphology and Paleobiology. PLoS ONE, 2009; 4(5): e5723 DOI: 10.1371/journal.pone.0005723)

ScienceDaily (Mar. 3, 2010) — A fossil that was celebrated last year as a possible "missing link" between humans and early primates is actually a forebearer of modern-day lemurs and lorises, according to two papers by scientists at The University of Texas at Austin, Duke University and the University of Chicago.

In an article now available online in the *Journal of Human Evolution*, four scientists present evidence that the 47-million-year-old *Darwinius masillae* is not a haplorhine primate like humans, apes and monkeys, as the 2009 research claimed.

They also note that the article on *Darwinius* published last year in the journal *PLoS ONE* ignores two decades of published research showing that similar fossils are actually strepsirrhines, the primate group that includes lemurs and lorises.

"Many lines of evidence indicate that *Darwinius* has nothing at all to do with human evolution," says Chris Kirk, associate professor of anthropology at The University of Texas at Austin. "Every year, scientists describe new fossils that contribute to our understanding of primate evolution. What's amazing about *Darwinius* is, despite the fact that it's nearly complete, it tells us very little that we didn't already know from fossils of closely related species."

His co-authors are anthropologists Blythe Williams and Richard Kay of Duke and evolutionary biologist Callum Ross of the University of Chicago. Williams, Kay and Kirk also collaborated on a related article about to be published in the Proceedings of the National Academy of Sciences that reviews the early fossil record and anatomical features of anthropoids -- the primate group that includes monkeys, apes, and humans.

Last spring's much-publicized article on *Darwinius* was released in conjunction with a book, a History Channel documentary, and an exhibit in the American Museum of Natural History. At a news conference attended by New York Mayor Michael Bloomberg, the authors unveiled the nearly complete fossil of a nine-month-old female primate that had been found at the site of Messel in Germany.

But other anthropologists were immediately skeptical of the conclusions and began writing the responses that are being published this month.

"Just because it's a complete and well-preserved fossil doesn't mean it's going to overthrow all our ideas," says Williams, the lead author. "There's this enormous body of literature that has built up over the years. The *Darwinius* research completely ignored that body of literature."

That literature centers on the evolution of primates, which include haplorhines (apes, monkeys, humans, tarsiers) and strepsirrhines (lemurs, lorises). The two groups split from each other nearly 70 million years ago.

The fossil group to which *Darwinius* belongs -- the adapiforms -- have been known since the early 1800s and includes dozens of primate species represented by thousands of fossils recovered in North America, Europe, Asia and Africa. Some adapiforms, like North American Notharctus, are known from nearly complete skeletons like that of *Darwinius*. Most analyses of primate evolution over the past two decades have concluded that adapiforms are strepsirrhines, and not direct ancestors of modern humans.

The most recent such analysis, published last year in the journal Nature, concluded that *Darwinius* is an early strepsirrhine and a close relative of the 39-million-year- old primate Mahgarita stevensi from West Texas.

Nevertheless, the scientists who last year formally described *Darwinius* concluded that it was an early haplorhine, and even suggested that *Darwinius* and other adapiform fossils "could represent a stem group from which later anthropoid primates evolved."

For example, they note that *Darwinius* has a short snout and a deep jaw -- two features that are found in monkeys, apes, and humans.

However, Kirk, Williams and their colleagues point out that short snouts and deep jaws are known to have evolved multiple times among primates, including several times within the lemur/loris lineage. They further argue that *Darwinius* lacks most of the key anatomical features that could demonstrate a close evolutionary relationship with living haplorhines (apes, monkeys, humans, and tarsiers).

For instance, haplorhines have a middle ear with two chambers and a plate of bone that shields the eyes from the chewing muscles.

"There is no evidence that *Darwinius* shared these features with living haplorhines," says Kirk. "And if you can't even make that case, you can forget about *Darwinius* being a close relative of humans or other anthropoids."

Story Source:

Adapted from materials provided by University of Texas at Austin, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Blythe A. Williams, Richard F. Kay, E. Christopher Kirk, Callum F. Ross. **Darwinius masillae is a strepsirrhine -- a reply to Franzen et al. (2009)**. *Journal of Human Evolution*, 2010; DOI: 10.1016/j.jhevol.2010.01.003

http://www.sciencedaily.com/releases/2010/03/100302131719.htm

Back Talk: Martha C. Nussbaum

By **Christine Smallwood**

ROBIN HOLLAND

Philosopher Martha C. Nussbaum teaches law and ethics at the University of Chicago and is the author of more than twenty books. Her latest, *From Disgust to Humanity: Sexual Orientation and Constitutional Law* (Oxford; $21.95), expands the thinking on the "politics of disgust" that she explored in *Hiding from Humanity*. She argues that opposition to gay equality is rooted not in legally defensible reason but in an anxiety of contamination and a fear of the body's animal nature. She advocates instead a "politics of humanity," based on the capacity to imagine others as being persons like ourselves, pursuing ends not unlike our own, and worthy of equal respect and treatment under the law. --*Christine Smallwood*

What is the politics of disgust?

It's an aversion to being sullied by something one views as degrading or foreign. The things that inspire that idea are typically reminders of our animality and bodily nature, particularly mortality and the weak decaying aspects of our bodily nature. In *Hiding from Humanity* I used the idea to criticize first of all theories, like the theory of Lord Devlin, that say that disgust is a reliable way of thinking about what should be legally regulable. Disgust tends to extend itself to groups of people to whom the person then imputes disgusting properties--these people are smelly, they have germs, they'll contaminate me. You can see the role of disgust in racism, anti-Semitism, the subordination of women, etc. All these groups have been characterized as hyper-animal, hyper-bodily, therefore disgusting. It's unusually unreliable as emotions go, because it embodies a shrinking from some aspect of our nature.

The politics of humanity is a politics that says, We're going to think of these people as our fellow citizens and equals and try to imagine them as people with projects they're pursuing that are similar to ourselves. Respect is, of course, crucial to maintaining the equality of people in society, but respect doesn't sustain itself. You need this quality of imagination to give it life, to stabilize it.

Why can we trust ourselves to imaginatively identify *with* others but not to imaginatively oppose them?

I don't think any emotion should be trusted on its own without being constantly in dialogue with moral principles. At every point, whether it's anger or fear or any emotion--even compassion, which can, of course, lead you to favor your family against other people--you should always be asking, Is this consistent with the idea of a society of people who are free and equal? Disgust, though, is different because it has this singular type of irrationality. It's not noncognitive; it has an idea. But the idea repudiates some aspect of ourselves. It embodies a kind of self-loathing. In the case of compassion, compassion can be uneven; it can target people in a partial way. Or anger can be wrong about the facts. But disgust always has this edgy irrationality about it. It's a way of fleeing from yourself. Whether it's useful in evolutionary terms, that I leave to evolutionary scientists. Probably it is. That doesn't mean that in the law we should rely on it. The imagination of humanity, of course, can be unreliable too. But all we're really asking is that people see the other people as people. And I think that's actually not so unreliable. What we see is that when people know that their children or their children's friends or some relative is gay or lesbian, they immediately change. Then they can't see them as slimy slugs. They're just people. They may not like those people, but they still see them as people.

Can you walk me through your defense of the legal right to gay marriage?

I look at the various arguments that have been made against same-sex marriage. And always in the back of the picture is the analogy to miscegenation. In both cases the arguments look like public arguments, but they're driven by a deeper loathing. Some of them look perfectly OK within a given religion, but that doesn't lead to making something illegal for everyone. They're like Jewish arguments against the eating of pork. Then there's another class of arguments that look public, but they always have a flaw, like the argument that marriage is about procreation. That's not something we've ever believed in our history or, in our case, law. People who are above the age to conceive, who are sterile, who never see each other, like prison inmates serving life terms, people on their death bed--they've all been held to have a constitutional right to marry. Then I look at the argument that children do best when raised with one mother and one father; and if that were true, that would provide a public reason for fostering that institution, although it's not clear it would provide a reason for opposing others. But psychological research shows that when you define child welfare in a nonreligious way, children do just as well. Then there's finally the argument that legalizing same-sex marriage will degrade or defile straight marriage. What's that about? It looks something like the claim that admitting all these baseball players who use steroids to the Hall of Fame would degrade the achievements of the genuine competitors. It taints the achievement. But what can that be about? We don't think that heterosexuals who are flaky, silly or awful, Britney Spears marrying on a whim and then divorcing almost immediately, we don't think that that taints the institution of heterosexual marriage. By the same token, people do think that the marriage of two gay people of good character does taint the institution. We can't understand what's being said without going back to some kind of magical idea about stigma or taint.

You suggest that perhaps the state should get out of the marrying business altogether.

I guess the first thing to say is that they can't do it in a way that just simply takes away the possibility of marriage from gays and lesbians. During integration in the South there were attempts to get around mandatory integration by ending the program in question. They closed down the public swimming pools or the public schools rather than integrate them. That kind of thing has been held to be unconstitutional, and quite rightly so. But I guess I think that marriage as it currently exists is a weird institution. There are a bunch of civil benefits that could be captured in civil unions. There are religious elements, but they're not really part of state marriage. Then there's the expressive significance--we want the state to dignify or affirm our marriage. Should the state be in the business of dignifying certain unions? The answer would be no. If we were starting over again, we'd want to go back and look at the privileges associated with marriage--tax benefits, immigration status, etc.-- and ask, Who do we want to give those benefits to? What do we want to do? That kind of thorough rethinking would be ideal, but it's also not likely to actually happen. How do we get from where we are to there? In the short run, I think the best thing is just

to push on the equality issue and say, So long as marriage is offered by the state, it should be offered with an even hand.

You build a lot of your thinking on John Stuart Mill.

Mill is one of my favorite philosophers. He's so complicated and sees many sides of most issues. But also he's a genuine ally of women's equality, and that's so rare in the history of philosophy. In this area, what Mill wants to do is to say that there are two types of behavior: what he calls self-regarding, involving only yourself and other consenting parties; and behavior that's other-regarding, involving the rights and interests of other nonconsenting parties. That's the fundamental distinction. Not this place or that place, solitude or public space. His further claim is that behavior that's self-regarding should be off limits to legal regulation. The key notion in making something legally regulable is the notion of a potential harm. If there's no harm in the offing except a self-chosen one, for Mill that's just no business of the law.

The United States has never fully accepted Mill's idea. It has been accepted by certain state constitutions, like states that wanted to decriminalize the consumption of alcohol by private parties. In certain alcohol-producing states it was a crime to have alcohol in your possession, so they rewrote the state constitution and put in Mill's harm principle. Much later, part of the Pennsylvania and Kentucky constitutions were used to decriminalize sodomy. So it was very closely connected. Mill reigns in Pennsylvania and Kentucky, and is kind of on the borderline in New York. But most of the US Constitution has never been interpreted in a Millian spirit. Justice Scalia is right that we've never agreed to the idea that something that's consensual is fine so long as it does no harm to others. We've allowed public moral laws to prevail. I just think that's wrong and that we're gradually beginning to realize that's wrong. Mill, I hope, will come more and more to underlie the values of a decent society.

About Christine Smallwood

Christine Smallwood, a writer in New York, is former associate literary editor of *The Nation*

http://www.thenation.com/doc/20100315/smallwood

Human Culture, an Evolutionary Force

By NICHOLAS WADE

As with any other species, human populations are shaped by the usual forces of natural selection, like famine, disease or climate. A new force is now coming into focus. It is one with a surprising implication — that for the last 20,000 years or so, people have inadvertently been shaping their own evolution.

