Infoteca's E-Journal

An Electronic Compilation of Scientific and Cultural Information by Sistema de Infotecas Centrales, Universidad Autónoma de Coahuila

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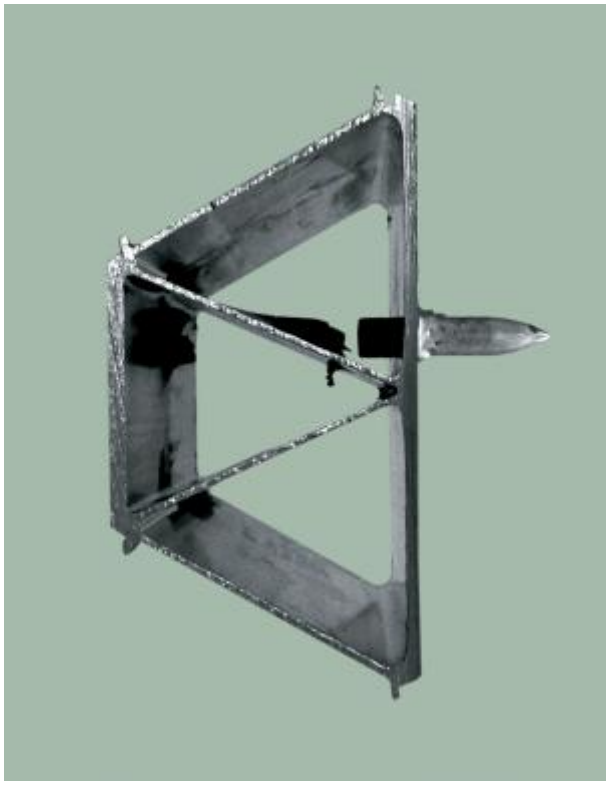
Light Metals Against Bombs And Grenades



The aluminium shape seen from above. The projectile has gone through the outer wall from the left and has passed through two layers of aluminium, but was stopped by the third – even though there was no sand or other substance in the form. (Credit: SIMLab/NTNU)

ScienceDaily (Aug. 18, 2008) — A cheap and simple structure made of aluminium can mean the difference between life and death the day the bombs go off.

A soldier in a war lives a life exposed to danger – both inside the compound fence and on assignment on the outside. If the container he lives in is struck by a direct hit, it can be transformed into a clump of twisted metal in a matter of seconds. If he drives over a land mine, he and his vehicle can be blown sky high.

War is never safe. Nevertheless, it's possible to protect soldiers from at least some of the dangers. Tank steel and armoured concrete provide good protection, but structures made from steel or concrete are quite heavy, and can be difficult to move. Aluminium, on the other hand, is a light product -- in a number of different ways.

One of the Norwegian University of Science and Technology's three Centres for Research-based Innovation is called SIMLab (Structural Impact Laboratory). Here, researchers are working with aluminium structures for protection against impacts, metal-piercing projectiles and explosions from everything from small stones to bombs -- in war or in peace.

"We have developed a light, cheap and flexible solution to protect fences, buildings, ammunition dumps and containers", says the lab's leader, Magnus Langseth.

Stands against most

The solution has grown out of a close co-operative effort between the Norwegian Defence Estates Agency (NDEA), a branch of the Norwegian Defence Ministry, and NTNU. NDEA is responsible for the Norwegian camps and compounds that are involved in international operations, and has over a number of years financed the centre's research on protective structures for both military and civilian use. The structure is made from a type of double panel filled with a heavy substance found on site, such as dirt, sand, gravel or small stones. The panels are pieced together from aluminium shapes that have cavities in them, which are shaped out of internal division walls. These aluminium shapes are easy to produce by extruding them through a kind of mouthpiece that gives them the desired cross-section. They are also easy to move, and are pieced together using a click-together system. A panel is placed in a lifting device and is mounted on a container wall, for example. Afterwards it can be filled from the top with weight, which then can be drained out of the bottom when the panel needs to be unmounted and moved to another area.

Two men can completely secure a container in this manner in the course of a morning.

"These filled aluminium shapes can stand against projectiles and explosives" explains Tore Børvik, who works with NDEA and is an adjunct lecturer at NTNU, with a position at SIMLab.

Survived the test

The system was tested in a full-scale explosion and demonstrated its effectiveness: the panelled container received just minor damage from an explosion that was equivalent to 4 tonnes of TNT detonated from 120 metres away. Without the light metal protection, the container would have been blown to smithereens. But there remain a few details that have to be improved, so the system isn't on the market yet. Nevertheless, a number of NATO countries have already shown interest in it. "We at NTNU aren't in the business of producing these things", Langseth says. "Our job is to develop work tools that product developers need. We make computer models for design, and experiment with alloys, dimensions and construction. The tools for this type of protection need just a little more work before they're ready."

On dangerous roads

Only a few of the vehicles used for peacekeeping forces are protected from land mines. Tank steel is expensive, but first and foremost it's heavy – and many places are inaccessible to a four-wheel drive that's been armoured with tank steel. A vehicle needs lightweight protection. Aluminium is a light metal. But a gravel-filled panel is quite heavy, and isn't suited as either a bottom plate or as a canopy. So SIMLab's researchers are working to develop light plates made from aluminium foam that in time may be used to solve the dilemma.

"This is an extremely complex problem", Langseth emphasises. "When a landmine explodes, the combination of sand and air pressure tosses the vehicle and the driver up in the air. We have to find a method to absorb the pressure, something that is lightweight and doesn't take up much space. We don't yet have the technology, but we're working with the design tools that we have already developed."

SIMLab has now been invited to join an international co-operative effort comprised of the world's leading researchers in mechanics and materials where the theme is protection of vehicles in war zones.

Adapted from materials provided by Norwegian University of Science and Technology, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/08/080813110800.htm

Potential Alzheimer's, Parkinson's Cure Found In Century-old Drug

A century-old drug, methylene blue, has been found to slow cellular aging and enhances mitochondrial function, potentially allowing those with Alzheimer's or Parkinson's to live longer, healthier lives. (Credit: iStockphoto/Silke Dietze)

ScienceDaily (Aug. 18, 2008) — A new study conducted by researchers at Children's Hospital & Research Center Oakland shows that a century-old drug, methylene blue, may be able to slow or even cure Alzheimer's and Parkinson's disease. Used at a very low concentration – about the equivalent of a few raindrops in four Olympic-sized swimming pools of water – the drug slows cellular aging and enhances mitochondrial function, potentially allowing those with the diseases to live longer, healthier lives.

A paper on the methylene blue study, conducted by Hani Atamna, PhD, and a his team at Children's, was published in the March 2008 issue of the Federation of American Societies for Experimental Biology (FASEB) Journal. Dr. Atamna's research found that methylene blue can prevent or slow the decline of mitochondrial function, specifically an important enzyme called complex IV. Because mitochondria are the principal suppliers of energy to all animal and human cells, their healthy function is critical.

"The results are very encouraging," said Dr. Atamna. "We'd eventually like to try to prevent the physical and cognitive decline associated with aging, with a focus on people with Alzheimer's disease. One of the key aspects of Alzheimer's disease is mitochondrial dysfunction, specifically complex IV dysfunction, which methylene blue improves. Our findings indicate that methylene blue, by enhancing mitochondrial function, expands the mitochondrial reserve of the brain. Adequate mitochondrial reserve is essential for preventing age-related disorders such as Alzheimer's disease."

Also impressed is one of Dr. Atamna's co-authors, Bruce Ames, PhD, a senior scientist at Children's and world-renowned expert in nutrition and aging. "What we potentially have is a wonder drug." said Dr. Ames. "To find that such a common and inexpensive drug can be used to increase and prolong the quality of life by treating such serious diseases is truly exciting."

Methylene blue, first discovered in 1891, is now used to treat methemoglobinemia, a blood disorder. But because high concentrations of methylene blue were known to damage the brain, no one thought to experiment with low concentrations. Also, drugs such as methylene blue do not easily reach the brain.

Dr. Atamna's research is the first to show that low concentrations of the drug have the ability to slow cellular aging in cultured cells in the laboratory and in live mice. He believes methylene blue has the potential to become another commonplace low-cost treatment like aspirin, prescribed as a blood thinner for people with heart disorders.

Dr. Atamna's research, funded by the Bruce and Giovanna Ames Foundation, was conducted at Children's research institute and will continue when Dr. Atamna assumes a position as a professor of Neuroscience at The Commonwealth Medical College in Pennsylvania.

Journal reference:

1. Atamna et al. **Methylene blue delays cellular senescence and enhances key mitochondrial biochemical pathways**. *The FASEB Journal*, 2007; 22 (3): 703 DOI: 10.1096/fj.07-9610com

Adapted from materials provided by Children's Hospital & Research Center at Oakland, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/08/080818101335.htm

Energy Storage For Hybrid Vehicles

Prototype of a lithium-polymer accumulator for use in hybrid vehicles. (Credit: Copyright Fraunhofer ISIT)

ScienceDaily (Aug. 18, 2008) — Hybrid technology combines the advantages of combustion engines and electric motors. Scientists are developing high-performance energy storage units, a prerequisite for effective hybrid motors.

The vehicle is powered by petroleum on the freeway and by electricity in town, thus using considerably less energy. A hybrid propulsion system switches over to generator operation when the brakes go on, producing electric current that is temporarily stored in a battery. The electric motor uses this current when starting up. This yields tremendous savings, particularly in urban traffic.

But up to now, hybrid technology has always had a storage problem. Scientists from three Fraunhofer Institutes are developing new storage modules in a project called “Electromobility Fleet Test”.

The pilot project was launched by Volkswagen and Germany’s Federal Ministry for the Environment BMU together with seven other partners. The Fraunhofer Institutes for Silicon Technology ISIT in Itzehoe, Integrated Circuits IIS in Nuremberg, and Integrated Systems and Device Technology IISB in Erlangen will be pooling their expertise for the next three years. The researchers are developing an energy storage module based on lithium-polymer accumulator technology that is suitable for use in vehicles.

“This module has to be able to withstand the harsh environmental conditions it will encounter in a hybrid vehicle, and above all it must guarantee high operational reliability and a long service life,” states ISIT

scientist Dr. Gerold Neumann, who coordinates the Fraunhofer activities. The researchers hope to reach this goal with new electrode materials that are kinder to the environment.

A specially developed battery management system makes the energy storage device more durable and reliable. The experts are also researching into new concepts that will enable large amounts of energy to be stored in a small space. To do this, they integrate mechanical and electrical components in a single module, devising systems for temperature control, performance data registration and high-voltage safety.

The tasks involved are distributed between the three Fraunhofer Institutes according to their skills: The ISIT experts, who have long experience in developing and manufacturing lithium accumulators, are manufacturing the cells. Their colleagues at IIS are responsible for battery management and monitoring. The scientists from IISB are contributing their know-how on power electronics components to configure the accumulator modules. The development and configuration of the new energy storage module is expected to be finished by mid-2010. Volkswagen AG – the industrial partner in this project – will then carry out field trials to test the modules' suitability for everyday use in the vehicles.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2008/08/080814091059.htm

Light Receptors In Eye Play Key Role In Setting Biological Clock, Study Shows

A white albino pet or lab mouse isolated on a white background. (Credit: iStockphoto/Joseph Zellner)

ScienceDaily (Aug. 18, 2008) — Biologists at the University of Virginia have discovered a switching mechanism in the eye that plays a key role in regulating the sleep/wake cycles in mammals.

The new finding demonstrates that light receptor cells in the eye are central to setting the rhythms of the brain's primary timekeeper, the suprachiasmatic nuclei, which regulates activity and rest cycles.

"The finding is significant because it changes our understanding of how light input from the eye can affect activity and sleep patterns," said Susan Doyle, a research scientist at U.Va. and the study's lead investigator.

The finding appears in the current issue of the Proceedings of the National Academy of Sciences.

The U.Va. researchers discovered that they could reverse the "temporal niche" of mice – meaning that the animals' activity phase could be switched from their normal nocturnality, or night activity, to being diurnal, or day active.

The investigators did this by both reducing the intensity of light given to normal mice, and also creating a mutated line of mice with reduced light sensitivity in their eyes, which rendered them fully active in the day but inactive at night, a complete reversal of the normal activity/rest cycles of mice.

"This suggests that we have discovered an additional mechanism for regulating nocturnity and diurnity that is located in the light input pathways of the eye," Doyle said. "The significance of this research for humans is that it could ultimately lead to new treatments for sleep disorders, perhaps even eye drops that would target neural pathways to the brain's central timekeeper."

Biological clocks are the body's complex network of internal oscillators that regulate daily activity/rest cycles and other important aspects of physiology, including body temperature, heart rate and food intake. Besides sleep disorders, research in this field may eventually help treat the negative effects of shift work, aging and jet lag.

About 20 to 25 percent of U.S. workers are shift workers, many of whom have difficulty sleeping during the day when they are not working, and likewise find it hard to stay alert at night while on the job.

An estimated one in six people in the United States suffer from sleep disorders, including insomnia and excessive sleepiness. And as the U.S. population ages, a growing number of people are developing visual impairments that can result in sleep disorders.

"Currently, one in 28 Americans age 40 and over suffer from blindness or low vision, and this number is estimated to double in the next 15 years," Doyle said. "Our discovery of the switching mechanism in the eye has direct relevance with respect to the eventual development of therapies to treat circadian and sleep disorders in the visually impaired."

Doyle conducted her research with colleagues Tomoko Yoshikawa, a visiting scholar from Japan, and Holly Hillson, a U.Va. undergraduate student, in the laboratory of Michael Menaker, a leading researcher in the study of circadian rhythms. The work is funded by the National Institute for Mental Health.

Adapted from materials provided by University of Virginia.

http://www.sciencedaily.com/releases/2008/08/080815140250.htm

Sex (and Love and Death): Woody's World Steams Up

By STEPHEN HOLDEN

When Javier Bardem first notices Rebecca Hall and Scarlett Johansson in Woody Allen's new film, "Vicky Cristina Barcelona," his penetrating gaze is a wolfish one that has seldom been seen in Mr. Allen's screen work. It is not as though his films haven't acknowledged male lust; they are steeped in longing. But that desire is usually camouflaged by layers of shyness and nervous banter. Pretty women like Ms. Hall and Ms. Johansson, who play two Americans vacationing in Barcelona, are to be admired and wooed with smart conversation, but they are not raw meat to be pounced on and devoured.

Mr. Allen's typical alter egos are variations of the neurotic nebbish he has so often played. Brainy, not brawny, they seduce with charm and wit, not physical magnetism. One reason movie critics heaped such lavish praise on his movies during the "Annie Hall" period was that so many of them were fuzzy-haired brainiacs like Mr. Allen, living more in the mind than in the body. Mr. Allen, like his homely Hollywood forerunner Fred Astaire, is a profoundly reassuring role model for male nerds of all ages. Despite his lack of sex appeal, he often gets the girl, and it can even be Julia Roberts.

When in his work have you seen a hookup in which a hunk and a babe make eye contact and fall into ravenous lovemaking? Mr. Allen's disdain for the jock-cheerleader ideal was encapsulated in the famous scene in "Annie Hall" in which his character, Alvy Singer, approaches a golden couple on the street, remarks that they look happy and asks how they account for it. The young woman replies, "I'm very shallow and empty and have nothing of interest to say." Her companion adds, "I'm exactly the same way."

Mr. Bardem has bedroom eyes and is sort of a hunk. In "Vicky Cristina Barcelona," his character, Juan Antonio, a painter, eventually has his way with both Vicky (Ms. Hall), a straitlaced student of Catalan culture who is engaged to a yuppie go-getter, and Cristina (Ms. Johansson), a restless, moody aspiring artist with a talent for photography.

His seductions follow his initial suggestion that the three have sex together, an offer that the prudish Vicky rejects. All that is shown of each encounter is some moderately passionate kissing before the camera retreats. As always in a Woody Allen production, what happens in the bedroom stays in the bedroom.