The force is human culture, broadly defined as any learned behavior, including technology. The evidence of its activity is the more surprising because culture has long seemed to play just the opposite role. Biologists have seen it as a shield that protects people from the full force of other selective pressures, since clothes and shelter dull the bite of cold and farming helps build surpluses to ride out famine.

Because of this buffering action, culture was thought to have blunted the rate of human evolution, or even brought it to a halt, in the distant past. Many biologists are now seeing the role of culture in a quite different light.

Although it does shield people from other forces, culture itself seems to be a powerful force of natural selection. People adapt genetically to sustained cultural changes, like new diets. And this interaction works more quickly than other selective forces, "leading some practitioners to argue that gene-culture co-evolution could be the dominant mode of human evolution," Kevin N. Laland and colleagues wrote in the February issue of Nature Reviews Genetics. Dr. Laland is an evolutionary biologist at the University of St. Andrews in Scotland.

The idea that genes and culture co-evolve has been around for several decades but has started to win converts only recently. Two leading proponents, Robert Boyd of the University of California, Los Angeles, and Peter J. Richerson of the University of California, Davis, have argued for years that genes and culture were intertwined in shaping human evolution. "It wasn't like we were despised, just kind of ignored," Dr. Boyd said. But in the last few years, references by other scientists to their writings have "gone up hugely," he said.

The best evidence available to Dr. Boyd and Dr. Richerson for culture being a selective force was the lactose tolerance found in many northern Europeans. Most people switch off the gene that digests the lactose in milk shortly after they are weaned, but in northern Europeans — the descendants of an ancient

cattle-rearing culture that emerged in the region some 6,000 years ago — the gene is kept switched on in adulthood.

Lactose tolerance is now well recognized as a case in which a cultural practice — drinking raw milk — has caused an evolutionary change in the human genome. Presumably the extra nutrition was of such great advantage that adults able to digest milk left more surviving offspring, and the genetic change swept through the population.

This instance of gene-culture interaction turns out to be far from unique. In the last few years, biologists have been able to scan the whole human genome for the signatures of genes undergoing selection. Such a signature is formed when one version of a gene becomes more common than other versions because its owners are leaving more surviving offspring. From the evidence of the scans, up to 10 percent of the genome — some 2,000 genes — shows signs of being under selective pressure.

These pressures are all recent, in evolutionary terms — most probably dating from around 10,000 to 20,000 years ago, in the view of Mark Stoneking, a geneticist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. Biologists can infer the reason for these selective forces from the kinds of genes that are tagged by the genome scans. The roles of most of the 20,000 or so genes in the human genome are still poorly understood, but all can be assigned to broad categories of likely function depending on the physical structure of the protein they specify.

By this criterion, many of the genes under selection seem to be responding to conventional pressures. Some are involved in the immune system, and presumably became more common because of the protection they provided against disease. Genes that cause paler skin in Europeans or Asians are probably a response to geography and climate.

But other genes seem to have been favored because of cultural changes. These include many genes involved in diet and metabolism and presumably reflect the major shift in diet that occurred in the transition from foraging to agriculture that started about 10,000 years ago.

Amylase is an enzyme in the saliva that breaks down starch. People who live in agrarian societies eat more starch and have extra copies of the amylase gene compared with people who live in societies that depend on hunting or fishing. Genetic changes that enable lactose tolerance have been detected not just in Europeans but also in three African pastoral societies. In each of the four cases, a different mutation is involved, but all have the same result — that of preventing the lactose-digesting gene from being switched off after weaning.

Many genes for taste and smell show signs of selective pressure, perhaps reflecting the change in foodstuffs as people moved from nomadic to sedentary existence. Another group under pressure is that of genes that affect the growth of bone. These could reflect the declining weight of the human skeleton that seems to have accompanied the switch to settled life, which started some 15,000 years ago.

A third group of selected genes affects brain function. The role of these genes is unknown, but they could have changed in response to the social transition as people moved from small hunter-gatherer groups a hundred strong to villages and towns inhabited by several thousand, Dr. Laland said. “It’s highly plausible that some of these changes are a response to aggregation, to living in larger communities,” he said.

Though the genome scans certainly suggest that many human genes have been shaped by cultural forces, the tests for selection are purely statistical, being based on measures of whether a gene has become more common. To verify that a gene has indeed been under selection, biologists need to perform other tests, like comparing the selected and unselected forms of the gene to see how they differ.

Dr. Stoneking and his colleagues have done this with three genes that score high in statistical tests of selection. One of the genes they looked at, called the EDAR gene, is known to be involved in controlling the growth of hair. A variant form of the EDAR gene is very common in East Asians and Native Americans, and is probably the reason that these populations have thicker hair than Europeans or Africans.

Still, it is not obvious why this variant of the EDAR gene was favored. Possibly thicker hair was in itself an advantage, retaining heat in Siberian climates. Or the trait could have become common through sexual selection, because people found it attractive in their partners.

A third possibility comes from the fact that the gene works by activating a gene regulator that controls the immune system as well as hair growth. So the gene could have been favored because it conferred protection against some disease, with thicker hair being swept along as a side effect. Or all three factors could have been at work. “It’s one of the cases we know most about, and yet there’s a lot we don’t know,” Dr. Stoneking said.

The case of the EDAR gene shows how cautious biologists have to be in interpreting the signals of selection seen in the genome scans. But it also points to the potential of the selective signals for bringing to light salient events in human prehistory as modern humans dispersed from the ancestral homeland in northeast Africa and adapted to novel environments. “That’s the ultimate goal,” Dr. Stoneking said. “I come from the anthropological perspective, and we want to know what the story is.”

With archaic humans, culture changed very slowly. The style of stone tools called the Oldowan appeared 2.5 million years ago and stayed unchanged for more than a million years. The Acheulean stone tool kit that succeeded it lasted for 1.5 million years. But among behaviorally modern humans, those of the last 50,000 years, the tempo of cultural change has been far brisker. This raises the possibility that human evolution has been accelerating in the recent past under the impact of rapid shifts in culture.

Some biologists think this is a possibility, though one that awaits proof. The genome scans that test for selection have severe limitations. They cannot see the signatures of ancient selection, which get washed out by new mutations, so there is no base line by which to judge whether recent natural selection has been greater than in earlier times. There are also likely to be many false positives among the genes that seem favored.

But the scans also find it hard to detect weakly selected genes, so they may be picking up just a small fraction of the recent stresses on the genome. Mathematical models of gene-culture interaction suggest that this form of natural selection can be particularly rapid. Culture has become a force of natural selection, and if it should prove to be a major one, then human evolution may be accelerating as people adapt to pressures of their own creation.

http://www.nytimes.com/2010/03/02/science/02evo.html

Darwin Foes Add Warming to Targets

By LESLIE KAUFMAN

Critics of the teaching of evolution in the nation's classrooms are gaining ground in some states by linking the issue to global warming, arguing that dissenting views on both scientific subjects should be taught in public schools.

In Kentucky, a bill recently introduced in the Legislature would encourage teachers to discuss "the advantages and disadvantages of scientific theories," including "evolution, the origins of life, global warming and human cloning."

The bill, which has yet to be voted on, is patterned on even more aggressive efforts in other states to fuse such issues. In Louisiana, a law passed in 2008 says the state board of education may assist teachers in promoting "critical thinking" on all of those subjects.

Last year, the Texas Board of Education adopted language requiring that teachers present all sides of the evidence on evolution and global warming.

Oklahoma introduced a bill with similar goals in 2009, although it was not enacted.

The linkage of evolution and global warming is partly a legal strategy: courts have found that singling out evolution for criticism in public schools is a violation of the separation of church and state. By insisting that global warming also be debated, deniers of evolution can argue that they are simply championing academic freedom in general.

Yet they are also capitalizing on rising public resistance in some quarters to accepting the science of global warming, particularly among political conservatives who oppose efforts to rein in emissions of greenhouse gases.

In South Dakota, a resolution calling for the "balanced teaching of global warming in public schools" passed the Legislature this week.

"Carbon dioxide is not a pollutant," the resolution said, "but rather a highly beneficial ingredient for all plant life."

The measure made no mention of evolution, but opponents of efforts to dilute the teaching of evolution noted that the language was similar to that of bills in other states that had included both. The vote split almost entirely along partisan lines in both houses, with Republican voting for it and Democrats voting against.

For mainstream scientists, there is no credible challenge to evolutionary theory. They oppose the teaching of alternative views like intelligent design, the proposition that life is so complex that it must be the design of an intelligent being. And there is wide agreement among scientists that global warming is occurring and that human activities are probably driving it. Yet many conservative evangelical Christians assert that both are examples of scientists' overstepping their bounds.

John G. West, a senior fellow with the Discovery Institute in Seattle, a group that advocates intelligent design and has led the campaign for teaching critiques of evolution in the schools, said that the institute was not specifically promoting opposition to accepted science on climate change. Still, Mr. West said, he is sympathetic to that cause.

"There is a lot of similar dogmatism on this issue," he said, "with scientists being persecuted for findings that are not in keeping with the orthodoxy. We think analyzing and evaluating scientific evidence is a good thing, whether that is about global warming or evolution."

Lawrence M. Krauss, a physicist who directs the Origins Initiative at Arizona State University and has spoken against efforts to water down the teaching of evolution to school boards in Texas and Ohio, described the move toward climate-change skepticism as a predictable offshoot of creationism.

"Wherever there is a battle over evolution now," he said, "there is a secondary battle to diminish other hot-button issues like Big Bang and, increasingly, climate change. It is all about casting doubt on the veracity of science — to say it is just one view of the world, just another story, no better or more valid than fundamentalism."

Not all evangelical Christians reject the notion of climate change, of course. There is a budding green evangelical movement in the country driven partly by a belief that because God created the earth, humans are obligated to care for it.

Yet there is little doubt that the skepticism about global warming resonates more strongly among conservatives, and Christian conservatives in particular. A survey published in October by the Pew Research Center for the People and the Press found that white evangelical Protestants were among those least likely to believe that there was "solid evidence" that the Earth was warming because of human activity.

Only 23 percent of those surveyed accepted that idea, compared with 36 percent of the American population as a whole.

The Rev. Jim Ball, senior director for climate programs at the Evangelical Environmental Network, a group with members who accept the science of global warming, said that many of the deniers feel that "it is hubris to think that human beings could disrupt something that God created."

"This group already feels like scientists are attacking their faith and calling them idiots," he said, "so they are likely to be skeptical" about global warming.

State Representative Tim Moore, a Republican who introduced the bill in the Kentucky Legislature, said he was motivated not by religion but by what he saw as a distortion of scientific knowledge.

"Our kids are being presented theories as though they are facts," he said. "And with global warming especially, there has become a politically correct viewpoint among educational elites that is very different from sound science."

The evolution curriculum has developed far more than instruction on climate change. It is almost universally required in biology classes, while the science of global warming, a newer topic, is taught more sporadically, depending on the interest of teachers and school planners.

But interest in making climate change a standard part of school curriculum is growing. Under President Obama, for example, the Climate Education Interagency Working Group, which represents more than a dozen federal agencies, is making a strong push toward "climate literacy" for teachers and students.

State Representative Don Kopp, a Republican who was the main sponsor of the South Dakota resolution, said he acted in part because "An Inconvenient Truth," a documentary film on global warming starring Al Gore, was being shown in some public schools without a counterweight.