"Vicky Cristina Barcelona," like many of his films, has antecedents in European cinema. Here the obvious forerunner is François Truffaut's "Jules and Jim," but instead of two men and a woman Mr. Allen gives us three women and a man. Penélope Cruz plays the third woman, Maria Elena, Juan Antonio's volatile ex-wife, a fellow painter who crashes back into his life while he is living with Cristina. Ms. Cruz's spitfire, who suggests both Jeanne Moreau's Catherine in "Jules and Jim" and Marion Cotillard's Édith Piaf in "La Vie en Rose," is casually bisexual. Cristina, Maria Elena and Juan Antonio share an interlude as a ménage à trois.

Maria Elena is also the hot-blooded European version of the dangerous, headstrong women played in earlier Allen films by Judy Davis. The difference between Maria Elena and Ms. Davis's characters in "Husbands and Wives" and "Deconstructing Harry" indicates that Mr. Allen views European sexuality as more advanced and sophisticated than that of uptight America. Where Ms. Davis's women are bitter, frustrated neurotics, Ms. Cruz's Maria Elena, for all her gun-waving craziness, is tempestuous, free-spirited and sexually uninhibited. It is the difference between Joan Crawford and Sophia Loren.

The racing erotic pulse of "Vicky Cristina Barcelona" is an encouraging development for Mr. Allen, who, for all the talk about relationships in his films, views arguing couples more as self-absorbed therapy patients than as lovers. If his dialogue weren't so witty, you'd beg them to shut up.

That view changed decisively in "Match Point," from 2005. There, the illicit lovers played by Jonathan Rhys Meyers and Ms. Johansson were portrayed as hungry young animals in a movie that aspired to be a film noir on the order of "The Postman Always Rings Twice." But as their sculptural lips locked, there was no sign of a passion strong enough to incite murder, because for all his sleek good looks Mr. Rhys Meyers was still a cold fish.

Despite the sensual loosening up of "Vicky Cristina Barcelona," it still follows the romantic pattern of all Mr. Allen's movies. The male protagonist is often older (sometimes a lot older) than the women he pursues. (In real life Mr. Bardem is 39; Ms. Johansson and Ms. Hall are in their 20s.) He clings to the role of teacher and guide, flaunting his wit, erudition and self-deprecating humor. His love interests run to childlike eccentrics who are relatively unthreatening. The young Diane Keaton was a girlish neurotic kook, Mia Farrow a waifish tomboy and Mariel Hemingway, in "Manhattan," a schoolgirl.

Juan Antonio, in addition to having erotic magnetism, is a suave bon vivant and knowledgeable Barcelona tour guide. Most important, he is a serious artist, an exalted status in Mr. Allen's universe that puts him on the same plane as the professors, intellectuals and filmmakers who inhabit his films. Among this elite, lovers lacking intellectual curiosity, the gift of high-culture gab and a post-Freudian vocabulary are no better than peasants. "Vicky Cristina Barcelona" is the first Woody Allen film to infuse this lofty world with serious body heat.

http://www.nytimes.com/2008/08/20/movies/20woody.html?_r=1&th&emc=th&oref=slogin

Indian Modernism via an Eclectic and Elusive Artist

By HOLLAND COTTER

PHILADELPHIA — Word is that contemporary Indian art is the next sensation on the international market. So now's the time to learn something about where it came from, which the nuanced, storytelling show called "Rhythms of India: The Art of Nandalal Bose (1882-1966)" at the Philadelphia Museum of Art helps us to do.

Along with detailed information about one artist's life and times, the show delivers a significant piece of news, or what is still probably news to many people: that modernism wasn't a purely Western product sent out like so many CARE packages to a hungry and waiting world. It was a phenomenon that unfolded everywhere, in different forms, at different speeds, for different reasons, under different pressures, but always under pressure. As cool and above-it-all as modern may sound, it was a response to emergency.

In India the emergency was a bruising colonialism that had become as intolerable to artists as to everyone else. From the official British perspective, India had no living art. Its indigenous traditions were dead, the stuff of museums, and ethnological ones at that. Western classicism was the only classicism; European oil painting was the only worthy medium. Indian artists had to learn it if they wanted careers, but even then their options were limited.

Naturally some people, British and Indian alike, saw things another way. Ernest Binfield Havell, a British teacher and art historian, did. He recognized Indian art as the grand, ancient, still-vibrant phenomenon it was. And as director of the Government School of Art in Calcutta, he encouraged Indian students to bring their own past, transformed, into the present.

This mission really took fire, however, in a social circle gathered around the Tagore family in Calcutta. One of its members, the artist Abanindranath Tagore, taught at the Government School and developed a type of painting based on Indian rather than Western models. His uncle, the writer Rabindranath Tagore, opened an experimental university at Santiniketan in West Bengal. Devoted to the study, preservation and regeneration of native culture, it would be a modernist seedbed.

Into this venturesome environment came a young painter named Nandalal Bose, first as one of Abanindranath's prize students, later as a teacher and director of art at Rabindranath's school. From the

start Bose understood the concepts behind the school: the idea that an aesthetic was also an ethos, that art's role was more than life-enhancing, it was world-shaping.

And he knew that shaping was hard work, the result of accumulating, examining and sorting a wide spectrum of data. He observed and closely emulated Abanindranath's style, which was based on Mughal and Rajput miniatures, and made a success of it. Bose's watercolor and tempura "Sati" (1907), an image of a goddess who set herself on fire to prove her devotion to her husband, Shiva, was quickly adopted as an emblem of a resurgent, self-sacrificial Indian nationalism. (The original version of the painting was lost during World War II; a 1943 copy by Bose is in the show.)

In 1909 he spent months copying fifth-century Buddhist murals in the Buddhist caves at Ajanta . Everywhere he traveled he paid close attention to popular forms, urban and rural, Hindu and Muslim, from woodblock prints to palm-leaf manuscripts, to ephemeral patterns drawn in rice powder directly on the ground. He went to China and Japan to study ink-and-brush painting, and he kept an assimilative eye on trends in the West.

Steadily and quietly, from all of this he forged an art that was both cosmopolitan and distinctively Indian. It was also a body of work that conscientiously refused to settle on a recognizable style, which is why Bose continues to be an elusive presence in the history books and in the rare museum surveys of Indian modernism.

The Philadelphia show, organized by Sonya Rhie Quintanilla of the San Diego Museum of Art, in collaboration with the National Gallery of Modern Art, New Delhi, retains the eclectic texture of Bose's career while laying it out within something like a time-line format.

The first gallery includes early work influenced by Abanindranath's moody, spiritualized miniaturism and by the monumental Ajanta figure type. Later Bose would cook up a highly ornamental version of the Ajanta style in murals done for a private mausoleum called the Kirti Mandir in Baroda. These paintings of scenes from "The Mahabharata" now survive primarily in Bose's full-scale tempera-on-paper studies, which are in the show.

In 1930 he designed a series of linocut illustrations for Rabindranath Tagore's children's book teaching Bengali, and he made a print to commemorate Gandhi's march to the sea that year protesting the British taxation on salt. The print, a portrait of Gandhi, was an instant hit. Cheap to reproduce, it became the most widely circulated image of the leader of the Indian freedom movement.

The two men, who had met at Santiniketan, became friends, political collaborators and spiritual allies, with Bose creating hand-colored posters of Indian village life for three of the Indian National Congress's annual sessions that led up to independence in 1947.

After Gandhi's death Bose continued to teach at Santiniketan; Indira Gandhi and the filmmaker Satyajit Ray were two of his many pupils. In 1951 he retired but kept producing art, mostly Japanese-inspired, ink nature studies that moved toward abstraction, and postcard-size sketches — of friends and students, street scenes and coastal fishing communities, farm animals and flowers — of a kind he had been turning out by the thousands throughout his life.

He spoke of the sketches as a form of seeing. His long-nurtured habit of carrying paper and pens wherever he went suggests a form of yoga. With their formal deftness and avidity of detail, the drawings are his most engaging and personal body of work.

While the almost self-effacing scope of Bose's art can make his career hard to grasp, its effect on 20th-century Indian art has been important, as demonstrated in a small satellite show called "Multiple

Modernities: India, 1905-2005," organized by the art historian Michael W. Meister and the museum's curator of Indian art, Darielle Mason, to accompany the Bose survey.

It ranges from drawings by Rabindranath Tagore, through work by Bose's fellow modernists in Calcutta and Bombay, to pieces by contemporary artists like Atul Dodiya. Mr. Dodiya, who has recently set auction records for new Indian art, is represented here by prints of scenes from the epic "Ramayana" inspired by Bose.

If Bose was ahead of his day, he was also very much of it. Some of his work is now dated. His image of the self-immolating Sati as an ideal of Indian womanhood obviously doesn't work today. Arpita Singh's politically ambiguous 1993 oil painting of a pistol-wielding goddess Durga, or Bhupen Khakhar 's watercolor "goddesses" of uncertain gender are more like it.

But as an example of a polymath artist and teacher who through consistent and diligent generosity put his talent to the service of the life of his time, he is worthy of prolonged and intensive notice. The Philadelphia show, which will travel to India, immerses us, wonderfully, in both that life and that time. And it reminds us that every Museum of Modern Art in the United States and Europe should be required, in the spirit of truth in advertising, to change its name to Museum of Western Modernism until it has earned the right to do otherwise.

"Rhythms of India: The Art of Nandalal Bose (1882-1966)" remains through Sept. 1, and "Multiple Modernities: India, 1905-2005" is on view through Dec. 7 at the Philadelphia Museum of Art, Benjamin Franklin Parkway at 26th Street; (215) 763-8100, philamuseum.org.

http://www.nytimes.com/2008/08/20/arts/design/20bose.html?th=&adxnnl=1&emc=th&adxnnlx=1219244415-WWICYNyrgpVzYnfs5+FE/g

Tolerant Faculty, Intolerant Students

Inspired by David Horowitz and others, legislators in many states have proposed legislation that would insist on annual reports from public colleges on their efforts to promote "intellectual diversity." These efforts — which have attracted considerable attention while not moving very far legislatively — have been opposed by most educators. Faculty groups and presidents tend to fear that the measures could pressure colleges into political quotas on hiring or campus speaking engagements, and that these proposals respond to a problem that doesn't really exist.

The University System of Georgia on Tuesday unveiled an unusual response to this sort of debate. The system — whose member campuses include just about every kind of public college, in both urban and rural locations — released a statewide survey of student views on free speech and discussion at their campuses. The survey was planned in consultation both with faculty groups and with Republican legislators who have previously called for intellectual diversity legislation — thus making it difficult for either those in higher ed or those who like to criticize it to write the study off as politically fixed.

The results suggest that there may well be a problem with lack of tolerance of political views of others. But according to students (the supposed victims of intolerant professors, according to those who say there is no intellectual diversity), the problem isn't professors, but fellow students. Only 47 percent of students reported that they believed other students were tolerant of the political views of all students, as opposed to just those whose views they supported (and of that 47 percent, only 17 percent said this was true to a great degree). About 21 percent of students feel that other students aren't tolerant of the political views of others while the remainder are somewhat in the middle.

Some students characterized the political intolerance as reflecting a particular bias, and here roughly equal proportions saw bias leaning left or right. Among students, 12.9 percent saw an anti-Democratic/anti-liberal bias, while 10.1 percent saw an anti-Republican/anti-conservative bias. (Of the students in the survey, 34 percent identify as Republicans, 34 percent as Democrats, and the rest as independents or other.)

Students had the opportunity to submit written comments with the surveys, and the responses include some that back up the claims of intolerance by being intolerant, along with many thoughtful expressions from a variety of political perspectives. (While names were redacted by the system, crude language wasn't.) "Being a conservative while being in college has given me the chance to be told that I'm wrong by many students. One topic that I feel very passionately about is the right to bear arms, and never have I expressed my opinions on this issue without another student attacking my opinion as though the mere thought of someone with an opposing view was someone worth crushing to wipe away that thought," wrote one student.

Another wrote: "It seems that so many students in my classes are extremely right-wing for either religious reasons or because they're against taxes or because they are following in their parents' footsteps. I feel like being liberal in any way (not solely on the whole) is frowned upon, especially if these liberal opinions on certain topics are not consistent with Christian views (i.e. pro-choice). I've seen students get attacked just because someone thought the person might be a liberal...."

When it comes to professors, the students generally gave better grades when it comes to tolerance.

This finding may be significant because many Georgia students indicated that they don't want to be challenged on their views by their courses. Thirty-one percent of students said it was somewhat or very important to them that instructors not challenge their personal beliefs. (While some had no opinion, 52 percent said that to be exposed to new ideas, they thought it was important to have their beliefs challenged by what they learned.)

Asked about what professors do in the classroom, only 13 percent of students said that they believed professors had presented their own political views in an inappropriate way. A larger percentage — 23 percent — said they had felt that they had to agree with a professor to get a good grade — although the

majority of those students felt this had only happened once in their time in college. Even with these findings, there is evidence that suggests classroom expression isn't necessarily squelched. For example, of those who believed that professors had inappropriately presented their views, 62 percent said that they felt free to argue with the professor. And of those who said they had felt they needed to agree with a professor to get a good grade, only 42 percent said it was because of something the professor said.

Majorities of students also felt free to discuss important topics and religious topics in class, and said that their campuses had a wide range of speakers and student organizations — although most students said that they weren't active in those activities.

Susan Herbst, executive vice chancellor and chief academic officer of the university system, said she was pleased with the overall results of the survey. She said she is bothered by the idea that any student would think politics are linked to grading, but in light of the percentage of students who don't want to be challenged, she said that these figures were not surprising.

While all students should be comfortable in feeling that they are secure and respected, she said that she was hoping "for students to realize that universities are a place to go to feel uncomfortable intellectually." While most students didn't encounter professors grading based on politics, and the minority who said that they had experienced it didn't see it as typical, and the self-reporting was not solid evidence, Herbst said no students should be graded in that way. She noted that in conjunction with the survey, campus grievance policies were reviewed to make sure they were clear and provided open avenues to students.

Throughout her career, she added, she has always found that professors "want to be challenged" by students, and she believes that is the case throughout the system, although some students may not understand that.

The significant conclusion of the study, Herbst said, isn't about professors but students. "The big finding is that we need to do a better job in how we talk to students about how they talk to each other. Students don't seem to have the tools to argue passionately and not hurt each other's feelings," she said. "This is an opportunity for us. This is something we can work on," especially with a campaign season making political debate likely on campuses this fall.

Herbst said that the study was valuable for pointing to that need. But she also said she hoped it would answer complaints from legislators that higher education is engaged in political indoctrination. The study shows, she said, that "we don't have a systemic problem."

While some have argued that higher education should be skeptical of legislators who raise questions about ideological diversity, Herbst said data may be the most effective tool in reaching out to such lawmakers. "We are a state supported institution. Legislators are elected by the public, and we need to be in dialogue with them," she said. "I don't think there's any need to get defensive. There's a need to do empirical work."

And based on that work, Herbst said, the university system would have the basis to oppose legislation in the future to try to dictate intellectual diversity guidelines.

There is evidence that the strategy is working. Bill Hembree is a Republican who is chair of the Higher Education Committee of the Georgia House of Representatives. He has previously been a co-sponsor of intellectual diversity legislation and held hearings and discussions on the topic — and he was consulted on the survey and provided an advance look at the results.

He said he wanted the issue on the table previously because "I had heard from a number of individuals — students, citizens, voters — that they were concerned about what may be happening." Now that he's seen the survey, however, he said he believes that any problems are "isolated" and that the "universities have a way to resolve the problems."

At this point, Hembree said, he would not favor legislation. “I believe that by doing this, the university system said: ‘We don’t need a new law. We can deal with it.’ It’s shown me as a legislator that they are willing to step up.”

The process is also being praised by faculty leaders. Hugh D. Hudson, chair of history at Georgia State University and executive secretary of the Georgia Conference of the American Association of University Professors, was also in on planning the survey.

He said that he was struck that while some students “have a difficult time dealing with conflicting opinions,” he thinks the overall results suggest a system where professors are open to discussion, and where most students speak freely in class. At the same time, he said that the university system was defending the idea that faculty members “should offered reasoned interpretation and challenge students, and that it’s impossible for every idea — including the idea that the world is flat — to be treated by professors as a legitimate interpretation.”

Hudson said he hoped the survey would shift the political debate away from accusations about higher ed being dominated by professors trying to impose a political agenda. But he still expects complaints from some. “It’s good to have data and reasonable people will see what the data say — that there is no problem,” he said. “But people with a political agenda don’t care about data in the first place.”

— Scott Jaschik

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/08/20/georgia.

Wild dolphins tail-walk on water

By Richard Black
Environment correspondent, BBC News website

A wild dolphin is apparently teaching other members of her group to walk on their tails, a behaviour usually seen only after training in captivity.

The tail-walking group lives along the south Australian coast near Adelaide.

One of them spent a short time after illness in a dolphinarium 20 years ago and may have picked up the trick there.

Scientists studying the group say tail-walk tuition has not been seen before, and suggest the habit may emerge as a form of "culture" among this group.

"We can't for the life of us work out why they do it," said Mike Bossley from the Whale and Dolphin Conservation Society (WDCS), one of the scientists who have been monitoring the group on the Port River estuary.

"We're doing systematic observations now to determine if there's something that may trigger it, but so far we haven't found anything," he told BBC News.

Rich culture

In the 1980s, Billie, one of the females in the group, spent a few weeks in a local dolphinarium recovering from malnutrition and sickness, a consequence of having been trapped in a marina lock.

> **It would seem that among the Port River dolphins we may have an incipient tail-walking culture**
> Mike Bossley

She received no training there, but may have seen others tail-walking.

Now, other females in the group have picked up the habit. It is seen rarely in the wild, and the obvious inference is that they have learned it from Billie.

"This indicates that they do learn from each other, which is not a surprise really, but it does also seem that they exhibit elements of what in humans we would call 'cultural' behaviour," said Dr Bossley.

"These are things that groups develop and are passed between individuals and that come to define those groups, such as language or dancing; and it would seem that among the Port River dolphins we may have an incipient tail-walking culture."

The "cultural" transmission of ideas and skills has been documented in apes, while dolphins off the coast of Western Australia are known to teach their young to use sponges as an aid when gathering food.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7570097.stm

Published: 2008/08/19 11:57:07 GMT

Back pain eased by good posture

Long-term back pain can be relieved through encouraging sufferers to adopt good posture through the Alexander technique, say UK researchers.

The technique teaches patients how to sit, stand and walk in a way that relieves pain by focusing on their coordination and posture.

Until now there had been little evidence of the therapy's long term effectiveness.

The latest work is published in the British Medical Journal.

Please turn on JavaScript. Media requires JavaScript to play.

Diana Maclellan gives Jane Hill a lesson in posture

About half the UK population suffers from back pain during a year with up to 15% going on to have chronic problems.

It is the second biggest cause of sick leave, accounting for five million lost working days a year.

The trial was funded by the Medical Research Council and the NHS Research and Development fund.

Longer-term relief

Researchers from Bristol and Southampton universities used a combination of normal GP care, massage and Alexander technique lessons on 463 patients over the course of a year.

They found that by the end, the Alexander patients suffered just three days back pain a month.

This compared to 21 days for those receiving GP care, which tended to include regular consultations, pain killers and exercise regimes for some, and 14 for those who had massages.

The Alexander patients were split into two - one group received 24 lessons and one six.

Those who had 24 lessons were suffering just three days pain, compared to 11 for the other group.

It may not be effective for everyone
Dries Hettinga, researcher manager for Back Care

Lead researcher Professor Debbie Sharp said using the Alexander technique should provide help to most people with back pain.

She added: "Lessons in the Alexander technique offer an individualised approach to develop skills that help people recognise, understand, and avoid poor habits affecting postural tone and neuromuscular coordination.

"It can potentially reduce back pain by limiting muscle spasm, strengthening postural muscles, improving coordination and flexibility, and decompressing the spine."

Dries Hettinga, researcher manager for Back Care, a charity which offers support and advice to people with back pain, said: "There is little evidence available about the effectiveness of the Alexander technique so this research is welcome.

"The Alexander technique is something we do recommend and the feedback we have got is good.

"But I would say that it may not be effective for everyone. Back pain is different for each person and you often need a combination of things to help relieve it."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7568948.stm

Published: 2008/08/19 23:56:12 GMT

US to back 21st century learning

By Maggie Shiels
Technology reporter, BBC News Website, Silicon Valley

The US Congress has given the go-ahead for a new centre to explore ways advanced computer and communications technologies can improve learning.

The National Center for Research in Advanced Information and Digital Technologies will focus on "bringing education into the 21st century."

Supporters said classrooms have failed to keep up with technology innovations.

"America's reputation as an international leader rests in the hands of our youth," said Sen. Chris Dodd.

"It should be among our top priorities to provide our students with the tools they need to maintain and build upon this standing."

The Senator was one of the original sponsors of a bill that proposed the setting up of the centre. Meanwhile Congressman John Yarmuth of Kentucky spearheaded the passage of the bill through the House and said its timing could not be more critical.

"American businesses know that they need a well-educated workforce to face growing competition from China, India and Europe."

The Federation of American Scientists said, "The creativity that developed extraordinary new information technologies has not focused on finding ways to make learning more compelling, more personal and more productive in our nation's schools.

"People assumed that the explosion of innovation in information tools in business and service industries would automatically move into classrooms."

That, the Federation said, has simply not happened.

The centre will support a 'first of its kind' comprehensive research and development programme aimed at improving all levels of learning from kindergarten to university and from government training to college.

Missed opportunity

"Education is falling further and further behind the rest of the economy and we have to rethink our basic approach to helping people learn," said Henry Kelly, the Federation's president.

The FAS said that learning scientists and educators have known for years that people learn faster if education can be personalised and if students are motivated by seeing how their knowledge can help them solve problems they care about.

Mr Kelly told the BBC that the new technologies the business world and the commercial world use everyday can help "deliver on this promise" but have so far failed to do so because the "vexing demands of educational software has not been economically viable."

"Today's generation is very comfortable with using tools like iPods and computers and gaming, but when they go into the classroom none of that is there and there is this sense of an opportunity we are just not grasping," explained Mr Kelly.

He said the centre will concentrate on understanding how to use technology to help everyone learn in a more effective and interesting way that makes that knowledge stick.

The centre will award grants for research on a series of questions it will pose ranging from the "low hanging fruit variety" to deeper issues.

These include questions like taking technology that works well in an industry setting to the classroom and measuring its effectiveness.

At the other end of the spectrum, Mr. Kelly posed the question, "If you could teach someone without limits or resources, how would you go about it and how would you measure it?

"It's the kind of thing learning science people dared not think about because it seemed too expensive to tackle."

That should all now change, he said.

Some $50m (£27m) has been earmarked for the centre, which it is hoped will be up and running in a year's time.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7569484.stm

Published: 2008/08/19 07:51:13 GMT

Equal Start, Less Equal Progress in Social Sciences

Women could be poised to assume "equal footing" in the social sciences, and are starting their academic careers at levels of equity with men, a new report finds. But at the same time, gaps in progress appear for women within 10 years of earning their Ph.D.'s — and women in the social sciences differ significantly from men in terms of the impact of work/family balance, the report finds.

"Finally Equal Footing for Women in Social Science Careers?," by the University of Washington Center for Innovation and Research in Graduate Education, is based on data from "Social Science Ph.D.'s Five+ Years Out," as well as from the Survey of Earned Doctorates. For purposes of the study, the disciplines covered were anthropology, communication, geography, history, political science and sociology. Economics, which was not included, generally has smaller proportions of women than do other social science fields.

Many disciplinary organizations have been analyzing the status of women in their fields, and this latest report is an attempt to broaden the discussion by looking at a group of disciplines together — and in particular to examine disciplines that have seen huge changes in the last generation in terms of gender participation. In 2005, women earned 45 percent of the Ph.D.'s awarded in the social sciences fields studied, up from 27 percent in 1980 and 10 percent in 1966. With women now a majority of new doctorates in fields such as anthropology, the report attempts to see how they are progressing in their careers.

Generally, the evidence is very positive for women — as their careers start. Women are slightly more likely than men to have their first jobs on the tenure track (42 percent vs. 40 percent) and slightly less likely than men to have faculty jobs off the tenure track (26 percent vs. 28 percent). But these figures reverse themselves 6 to 10 years after a Ph.D., at which point men are more likely to have tenure or jobs outside of academe (generally with higher salaries than those for professors) and women are more likely to have jobs off the tenure track.

Employment Status by Gender 6-10 Years After Ph.D. in Social Sciences

Job Status	Women	Men
Tenured	30%	33%
Tenure-track, but not tenured	32%	32%
Non-tenure track	13%	9%
Other academic	8%	6%
Business, government or nonprofit	17%	20%

While not answering definitively why this gap appears, the report notes significant differences for men and women in marriage (or partnerships) and family life.

Men are more likely to be married 6-10 years out (79 percent to 71 percent). But the more significant difference may be who male and female social scientists marry. Women still "marry up," the report says, noting that women in the survey are much more likely to be married to fellow Ph.D.'s while men are more likely to be married to people with less education than they have.

Just this week, a Stanford University study noted that academic woman at top research universities are more likely than their male counterparts to be married to fellow academics — and noted that this makes their career advancement in academe more difficult as they need to navigate dual-career issues. The study on the social sciences suggests that this situation extends well beyond the top universities examined by Stanford.

Educational Attainment of Partners of Social Science Ph.D.'s

	Women	Men
Partner has Ph.D.	34%	17%
Partner has other doctoral degree (M.D., J.D. etc.)	10%	7%
Partner has master's degree	27%	35%
P		

Perhaps not surprisingly, in light of those statistics, women in the social sciences are more likely than men to report that they changed jobs because their partner needed to move for professional reasons.

About three-fourths of the social scientists studied — men and women alike — said that they wanted to be parents. But 6 to 10 years out, men were more likely (66 percent to 61 percent) to have become parents. And of those who wanted to become parents, half of all women had delayed parenthood for career-related reasons — more than twice the figure for men.

The study was prepared by Elizabeth Rudd, Emory Morrison, Joseph Picciano and Maresi Nerad. In an interview Wednesday, Rudd said that the question of "equal footing" still hadn't been answered. She said that, if Ph.D. production continues with equal numbers of men and women, some of the gaps in job experience and personal choices may also change. But that clearly hasn't happened yet, said Rudd, a research scientist at the University of Washington.

New equity measures may be needed, she said. When men and women are equally likely to delay childbirth or in other family/work balance issues, she said, "that will be an important indicator."

— Scott Jaschik

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/08/21/socsci.

Understanding 'Guyland'

Leaders of colleges for traditional-age students spend a lot of time worrying about the behavior of male undergraduates — and specifically the misbehavior of many through excessive drinking, hazing, and abusive behavior toward women. A leading sociologist and gender scholar, Michael Kimmel, has just published a new book that offers an inside look at this young male culture, *Guyland: The Perilous World Where Boys Become Men* (HarperCollins). The book covers male development from ages 16 through 26, and features extensive discussion of campus life. Kimmel responded via e-mail to questions about his work.

Q: As colleges welcome a new crop of freshmen, what should they be aware of about their new male students that perhaps they aren't aware of now?

A: What I call "Guyland" is both a developmental stage and a social space. Young adults, age 16-26, are taking about a decade longer to complete the transition to adulthood than did their parents and especially their grandparents. 30 is really the new 20. Guyland is also the world that young people — male and female — inhabit. After growing up with helicopter parents micromanaging every nanosecond, they enter a world in which colleges have backed away from the old "in loco parentis" model, so that young people increasingly define themselves through media images and peer groups. And on campus, guys rule.

Q: Many colleges are worried that their first-year classes are increasingly female. How do the trends in your book relate to this trend? What kind of behaviors will being a distinct minority on campus encourage in men?

A: It's not only numbers: young women are coming to campus with better grades, more honors, and seem more directed and motivated than many young men. Women's equality has been confusing to many men, and some become defensive and angry about it. A friend titled her book about sports *The Stronger Women Get, the More Men Love Football.* The "Guy Code" to which men are pressured to conform, is defiantly anti-PC, dismissively anti-intellectual, and derisively sexist. "Bros Before Hos" is the motto of Guyland.

On the other hand, we can't forget that women's equality on campus has many salutary effects: cross sex friendships; guys' assumption that their wives and partners will work and be committed to their careers; an increased interest in fatherhood.

Q: What are the key ways you noticed that white male students different from male students of other races and ethnicities?

A: Guyland saturates campus social life at pretty much every campus I've visited. There are some differences among campuses (large and small, public and private, elite and mass). On just about every campus, though, Guyland is largely a white thing. For example, in our survey of hooking up (more than 13,000 undergrads at 17 campuses), it was white students who did the majority of hooking up. While everywhere, Asian students followed more traditional dating scripts, for black students it depended on their numbers on campus. On overwhelmingly white campuses, they hooked up little, in part because there were so few of them, and in part because if the black men hooked up a lot with white women, their black friends would be extremely disapproving. On racially diverse campuses, or historically black colleges, black students hooked up far more often, but still not as much as white students. (That's equally true of binge drinking and hazing.)

Q: You talk about the codes that promote and protect binge drinking and hazing. Is there anything colleges can do about these problems?

A: I think most colleges and universities are keenly aware of these problems and are sincerely trying to develop strategies. There are many obstacles: angry alumni who block efforts to reform campus culture; the need to attract male students with sports and parties; the yawning disconnect between academic life and student life, and many others. Expanded first-year orientation, first year experience programs, and

stricter controls are only a start. Campuses and the local communities must identify what the issues are, and collectively begin to talk about these issues.

I'm inspired by three examples:

(1) Fraternities that have eliminated hazing and even pledging, who dare to believe that a brotherhood cemented by torture is more like Guantanamo than Georgia Tech.

(2) University administrators like John Wiley, chancellor at University of Wisconsin at Madison, who has implemented a new alcohol policy that includes intervention;

(3) Education-based programs like social norms research, that enable students to monitor their own behaviors relative to other students.

Q: While campuses are known to promote (officially) progressive values about the mutual respect of male and female students, your chapters on gender relations/sex/pornography paint a very different picture of male college students. What do you make of your findings on gender relations? Will guys just be guys, or is something seriously wrong?

A: I find the notion that we should do nothing because, as you put it "guys will be guys" to be a case of premature resignation. As if guys are biologically programmed to be rapacious predatory beasts. I think that's "male bashing" – and sets the bar far too low. I believe that guys can be men – ethical, responsible, and resilient in the face of the pressure to either conform to Guyland, or, at least, be bystanders who look the other way (and enable the few actual perpetrators). Guys need our support to stand up and do the right thing.

— Scott Jaschik

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/08/21/guyland.

How bestsellers chart the state of nations

What people are reading can tell you quite a lot about where they're reading it
August 21, 2008 1:06 PM

There are worse ways of finding out about a country than looking at its book charts. For instance, strange as it may seem, Takiji Kobayashi's Marxism-inspired Kani Kosen is a bestseller in Japan at the moment, 79 years after it was first published. But given the currently bleak economic climate in the country, you can see why a story about the struggles of poor labourers might be appealing reading.Looking at the UK book market, meanwhile, is a good way to obliterate any idea of the Brits being sophisticated, stiff-upper-lip types. For one, it appears we're completely incapable of thinking for ourselves and making any decisions without Richard and Judy telling us to - two-thirds of the bestselling fiction titles of the year thus far are written by authors who've appeared on the daytime duo's sofa. We follow the trends of the US (see Stephenie Meyer, Kim Edwards, James Patterson, William Young et al). We're obsessed with reading "real life" tales of other people's misery (financial rather than economic at the moment, but check the charts again next year). And, for everyone else, there's those books "written" (ahem) by people off the telly.

In America, it seems, you've really got to be cultivating your "spiritual" side. Oprah Winfrey, for instance, wants you to buy Eckhart Tolle's A New Earth: Awakening to Your Life's Purpose. And, based on sales, more than three million Americans are duly awakening. Meanwhile, William Young's self-published religious novel, The Shack, has sold almost a million copies this year, while pastors and preachers like Rick Warren, Joel Osteen, Joyce Meyer and Lee Strobel have all sold comfortably into five figures. Elizabeth Gilbert's memoir Eat, Pray Love has also done incredibly well publication - it has "pray" in the title - and for those not wanting to commit themselves to one religion, there's always Rhonda Byrne's The Secret.
What can be said of the Irish is that they are a patriotic bunch, with the likes of Ireland-born Cathy Kelly, Maeve Binchy, Sheila O'Flanagan and Marian Keyes never straying too far from the bestseller lists.