The legal incentive to pair global warming with evolution in curriculum battles stems in part from a 2005 ruling by a United States District Court judge in Atlanta that the Cobb County Board of Education, which had placed stickers on certain textbooks encouraging students to view evolution as only a theory, had violated First Amendment strictures on the separation of church and state.

Although the sticker was not overtly religious, the judge said, its use was unconstitutional because evolution alone was the target, which indicated that it was a religious issue.

After that, said Joshua Rosenau, a project director for the National Center for Science Education, he began noticing that attacks on climate change science were being packaged with criticism of evolution in curriculum initiatives.

He fears that even a few state-level victories could have an effect on what gets taught across the nation.

James D. Marston, director of the Texas regional office of the Environmental Defense Fund, said he worried that, given Texas' size and centralized approval process, its decision on textbooks could have an outsize influence on how publishers prepare science content for the national market.

"If a textbook does not give enough deference to critics of climate change — or does not say that there is real scientific debate, when in fact there is little to none — they will have a basis for turning it down," Mr. Marston said of the Texas board. "And that is scary for what our children will learn everywhere."

http://www.nytimes.com/2010/03/04/science/earth/04climate.html?ref=science

Study Says Undersea Release of Methane Is Under Way

By CORNELIA DEAN

Climate scientists have long warned that global warming could unlock vast stores of the greenhouse gas methane that are frozen into the Arctic permafrost, setting off potentially significant increases in global warming. Now researchers at the University of Alaska, Fairbanks, and elsewhere say this change is under way in a little-studied area under the sea, the East Siberian Arctic Shelf, west of the Bering Strait.

Natalia Shakhova, a scientist at the university and a leader of the study, said it was too soon to say whether the findings suggest that a dangerous release of methane looms. In a telephone news conference, she said researchers were only beginning to track the movement of this methane into the atmosphere as the undersea permafrost that traps it degrades. But climate experts familiar with the new research reported in Friday's issue of the journal Science that even though it does not suggest imminent climate catastrophe, it is important because of methane's role as a greenhouse gas. Although carbon dioxide is far more abundant and persistent in the atmosphere, ton for ton atmospheric methane traps at least 25 times as much heat.

Until recently, undersea permafrost has been little studied, but work so far shows it is already sending surprising amounts of methane into the atmosphere, Dr. Shakhova and other researchers are finding. Last year, scientists from Britain and Germany reported that they had detected plumes of methane rising from the Arctic seabed in the West Spitsbergen area, north of Scandinavia. At the time, they said they had begun their work hoping to gain data to predict future emissions and had not expected to find evidence that the process was under way.

It is "indispensable" to keep track of methane in the region, Martin Heimann of the Max Planck Institute in Germany said in a commentary accompanying the Science report. So far, Dr. Heimann wrote, methane contributions from Arctic permafrost have been "negligible." He added: "But will this persist into the future under sustained warming trends? We do not know." In an e-mail message, Euan G. Nisbet of the University of London, an expert on atmospheric methane, said the situation "needs to be watched carefully." Atmospheric concentrations of methane have more than doubled since pre-industrial times, Dr. Heimann wrote. Most of it comes from human activities including energy production, cattle raising and the cultivation of rice. But about 40 percent is natural, including the decomposition of organic materials in wetlands and frozen wetlands like permafrost.

Dr. Shakhova said that permafrost in the East Siberian Arctic Shelf, peat land that flooded as sea levels rose after the last ice age, is degrading in part because runoff from rivers that feed the Arctic Ocean is warmer than in the past. She estimated that annual methane emissions from the East Siberian Arctic Shelf total about seven teragrams. (A teragram is 1.1 million tons.) By some estimates, global methane emissions total about 500 teragrams a year. Dr. Shakhova said that undersea methane ordinarily undergoes oxidation as it rises to the surface, where it is released as carbon dioxide. But because water over the shelf is at most about 50 meters deep, she said, the gas bubbles to the surface there as methane. As a result, she said, atmospheric levels of methane over the Arctic are 1.85 parts per million, almost three times as high as the global average of 0.6 or 0.7 parts per million. Concentrations over the shelf are 2 parts per million or higher.

But, "I am not the person to judge" whether the Arctic findings suggest that estimates of climate change in coming decades should be rewritten, she added. "I would not go so far as to suggest any implications," she said. "We are at the very beginning of research."

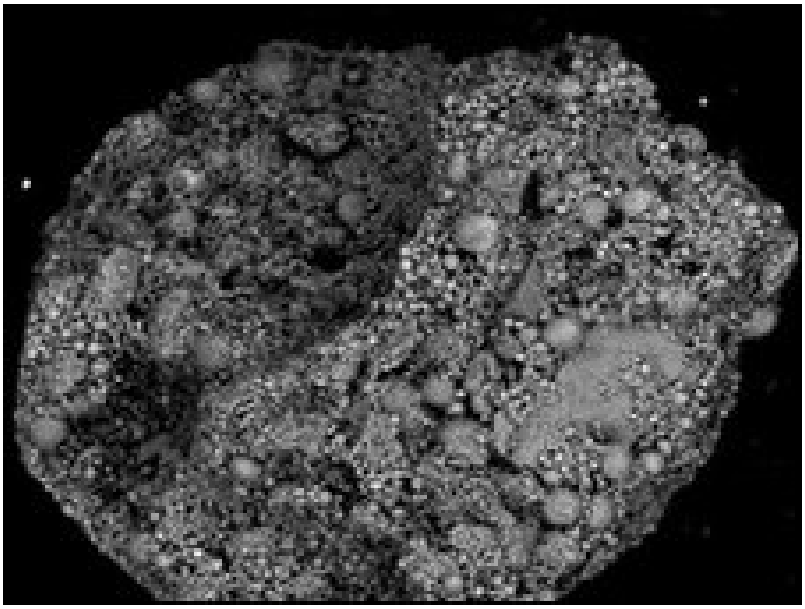
Andrew C. Revkin contributed reporting.

http://www.nytimes.com/2010/03/05/science/earth/05methane.html?ref=science

Clues to Antarctica space blast

By Paul Rincon
Science reporter, BBC News, The Woodlands, Texas

A large space rock may have exploded over Antarctica thousands of years ago, showering a large area with debris, according to new research.



The evidence comes from accumulations of tiny meteoritic particles and a layer of extraterrestrial dust found in Antarctic ice cores.

Details of the work were presented at a major science conference in Texas.

The event would have been similar to the Tunguska event, which flattened a large area of Siberian forest in 1908.

It is thought to have been a so-called "airburst" in which a space rock does not reach the ground, but rather explodes in the atmosphere.

The research is based on a study of extraterrestrial debris found in granite from Miller Butte, in the Transantarctic Mountains, and a layer of cosmic dust represented in two Antarctic ice cores.

The debris from the mountains includes micrometeorites and tiny particles called spherules. The study's authors think these spherules could be material eroded from a stony meteorite as it was heated up on its way through our atmosphere.

The spherules could potentially provide a signature to look for evidence of "airbursts" in the geological record.

Wide area

The results were the subject of a presentation at the Lunar and Planetary Science Conference (LPSC) in The Woodlands, Texas.

" **What makes Luigi and Matthias' work so exciting is that it may give us a way of spotting these events in the geological record** "
Phil Bland Imperial College London

A layer of extraterrestrial dust has been found in both the Dome C and Dome Fuji ice cores from Antarctica. The dust in both cores is dated to about 481,000 years ago - and is therefore likely to derive from the same event.

The team, led by Luigi Folco and Matthias van Ginneken at the University of Siena, Italy, and including Phil Bland from Imperial College London, UK, now conclude that the Dome C and Dome Fuji dust layers are also paired with debris from the Transantarctic Mountains.

They point to strong similarities in the texture and composition of the debris found in the ice cores and that found in the granite.

However, the sites are more than 2,900km apart. For cosmic debris to be spread over such a wide area, the researchers propose that an airburst is the most likely explanation.

They estimate that it could have been caused by an object weighing 100,000 tonnes.

"We've got similar material spread over a very large area. It's difficult to do that with any other mechanism," said co-author Dr Bland.

The Tunguska impact was caused by a space rock some tens of metres across that detonated 5-10km above the ground. The blast flattened some 2,000 sq km of Siberian forest, knocking people to the ground about 60km from the epicentre.

Airbursts on the scale of the Tunguska event are thought to occur every 500-1,000 years on Earth. This figure is based on computer modelling by Dr Bland and his colleagues.

These results are consistent with an analysis of airbursts in the atmosphere gathered by US Department of Defense satellites from the 1960s onwards.

"These events are tricky to spot after they happen. If you go to Tunguska now, you've really got your work cut out trying to find any trace of that event - and that was 1908," Dr Bland told BBC News.

"What makes Luigi and Matthias' work so exciting is that it may give us a way of spotting these events in the geological record. If these spherules are the signature, we know what to look for in future."

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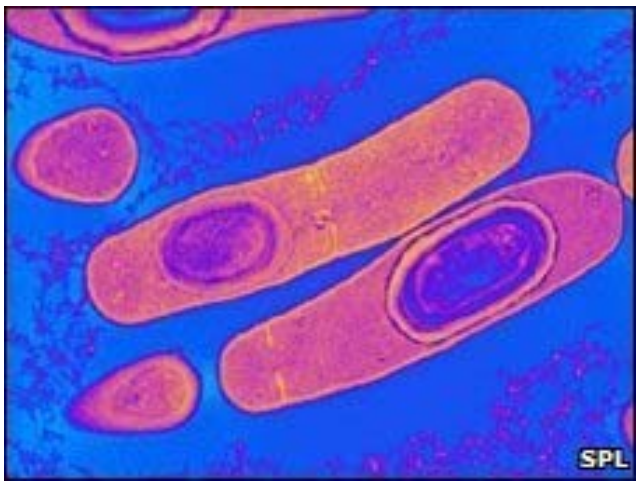
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8547534.stm

Published: 2010/03/03 16:55:21 GMT

Gut microbes hold 'second genome'

By Doreen Walton
Science reporter, BBC News

The human gut holds microbes containing millions of genes, say scientists.



In fact, there are more genes in the flora in the intestinal system than the rest of our bodies. So many that they are being dubbed our "second genome".

A study published in the journal Nature details the analysis of the genes, carried out to better understand how the gut flora is affected by disease.

"Basically, we are a walking bacterial colony," said Professor Jeroen Raes, one of the researchers involved.

"There is a huge diversity. We have about 100 times more microbial genes than human genes in the body. We also have 10 times more bacterial cells in our body than human cells," he told BBC News. Most of the microbes present in our bodies live in the gut.

" **We're basically living in symbiosis with these microbes** "
Professor Jeroen Raes

The study was led by Professor Jun Wang from the Beijing Genomics Institute-Shenzhen.

Scientists from Germany, Brussels, Denmark, Spain, France and the UK also took part in the international effort, named the European MetaHIT consortium, which has been co-ordinated by Dr Stanislav Dusko Ehrlich.

"Everyone was so motivated," said Dr Dusko Ehrlich. "To have such an exciting project to run - it's a piece of cake. The work went much faster than we expected."

Professor Raes, who works at Vrike Universiteit Brussel, explained why the microbes warranted such an intensive study: "Gut flora is crucial for our health. We're basically living in symbiosis with these microbes.

"The bacteria help digest food, provide vitamins, protect us from invading pathogens. If there's a disturbance, people get all sorts of diseases such as Crohn's disease, Ulcerative colitis, and a link has also been made to obesity."

Untangling a mess

The researchers have developed what is called a metagenome, a combined genome of all the bacteria sequenced at once.

"This creates a huge dataset that has to be disentangled," explained Professor Raes. "The untangling of this mess is what I do; it's my role in the study."

The team analysed faecal matter from 124 Europeans and found each person had about 160 bacterial species. The samples were more alike than they had expected and a significant fraction of the bacteria was shared between all the people who took part.

" **We already have very exciting results in terms of differences between healthy and sick people** "
Dr Stanislav Dusko Ehrlich

By mapping the genes, the scientists have found a way around the problem of having to culture bacteria in order to study them.

Many bacteria are very difficult to grow in cultures in the lab. From looking at the genes, the researchers hope to be able to investigate how the flora changes when a person has a disease.

"It will allow us to understand diseases better," said Professor Raes. "We know there is a microbial component but we don't know exactly how [it works]. We will use it for prognostic and diagnostic markers so we can predict disease severity or sensitivity to these diseases."

Dr Dusko Ehrlich said the work was showing promising results: "We have extremely interesting findings based on the results of this gene catalogue. We already have very exciting results in terms of differences between healthy and sick people."

Professor Elaine Holmes from Imperial College, London, who was not involved in the research, said it was a welcome advance on previous studies.

"The article is extremely timely given the escalating interest in the influence of the gut microbiota in many aspects of health ranging from Irritable Bowel Disease, sepsis and obesity to autism," she told BBC News.

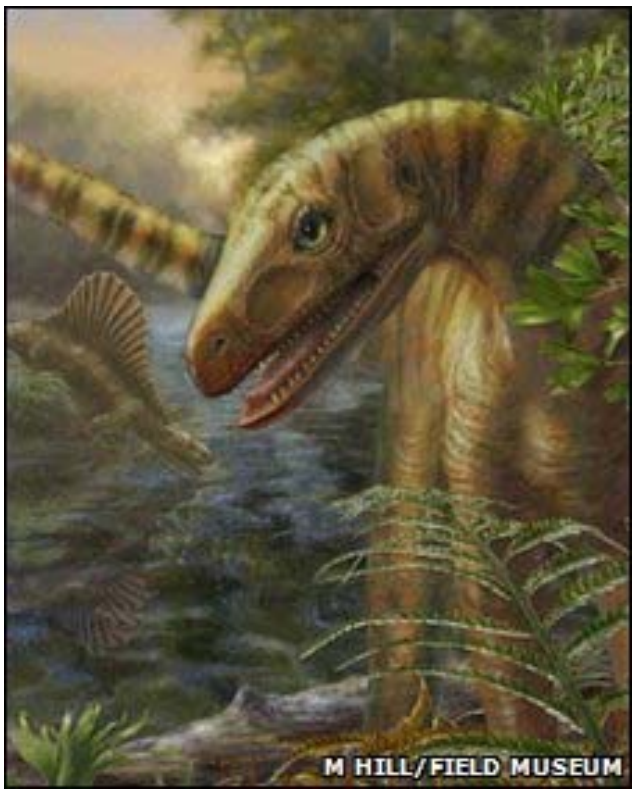
"It uses a large number of participants and therefore one assumes it is more representative of the 'real' microbial composition than previous studies. Also, it is an amazing feat of data processing."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8547454.stm

Published: 2010/03/03 18:06:38 GMT

Dinosaur's oldest relative found
By Victoria Gill
Science reporter, BBC News

Scientists have discovered a dinosaur-like creature 10 million years older than the earliest known dinosaurs.



Asilisaurus kongwe is a newly discovered herbivore that lived during the middle Triassic period - about 245 million years ago.

The scientists say that its age suggests that dinosaurs were also on the Earth earlier than previously thought.

They described their findings in the journal Nature.

The study was led by Dr Sterling Nesbitt from the University of Texas at Austin in the US.

He said: "This new evidence suggests that [dinosaurs] were really only one of several large and distinct groups of animals that exploded in diversity in the Triassic period, including silesaurs [like this one], pterosaurs, and several groups of crocodilian relatives."

Dr Randall Irmis from the Utah Museum of Natural History in the US was also involved in the study. He said that this group of creatures - the silesaurs - were the "closest relative of the dinosaurs".

"It was to dinosaurs much like chimps are to humans - kind of cousins," he told BBC News.

"Since we have one line of the family tree, the other branch must have existed at the same time. So this suggests there are other very early dinosaurs that we haven't found yet."

He also said that the creature was not what the researchers expected an early dinosaur cousin to look like.

"It was a weird little creature," he said. "We always thought the earliest relatives were small, bipedal, carnivorous animals.

"These walked on four legs and had beaks and herbivore-like teeth."

'Failed experiment'

Dr Paul Barrett, a palaeontologist from the Natural History Museum in London said that the finding provided scientists with important information about how dinosaurs evolved.

"The creatures share a lot of features with dinosaurs," he said. "They show us an intermediate step between more primitive reptiles and the more specialised dinosaurs."

The fossil record indicates that this group of primitive creatures went extinct approximately 45 million years after they emerged.

The dinosaurs, on the other hand, were far more successful and walked the Earth for about 165 million years.

Dr Barrett said: "[Silesaurids] were like a failed experiment in how to build a dinosaur."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8547735.stm

Published: 2010/03/04 00:07:53 GMT

Gadget may offer migraine relief

A new hand-held device that delivers a magnetic pulse to the back of the head could become an alternative to drug treatment for people with migraines.

A trial found that 40% of patients were pain free two hours after using the device.

Research showed there were no serious side-effects and patients found the device easy to use at home.

However, doctors say more research is needed to work out the timing of the doses.

Experts from the Albert Einstein College of Medicine in New York carried out the trial to assess the safety and effectiveness of the device.

Previous trials have only involved large, expensive devices which have to be used in a clinic.

Electrical events

The hand-held device emits a single-pulse transcranial magnetic stimulation (sTMS), thought to disrupt the electrical events in the brain which cause the preliminary symptoms of migraines with aura.

" **Migraine and headache are the least publicly funded of all neurological conditions in the UK** "
Wendy Thomas, The Migraine Trust

Auras are sensory or visual disturbances that occur before a migraine headache sets in.

These include visual symptoms such as spots of light and zigzag lines. Other symptoms include tingling, numbness and difficulties with speaking.

Two hundred patients were asked to use the device to treat migraines with aura over three months. Half of those patients were given placebo treatment.

The findings, to be published in The Lancet Neurology, showed that the real magnetic pulse from the device was significantly more effective than placebo treatment. More patients were pain free two, 24 and 48 hours afterwards.

MIGRAINES

They affect about 18% of women and 6% of men in the USA and Western Europe
There are two major forms of migraine - with aura and without aura.
Migraine with aura affects about 20-30% of patients
Migraine with aura is characterised by symptoms which usually precede the onset of a headache

Dr Hans-Christoph Diener, from University Hospital Essen in Germany, said: "The use of sTMS could be a major step forward in the treatment of migraine with aura, particularly in patients in whom presently available drug treatment is ineffective."

Wendy Thomas, chief executive of the Migraine Trust, welcomed the new trials but stressed that more research into migraines would be needed before patients could access the treatment.

"We look forward to hearing the results of further sTMS trials in the future.

"Migraine and headache are the least publicly funded of all neurological conditions in the UK, particularly relative to their economic impact," she said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8547042.stm

Published: 2010/03/04 00:33:34 GMT

Here's to the small print: The past and future of compact literature

From cigarette packet-sized classics to Don Quixote on the iPhone, Jonathan Gibbs charts the past and future of compact literature

Monday, 1 March 2010

Getty Images Europe

Light reading: miniature books displayed at Christie's in 2006 included a 5mm Bible

One of the strange by-products of the digital revolution that we are going through at the moment is that no one seems to know how big anything should be.

Newspapers went through a convulsive readjustment of dimensions a few years back – led, of course, by this one. Computers and televisions seem to want to be as big as possible in terms of screen size, and simultaneously almost non-existent in terms of depth and weight. One of the biggest question marks hanging over Apple's forthcoming iPad – which the publishing industry is hoping will trigger its own "iPod moment" – seems to be that of the weird inbetween-ness of its dimensions, halfway between phone and laptop.

There is one yardstick, though, by which we can judge certain gadgets and artefacts – their suitability for the human hand. The triumph of the iPod, and the iPhone that followed it, seems as much to do with the way it sits in your palm, as with its functionality. This is especially obvious when you consider that, before the iPhone's arrival, the trend for mobile phones had been for them to get smaller and smaller, until it seemed as if they were about to disappear altogether.

In all its lovable holdability, the iPod reaches back to those two other masterpieces of hand-sized design: the cigarette packet and the pack of cards. All three sit in the hand with absolute precision and confidence: not gripped, like a gun or a tennis racket, but held. The pack of cards is still with us (despite online poker and that evil, time-wasting version of solitaire that comes free with every computer operating system), but the fag packet, you would have to guess, is on the way out.

Tank magazine saw the poignancy of this condemned object at the time of the smoking ban and decided to commemorate it with a series of six books designed to fit inside the traditional flip-top cigarette packet, featuring stories from the likes of Kafka, Conrad and Hemingway. Little did anyone know that they would soon look almost like a requiem for the book itself.

The details of the Tank books are spot on, down to the foil wrapping inside and cellophane outside, and their looks, based on classic cigarette brands from around the world – Lucky Strike from the US, Nil from Germany, Sobranie from Russia. As Tank editor-in-chief, Masoud Golsorkhi, points out, cigarette packaging is "an example of gross over-engineering – it lasts much longer than you need it to."

Golsorkhi says that the books were designed partly as a sort of practical joke – "something to put on the table at the end of the meal, and watch the waiter hover nervously."

In fact, for all their visual and tactile beauty, the reading experience they offer doesn't compare especially well with a well-presented piece of text on an iPhone or digital reader. They're fiddly little things, especially if you're holding them in two hands, and only carry about 100 words to the page – about half of what I can get, perfectly legibly, on my iPhone.

In this, though, they are carrying on a long tradition of books that sacrifice readability for size. The first miniature books were religious texts, for those who wanted to keep something uplifting with them at all times. They often came in a locket, so they could be worn on a chain, next to the skin.

The idea of a book to take with you everywhere (in Latin, a *vade mecum*, meaning "go with me") transferred easily from religion to other subject matters, as evidenced by Quotations from Chairman Mao, the only book that can rival the Bible for the title of Most Published Ever. Keeping a copy of that about your person might not save your soul, but, during the Cultural Revolution, it would certainly have saved you a beating, at the very least. Not that it was particularly small: at 8"x6" it was slightly bigger than the average paperback today. Even in its American form – which is when it earned its nickname of "The Little Red Book" – it was about 5¾" tall, well outside the maximum size for a true miniature book, which must be no more than 3" in any dimension.

These days, miniature books are either a curiosity for collectors, or a publishing gimmick – something to pick up at the shop till as an afterthought. The perfect example of this is Paul Wilson's The Little Book of Calm, first published in 1997, which, for all that it bred a thousand execrable parodies, did at least continue the tradition of the spiritual text as *vade mecum*.

In terms of the non-spiritual, Penguin had a big hit with their Penguin 60s – a neat selection of stories and extracts, each edition coming in at a pocket-sized 4¼"x5". The series was later expanded, very profitably, into Great Ideas, Great Loves and Great Just About Everything Else (That's Out of Copyright).