Melbourne has just been named as the Unesco City of Literature, but I'd be very nervous about using the phrase "literature" to describe what's on the Australian bestseller charts. They just can't get enough of their Mills & Boon, and love Nora Roberts almost as much as the Americans do. It seems the Australian public are a romantic bunch, and with Shane Warne's exploits with the ladies much publicised in the UK tabloids, there's evidence to support it.Meanwhile, although South African unemployment rates are falling, there's still hundreds of people after some cheap financial advice, choosing Rich Dad, Poor Dad by Robert T Kiyosaki with alarming regularity.

In France, highbrow literary fiction cracks the top 10 on a regular basis, Marc Levy in particular. Although many a thought-provoker may have occupied non-fiction bestseller lists earlier this year, the French currently can't get enough of collections of old-school brain teasers and assorted tests, while the current popularity of the book General Culture for Dummies suggests the stereotype of the French as an enlightened bunch may just be a ruse.

In Germany, there's little room for celebrities or light-hearted works, with philosophical tomes Wer bin Ich? and Ein Mann - Ein Buch selling well. But the biggest success story this year is Feuchtgebiete, which has topped the fiction charts since March and is incredibly graphic. The novel was the talk of the London Book Fair earlier this year, and UK rights were eventually snapped up by Fourth Estate after a fierce bidding war.

I'm not sure you'll want to know what Feuchtgebiete means, or indeed what it reveals about Germany.

http://blogs.guardian.co.uk:80/books/2008/08/how_bestsellers_chart_the_stat.html

Oh So Quiet

By HOLLAND COTTER

BEACON, N.Y. — Favorite sounds: Mafalda Favero singing “The Last Rose of Summer,” New York City at night, geese overhead, Joe’s voice, the cat’s purr, silence. Silence is the tough one, all but impossible to find. John Cage said it didn’t exist, not in this world, and illustrated the point in his famous composition “4’33,” ” first performed in 1952.

A musician with a stopwatch comes on stage, sits at a piano, more or less motionless, for 4 minutes 33 seconds, raising and lowering the keyboard cover to signal the beginning and end of movements.

Instead of music, or not-of-this-world silence, the audience hears itself: coughing, jangling, whispering, tittering and eventually, depending on the general mood, erupting into boos or applause. As scored by Cage, silence is the sound of life as we live it in real time. We just never stopped to listen before.

A filmed variation on Cage’s score is playing this summer at Dia:Beacon; it’s well worth spending time with. It’s one of two Dia installations that, in very different ways, quietly commemorate artists now gone whose names have a magic ring to contemporary ears.

The Cage piece is by the British artist Tacita Dean, and is loquaciously titled “Merce Cunningham performs Stillness (in three movements) to John Cage’s composition 4’33” with Trevor Carlson, New York City, 28 April 2007 (six Performances; six films).”

The six projected films run simultaneously in Dia’s wide, cryptlike basement gallery, and Mr. Cunningham, now almost 90, appears in all of them. A radical sovereign of American dance, he was Cage’s lover and creative collaborator for nearly half a century, until the composer’s death in 1992. Their collaboration continues here.

In all six films Mr. Cunningham, wearing sneakers and a lavender shirt, sits in a chair in a rehearsal studio against a smudgy wall-length mirror. He is shot from a different angle and distance in each: face front and close up, full length from the left side, and so on.

He is partnered by another performer, Trevor Carlson, who stands, sometimes in camera range, sometimes not, with a stopwatch. Periodically, he holds up a hand to mark the movements in the score. At each signal Mr. Cunningham changes position. He turns slightly, adjusts his weight, rests his head on a hand, resettles himself. The films are silent except for the recorded ambient noise picked up during the filming — Manhattan traffic, the squeak of the chair, maybe a sigh — and the whirr of projectors and whatever contributions viewers at Dia may add. But in this performance of "4'33" " the emphasis is as much on the movement packed into stasis as on the sound in silence.

Along with Mr. Cunningham's timed shifts of position there are countless chance actions: the twitch of his eyelid, the rise and fall of his chest as he breathes, now a little faster, now more slowly, the flickering shadow cast by the ghostly Mr. Carlson. We are pulled into the performance because our perceptions stay unstable. Are we looking at one performance filmed from six angles, or six separate performances, adding up to one long one? (It's six adding up to one.) Which movement of Mr. Cunningham's version of Cage are we seeing at any given time? Where and when does Ms. Dean's piece, with its staggered comings and goings of images, begin or end?

It ends, of course, when you shut off the projectors and turn on the lights. But even then at least one part of it, sound — random and ambient — continues, after we leave the gallery and after Dia locks up for the night. (The work previously installed in the same basement gallery was Bruce Nauman's surveillance video of "after hours" activity of cats and mice in his studio.)

Mr. Cunningham's choreography has always had an existential dimension. "Stillness" is about duration and change, which are the same thing and are also the substance of life and history. Ms. Dean's film of Mr. Cunningham's performance is about the sound and motion of history in action: the personal history of one man's fidelity to the memory of another; the cultural history of a living artist transmitting and rejuvenating the creative essence of one who has died; the contemporary history of a younger artist preserving and honoring all this, and the two men (the piece is above all a portrait of Mr. Cunningham) in her art.

The second homage on view at Dia:Beacon takes the form of an installation of two dozen large abstract paintings titled "24 Farben — für Blinky" ("24 Colors — for Blinky"), 1977, by the German artist Imi Knoebel.

Mr. Knoebel and the artist known as Blinky Palermo studied with Joseph Beuys in the late 1960s in Düsseldorf. Both were interested in abstract art, and they became close friends. Palermo — his original name was Peter Schwarze — lived in the United States from 1973 to 1976, and once back in Europe he produced a group of 40 paintings that he titled "To the People of New York City."

Roughly the size of album covers, done in bands of red, yellow and black, the colors of the German flag, they suggest a cut-up version of Mondrian's "Broadway Boogie Woogie." The series is Palermo's best-known work and his last. (Dia owns it, and it is on permanent view here.) Palermo died at 33, in 1977, and almost immediately Mr. Knoebel began work on his tribute.

Like Mr. Cunningham and Ms. Dean's adaptation of Cage, it constituted a transfer of energy and influence. Before 1977 Mr. Knoebel had worked primarily in painted sculpture using a palette of white and black. In his Palermo piece he turned to painting and to color.

Not that their work is at all alike. In contrast to Palermo's small foursquare panels of bars and stripes, Mr. Knoebel made large monochrome cutouts in bizarre shapes, some hinting at recognizable forms, like

curled-up animals or distraught figures, but no two the same. Although he conceived “24 Colors” as a single work, its parts are not in sync. It’s like a giant jigsaw puzzle with pieces that can’t interlock.

In place of Palermo’s bright colors Mr. Knoebel chose bland, indeterminate hues: milky pinks, detergent blues, dull greens, very dusty roses. His goal, he said, was to create shapes and colors so vague in their oddness that they would neither hold the eye nor lodge in the memory. The Beacon installation reinforces the air of irresolution.

Paintings tumbling across a wall are interrupted by blank-looking stretches of empty space. Paintings that might have filled the spaces lean, unhung, against a gallery wall, in a stacked format Mr. Knoebel has used in sculptural pieces. The result is a sense of work in progress, or of a show being disassembled and destined for the warehouse.

In fact “24 Colors” was in storage for some 30 years, and when it was finally retrieved, Mr. Knoebel decided that it was in such bad shape that it was beyond salvaging. So he made a new version from scratch, which is what we see at Dia. This means, of course, that the thin line between restoration and re-creation has been breached, and you can almost hear the sound of voices raised in protest. Shouldn’t the original piece have been shown, whatever its condition? Isn’t a re-creation, even by the artist, historically inauthentic, an expensive fake?

I have no problem with the remake. The original was always meant as a conceptual gesture, a complicated act of self-assertion and self-abnegation, an exercise in loudness and dumbness, volubility and silence-seeking. The new version seems faithful to that. It will look old and “authentic” soon enough, and may then acquire a kind of authoritative voice it was never really meant to have.

Meanwhile it serves, as it was meant to, as an amplifying backdrop for Palermo’s voice, which is intense and distinctive. What is it like? Somewhat manic, tender and brash, evident in paintings that look as though they were alternately scuffed up as castoffs and coddled like pets. “To the People of New York City” is the visual equivalent of a heartfelt cheer, but also a passive-aggressive chuckle, with all those German flags.

In any case the sound of that voice is muted now. The paintings have become relics, and New York is no longer the city Palermo knew, though it still is a little. Friends still gather, lovers murmur together, cats purr in their sleep, birds fly over calling on their way to somewhere. All that’s there in Palermo’s kitchen table-size pictures, with their stripes like streets and their colors like the song of sirens on late summer nights.

Tacita Dean’s “Merce Cunningham performs ‘Stillness (in three movements)’ to John Cage’s composition 4’33” with Trevor Carlson, New York City, 28 April 2007 (six Performances; six films)” remains at Dia:Beacon, 3 Beekman Street, Beacon, N.Y., through Sept. 1. Imi Knoebel’s “24 Farben — für Blinky” (“24 Colors — for Blinky”) is on long-term view.

http://www.nytimes.com/2008/08/22/arts/design/22dia.html?_r=1&th&emc=th&oref=slogin

'WUNDERKAMMER: A CENTURY OF CURIOSITIES'

Dusting Off a Museum's Curio Cabinet

By ROBERTA SMITH

A museum collection is like a jigsaw puzzle whose pieces have unstable contours; they can be fit together in any manner the mind can conceive. New combinations create new ideas, experiences and insights, no matter how familiar the art. At least that's the theory.

This happens some of the time but not all of the time in "Wunderkammer: A Century of Curiosities," the latest permanent-collection exhibition in the galleries of the Museum of Modern Art's department of prints and illustrated books. It has been organized by Sarah Suzuki, one of the department's assistant curators, and is inspired by the Renaissance wunderkammer, or cabinet of curiosities. That's a fairly eccentric idea for a place as identified with classic modernism as the Modern, but Ms. Suzuki has still relied on too many of the museum's usual suspects.

The wunderkammer was a free-form collection of all things rare and marvelous: small works of art, exquisite objects made of precious materials, natural specimens, unusual rock or crystal formations, scientific instruments. Although ancestors of today's museums, wunderkammers were more capricious, with a broader mandate: the goal was to gather knowledge and explain the world — not just art — through its wonders.

Ms. Suzuki has tried to extract some curiosities from the Modern's holdings. She has assembled about 120 prints, illustrated books and the editioned objects called multiples, as well as a sprinkling of sculptures, drawings and even design objects from the museum's other departments. She leads off with "The Bad Need," a black-vinyl wall piece by Matthew Ritchie that resembles an archaic cosmic diagram. It promises an encompassing world view and the revelation of mysteries.

The selections range in time from Manet's 1875 transfer lithograph of a raven (for a book by Edgar Allan Poe) to Olafur Eliasson's 2006 artist's book, "Your House," an ingeniously compressed three-dimensional model of a house cut in cross-sections into the pages of a book. If allowed to touch it, you could move through the rooms, and the walls, by turning the pages.

The installation proceeds in thematic clusters with certain subjects — eyes, for example — recurring throughout. Living creatures are everywhere, whole or in part, real or imaginary, including humans, pigs, jellyfish and horned beetles. There are several works like Mr. Eliasson's that involve an ecstatic experience of architecture. The grotesque in varying degrees is favored, which gives the show something of a buzz, like an aberrant ark.

In the first gallery the displays rapidly progress from images of the eye to those of the human head, face and body, clothed and not. Among the eye images, old standbys from Odilon Redon, Max Ernst and Man Ray are enlivened by "Enigmatic Eye I" (1969), a large, velvety lithograph of a fleshy, barely opened bivalvelike eye by a little-known Guatemalan artist named Rodolfo Abularach, and a 2002 work by the German artist John Bock. This centers on a synthetic eyeball sewn with red thread to a black-and-white photograph of a fashion model whose head is tilted back. The effect is subtly shocking; the eye seems to roll down the woman's cheek as if she had just had an eye-socket malfunction of some sort.

Many works gain from the company they keep. Paul Klee's Orientalist "Menacing Head," a 1905 etching; Fred Tomaselli's colorful, mosaiclike "Cyclopticon" (2003); and a 1995 woodcut of a severed head by Kiki Smith all seem pushed to some kind of breaking point. A sequence of tattooed figures includes images of two bathing beauties from vintage magazines to which the tattoo artist Dr. Lakra has added ink tattoos; Otto Dix's dainty and vivacious "Maud Arizona (Suleika, the Tattooed Wonder)," a 1922 drypoint; and a more stolid tattooed man portrayed by the British Pop artist Peter Blake in a mid-1970s wood engraving that is one of the show's better surprises.

"The Communicating Vessels," Diego Rivera's big red-orange linoleum cut from 1938, is head, face, torso and body parts — a cosmology and a cluster unto itself. Marc Quinn's screenprint, "Template for My Future Plastic Surgery From London" (1992), has a similar force. Works by Ellen Gallagher, Raqib Shaw, Redon, Jake and Dinos Chapman, and Bruce Conner conjure jellyfish and other sea creatures on a sliding scale from realist to polymorphously perverse.

Several works remind us that the wunderkammer often contained hoaxes, like narwhal tusks passed off as unicorn horns. Minnie Evans's lusciously colored little painting on paper, "Green Animal" (1963), seems to be a creature of the imagination. So do the plant specimens in Joan Fontcuberta's gelatin-silver prints, or "Fecund," Roxy Paine's fragment of a giant mushroom cap, although both are tweaked with postmodern attitude. Mark Dion's cabinet of curiosities extracted from the construction site of the latest expansion of the Modern plays it absolutely straight (I think). Trenton Doyle Hancock's etching aquatints indicate that his elaborate fable regarding meat mounds, vegans and the power of color becomes clearer when he has less material to throw around.

The inclusion of the design objects is a smart move. Three examples of Tord Boontje's well-known Garland Light, whose shades are thick tendrils of leaves made of silver-plated brass, suggest both trees and nests. They add to a wall of images of birds, bats and insects by, among others, Gerhard Marcks, Ben Shahn, Marcel Dzama, Morris Graves (his frightening 1940 gouache "Fledgling") and James Ensor, whose small, obsessive prints (three etchings, one drypoint) look great every time.

The white polyethylene goalie mask designed by George Lynn in 1972 heightens the wunderkammer creepiness of a large cabinetlike vitrine. It hangs among works by Ken Price, Vija Celmins and Katharina Grosse, a final eyeball by Joseph Cornell and an exquisite laboratory glass by an unknown designer. The Lynn mask may not be exactly the one worn by Hannibal Lecter, but it's close enough.

Many inclusions feel perfunctory and predictable. Louise Bourgeois, Lucian Freud and Cindy Sherman, for example, should be cycled out of the rotation for a while. Even Paul Cadmus, Bill Traylor and Howard Finster have become, for the moment, familiar departures from the norm. Leonora Carrington, Dorothea Tanning, José Posada and Paul Wunderlich add freshness. Natsuyuki Nakanishi's Arman-esque "Compact Object," a head-size oval sphere of cast polyester filled with small objects, introduces a new name, as does "Four Generations," an altered photograph of a freakishly hairy family by a young Italian artist, Seb Patane.

Leonard Baskin is a surprise, but his small etchings of insects would be easier to see on a wall rather than artfully strewn around a vitrine. "Bulbous Face," a small, spidery drypoint by the German artist Wols, suffers a similar fate. Other inclusions reflect what may be one of the central weaknesses of today's art: too many artists are group-show artists. Their efforts look best in situations like this, one or two at a time woven together with related works by other artists. The two most obvious examples here (due partly to their large size) are Grenville Davey's grids of blurry photographic screenprints of eyes and Nicolas Lampert's pedestrian digital prints of insect-machine hybrids with parts that seem lifted from old engravings and, thus, from Ernst.

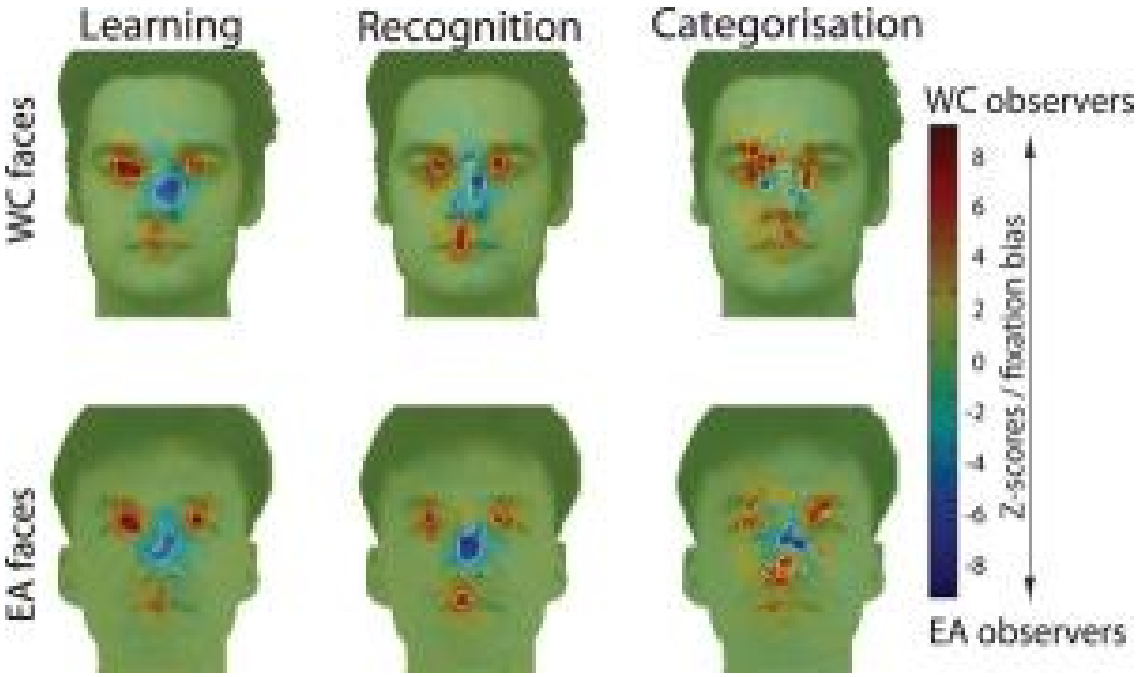
But group-show art isn't new. Take Jim Dine's 1963 lithograph "White Teeth" — a set of dentures on a black ground (very Jasper Johns). Baskin may be more conservative, but here his vision seems more intense and complete than Mr. Dine's.

All this raises prickly questions about what museums buy and why, and the gamble inherent in any acquisition. It also explains Ms. Suzuki's over-reliance on the Modern's greats. They provide spine and pick up slack when the group-show art lags, which is a little too often.

"Wunderkammer: A Century of Curiosities" is at the Museum of Modern Art through Nov. 10; (212) 708-9400, moma.org.

http://www.nytimes.com/2008/08/22/arts/design/22curi.html?ref=design

Face Recognition: Nurture Not Nature



Fixation biases for Western Caucasian (WC - red) and East Asian (EA - blue) observers are highlighted by subtracting WC and the EA Z-scored fixation distribution maps during WC and EA face learning, recognition and categorization by race. (Credit: Caroline Blais et al, doi:10.1371/journal.pone.0003022.g002)

ScienceDaily (Aug. 22, 2008) — Researchers have discovered that our society can influence the way we recognise other people's faces.

Because face recognition is effortlessly achieved by people from all different cultures it was considered to be a basic mechanism universal among humans. However, by using analyses inspired by novel brain imaging technology, researchers at the University of Glasgow have discovered that cultural differences cause us to look at faces differently.

Lead researcher Dr Roberto Caldara said: "In a series of eye-movement studies, we showed that social experience has an impact on how people look at faces. Specifically we noticed a striking difference in eye movements in Westerners and East Asian observers. We found that Westerners tend to look at specific features on an individual's face such as the eyes and mouth whereas East Asian observers tend to focus on the nose or the centre of the face which allows a more general view of all the features. One possible cause of this could be that direct or excessive eye contact may be considered rude in East Asian cultures."

The results of the study, funded by the Economic and Social Research Council and the Medical Research Council, provide novel insights into why non verbal communication between people from different cultures is sometimes problematic, in an age where globalisation has dramatically increased interdependence, integration and interaction among people and corporations from all over the world. Western societies are generally more individualistic, whereas East Asian societies are collectivistic; Westerners appear to think and perceive focally and Easterners globally.

Dr Caldara continued: "By disproving the long-held assumption that face processing is universally achieved we have highlighted that the external environment, including the society in which we develop, is

very influential in basic human mechanisms and caution should be taken when generalising findings to the entire human population."

Journal reference:

1. Blais et al. **Culture Shapes How We Look at Faces**. *PLoS One*, 2008; 3 (8): e3022 DOI: 10.1371/journal.pone.0003022

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

http://www.sciencedaily.com:80/releases/2008/08/080819213027.htm

Trees Kill Odors And Other Emissions From Poultry Farms

Scientists report that planting three rows of trees around poultry farms can reduce emissions of dust, ammonia and odor. (Credit: George W. Malone, University of Delaware)

ScienceDaily (Aug. 22, 2008) — Planting just three rows of trees around poultry farms can cut nuisance emissions of dust, ammonia, and odors from poultry houses and aid in reducing neighbor complaints, according to scientists from the University of Delaware.

Some of the emissions were cut by almost half, George W. Malone, Ph.D., and colleagues said here today at the 236th National Meeting of the American Chemical Society (ACS). Trees also provide farms with the added benefit of reducing energy consumption, he noted.

Malone, who is an extension poultry specialist with the University of Delaware, points out that trees have been used in the past as aesthetic barriers. His research on giving trees a new role in the poultry industry began in 2000, when residents near farms on the Delmarva Peninsula in Delaware, Maryland and Virginia complained about dust and odors from poultry houses that had recently switched to new ventilation systems.

In the report delivered today, Malone's team suggested that planting vegetation could reduce ammonia and particulates that may degrade surrounding air and water quality. "We were aware of the concerns locally," said Malone. "We looked at what we could do to address them and the whole area of air quality as it relates to the emission of ammonia from poultry houses."

In response, they proposed planting trees to serve as a vegetative filter that could capture emissions from these family farms, which individually can house an average of 75,000 chickens. In a six-year study,

Malone and his team found that a three-row plot of trees of various species and sizes reduced total dust by 56 percent, ammonia 53 percent, and odor 18 percent. The approach is being adopted around the Delmarva.

The research showed that as vegetative "filters," not all trees are created equal. "We've certainly been on a learning curve since 2001 about the different plant materials suitable for this practice. We typically recommend the first row nearest the fans to be either a deciduous tree or a tree with a waxy leaf surface and the other two rows be an evergreen," Malone said. "It's very important to realize there are a number of criteria that you use in tree selection and planting design. What works for our soil types and climate on the Delmarva Peninsula may not be suitable for other locations."

Certain species of trees can grow eight to 10 feet per year, Malone said, which allows for a quick start in creating a buffer. "One initial concern was that it takes years for trees to grow to become effective in filtering out poultry house emissions, but that's not necessarily the case."

Trees reduce poultry house emissions by capturing dust, ammonia and odors in their leaves. They also aid in dispersion of emissions, which reduces the impact on neighbors.

Another factor intensifying the need for environmentally friendly agricultural practices has been the rapid growth of residential development in poultry-producing areas. "Planting trees demonstrates that the poultry grower is being proactive to address potential concerns of neighbors, gives the poultry farm a landscape appearance and increases property values. Adding the vegetative buffers also helps to reduce noise associated with farm operations," he said.

Today, about 35 percent of Delmarva Peninsula's 2,000 farms have developed vegetative buffers, making this region the first in the country to adopt a widespread comprehensive vegetative buffer program, Malone said.

The living filter system also has other benefits, Malone noted. For instance, it conserves energy by increasing shade and cooling in the summer and acts as a buffer to reduce heating costs in the winter.

Not only do trees enhance air quality, they also improve the water quality around poultry farms because they can filter pollutants from soil and groundwater.

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

http://www.sciencedaily.com/releases/2008/08/080820163010.htm

Obesity In Elderly A Ticking Time Bomb For Health Services

ScienceDaily (Aug. 22, 2008) — Research carried out at the Peninsula Medical School in the South West of England has discovered that obesity in later life does not make a substantial difference to risks of death among older people but that it is a major contributor to increased disability in later life – creating a ticking time bomb for health services in developed countries.

The research is published in the August 2008 edition of the Journal of the American Geriatrics Society.

The Peninsula Medical School research team worked with data on just under 4,000 participants in the English Longitudinal Study of Ageing (ELSA) aged 65 and older and living in the community. Each participant had their weight and height measured and their BMI (body mass index) calculated and they were followed up for five years. The researchers compared people with BMI of 20 to 24.9 (i.e. those of recommended weight), with those who had a BMI of 25 to 29.9 ("overweight"), 30 to 34.9 ("obese"), or 35 or over ("severely obese").

The results showed that the higher an older person's BMI, the more likely he or she was to develop mobility problems (measured using a standard performance test) or to develop difficulty carrying out everyday tasks. The results also showed that, in older people, the link between higher BMI and the risk of death is weak – only severely obese older men seemed to run this increased risk.

Dr Iain Lang, who led the research from the Peninsula Medical School, commented: "We have known for some time that young and middle-aged adults who are overweight run a higher risk of death and it was presumed that this held true for older people. In fact, our results show that the risk of dying is higher only for the most severely obese but that all older people who are overweight are at significantly increased risk of developing problems with mobility and carrying out everyday tasks."

He added: "This research is important because a growing proportion of the population is aged 65 or over, and more and more of these older people are overweight. In fact, in most developed countries middle-aged and elderly adults are more likely to be obese than people in any other age group. These findings have huge significance for the delivery of health care, both now and in the future. Increasing numbers of older people and higher levels of overweight and obesity will lead to a greater burden of disability and ill health and place an immense strain on health and social services. The issue is likely to get worse as time goes on and represents a ticking time bomb for health services around the world."

The research team recommends that older people should talk to their doctor or other health care professional about their weight, and take their advice regarding slimming down if they are overweight. The advice may include more exercise, a change in diet, or both.

Lindley Owen, Consultant in Public Health at Cornwall and Isles of Scilly Primary Care Trust, said: "Staying a healthy weight can be a fun and relatively easy thing to do, even as people get older. People don't have to join a gym or take on complicated new diets. There are many everyday opportunities to stay active through regular walking, gardening or social groups, while eating fresh, nutritious food is enjoyable at any age.

"Our experience of running supported walking and cycling groups has shown that older people benefit in many ways from regular physical activity. Not only do they get fitter and physically stronger but the enjoyment of spending time with friends in the open air can give new confidence and a real zest for life.

"People are living longer but this study shows that excess weight can have a real impact on the quality of people's lives which can reduce the benefit of those extra years. We must do all we can to encourage older

friends or relatives to build enjoyable exercise into their daily routine and develop good habits ourselves to take into our retirement years."

Dr Gill Lewendon, Consultant in Public Health Medicine, Plymouth Teaching PCT, added: "This report highlights the problem of obesity in an increasingly ageing population. The PCT and City Council work closely with a wide range of voluntary and statutory agencies to provide increased opportunities for everyone to eat more healthily and to move around a bit more. For those who are already very overweight or obese, the PCT provides a comprehensive weight management service for people of all ages. "

Adapted from materials provided by The Peninsula College of Medicine and Dentistry, via EurekAlert!, a service of AAAS

http://www.sciencedaily.com/releases/2008/08/080821110117.htm

Optical Computing Closer To Reality

ScienceDaily (Aug. 22, 2008) — Scientists at the University of Pennsylvania have theorized a way to increase the speed of pulses of light that bound across chains of tiny metal particles to well past the speed of light by altering the particle shape.

Application of this theory would use nanosized metal chains as building blocks for novel optoelectronic and optical devices, which would operate at higher frequencies than conventional electronic circuits. Such devices could eventually find applications in the developing area of high-speed optical computing, in which protons and light replace electrons and transistors for greater performance.

Recent developments in nanotechnology have enabled researchers to fabricate nanoparticle chains with great precision and fidelity. Penn's research team took advantage of this technological advance by utilizing metallic nanoparticles as a chain of miniature waveguides that exchange light.

Currently, the advance is theoretical. But, from a practical standpoint, the creation of a metallic nanochain would provide the combination of smaller-diameter optical components coupled with larger bandwidth, making them optimal wave guiding materials.

As the velocity of the light pulse increases, so too does the operating bandwidth of a waveguide. Increasing the bandwidth helps to increase the number of information channels, allowing more information to flow simultaneously through a waveguide.

Researchers investigated changing the shape of particles in an attempt to increase this bandwidth. Spherically-shaped nanoparticles, the shape used almost exclusively in early research, provide narrow bandwidths of light. As Markel and Govyadinov discovered, shaping the particles as prolate, cigar-shaped or oblate, saucer-shaped, spheroids boosted the velocities of surface plasmon pulses reflecting off the surface to 2.5 times the speed of light in a vacuum.

Reshaping the nanoparticles therefore resulted in an enormous increase in the operating bandwidth of the waveguide. As an additional bonus, constructing the chains from oblate spheroids results in decreased power loss as well.

The exceptional combination of small size, large bandwidth and relatively small losses may make these useful as building blocks for the light-based devices of the future.

Researchers have used light and metal to create special electromagnetic wave of electrons on the surface called plasmons for years. Just as light travels through optical fibers, surface plasmons propagate along a chain of closely spaced, metallic particles with each particle acting like a miniature beacon, receiving a signal from its neighbor and transmitting it further along the chain. Although chains of metallic particles are not practical for long-range communication due to rapid power loss, they are well suited for optoelectronic and optical devices in which achieving a small overall size is important.

Markel and Govyadinov's theory may prove useful in overcoming sizing obstacles that complicate optics. Light cannot travel through an optical fiber if the fiber's diameter is smaller than a micron. A particle chain like the one proposed by Penn researchers, however, could be as thin as 50 nanometers in diameter, a few hundred times thinner than any optical fiber, and still guide the surface plasmon waves.

An interesting conundrum arises from the work. The theory of relativity prohibits anything from moving faster than light.

"But what is a 'thing'?" Markel said. "A very powerful flashlight directed at the moon would theoretically create a bright spot on its surface. By simply turning the flashlight sideways, the flashlight's beam streaks across the sky at speeds far exceeding the speed of light. This evidence has long been known and dismissed, since the bright spot cannot be used for superluminal, or faster-than-light communication, between the earth and the moon. The fast motion of the bright spot is simply a geometrical artifact, similar, in some ways, to the point at which the two blades of closing scissors intersect. The theory of relativity does not concern such purely geometrical objects."

The researchers believe there are, in fact, some superluminal "things" in nature. For example, it has been long theorized, and was demonstrated in a series of experiments in the last quarter of the 20th century, that electromagnetic pulses, or "wave packets," can propagate through material media with an overall velocity which is greater that the speed of light in vacuum. Although the superluminal wave packets cannot be used to transmit energy or information faster than the speed of light, and therefore do not contradict the theory of relativity, they are fascinating objects and can be utilized in optical communications.

The surface plasmon pulses discovered at Penn belong to the same class of superluminal wave packets. It is predicted that the superluminal properties of these pulses are much bolder than anything previously observed.

Colleagues in the Department of Bioengineering, Alexander A. Govyadinov and Vadim A. Markel, also of the Department of Radiology at Penn, published the study in a recent issue of the journal Physical Review B.