These books are great for shoving in a pocket or handbag, but they're short, and soon finished. It's the great advantage of a digital reader that it can carry so much data, and so conveniently. I keep a small selection of literature apps on my iPhone, just so I know I've always got something to read, whether it's crammed into a tube, waiting in a queue, or sat in the glow of a campfire, when everyone else had gone to bed.

The iTunes store currently has nearly 19,000 books apps listed, most of which are uninspired renderings of out-of-copyright classics, collections of quotes, or bargain basement comics and manga. There is some good stuff mixed in with it, though.

Electric Literature is an American bi-monthly magazine that comes in every conceivable format – paperback, eBook and for the Kindle, Sony Reader and iPhone. The interface is good and, crucially, so is the writing, with contributions so far from such writers as Michael Cunningham (author of *The Hours*) and Lydia Davis. They recently commissioned a rather sweet Twitter story from Rick Moody, "Some

Contemporary Characters", which was tweeted at ten-minute intervals over three days, and can be read again in their forthcoming third issue.

Hip journal McSweeney's, too, has its own app, though much of its content can be found for free on its website. Or try Opium Magazine, which helpfully gives you an estimated reading time for its "quick fixes" (you have to turn on the iPhone's "shake-to-shuffle" feature to move between them), or Scarab, an online-only journal of mostly poetry which neatly presents its pieces both on-screen and as audiofiles. American sites, all of them – if there are British 'zines out there doing the same, I've missed them.

The iPhone is fine for short stories. The swipe of a thumb to turn the page is very cool, and looks even better on the iPad, and there's something pleasantly disorientating about reading something without page numbers, and no sense of when it's going to end. As long as it's short. I won't be reading the version of *Don Quixote* I downloaded for free with a batch of other "classic novels". Not on my iPhone - and not on the iPad. Apple's new toy is simply too big and too heavy (the size and weight of your average hardback novel, though thinner) and its screen is apparently harder on the eye than the Kindle and Sony's "e-ink".

In the end, it is convenience that will decide the future of the book. The publishing industry is fuelled by people who care more about having something to read, when they want and at the price they want, than about books as objects. The small, lightweight book, whether hardback or paperback, has ruled the roost for hundreds of years, above all because it was the right size. When the boffins come up with something that fits the hand as well as a Penguin or a pack of cards, that's when their "iPod moment" will come.

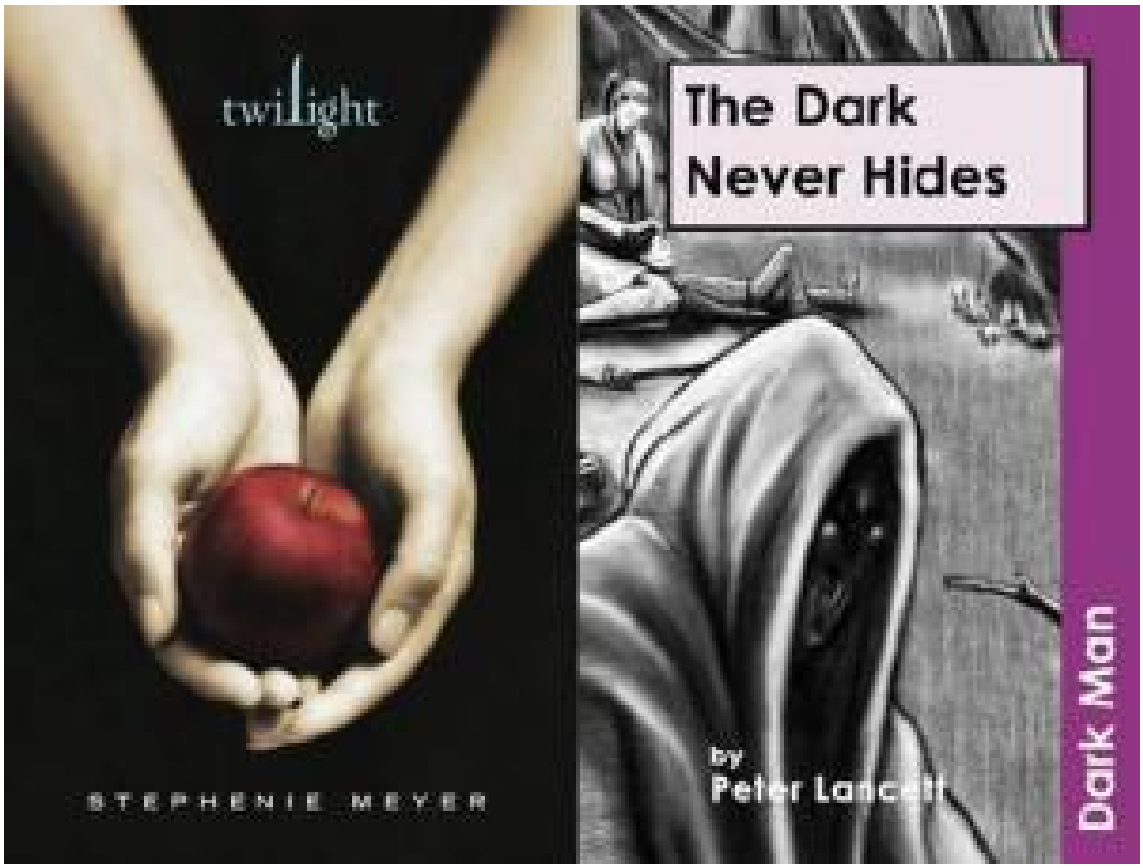
http://www.independent.co.uk/arts-entertainment/books/features/heres-to-the-small-print-the-past-and-future-of-compact-literature-1913501.html

Boys read as much as girls, but prefer the simpler books

At all ages, girls score more highly on reading tests, survey shows

By Richard Garner, Education Editor

Monday, 1 March 2010



Girls are reading Stephanie Meyer's 'Twilight' saga, while boys are turning to Peter Lancett's 'Dark Man' series

First the good news: boys are reading as much as girls. Now the bad: the books they choose are far less challenging and easier to comprehend than those selected by girls, and this gets worse as they grow older.

The findings of a major study of 100,000 children's reading habits coincide with national curriculum test results which show that – at all ages – girls score more highly on reading tests. "Boys are clearly reading nearly as much as girls, a finding that may surprise some onlookers," said Professor Keith Topping, of the University of Dundee's school of education, who headed the study. "But boys are tending to read easier books than girls. The general picture was of girls reading books of a consistently more difficult level than boys in the same year."

The gap in the standard of their reading habits becomes most marked between the ages of 13 and 16, the report says. The favourite girl's book in this age group is Twilight, by Stephanie Meyer, the first in the vampire romance series that has sold 85 million copies worldwide. This was ranked far more difficult to read than the boys' favourite, The Dark Never Hides, from the British novelist Peter Lancett's Dark Man series, illustrated fantasy novels aimed at reluctant teens and young adults struggling to read.

The study notes that both sexes tend to choose books that are easier to read once they reach the age of 11 and transfer to secondary school. Compared with a similar study two years ago, the Harry Potter author JK Rowling has tumbled down the top 10 most popular children's authors, from second to ninth place.

Boys, in particular, chose not to read her books, which are considered more challenging than many other children's titles. "Perhaps the lapse in popularity of the Harry Potter books ... has left boys with few high difficulty books they have the urge to attack," Professor Topping added.

One author to shoot into the top 10 for the first time - at number two - is Roderick Hunt, whose 300 The Magic Key books, following the lives of three children and their dog, Floppy, are used in 80 per cent of British schools to teach people how to read. Roald Dahl still tops the chart.

The report, commissioned by Renaissance Learning, which pioneers online reading tests widely in use in US schools to determine the reading age of children, recommends that teachers should closely monitor the reading habits of their pupils, particularly the boys. "As with adult reading, kids will not always read to the limit of their ability," Professor Topping said. "Even high-achieving readers do not challenge themselves enough as they grow older."

The report recommends an expansion of the school library service, with schools encouraged to stock every book which appears in the top 10 favourites for each age group. The children's reading habits were confirmed by taking online quizzes on the books they had read.

The findings reverse the conclusions of a similar survey two years ago when boys were found to be opting for harder-to-read books than girls.

http://www.independent.co.uk/news/education/education-news/boys-read-as-much-as-girls-but-prefer-the-simpler-books-1913667.html

Warning: Your reality is out of date

Introducing the mesofact

By Samuel Arbesman | February 28, 2010

When people think of knowledge, they generally think of two sorts of facts: facts that don't change, like the height of Mount Everest or the capital of the United States, and facts that fluctuate constantly, like the temperature or the stock market close.

But in between there is a third kind: facts that change slowly. These are facts which we tend to view as fixed, but which shift over the course of a lifetime. For example: What is Earth's population? I remember learning 6 billion, and some of you might even have learned 5 billion. Well, it turns out it's about 6.8 billion.

Or, imagine you are considering relocating to another city. Not recognizing the slow change in the economic fortunes of various metropolitan areas, you immediately dismiss certain cities. For example, Pittsburgh, a city in the core of the historic Rust Belt of the United States, was for a long time considered to be something of a city to avoid. But recently, its economic fortunes have changed, swapping steel mills for technology, with its job growth ranked sixth in the entire United States.

These slow-changing facts are what I term "mesofacts." Mesofacts are the facts that change neither too quickly nor too slowly, that lie in this difficult-to-comprehend middle, or *meso-*, scale. Often, we learn these in school when young and hold onto them, even after they change. For example, if, as a baby boomer, you learned high school chemistry in 1970, and then, as we all are apt to do, did not take care to brush up on your chemistry periodically, you would not realize that there are 12 new elements in the Periodic Table. Over a tenth of the elements have been discovered since you graduated high school! While this might not affect your daily life, it is astonishing and a bit humbling.

For these kinds of facts, the analogy of how to boil a frog is apt: Change the temperature quickly, and the frog jumps out of the pot. But slowly increase the temperature, and the frog doesn't realize that things are getting warmer, until it's been boiled. So, too, is it with humans and how we process information. We recognize rapid change, whether it's as simple as a fast-moving object or living with the knowledge that humans have walked on the moon. But anything short of large-scale rapid change is often ignored. This is the reason we continue to write the wrong year during the first days of January.

Our schools are biased against mesofacts. The arc of our educational system is to be treated as little generalists when children, absorbing bits of knowledge about everything from biology to social studies to geology. But then, as we grow older, we are encouraged to specialize. This might have been useful in decades past, but in our increasingly fast-paced and interdisciplinary world, lacking an even approximate knowledge of our surroundings is unwise.

Updating your mesofacts can change how you think about the world. Do you know the percentage of people in the world who use mobile phones? In 1997, the answer was 4 percent. By 2007, it was nearly 50 percent. The fraction of people who are mobile phone users is the kind of fact you might read in a magazine and quote at a cocktail party. But years later the number you would be quoting would not just be inaccurate, it would be seriously wrong. The difference between a tiny fraction of the world and half the globe is startling, and completely changes our view on global interconnectivity.

Mesofacts can also be fun. Let's focus for a moment on some mesofacts that can be of vital importance if you're a child, or parent of a child: those about dinosaurs. Just a few decades ago, dinosaurs were thought to be cold-blooded, slow-witted lizards that walked with their legs splayed out beside them. Now, scientists think that many dinosaurs were warm-blooded and fast-moving creatures. And they even had feathers! Just a few weeks ago we learned about the color patterns of dinosaurs (stripes! with orange tufts!). These facts might not affect how you live your life, but then again, you're probably not 6 years old. There is another mesofact that is unlikely to affect your daily routine, but might win you a bar bet: the number of planets known outside the solar system. After the first extrasolar planet around an ordinary star made headlines back in 1995, most people stopped paying attention. Well, the number of extrasolar planets is currently over 400. Know this, and the next round won't be on you.