Adapted from materials provided by University of Pennsylvania.

http://www.sciencedaily.com/releases/2008/08/080819160155.htm

Helping The Medicine Go Down

Young girl refusing to take medicine. (Credit: iStockphoto/Paul Roux)

ScienceDaily (Aug. 21, 2008) — Getting little Doug and Debbie to take a spoonful of medicine is more than just a rite of passage for frustrated parents. Children's refusal to swallow liquid medication — and their tendency to vomit it back up — is an important public health problem that means longer or more serious illness for thousands of kids each year. In the case of HIV and AIDS pediatrics, missing a dose can be a life or death scenario.

In a report presented today at the 236th National Meeting of the American Chemical Society, Julie A. Mennella, Ph.D., described how knowledge from basic research on the chemical senses explains why a child's rejection of bitter medicine and nutritious but bitter-tasting foods like spinach and other green vegetables is a reflection of their basic biology.

"Children's rejection of unpalatable medications and bitter-tasting foods is a complex product of maturing sensory systems, genetic variation, experiences and culture," says Mennella, a researcher with the Monell Chemical Senses Center in Philadelphia.

She says that children are born with a much stronger preference for sweet flavors, naturally attracting infants to mother's milk. This heightened preference for sweets continues even in their teenage years. By late adolescence, kids start to outgrow their sugary predilection.

"A better understanding of the sensory world of the child – and the scientific basis for distaste and how to ameliorate it – is a public health priority," states Mennella.

Mennella investigates the role of early experience as a child develops their unique sense of taste and smell. In the process, she ultimately hopes to find ways of creating more palatable medicines and getting kids to eat their greens more readily.

"The number one reason for non-compliance among children when taking medicine or eating vegetables is that they don't like the taste," says Mennella. "Just look at a child's face when they're eating some of these things!"

The root of this bitter problem lies in human taste buds, or taste receptors. While there are only a few receptors for sweet flavors, evolution imbued man with about 27 for bitterness. In prehistoric times, this heightened sensitivity to bitterness prevented early humans from eating toxic plants or other unsavory and possibly poisonous fare. "Bitter taste is a sensation that evolved to make you not want to ingest something," says Mennella.

Unfortunately, most of the chemicals in the pharmacist's cookbook are plant-derived and therefore inherently bitter. Some of more potent drugs like certain AIDS medications for children are even less pleasant – they often smell bad and cause mouth irritation.

For some medications, masking the bitterness is possible by encapsulating the bitter chemical in pill or tablet form, or by using special "bitter blockers" that numb the tongue's receptors. But many children have trouble swallowing pills, so liquid formulations are needed. Adding sweet tastes and flavors that children like helps the medicine go down.

Unfortunately, Mennella says its extremely difficult to mask the flavors of some of the truly bitter liquid medicines. A better understanding of bitter taste receptors may yield new ways of overcoming these unpleasant flavors.

A recent explosion in taste and smell research led to the identification of genes that code for certain bitter taste receptors. Mennella's team showed that a variation in the TAS2R38 gene is linked to the perception of bitterness in children and their parents. The researchers found that while parents with this variation were sensitive to certain bitter compounds, their children were most sensitive of all.

"It is interesting because it may suggest that children have heightened bitter sensitivity compared to adults," states Mennella.

Babies begin developing their unique tasting profile while still in the womb. What a mother eats while pregnant and nursing enhances a newborn's acceptance of foods. "We find that the more a mother eats fruits when she's pregnant, the more a child will accept fruits and vegetables," says Mennella.

The culture that a child grows up in also plays a huge role in their development of taste and smell. For evidence, Mennella points to the flavorings found in children's medicine around the world. "In England, there is a lot of lemon flavor added to children's medicine. It's a cultural phenomenon. Bubblegum and cherry are popular in the United States," according to Mennella.

When children cannot or will not take medicines in encapsulated form, methods to reduce the bitterness in liquid medications become medically significant. Failure to consume medication may do the child harm, and in some cases, may be life threatening, according to Mennella. She says that pharmaceutical companies will benefit from more basic research on bitter taste and how to ameliorate it.

"It is one of the fundamental mysteries of human behavior – why do we grow to like these foods and flavors that we initially rejected?"

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

http://www.sciencedaily.com/releases/2008/08/080821163844.htm

Eco-architecture Could Produce 'Grow Your Own' Homes

A TAU/Plantware bench on the grounds of Israel's Tel Hashomer Hospital. (Credit: Image courtesy of American Friends of Tel Aviv University)

ScienceDaily (Aug. 21, 2008) — A bus stop that grows its own foliage as shade? A children's playground, made entirely from trees? A shelter made from living tree roots that could provide natural protection against earthquakes in California?

"Eco-architecture" may sound like a Buck Rogers vision of an ecologically-sustainable future, but that future is now thanks to the guidance of Tel Aviv University Professors Yoav Waisel and Amram Eshel. The concept of shaping living trees into useful objects known as tree shaping, arborsculpture, living art or pooktre isn't new. But scientists are now ready to use this concept as the foundation of a new company that will roll out these structures worldwide.

Pilot projects now underway in the United States, Australia and Israel include park benches for hospitals, playground structures, streetlamps and gates. "The approach is a new application of the well-known botanical phenomenon of aerial root development," says Prof. Eshel. "Instead of using plant branches, this patented approach takes malleable roots and shapes them into useful objects for indoors and out."

A Scientific and Commercial Partnership

The original "root-breaking" research was conducted at the Sarah Racine Root Research Laboratory at Tel Aviv University, the first and largest aeroponics lab in the world. Founded by Prof. Waisel 20 years ago, the lab enables scientists to conduct future-forward and creative research that benefits mankind and the environment.

Commercial applications of the research are being developed by Plantware, a company founded in 2002. TAU and Plantware researchers working together found that certain species of trees grown aeroponically (in air instead of soil and water) do not harden. This developed into a new method for growing "soft roots," which could easily turn living trees into useful structures.

Completing the informal collaboration between Plantware founders and the university, the company's director of operations, Yaniv Naftaly, holds a degree in life sciences from TAU.

An Eco-Positive Abode

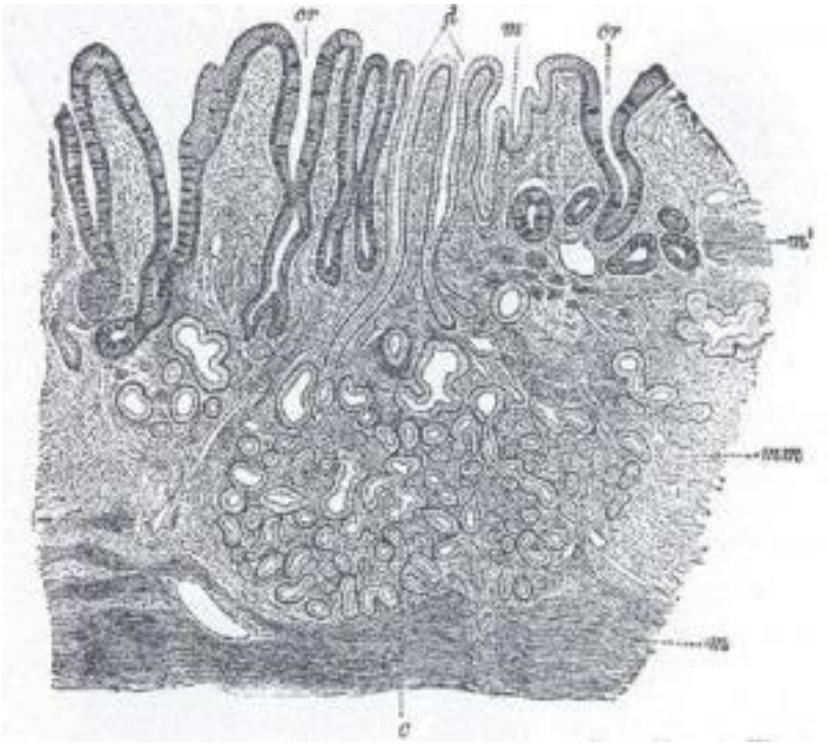
It's even possible that, in the near future, entire homes will be constructed with the eco-friendly technology. An engineer by trade, Plantware's CEO Gordon Glazer hopes the first home prototype will be ready in about a decade. While the method of "growing your own home" can take years, the result is long lasting and desirable especially in the emerging field of green architecture.

Prof. Eshel's team is also working on a number of other projects to save the planet's resources. They are currently investigating a latex-producing shrub, Euphoria tirucalii, which can be grown easily in the desert, as a source for biofuel; they are also genetically engineering plant roots to ensure "more crop per drop," an innovative approach to irrigation.

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

http://www.sciencedaily.com/releases/2008/08/080821164300.htm

Breaking The 'Mucus Barrier' With A New Drug Delivery System



An illustrated cross-section of human mucus membrane from the stomach. (Credit: Henry Gray's Anatomy of the Human Body, courtesy of ACS)

ScienceDaily (Aug. 21, 2008) — Chemical engineers from Johns Hopkins University have broken the "mucus barrier," engineering the first drug-delivery particles capable of passing through human mucus — regarded by many as nearly impenetrable — and carrying medication that could treat a range of diseases.

Those conditions include lung cancer, cervical cancer and cystic fibrosis, the research noted in a presentation scheduled for the 236th National Meeting of the American Chemical Society.

"We studied the properties of disease-causing viruses that evolved to infect mucosal surfaces to engineer a coating that enables our drug delivery particles to penetrate mucus layers in minutes. In our new work, we have improved the coatings considerably to allow faster penetration for a wider array of particle sizes," says lead presenter Samuel K. Lai, Ph.D.

Mucus, the slippery secretion lining the lung airways, surface of the eye, gastrointestinal tract, and female reproductive tract, may seem delicate. But it is a tenacious barrier, effectively keeping out most pathogens and limiting infections.

"Mucus has evolved to be a highly efficient barrier," says Justin Hanes, professor of chemical & biomolecular engineering at Johns Hopkins University, the lead investigator of the study. "For example, we constantly inhale particles into our lungs, but they typically stick to mucus rather than penetrate it. Particles that stick are removed rapidly from the lungs on a mucus 'conveyor belt,' and are swallowed and sterilized in the gut. Mucus barriers protect us from constant infection, as well as everyday things like the millions of particles in the black cloud emitted from a bus when it takes off from a stop."

Unfortunately, mucus also prevents the passage of many beneficial drugs. And when the mucus gets thicker — most notably in diseases like chronic sinusitis, cystic fibrosis and chronic obstructive pulmonary disorder — drug treatment of the lungs and other mucus-lined areas becomes more difficult.

Lai explained that coating drug-loaded nanoparticles with an inexpensive polymer material allows particles to pass through the mucus linings. With this mucus-penetrating mechanism, drugs could be delivered locally and with enhanced durations to treat diseases at mucosal surfaces. In collaboration with Richard Cone, professor of biophysics at Johns Hopkins, the work also opens the door to more targeted drug delivery – including improved chemotherapy for cervical and lung cancer patients.

For inspiration in their quest to breech mucus, Hanes and colleagues took a lesson from Mother Nature — specifically viruses capable of infecting mucosal surfaces. Some of these viruses were able to pass through the dense, net-like mesh of mucus as if it were water.

The researchers found that the spaces between the "threads" of the mucus mesh were much larger than previously thought, providing an opportunity for drug particles that do not adhere to mucus to pass through and avoid rapid clearance .

"If a particle is small enough and not adhesive, then it can get through the mucus net – that's how some viruses penetrate mucus barriers," says Hanes.

The team found that a polymer known as polyethylene glycol, or PEG, could coat individual drug particles and imbue them with the same properties as these mucus-breeching viruses. "PEG is one of the most widely used polymers for therapeutic applications," Lai explains. It's an FDA approved polymer that's been in use in humans for over 25 years – it's known to be very safe."

By encapsulating drugs in mucus-penetrating particles, drug companies could expand the realm of treatment options for many diseases. "For example, cervical cancer patients could locally apply chemo drugs inside mucus-penetrating particles, which would then deliver the drug locally in the female reproductive tract at efficient concentrations over prolonged periods of time, instead of delivering it everywhere else in the body. That could drastically reduce the side effects as well as prolong the presence of drugs at the target site," says Lai.

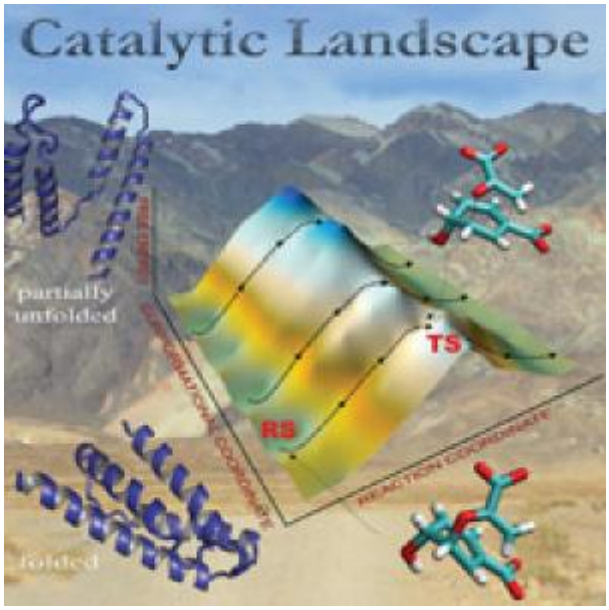
And in the case of patients with cystic fibrosis —which causes thick mucus buildup in the lungs — mucus-penetrating drugs could create more effective therapies to fight the disease. This could improve the quality of life for 70,000 cystic fibrosis sufferers worldwide.

"Eventually, we seek to engineer systems where a drug could be delivered to a specific tissue or set of cells anywhere in the body – we want to make that possible."

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

http://www.sciencedaily.com/releases/2008/08/080820163059.htm

Catalyst Mystery Unlocked



Author Arieh Warshel's model shows that the engineered enzyme takes the shape of many keys, with all fitting electrostatically in the same lock. (Credit: Image courtesy of University of Southern California)

ScienceDaily (Aug. 21, 2008) — Different keys are not supposed to fit the same lock, but in biological systems multiple versions of a catalyst all make a reaction go, according to a new study that explains the phenomenon.

Scheduled for online publication in PNAS Early Edition sometime after Aug. 18, the study challenges entrenched ideas about the workings of catalysts.

The study also suggests a method for designing new catalysts.

Catalysts are molecules that speed up chemical reactions without participating in them. Thousands of industrial and biological processes rely on catalysts. In the human body, enzymes catalyze almost every reaction. "The Holy Grail of enzyme catalysis and the ultimate manifestation of understanding of this process is the ability to design enzymes," said senior author Arieh Warshel, professor of chemistry at USC College.

He listed drug production, environmental chemistry and bioremediation as areas that could be revolutionized by custom-designed enzymes.

In the PNAS study, Warshel described a computational model that both explains a key aspect of catalyst function and suggests a design strategy.

Since the early days of catalyst chemistry, scientists had championed the "lock and key" model, which held that a catalyst worked by exquisitely surrounding and matching the reacting system (the substrate).

Warshel's group has published several papers in support of an alternate theory based on electrical attraction. According to the group, a perfect physical fit between catalyst and substrate is not necessary. "What really fits is the electrostatic interaction between the enzyme active site to the substrate charges at the so-called transition state, where the bonds are halfway to being broken," Warshel said.

If Warshel is correct, catalyst and substrate would be less like lock and key, and more like two magnets: As long the opposite poles could get close to each other, they would bind.

Warshel's model reproduced new experimental data showing that a natural enzyme and its engineered, structurally different counterpart both have the same catalytic power, despite being very different from each other.

The engineered enzyme, made by co-author Donald Hilvert of ETH in Zurich, Switzerland, displays less distinct folding than the natural enzyme. It also changes shape very rapidly.

Warshel's model shows that the engineered enzyme takes the shape of many keys, with all fitting electrostatically in the same lock. This should offer a new option for enzyme design.

Funding for the research came from the National Institutes of Health and European agencies. The Center for High-Performance Computing and Communications at USC provided computer time.