The fact that the world changes rapidly is exciting, but everyone knows about that. There is much change that is neither fast nor momentous, but no less breathtaking.

Samuel Arbesman is a postdoctoral fellow in the Department of Health Care Policy at Harvard Medical School. He is a regular contributor to Ideas. He has started a new website devoted to mesofacts, which can be found at mesofacts.org. ■

http://www.boston.com/bostonglobe/ideas/articles/2010/02/28/warning_your_reality_is_out_of_date/

A room temperature of one's own

Better living through 'personal climates'

By Rebecca Tuhus-Dubrow | February 28, 2010

At work, if there's anything people love to complain about more than the weather outside, it's the weather inside. A friend of mine recently revealed that she sometimes sports a hat, scarf, and coat at her desk, partly to make a point. Another bemoans that in his office, he sweats all winter. Indeed, according to several surveys, the number one complaint about office environments is that it's too cold. Number two: It's too hot. Often, both complaints come from the same building, possibly even from neighbors in adjacent cubicles.

After all, trying to satisfy everyone with a uniform climate is an impossible task; people simply have different thermal preferences. The industry guidelines, resigned to this reality, stipulate that at least 80 percent of building occupants should find the temperature acceptable - a rather modest aim, it would seem, by the standards of most industries.

Temperature is only one of the issues. Since everyone is breathing the same air, infections spread easily. Indoor air can also cause so-called Sick Building Syndrome - itchy skin, dry eyes, headaches. And ailing, uncomfortable employees are unlikely to be working up to their full potential. Problems with indoor environmental quality are estimated to cost the US economy billions of dollars per year in lowered productivity. Despite these flaws, climate control in office buildings consumes an enormous amount of energy, constituting one of the country's major sources of greenhouse gases.

But according to growing number of architects and engineers, there's an ingenious way to address all of these problems at once: provide all a building's occupants with jurisdiction over their own "microclimates." The basic idea is to stream air directly to individual workstations - usually through nozzles on the desks or plenums under the floors - and allow occupants to control the temperature and airflow where they sit. Such systems can enhance comfort, health, and productivity. Recent studies also indicate their potential to save energy, because the building's base temperature can be kept closer to the outside weather, and each unit runs only when the desk is occupied.

"You can bring 100 percent of the people to comfort," says Edward Arens, a professor of architecture at University of California Berkeley and director of the university's Center for the Built Environment. "The other side is the energy savings are really huge."

In the past few years, academics have designed several new models, which are being implemented and tested in real buildings. Researchers at the Center for the Built Environment have developed a prototype, and plans are underway to install the devices at office buildings in San Jose and Alameda, Calif., as well as in the Orinda City Hall. Exhausto, a Danish company, has collaborated with a Danish university to launch a personalized ventilation system, which has been installed in two banks in Denmark. And Syracuse University's new Center of Excellence Headquarters, a building that will be dedicated in March, has workstations with personal environmental control, where researchers will monitor the human response and the energy impact.

A system has been commercially available since the late 1980s, but the units have always been expensive - up to $2,000 each - and some experts say it's difficult to retrofit existing buildings to accommodate them. There is, however, evidence that they are worth the initial costs. In the early 1990s, a study concluded that such a system paid for itself in under two years, thanks to higher productivity. Still, productivity gains are hard to guarantee. Sticker shock, along with the slow pace of change in the building industry, has severely limited adoption so far.

But now, the findings about energy savings will appeal to the growing number of firms aspiring to be green - and the promise of lower electric bills could help justify the costs of installation. What's more, at least one cutting-edge variation is far less expensive than earlier models.

Often, being eco-friendly means sacrificing luxury, and tailoring to individual preferences means consuming more resources. The appeal of personalized ventilation is that it inverts these equations: Enhancing comfort by customization, advocates say, can actually reduce energy use. As research and experimentation continue, the idea may finally start to gain a foothold.

In a culture that relentlessly caters to individual needs, it's a little surprising that personal environmental control isn't already common in workplaces. And the idea has been around for some time. In the late 1980s, Johnson Controls, an American company, developed a system, which is still commercially available. In Johnson Controls' "Personal Environments" modules, air is delivered through desktop control units, and workers can adjust temperature, airflow, and lighting. Over the years, units have been installed in a number of buildings - for example, at the Security Benefit Group in Topeka, Kan., and JohnsonDiversey in Sturtevant, Wis.

Research has shown positive effects of this system on comfort and productivity. A 1992 study conducted by Walter Kroner of Rensselaer Polytechnic Institute examined several hundred workstations with Johnson Controls' modules at the West Bend Mutual Insurance office in Wisconsin. The study found that complaints about temperature disappeared almost entirely. It also credited the modules with a 2.8 percent gain in productivity, and concluded that the system paid for itself in 18 months, through increased productivity alone. (Energy use was not tracked.)

A 1998 study of a Bank of America office in San Francisco with these units likewise documented a high degree of worker satisfaction. Nonetheless, for years, it failed to catch on. Experts attribute the failure to the expense and entrenched practices.

"We have an industry that's all based on the concept of centralized ventilation," says H. Ezzat Khalifa, a professor of engineering at Syracuse University. "Even though [personal environmental control] is without dispute a very good thing in terms of improving people's productivity, people have to weigh the advantages, which are overwhelming, against the costs, which are still high."

New research has focused on the potential for energy savings. In a recent paper, Stefano Schiavon, a postdoctoral scholar at Berkeley's Center for the Built Environment, simulated a hot and humid climate. He found that without appropriate strategies, a personalized ventilation system could actually lead to a surge in energy consumption. But with energy-conscious measures, such as allowing the overall air temperature to rise, the system could reduce energy use in a typical building as much as 51 percent.

Schiavon's colleagues at the center have developed a substantially cheaper alternative. Professor Arens and his team have designed low-tech devices that can be installed at any workstation, without needing to connect to the central ventilation system. The prototype uses fans in hot weather, and heat lamps in cold weather, both extremely low-wattage. (It does not supply fresh air, so it would not reduce the spread of infections.)

Intriguingly, their studies suggest that we can target certain body parts in order to efficiently achieve contentment. In hot weather, cooling the head and hands apparently suffices to make us comfortable. At lower temperatures, as long our hands and feet are warm, we feel fine (within a reasonable range, of course). In a recent experiment, subjects worked at desks in various simulated climates. In the fake Minneapolis winter, each subject had access to a palm warmer, foot warmer, and heated computer mouse. In the pretend Fresno summer, fans cooled the head and hands.

"When you make people comfortable, you just need to target those locations," says Hui Zhang, the paper's lead author.

They allowed the overall "ambient" temperature to drop to 64 degrees Fahrenheit in cold weather, and to rise all the way to 86 degrees in the hot climate. Even at those extremes, subjects were comfortable at their workstations. (Bathrooms and hallways could have their own climate control - or people could endure suboptimal temperatures before returning to the relief of their own desks.) Energy savings ranged from 27 to 44 percent. Arens estimates that if and when these devices are marketed commercially, each unit could cost less than $100.

The notion of personal environmental control sounds fancy, but the basic principle, after all, dates back to the use of the feather fan. Over the last few decades, we have grown accustomed to energy-intensive office climate systems that create a uniform, highly artificial indoor environment. In some of these new systems, the office at large would not be so starkly distinguished from the outdoor weather - you would actually encounter some heat in August, for example. Whether people will accept that remains to be seen. But it's hard to imagine that it would generate more complaints than the status quo.

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http://www.boston.com/bostonglobe/ideas/articles/2010/02/28/a_room_temperature_of_ones_own/

Gilbert Sorrentino's Last Novel

By ROGER BOYLAN
Skip to next paragraph

THE ABYSS OF HUMAN ILLUSION

By Gilbert Sorrentino

151 pp. Coffee House Press. Paper, $14.95

The title of Gilbert Sorrentino's last novel comes from Henry James's story "The Middle Years": "It was the abyss of human illusion that was the real, the tideless deep." Sorrentino, who died in 2006 at the age of 77, was a cleareyed observer of human illusion and the frailties and follies of the species. He was also a very funny writer. When asked in an interview about the apparent contradiction in his work between the hilarity of his style and the bleakness of his subject matter, he said, by way of explanation, "A writer - seizes on a particular aspect of the culture, and I believe that life is basically ridiculous," then went on to gloss this ridiculous quality as being potentially tragic or comic, light or dark, laughter- or sob-provoking, or all of the foregoing, depending on circumstance.

These elements were present throughout his work, and all inform "The Abyss of Human Illusion," his final take on life's absurdity. The book, though short, is a powerful distillation of themes from Sorrentino's earlier work; thematically, it's a logical progression from "A Strange Commonplace" (2006) and "Lunar Follies" (2005), his two previous books, which it resembles in brevity, humor and unorthodox structure. This last was common in Sorrentino's books: "Form not only determines content," he once said, "but form invents content." Accordingly, "The Abyss of Human Illusion," with its 50 set pieces labeled by Roman numerals — the first a mere 130 words long, the last approximately 10 times that — is not so much a novel as a random collection of mini-narratives, some of them variations on previous Sorrentino themes, one a homage to Rimbaud, another a nod to Saul Bellow. They are very entertaining. A lesser writer, or one with less humor, would have allowed himself to wallow in contempt and schadenfreude, and those feelings are certainly present, but Sorrentino, like the great Roman satirists in his ancestry — Juvenal, Suetonius, Martial — has an antic disposition that rises above all that and makes us laugh, not cry:

"He loves a girl, who, as it turns out, does not love him, and so he wastes years of his life trapped in a wretched cliché. This is, as everyone knows, the oldest of news. At the time that he met the unattainable girl, another girl, whom he treated with a distant, friendly formality, tinged with a benign contempt, adored him and would have done anything for him, had he but asked. She was, as they say, 'the girl for him.' This is but more old news."

No one familiar with Sorrentino's work will be surprised at the underlying bitterness in these passages. He was bitter — perhaps "disillusioned" is a better word — because he was a brilliant and original writer who never got the success he deserved, while lesser lights triumphed: more old news. Even his best-known novel, "Mulligan Stew," named one of the best books of 1979 by The New York Times Book Review, has sold to date fewer than 25,000 copies. Sorrentino was a realist about this, as about most things. "It's always been this way and probably always will be," he said. "The novel has somehow been posited for us as a kind of 'mass item,' and if it sells only 1,500 copies is seen as a failure. I don't know if that's even a reasonably intelligent way of thinking."

It's not, and Sorrentino suffered from the consequences of such thinking more than most. His work was hard to sell because it was demanding and original, and because it — and he — were so hard to pigeonhole. An autodidact from Brooklyn, he never earned a college degree, yet made a living as a tenured professor at Stanford for 20 years (and moved back to Brooklyn promptly upon retirement). He was a Brooklynite through and through, as well as a writer of limitless cosmopolitanism.

With his experimental "metafiction" — spoofing literary conventions, leaving sentences dangling, writing an entire novel ("Gold Fools") in the form of questions — he seemed to place himself squarely in the postmodernist camp; but his ear for American, especially New York, speech, and his attention to the spirit of place and compassion for the average loser, all defined him as a kindred spirit of such great American humorists as Mark Twain and Peter De Vries. His true masters, however, were the black-humored Irish, notably Joyce, Beckett and Flann O'Brien. O'Brien's "At Swim-Two-Birds," in which the characters, borrowed from Irish history and legend, rebel against the author, heavily influenced "Mulligan Stew," in which the characters, borrowed from Dashiell Hammett and Scott Fitzgerald, among others, do likewise.

The characters in "The Abyss of Human Illusion" wouldn't have the energy. Life has worn them out. They're mostly interchangeable drunks, failed writers, self-hating cuckolds and preening salesmen who seem to have wandered out of one of Edward Hopper's haunted cityscapes, with fading memories of another, bolder age, one chronicled by Richard Yates, perhaps, or John Updike:

"When he thought of his youth he could scarcely believe that his memories had anything at all to do with the absurd life he was now living, an observation, he knew, that was far from original. Somehow, he had thought that his old age would miraculously produce finer, subtler notions of — what? — life? But he was no better, no cleverer, no more insightful than any shuffling old bastard in the street, absurdly bundled against the slightest breeze."

He's "absurdly" bundled because it isn't the breeze that will get him, it's life itself, and he can't do anything about that. Nor could Sorrentino. Shortly before he finished this book, doctors diagnosed the cancer that would kill him. This depressed him, of course, but above all, recalls his son, Christopher (also a novelist), it bored him: "In a sense," Christopher writes in an afterword that wasn't included in the finished book, "my father believed he was immortal, and when he discovered that he was not, I believe that he grew bored. There was, in his final days, an ineffable sense that came off him not of despair, but of ennui."

Fortunately, none of this ennui settles on the reader of "The Abyss of Human Illusion," in which Sorrentino is frequently hilarious, in a vein more Swiftian than postmodern. His tally of life's achievements comes down heavily on the debit side, but his stock-taking is leavened by pity and humor:

"In his old age, childless and thrice-divorced, with all of his old friends either dead, sick or gone to sunbaked funereal places that were beyond his wish even to imagine them, Arthur began, one day, with no plan to speak of, to tote up, idly, to be sure, his grievances: the slights he'd endured, the insults, the petty humiliations unanswered and unavenged. He listed the unreciprocated kindnesses he'd shown others, the unanswered letters, the snubs, hurts, bad manners revealed, the advantage taken of him by those he had considered friends, or, at the least, not enemies. The project, if it may be given such a name, overwhelmed him, and he began to recover incidents, long forgotten, that he added, painstakingly and precisely, to his cruel catalog. He felt as if driven before a wholly unexpected avalanche."

Actually, he was right about being immortal, as long as we have his work.

Roger Boylan is the author of the novels "Killoyle" and "The Great Pint-Pulling Olympiad."

http://www.nytimes.com/2010/02/28/books/review/Boylan-t.html?nl=books&emc=booksupdateema3

The Comforting Notion of an All-Powerful Enemy

By: Tom Jacobs | March 8, 2010 | 13:00 PM (PDT) |

New research supports the notion that we fixate on enemies, and inflate their power, as a defense mechanism against generalized anxiety.

We have seen the enemy, and he is powerful. That's a recurring motif of contemporary political discourse, as generalized fear mutates for many into a fixation on a ferocious foe.

Partisan rhetoric has turned increasingly alarmist. President Obama has difficulty getting even watered-down legislation passed, yet he is supposedly establishing a socialist state. The Tea Party is viewed as a terrifying new phenomenon, rather than the latest embodiment of a recurring paranoid streak in American politics. Osama bin Laden is likely confined to a cave, but he's perceived as a threat large enough to justify engaging in torture.According to one school of thought, this tendency to exaggerate the strength of our adversaries serves a specific psychological function. It is less scary to place all our fears on a single, strong enemy than to accept the fact our well-being is largely based on factors beyond our control. An enemy, after all, can be defined, analyzed and perhaps even defeated.

The notion that focusing our anger on a purportedly powerful foe helps mitigate our fears was first articulated by cultural anthropologist Ernest Becker in his 1969 book *Angel in Armor*. It has now been confirmed in a timely paper titled "An Existential Function of Enemyship," just published in the *Journal of Personality and Social Psychology*.A research team led by social psychologist Daniel Sullivan of the University of Kansas reports on four studies that suggest people are "motivated to create and/or perpetually maintain clear enemies to avoid psychological confrontations with an even more threatening chaotic environment." When you place their findings in the context of the many threats (economic and otherwise) people face in today's world, the propensity to turn ideological opponents into mighty monsters starts to make sense.

In one of Sullivan's studies, conducted during the 2008 presidential campaign, a group of University of Kansas undergraduates were asked whether they believed enemies of their favored candidate (Obama or

John McCain) were manipulating voting machines in an attempt to steal the election.Prior to considering such conspiracy theories, half were asked to consider the truth of statements such as “I have control over whether I am exposed to a disease,” and “I have control over how my job prospects fare in the economy.” The other half were asked to assess similar statements on relatively unimportant subjects, such as “I have control over how much TV I watch.”

Those who were forced to contemplate their lack of control over significant life events “reported a stronger belief in opponent-led conspiracies,” the researchers report.In another study, the student participants were randomly assigned to read one of two essays. The first stated that the U.S. government is well-equipped to handle the economic downturn, and that crime rates are declining due to improved law enforcement. The second reported the government is not at all competent to cope with the recession, and crime rates are going up in spite of the authorities’ best efforts.

They were then presented with a list of hypothetical events and asked to pick the most likely cause of each: A friend, an enemy, or neither (that is, the event happened randomly).Those “informed” that the government was not in control were more likely to view a personal enemy as responsible for negative events in their lives. In contrast, those told things are running smoothly “seemed to defensively downplay the extent to which enemies negatively influence their lives,” the researchers report.These studies suggest it’s oddly comforting to have someone, or something, you can point to as the source of your sorrows. This helps explain why Americans inevitably find an outside enemy to focus on, be it the Soviets, the Muslims or the Chinese. Given that society pays an obvious price for such illusions, how might we go about reducing the need for “enemyship?”“If you can somehow raise people’s sense that they have control over their lives and negative hazards in the world, their need to ‘enemize’ others should be reduced,” Sullivan said in an e-mail interview. “In our first study, for instance, we showed that people who feel dispositionally high levels of control over their lives did not respond to a reminder of external hazards by attributing more influence to an enemy. Any social structure or implementation that makes people feel more control over their lives should thus generally reduce (though perhaps not completely eliminate) the ‘need’ or tendency to create or attribute more influence to enemy figures.

“In our third study, we showed that if people perceived the broader social system as ordered, they were more likely to respond to a threat to personal control by boosting their faith in the government, rather than by attributing more influence to an enemy. So, again, we see that the need to perceive enemies is reduced when people are made to feel that they are in control of their lives, or that there is a reliable, efficient social order that protects them from the threat of random hazards.“One could imagine, then, that circumstances which allow all citizens to be medically insured, or to have a clear sense of police protection, could reduce the tendency to seek out enemy figures to distill or focalize concerns with random, imminent threats.”Sullivan also offers two more personal potential solutions. “If people have such inherent needs for control and certainty in their lives, they should try to channel those needs as best they can into socially beneficial pursuits,” he says. “Lots of people pursue science, art and religion — just to give a few examples — as means of boiling down uncertainty about the world into clear systems of rules and engagement with reality, creating small domains for themselves in which they can exert a sense of mastery. Insofar as these pursuits don’t harm anyone, but still provide a sense of control, they can reduce the need for enemyship.

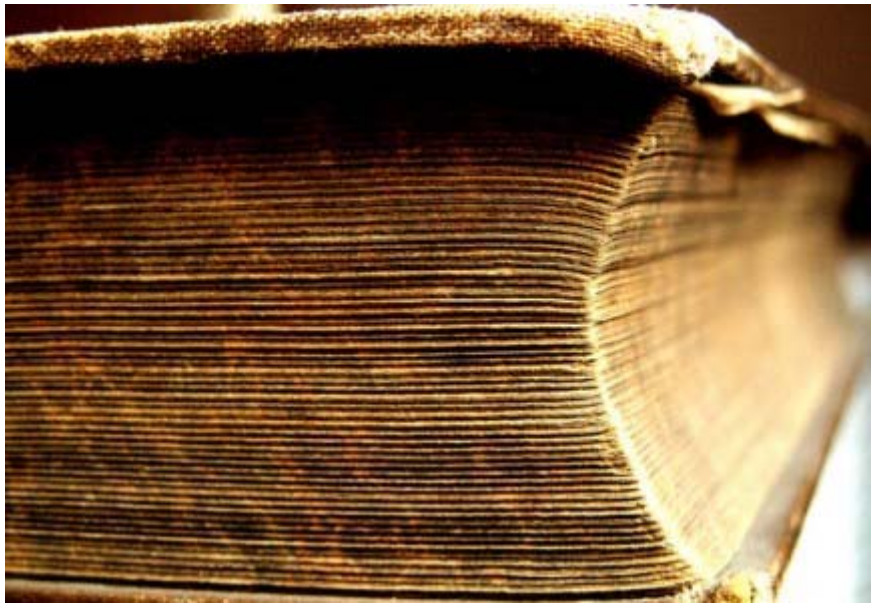
“A final solution would be to encourage people to simply accept uncertainty and lack of control in their lives,” he adds. “Some meaning systems — Taoism for example — are rooted in this idea, that people can eventually accept a certain lack of control and eventually become resigned to this idea to the extent that they no longer react defensively against it.”

So there, at least, is a practical place to begin: Less MSNBC and more meditation.

http://www.miller-mccune.com/politics/the-comforting-notion-of-an-all-powerful-enemy-10429/?utm_source=Newsletter99&utm_medium=email&utm_content=0309&utm_campaign=newsletters

Having a Nose for Degraded Documents

By: Matt Palmquist | March 9, 2010 | 05:00 AM (PDT) |



A scientific 'sniff test' could aid museums and libraries in preserving their old works without damaging the actual documents.Ever wondered why your grandfather's cherished, dog-eared copy of Gibbon's *The Decline and Fall of the Roman Empire* smells like that? Or why the Declaration of Independence retains the unmistakable musk of 1776?

At long last, scientists have developed a "sniff test" to measure the telltale aroma of old books and irreplaceable historical documents. You know the smell — that "combination of grassy notes with a tang of acids and a hint of vanilla over an underlying mustiness," as the authors put it. Inhale and smell the Industrial Revolution!In a recent edition of the American Chemical Society's journal *Analytical Chemistry*, professor Matija Strlic and colleagues describe their development of a method to gauge the degradation of paper pages based on their distinctive smell. The nondestructive technique, called "material degradomics," could aid museums and libraries in preserving their old works without damaging the actual documents, the researchers say.

The smell of an old book, the study asserts, is caused by hundreds of volatile organic compounds that the paper releases into the air over time; those compounds also reveal changes in the paper's condition. Strlic's test was applied to "sniff" 72 historical papers from the 19th and 20th centuries; the documents contain rosin, pine tar and wood fiber, which are the materials that degrade quickest in old books. Binding and other media, including photographs, also contribute to the pace of a book's degradation.

So the next time you pick up that copy of the family Bible, take a whiff of Deuteronomy and smell the volatile organic compounds. You'll be glad you did.

The Cocktail Napkin appears at the back page of each issue of Miller-McCune *magazine, highlighting current research that merits a raised eyebrow or a painful grin.*

http://www.miller-mccune.com/science-environment/having-a-nose-for-degraded-documents-10399/

Something for Everyone

By: Ben Preston | March 8, 2010 | 08:00 AM (PDT) |

With 90 percent of its water diverted for agricultural and urban use, scientists and managers have to get creative about how they go about habitat restoration on the Colorado River.