Adapted from materials provided by University of Southern California.

http://www.sciencedaily.com/releases/2008/08/080818184303.htm

Hydrogels Provide Scaffolding For Growth Of Bone Cells

ScienceDaily (Aug. 21, 2008) — Hyaluronic hydrogels developed by Carnegie Mellon University researchers may provide a suitable scaffolding to enable bone regeneration. The hydrogels, created by Newell Washburn, Krzysztof Matyjaszewski and Jeffrey Hollinger, have proven to encourage the growth of preosteoblast cells, cells that aid the growth and development of bone.

Doctoral student Sidi Bencherif will present this research, Sunday, Aug. 17 at the 236th national meeting of the American Chemical Society in Philadelphia.

Currently, physicians are able to treat patients with damaged bone tissue, like those who have bone fractures that fail to heal, using demineralized bone matrix, a biological material obtained from cadavers. Demineralized bone matrix is rich in growth factor proteins which signal bone cells in the area to multiply and form complex bone tissue, while other proteins in the matrix regulate the activity of the growth factors. Demineralized bone matrix is in limited supply, and because it comes from a human donor, there is a risk of transmitting viruses to the recipient.

"Tissue engineering is an exciting field. We're creating solutions to problems that can significantly impact people's quality of life," said Washburn, an assistant professor of chemistry and biomedical engineering at Carnegie Mellon. "These gels have great promise in not only regenerating bone, but serving as a gene therapy delivery system."

Members of the Washburn lab have been developing synthetic alternatives to demineralized bone matrix. In the work being presented today, they created a flexible hydrogel using biologically active and degradable hyaluronic acid. Hydrogels, which are considered to be the state-of-the-art in tissue design, are made from polymers that swell in water to form a gel-like material. They interact with growth factors much like demineralized bone matrix does, providing scaffolding for bone cells to proliferate and form new tissue. The researchers found that, in vitro, the hydrogels promoted cell proliferation, differentiation and mineralization of pre-osteoblast cells.

Further research by the group has created a hybrid hydrogel that incorporates a nanogel structure. This new hydrogel promotes the differentiation of cells, much like the hyaluronic acid gel while also releasing nanogels in a controlled and targeted manner. The researchers hope that this structure could be used to partner tissue engineering with gene therapy.

This work was funded by the National Tissue Engineering Center, the National Institutes of Health and a 3M Non-Tenured Faculty grant.

Adapted from materials provided by Carnegie Mellon University.

How Rheumatoid Arthritis Causes Bone Loss

ScienceDaily (Aug. 21, 2008) — Researchers have discovered key details of how rheumatoid arthritis (RA) destroys bone, according to a study published in the Aug. 22 edition of the Journal of Biological Chemistry. The findings are already guiding attempts to design new drugs to reverse RA-related bone loss and may also address more common forms of osteoporosis with a few adjustments.

Two million Americans suffer from rheumatoid arthritis (RA), which causes swelling, pain and deformity in joints and also lead to the thinning of bone. In autoimmune diseases like RA, the body's disease-fighting immune cells mistakenly identify parts of a person's body as foreign invaders, akin to bacteria, and produce chemicals to destroy them. Among the immune chemicals known to play a central in autoimmune disease is tumor necrosis factor alpha (TNF alpha), which ramps up the production of immune cells and chemicals as part of the body's response to disease. When overproduced in RA patients, TNF alpha signals for the destruction of cartilage and bone.

Beyond its control over immune cells, TNF alpha also influences bone mass. Human bone is continually regenerated to maintain strength. Under the control of signaling molecules which include TNF alpha, two cell types, balanced against each other, make bone recycling possible. Osteoclasts break down aging bone to make way for new bone, while osteoblasts build new bone at the sites where osteoclasts have removed it. Going into the study, the field understood that TNF alpha decreases the number of bone-building osteoblasts, but not how. The current study provides the first direct proof that the TNF alpha affects osteoblasts through an enzyme called Smad Ubiquitin Regulatory Factor 1 (Smurf1), which in turn shuts down two proteins that would otherwise drive bone-building.

While traditional RA drugs like NSAIDs and steroids treat symptoms, a newer class of best-selling drugs (e.g. Humira, Remicade and Enbrel) reverses the disease process by shutting down TNF alpha activity. While the new drugs are effective for many patients, others experience infections and even lymphoma in a few cases. The new drugs are based on bioengineered versions of proteins made by human immune cells called antibodies, and are very expensive to make. Thus, the field has been searching for smaller, simpler chemicals that would be effective, but with lower costs and fewer side effects.

"The significance of our study is that it identifies SMURF1 as the signaling partner through which TNF does damage in RA-related bone loss," said Lianping Xing, Ph.D., assistant professor of Pathology and Laboratory Medicine at the University of Rochester Medical Center. "That has enabled researchers to begin designing small molecule drugs to shut down the action of Smurf 1 and its relatives. Furthermore, since mice engineered to have less Smurf1 expression develop thicker bones, future drugs that shut down Smurf1 may be also useful against more common forms of osteoporosis simply by changing the dose. Of course, this is early-stage work with many obstacles ahead, but it is exciting nonetheless."

Study Details

In the late 1990s, Gerald H. Thomsen, Ph.D., at Stony Brook University in New York discovered that Smurf1 helps to attach a protein tag called ubiquitin to aging proteins in need of disposal. The tag then attracts the attention of cellular machines called proteosomes that degrade proteins.

Xing's team generated two lines of mice – one with high TNF alpha levels and with Smurf1 present, and a second group with high TNF alpha production but no Smurf1. Bone volume and strength of both groups of mice were then examined using a combination of imaging technologies and were compared. Experiments showed that increased TNF alpha levels dramatically decreased the levels of two key factors, Smad1 and Runx2. Both Smad1 and Runx2 signaled to increase the number of bone-building osteoblasts, but only if Smurf1 was present to pass on the signal from TNF alpha.

Genetically engineered mice with the Smurf1 gene removed no longer responded to TNF alpha because Smurf1 was not present to label Smad1 and Runx2 with the ubiquitin destruction tag. As expected, mice with increased TNF alpha had lesser bone mass than their counterparts, a result partially reversed in mice where Smurf1 had been removed.

Bolstering the importance of the current paper is the fact that TNF alpha promotes the destruction of some types of cancer cells. While toxic when administered systemically, it has found a niche in preventing the spread of skin cancer, where it can be injected directly into a tumor. Other drugs then became available that shut down the TNF signal by directly inhibiting the protein-eating proteosomes that receive the signal. There is an existing anti-myeloma drug on the market, bortezomib, which shuts down the proteosomes that Smurf1 partners with to destroy Smad 1 and Runx2.

Thus, Xing's team will be looking at the effect of bortezomib over the next year to see if shutting down proteosomes in bone cells does indeed increase bone mass in mice engineered to have high levels of TNF alpha. Bortezomib, is a general proteosome inhibitor, however, and does not specifically target Smurf 1, and future efforts will seek to identify Smurf1-specific drug candidates. In the meantime, the team is also seeking other groups of ligases that, like Smurf1, contribute to bone loss because experiments revealed that Smurf1 is not responsible for 100 percent of the bone loss under inflammatory conditions.

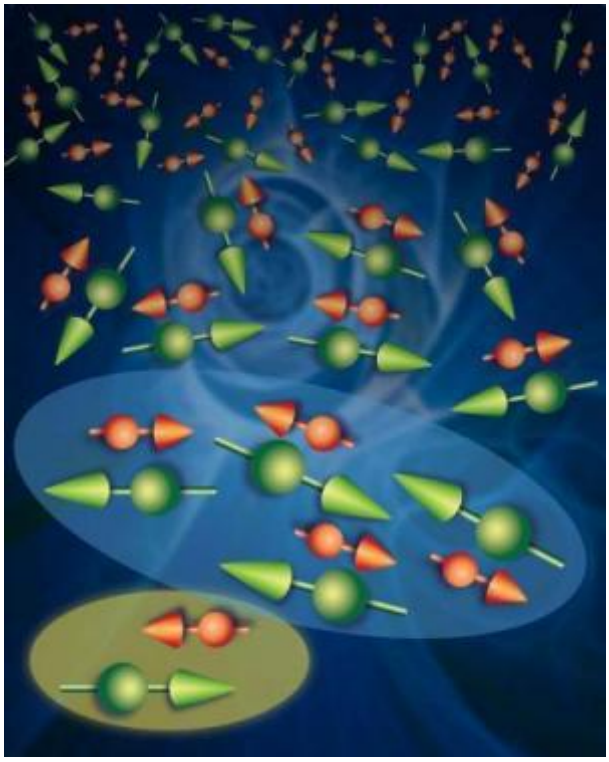
Along with Xing, the study was led by Ruolin Guo, Motozo Yamashita, Qian Zhang, Quan Zhou, Di Chen, David G. Reynolds, Hani Awad, Laura Yanoso, Lan Zhao, Edward Schwarz, Ying Zhang and Brendan Boyce within the Department of Pathology at University of Rochester. The article published today in hard copy was first published online on June 19, 2008.

"Our over-all hypothesis is that in inflammatory diseases like RA, the function of a group of enzymes like Smurf1 gets turned on to cause proteasome degradation of key regulator proteins leading to bone loss," Xing said. "The real, future solution will involve a treatment that specifically addresses each of these."

Adapted from materials provided by University of Rochester Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/08/080820163233.htm

Creating Unconventional Metals: Quantum Halfway House Between Magnet And Semiconductor Discovered



The magnetic bar magnets (called "magnetic moments") associated with the mobile electrons (red arrows) responsible for electrical conduction and manganese atoms (green arrows) in manganese doped iron silicide (Fe1-xMnxSi). This figure depicts the coupling of the magnetic moments as the temperature is reduced from room temperature (top of the figure) where the magnetic dipoles are independent, to very low temperature (bottom of the figure) where coupling between the dipoles creates regions where the moments add to zero (light blue region). The existence of a population of uncoupled complexes (depicted here in the yellow region) down to the lowest temperatures results in the material being neither a magnet nor common semiconductor. External magnetic fields align these rare yellow regions to the magnetic field, switching on ordinary semiconducting behavior. (Credit: UCL/London Centre for Nanotechnology)

ScienceDaily (Aug. 21, 2008) — The semiconductor silicon and the ferromagnet iron are the basis for much of mankind's technology, used in everything from computers to electric motors. In the journal Nature (August 21st) an international group of scientists, including academic and industrial researchers from the UK, USA and Lesotho, report that they have combined these elements with a small amount of another common metal, manganese, to create a new material which is neither a magnet nor an ordinary semiconductor.

The paper goes on to show how a small magnetic field can be used to switch ordinary semiconducting behaviour (such as that seen in the electronic-grade silicon which is used to make transistors) back on.

The new material exists in a quantum halfway house between magnet and semiconductor - in the same way that much more complex materials such as ceramics which exhibit high temperature superconductivity exist in quantum halfway houses between metals and magnetic insulators. The research is of fundamental importance because it demonstrates, for the first time, a simple recipe for reaching this halfway house, whilst also suggesting new mechanisms for controlling electrical currents and magnetism in semiconductor devices.

Professor J.F. DiTusa of Louisiana State University and a co-author of the paper said: "It's amazing that something which was thought to exist theoretically in mathematical physics could actually be found in an alloy which was simply formed by melting together a few common elements."

Professor Gabriel Aeppli of UCL (University College London), another member of the research team and Director of the London Centre for Nanotechnology, added: "It might be possible to see similar effects in devices made using materials and methods found in laser pointers. This would put what we've seen firmly in the realm of that which can easily be achieved using current technologies."

The first author of the paper, Dr. N. Manyala of the National University of Lesotho, said: "We are looking forward to investigating whether we can see these effects using thin layers of the same materials deposited directly on the silicon wafers. These wafers are the same as those used by mass market electronics manufacturers as the basis for integrated circuits." Dr. Ramirez, who is now with LGS-Bell Labs Innovations echoed this thought, noting that, "with the end of Moore's law in sight, mechanisms for controlling and understanding possible new information bits such as spins in solids are actively being sought after."

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

http://www.sciencedaily.com/releases/2008/08/080820162856.htm

World heading towards cooler 2008

By Richard Black
Environment correspondent, BBC News website

This year appears set to be the coolest globally this century.

Data from the UK Met Office shows that temperatures in the first half of the year have been more than 0.1 Celsius cooler than any year since 2000.

The principal reason is La Nina, part of the natural cycle that also includes El Nino, which cools the globe.

Even so, 2008 is set to be about the 10th warmest year since 1850, and Met Office scientists say temperatures will rise again as La Nina conditions ease.

TEMPERATURES - KEY FACTS
Temperatures given as variations from 1961-1990 average
Warmest on record - 1998 - +0.515C
Coldest on record - 1862 - -0.616C
From 2001 to 2007, varied between +0.400 and +0.479C
2008 January to June - +0.281C
Data from Hadley Centre

"The big thing that's been happening this year is La Nina, which has lowered global temperatures somewhat," said John Kennedy, climate monitoring and research scientist at the Met Office's Hadley Centre.

"La Nina has faded in the last couple of months and now we have neutral conditions in the Pacific," he told BBC News.

Scientists at the World Meteorological Organization have also suggested that 2008 will turn out to be cooler than the last few years.

Breaking the ice

La Nina cools waters in the eastern Pacific Ocean, but its effects are felt around the globe.

It is one of a number of natural climatic cycles that can re-inforce or counteract the warming trend stemming from increased levels of greenhouse gases in the atmosphere.

LA NINA EXPLAINED
La Nina translates from the Spanish as "The Child Girl"
Refers to the extensive cooling of the central and eastern Pacific
Increased sea temperatures in the western Pacific mean the atmosphere has more energy, and frequency of heavy rain and thunderstorms is increased
Typically lasts for up to 12 months and generally less damaging event than the stronger El Nino

Earlier this year, one group of researchers suggested that another natural cycle, the Atlantic Multidecadal Oscillation, was likely to hold temperatures steady for about the next decade, before reversing direction and allowing a renewed warming.

"The principal thing is to look at the long-term trend," said Dr Kennedy.

"2008 will still be significantly above the long-term average. There's been a strong upward trend in the last few decades, and that's the thing to focus on."

One of the starkest effects of rising temperatures has been the rapid loss of summer Arctic sea ice, which has accelerated since the year 2000.

Earlier in the year, there were indications that 2008 could see even more ice lost than in the record-breaking melt of 2007.

Currently, the ice appears to be holding together better than a year ago, although scientists are wary as much of it is relatively fragile ice that formed in a single winter.

Canadian authorities have just declared that the Northwest Passage is "navigable", though acknowledging that some parts of it still contain floating ice.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7574603.stm

Published: 2008/08/21 14:50:43 GMT

http://news.bbc.co.uk/2/hi/science/nature/7574603.stm

Black holes 'dodge middle ground'

For black holes, there appears to be very little room for mediocrity, astronomers have found.

A study suggests they come in either small or large sizes, but medium-sized ones are very rare or non-existent.

A team of astronomers has examined one of the best hiding places for a middleweight black hole, and found that it cannot possibly host one.

Details of the research are to be published in the latest issue of the Astrophysical Journal.

Black holes are incredibly dense points of matter, whose gravity prevents even light from escaping.

The least massive black holes known are about 10 times the mass of our Sun and form when colossal stars explode as supernovas.

The heftiest black holes are billions of times the mass of the Sun and lie deep in the bellies of almost all galaxies.

That leaves black holes of intermediate mass, which were thought to be buried at the cores of globular clusters.

Full of stars

Globular clusters are dense collections of millions of stars, which reside within galaxies containing hundreds of billions of stars.

Theorists argue that these clusters should have a scaled-down version of a galactic black hole. Such objects would be about 1,000 to 10,000 times the mass of the Sun - medium-sized as far as black holes are concerned.

Now, a team of astronomers led by Stephen Zepf of Michigan State University, East Lansing, has carried out a detailed examination of a globular cluster called RZ2109.

The researchers' work led them to the conclusion that it could not possess a medium-sized black hole.

"Some theories say that small black holes in globular clusters should sink down to the centre and form a medium-sized one, but our discovery suggests this isn't true," said co-author Daniel Stern of Nasa's Jet Propulsion Laboratory in Pasadena, California.