In the next installment of this series, conservation and restoration efforts on the Mexican side of the International Border will be explored. With less money and less water available, several nongovernmental organizations are busily dedicated to preserving key wetlands in the Colorado River's Delta, as well as restoring riparian habitat along its corridor. In the third and final segment, cooperation between American and Mexican entities will be examined. The Colorado River conservation community is tight-knit, but there are transnational political considerations to be made when working with a natural resource that isn't confined by political boundaries.

Along its 1,450-mile length, the Colorado River crosses some of the wildest and most barren landscapes in North America, weaving through parts of Colorado, Utah, Arizona, Nevada, California, and the Mexican states of Baja California Norte and Sonora before emptying into the Gulf of California. With headwaters in northern Colorado and tributaries throughout its course, the river is fed by snowmelt and the terrific storms, which only occasionally slam the parched American Southwest, dropping thousands of feet in elevation before it snakes across the broad alluvial plain downstream from modern-day Lake Havasu.

Before the dawn of the 20th century, the Lower Colorado could instantly change from a mere trickle after dry summer months into a muddy, raging torrent, carrying tons of sediment from the dry terrain above, after a winter storm. Since that distant time, human progress â€" in the form of several massive dams â€" has put a chokehold on the once mighty river, and what was an unpredictable beast has been tamed into a vital asset to millions of acres of profitable farmland and tens of millions of urban water customers.

The riverâ€™s drastic transformation began during the first half of the last century, starting with the institution of the Colorado River Compact in 1922 â€" a complex agreement between states in the river's water shed dividing its resources: essentially dividing the river into two basins â€" the Upper Basin covering Utah, Wyoming, Colorado and New Mexico, and the Lower Basin encompassing California,

Arizona and Southern Nevada. Based upon an estimated average annual flow of 17.5 million acre-feet per year, each basin received 7.5 million acre feet annually in the Compact, with an extra 1 million thrown in for obstreperous California Compact conference delegates, and 1.5 million acre-feet set aside for Mexico.

Although the average annual flow projection sounded good at the time, it may not have been realistic. Measurements taken at Lee's Ferry, Ariz. â€" the spot arbitrarily selected to take the measurements ensuring the Lower Basin was getting its fair share â€" since 1921 indicate that the average annual flow has steadily decreased over the years as use has been ever on the rise.

Next came the construction of several monumental dams. Hoover Dam â€" which, when it was completed in 1936, was the largest dam and reservoir project in the world â€" was the first big dam erected on the river. Over the next 30 years, two more large dams â€" including Glen Canyon Dam, completed in 1966, standing at a height close to that of Hoover, but with a much greater width â€" and several smaller diversion dams for agricultural operations in Californiaâ€™s Imperial Valley were completed. On the Lower Colorado River, this has meant nearly 58 million acre-feet of water storage capacity and almost 4 million kilowatt hours of electricity production from the hydroelectric turbines included in dam construction.

While harnessing the Colorado's resources has fueled development in the booming Southwest, at the same time putting an end to the damaging floods that once ravaged flat sections of the river's course, as well as putting into existence some of the most magnificent dams ever built by humankind, there has been a cost. Today, nearly every drop of the river's water is spoken for, sometimes above whatâ€™s actually available, leaving little for the once teeming ecosystems along the banks of the river's lower reach.

The Colorado River Delta, once an immense wetland the size of Rhode Island and the most important stopover along the route of migratory waterfowl in North America, has shriveled to a tenth of its original size. Cottonwood, willow and mesquite, which a century ago shaded river banks, have largely disappeared with the water; nonnative, and very hearty, salt cedar has taken their place. Insects, birds and fish that were common are now more difficult to find.But as the dams were built and the waters diverted during the 20th century, the seeds of a greater awareness of the river's resources were planted. The U.S. Bureau of Reclamation, the agency largely responsible for most of the damming and diversion, began to listen to a growing amount of scientific study and popular discontent directed at the dams' environmental impacts.

Many educational institutions, nongovernmental organizations and government agencies on both sides of the international border have a hand in habitat conservation and restoration efforts along the banks of the Colorado River. But the Bureau of Reclamation's Lower Colorado River Multi Species Conservation Program â€" better known in bureaucratic lingo as MSCP (pronounced "em-skeep") and covering a reach of the river stretching nearly 300 miles from the International Border to the upstream edge of Lake Mead â€" is perhaps the largest and best financed effort currently in place.Since its initiation in 2005, MSCP overshadows the spending of any other conservation or restoration program. According to a Congressional Budget Office report, the program will receive approximately $70 million over the next five years alone, with nearly $600 million more over its 50-year lifespan. Its budget includes federal dollars already allocated to the bureau by Congress as well as money from state wildlife management agencies, which cover half of the overall cost. Of the states' portion, California pays 50 percent, and Nevada and Arizona 25 percent each. The Bureau of Reclamation is the program's lead agency, but there are more than 50 entities involved, including university research groups, farm advisory boards and other federal agencies.

Some form of conservation activity has been going on along the river's lower reach since the 1970s, when the Bureau began dredging oxbows lakes â€" long disconnected from the river's main stem â€" to create waterfowl habitat.

But MSCP is the first attempt to find ecological solutions that work within the big-picture context of intense irrigation and urban water supply demands. "Even before the MSCP, we had MSCP-like activity,"

said Terry Murphy, the program's Restoration Group manager based out in Boulder City, Nev., office. "Lots of people divert water from [the Colorado River], so reasonable goals have to be set for wildlife conservation over the next 40 to 50 years."

The programâ€™s stated goal is to preserve 26 species, a list that includes native plants, mammals, birds, fish, reptiles and invertebrates, among the more charismatic animals like the red western bats, southern willow flycatchers and razorback suckers. Conservationists hope the species targeted by the project will be bolstered by 8,132 acres of restored habitat called for in the plan.

"The way I would look at it is advanced mitigation. Basically, this will take care of the potential impacts of continued river operations," said Murphy, highlighting fish augmentation, species research, system monitoring, habitat creation and existing habitat protection as the program's main tenets.

There are 14 conservation areas scattered up and down the Lower Colorado River, and each one is unique. Murphy pointed out when he took this reporter on a tour of some of the project sites near Blythe, Calif., that different places have different needs, based on the topography, water table, wildlife, the people living nearby and myriad other considerations. Most are fed with water from nearby irrigation districts, and depending upon the plants being established, different irrigation techniques are used.

At one such site, the Palo Verde Ecological Reserve, several different methods of growing cottonwood trees are used. The trees are evenly planted in close rows on one plot. On another, cottonwoods, mesquites and willows â€" the main type of tree needed for this type of habitat â€" are planted together to see how they fare among one another. One thing that Murphy's team and its partners have found is that salt cedar tends not to supplant native plants, but fills in after lack of water kills them.

Downriver a few miles, nestled in a bend on the Arizona bank, is the Cibola National Wildlife Refuge. Although owned and operated by the National Fish and Wildlife Service, there are several large plots dedicated to MSCP restoration projects."At this scale, you really have to run this like a business, like a farmer would â€" break it up into manageable chunks and keep it going," said Murphy. He added that forming relationships with farmers and other federal agencies working in the area relieves some of the pressure from his seven-person Boulder City-based staff. The scale of their collective efforts could be seen as he pointed out distant stands of trees at various stages of growth set against a backdrop of jagged brown mountains. They are the result of planting operations that have been going on since before MSCP was instituted.

Several miles back up the river, just outside the impoverished town of Ehrenberg, Ariz., lies a huge tract of federal land owned by the Colorado River Indian Tribes. This land is administered by the federal bureaus of Indian Affairs and Land Management, but the MSCP is working to restore stands of mesquite among the unsightly tangle of salt cedar that has filled in. Not only do residents occasionally use mesquite cuttings for ceremonial purposes, but the salt cedar creates a layer of fluffy detritus that has led to more wildfires.With huge swaths of land staked out for restoration, there is still much for the MSCP to accomplish and many ways for each area to be approached. Once all of these now-barren patches are planted, the project will be able to focus more heavily on making the work that has been finished last.

A big question that pops up when considering the Colorado River water scenario is how all of this affects Mexico, which lies at the end of the river's long course, and is, by treaty, guaranteed 1.5 million acre-feet of water every year to feed the fertile desert farmland and bustling population centers just south of the border."It really doesn't affect their water at all. What was growing alfalfa last year is growing trees this year," said Murphy, explaining that the bureau has to buy its water rights like everyone else. "We like to think that it's more beneficial to the entire river corridor because it provides habitat for all the species that use it."

http://www.miller-mccune.com/science-environment/something-for-everyone-10470/

How Bright is Orion? Take a Look

By: Melinda Burns | March 3, 2010 | 16:42 PM (PDT) |

GLOBE at Night invites the world to measure light pollution.

On a moonless night this month, you can look up at Orion, count the visible stars in the constellation — if there are any — and make a report online for a worldwide survey of light pollution, hosted by the National Optical Astronomy Observatory.

Stargazers of all ages are invited to participate, tonight through March 16, sending their measurements to the GLOBE at Night Web site. Orion will be in the southern sky at 8 p.m. around the world, looking much like an hourglass at arm's length, a couple of fists above the horizon.

Participants in the survey can record their latitude and longitude, then match the brightness of Orion with online charts of stellar magnitude, reporting the brightness or faintness of the stars.

This year is GLOBE at Night's fifth annual citizen-science campaign. Last year, 15,300 observations were sent in from 70 countries, mostly from children in the U.S., Europe and Chile. Twenty percent of the data came from a school district in South Bend, Ind., where students presented their findings to city officials.

"You know how sometimes it's not until you do something that you understand how important it can be?" asked Connie Walker, an astronomer who directs the campaign. "We want to put people in a position where they understand light pollution. They might become more socially conscious about wasted energy and what they can do about it."

GLOBE at Night chose early March for the survey, Walker said, because children everywhere are in school this time of year. Young or old, the survey participants can take one measurement, she said, or send in multiple observations from points at least 0.6 mile apart, on the same night or different nights, between 8 and 10 p.m.

"If you want to make the best use of your time, you can measure the sky above your town as if on a grid map or along the spokes of a wheel," Walker said.

Light pollution is a man-made phenomenon. It is the artificial light from cars, streetlights, parking lots, billboards, stadiums, office buildings and homes that leaks sideways or upward into the night sky, dimming the stars. Light pollution wastes energy and money, disrupts sleep, confuses wildlife and makes it hard for astronomers to study the skies.

"Many urban dwellers have never experienced the wonderment of pristinely dark skies and maybe never will," Walker said.

Walker and her observatory are members of the International Dark Sky Association, a Tucson, Ariz.-based nonprofit group that advocates for federal, state and local regulations to reduce light pollution. Streetlights, for example, can be shielded so that the light points directly downward. Interior lighting in office buildings can be turned off at night or placed on sensors. Outdoor lights at homes can be outfitted with low-wattage bulbs.

According to the observatory, only one out of three Americans can see the Milky Way galaxy arching across the dark night sky. Sky glow from cities dims the stars all over the world. The glow is visible on the horizon in rural areas as far as 200 miles away.

Hundreds of stars are visible in Orion in a magnitude 7 night sky, as might be the case in a national park. At that magnitude, 14,000 stars can be seen across the night sky. By comparison, only two stars are visible in Orion in a magnitude 1 sky, as in New York City. Only 10 stars can be seen across an entire magnitude 1 night sky.

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