In a previous study, Dr Zepf and his colleagues looked for evidence of a black hole in RZ2109, located 50 million light-years away in a nearby galaxy.

Elusive quarry

Using the European Space Agency's (Esa) XMM-Newton telescope, they discovered the telltale X-ray signature of an active, or "feeding", black hole. But, at that point, they still didn't know its size.

Stephen Zepf and Daniel Stern then teamed up with other researchers to obtain a chemical fingerprint, called a spectrum, of the globular cluster, using the WM Keck Observatory on Mauna Kea in Hawaii.

The spectrum revealed that the black hole is petite, with roughly 10 times the mass of the Sun.

According to theory, a cluster with a small black hole cannot have a medium one, too.

"If a medium black hole existed in a cluster, it would either swallow little black holes or kick them out of the cluster," said Dr Stern. In other words, the small black hole in RZ2109 rules out the possibility of a medium one being there, too.

The study does not quite represent the end of the road for medium-sized black holes.

Zepf said it was possible such objects were hiding in the outskirts of galaxies like our Milky Way, either in surrounding "dwarf galaxies" or in the remnants of dwarf galaxies being swallowed by a bigger one.

If so, he said, the black holes would be faint and difficult to find.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7573364.stm

Published: 2008/08/20 22:30:54 GMT

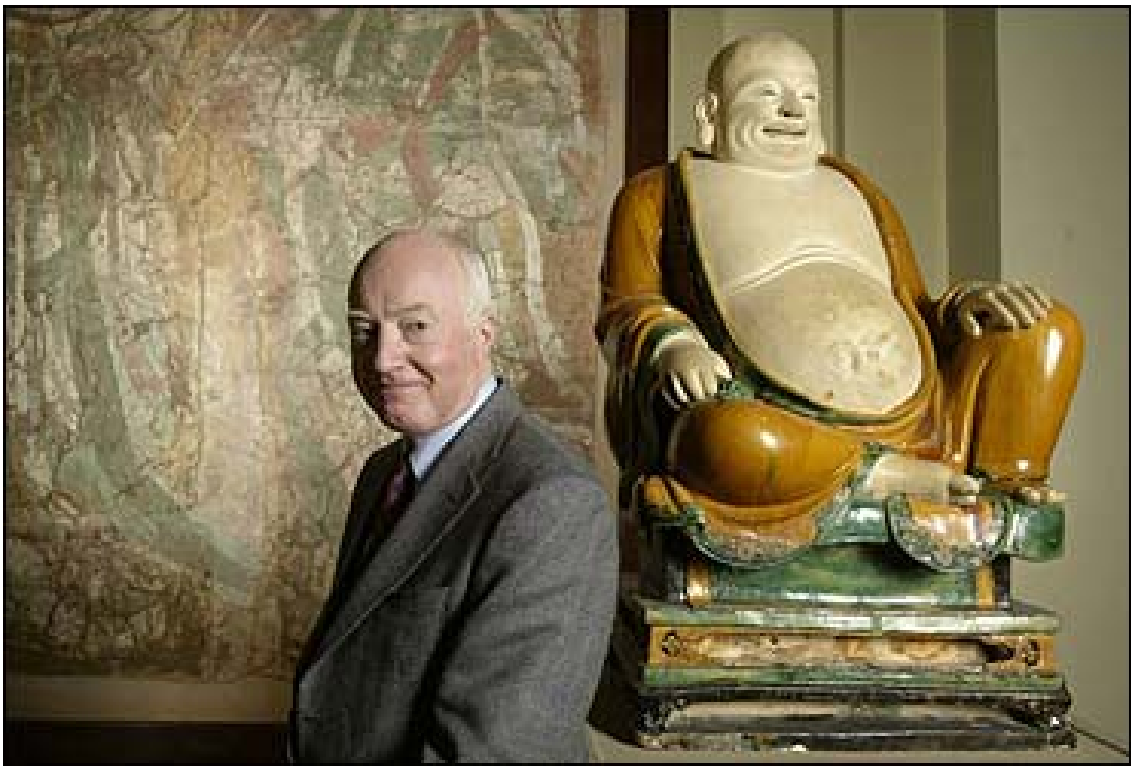
http://news.bbc.co.uk/2/hi/science/nature/7573364.stm

Gavin Menzies: mad as a snake - or a visionary?

Last Updated: 12:01am BST 01/08/2008
Page 1 of 3

His first book claimed that the Chinese discovered America. Now, in a controversial sequel, Gavin Menzies says they also sparked the Renaissance

Gavin Menzies does not look robust enough to take the brickbats that are surely coming his way.



Gavin Menzies: 'It is amazing how splenetic academics can be - such a different world from the Navy'

Six years ago, the retired submarine commander caused apoplexy among historians with his controversial theory that vast fleets of Chinese adventurers in multi-masted junks beat Christopher Columbus to the Americas and mapped the entire world centuries before the European explorers. It made him rich and infamous.

Whole websites sprang up devoted to debunking his claims. Scholars called him a fantasist.

Felipe Fernandez-Armesto, professor of history at the University of London, dismissed his book, 1421: The Year China Discovered the World, as "the historical equivalent of stories about Elvis Presley in Tesco and close encounters with alien hamsters".

But while boiling oil was being poured on him from the ramparts of academe, Menzies's book was surging up the bestseller list. It has sold a million copies worldwide, and run to 24 editions in 135 countries.

"I get criticised for being a charlatan and making millions," he says wearily. "But people are astute and if my theories were false and didn't stack up, I would soon know about it from the public."

Every day, 2,000 people go to his website, www.1421.tv - which was set up to deal with the response to the book - pouring in new evidence and ideas. "It is staggering," he says. "Conceited as it may sound, people now think of us as a centre for collating evidence on this period of European and Chinese history."

Menzies, 71, could have anointed his bruises, pulled up his stumps and gone to live in Venice on the proceeds of 1421, satisfied that his revisionist view of history had at least got a good airing.

Instead, he has ploughed his profits into more research and produced an equally contentious sequel, 1434, claiming that the Chinese, once again sailing under the eunuch Admiral Zheng He, sparked the Italian Renaissance and that Leonardo da Vinci's inventions were directly influenced by Chinese technical drawings.

While the eyes of the world are on the exploits of modern China as host of the Beijing Olympics, Menzies is providing the historical counterpoint. What drives him? Is he, as some critics have suggested, "mad as a snake" or a sincere visionary?

"I think one's got to hold on to one's nerve and keep going," he says. "Some of the attacks were vitriolic. I was accused of manufacturing the evidence. I got so ferociously attacked that I decided to defend myself by putting the new evidence on the website as it piles in.

" Much of the critical flak has come from the National University of Singapore and from academics in New Zealand. But Menzies has academic supporters, too, especially in China and America.

The worse the battering he gets from historians, the more people want to know what the fuss is all about. Advance warning of a television documentary called Junk History, shown by the Australian Broadcasting Corporation in 2006, prompted Menzies to alert the website's 13,000 subscribers.

"It was a carve-up," he says. "They completely tore me and my then publishers, Transworld, to shreds. We apologised to our website friends and said if you want to cancel your subscription, we will understand. Only one person cancelled.

That night, we had a huge number of new subscribers and sales of the book in Australia trebled, making it the biggest-selling history book in that country. People want to make up their own minds."

In 1421, Menzies argues that the 107-strong armada of Zheng He's sixth voyage of exploration reached Latin America, the Caribbean and Australia, circumnavigating the globe a century before Ferdinand Magellan, leaving wrecks and artefacts and establishing colonies.

He believes Columbus, Magellan and James Cook all had maps before they set sail - based on a Chinese original. The new book, 1434, is not so sensational but more far-reaching. In it, he contends that Chinese advances in science, art and technology - brought by a cultural delegation that sailed first to Cairo and arrived in Tuscany in 1434 - shaped the Renaissance.

"The idea that Europeans dreamed up everything in the Renaissance is just to make history more romantic," says Menzies. "There's going to have to be an agonising reappraisal of the Eurocentric view of history."

Under his urbanity there is a thin skin. "I got terribly upset when people called me a crank in the early

read.

But the Chinese went home, they didn't colonise the world. History wasn't affected. That was the end of it. So what?' But they handled it badly by trying to undermine me. The man in the street thought he'd better find out about this unknown writer."

It is easy to see why Menzies could be the victim of academic snobbery. He left school at 15, with no qualifications, to follow his father into the Navy, becoming a commander of submarines.

He became fascinated by Chinese navigation on a silver wedding trip to Beijing, where he first heard about Zheng He. His sprawling book on the subject took 11 years to write and was unpublishable.

But his agent refined it to the year 1421 and secured a £500,000 advance from Transworld, a colossal sum for the first-time author of a work of non-fiction. The usual advance for a history book is between £20,000 and £30,000.

"The response is fairly natural," he says. "If some university don had tried to lecture me on submarines, I would have said: Who is this screwball? I can understand their lack of enthusiasm. Also, if you have written about Columbus's discoveries and you are told he had a map, you would think: this is grotesque."

A further annoyance is that Menzies produces riveting reads with copious reference sources and appendices. "This kind of revisionist view of history is very popular and makes people think," says his literary agent, Luigi Bonomi.

"It probably does a lot more to inspire people to approach history than any dry academic tome, even if they disagree with his theory. Gavin is a phenomenon. He genuinely believes he is right and offers some very fascinating insights. People think he must be in the pay of the Chinese government but he pays for all his own flights. He is out there on a mission statement."

Menzies has been made an honorary professor of Yunnan University, in south-west China, and been given the freedom of the city of Kunming. He has carried out 62 major foreign tours - mostly to China, America and the Far East - since 1421 came out in 2002, and is in demand for speaking engagements.

Critics tried to stop his presentation to the Library of Congress in Washington in 2005 from going ahead, and security guards were doubled to prevent his talk being disrupted.

To date, 1421 has been the subject of eight television documentaries and is taught in some educational establishments - not as history but as liberal studies. Both 1421 and 1434 will be part of the Key Stage 3 history for 11-14 year-olds this autumn. The film rights of 1421 have been bought by Warner Bros.

Menzies's ordered life as a retired seaman has been turned upside down. He works harder, lives more healthily and spends alarmingly. "Before this book came along, I used to drink far too much, two bottles of vino a day. For the past six years, I have started work at 6am and gone through to 7pm. Boozing time is dramatically curtailed."

He has sunk almost £2 million into research. Recently, he commissioned radar studies off the coast of Oregon to establish whether a shipwreck identified by an American, Dave Cotner, is a Chinese junk.

The wood samples were in such poor condition it was impossible to tell, so Menzies is now faced with raising money for a complete excavation. "There's no end to it," he says.

Menzies and his Italian wife, Marcella, have been round the world six times in pursuit of his Chinese

adventure. Their five-storey north London home has become the hub of the history machine, with an entire room given over to files of evidence on the top floor and a team of four graduates working full-time in the basement.

"They have assembled into a coherent whole the avalanche of assorted evidence that pours in," he says. "They are head and shoulders better than I and my friends were at a similar age - we were mostly irresponsible drunken ruffians."

Some reviewers suggest that Menzies's strength is that he links known facts that no one has had the wit to put together before and comes up with something worth debating. Others have called his books a tower of hypotheses. But his brand of history as detective thriller, with clues being provided by a fascinated public, has its own peculiar momentum.

It was Henry Adams, the novelist and historian, who said that history will die if not irritated. "The only service I can do to my profession," he said, "is to act as a flea." Menzies is a very troublesome flea indeed, and possibly an important one.

• '1434: The Year a Magnificent Chinese Fleet Sailed to Italy and Ignited the Renaissance' by Gavin Menzies (HarperCollins) is available from Telegraph Books for £18 + £1.25 p & p. To order, call 0870 428 4112 or go to www.books.telegraph.co.uk

http://www.telegraph.co.uk:80/arts/main.jhtml?xml=/arts/2008/08/01/bomenzies101.xml

Public Art, Eyesore to Eye Candy

By ROBERTA SMITH

ART adores a vacuum. That's why styles, genres and mediums left for dead by one generation are often revived by subsequent ones. In the 1960s and '70s public sculpture was contemporary art's foremost fatality — deader than painting actually. The corpse generally took the form of corporate, pseudo-Minimalist plop art. It was ignored by the general public and despised by the art world.

At the time many of the most talented emerging sculptors were making anything but sculpture. Ephemeral installations, earthworks and permanent site-specific works were in vogue, and soon the very phrase "public sculpture" had been replaced by public art, an amorphous new category in which art could be almost anything: LED signs, billboards, slide or video projections, guerrilla actions, suites of waterfalls.

But over the past 15 years public sculpture — that is, static, often figurative objects of varying sizes in outdoor public spaces — has become one of contemporary art's more exciting areas of endeavor and certainly its most dramatically improved one.

To be sure, this new public sculpture is not always good. (Damien Hirst's "Virgin Mother" at Lever House comes to mind.) If this kind of work may not be batting much above .300, hits are happening, showing art's ability to reach larger audiences (as it satisfies its core one) and to create a communal experience that is in some ways akin to movies or popular music in its accessibility.

Some recent successes have included Rachel Whiteread's 1993 "House," a concrete cast of the interior of a London terrace house; Mark Wallinger's 1999 "Ecce Homo," a life-size figure of Jesus crowned with thorns, hands bound, standing amid the din of Trafalgar Square in London; Takashi Murakami's wicked aluminum and platinum leaf Buddha shown in the atrium of the IBM Building in New York in the spring; and Anish Kapoor's abstract "Cloud Gate," nicknamed the Bean, at Millennium Park in Chicago. Freely mixing elements of Pop, Minimalism, conceptual art and realism, these pieces also often benefit from new technologies and materials that make them dynamic and provocative. (Jean Dubuffet's giant,

cartoony “Group of Four Trees,” at 1 Chase Manhattan Plaza in Lower Manhattan, is a marvelous, unsung ancestor, but then it arrived in 1972, when sculpture was in an uproar.)

Certain artists may do their best work in the public arena. The Kapoor Bean’s giant, mercurylike dollop of brilliantly polished steel gives the phrase plop art robust new life and converts this artist’s sometimes glib involvement with reflective surfaces into an enveloping experience both humorous and almost sublime. From outside, the Bean’s curving exterior casts distorted reflections of its world — plaza, sky, city, people — back at us. It makes itself seem larger than it is by making us seem smaller, but its distortions change with every step we take, tilting the world this way and that, as if the universe were slightly adrift.

Beneath the sculpture is an arched space the size of a small chapel. Here the curving surface of the piece reflects itself, creating a dark violet cloudiness except at the highest point, which is reflection free. This small gleaming circle of silvery steel suggests a Baroque occulus letting in light; it has all the mysterious illusionism of a hole-in-the-roof church ceiling painted by Correggio but restated in modern, nondenominational terms.

No one has been more important to the revival of public art than Jeff Koons, contemporary sculpture’s genius lightweight, whose up-and-down, hellbent-on-perfection career is the subject of an illuminating if rather crowded survey at the Museum of Contemporary Art in Chicago. It was Mr. Koons’s giant “Puppy” — a West Highland terrier covered with dirt, planted densely with flowers and first shown 16 years ago — that broadcast most loudly and clearly that public sculpture was neither an exhausted form nor necessarily a dumbed-down one.

“Puppy” was well placed and well timed. It stood in the courtyard of a handsome, mustard-colored Baroque palace that framed it perfectly. It was June 1992, and a few miles away, in the German city of Kassel, the international megashow “Documenta 9” was opening. Scores of art-world denizens made the short schlep to Arolsen to see what Mr. Koons was up to.

What they found was a shocking simplicity, accessibility and pleasure. “Puppy” was intensely lovable, triggering a laugh-out-loud delight that expanded your sense of the human capacity for joy. It was a familiar, sentimental cliché revived with an extravagant purity, not with enduring materials like marble or bronze but with nature at its most colorful and fragile. The flowery semblance of fur made “Puppy” almost living flesh, like us.

The sculpture could also be read as a redemptive gesture, a kind of mea culpa after the sexually explicit harshness of Mr. Koons’s “Made in Heaven” series, exhibited the previous year at galleries in New York, Brussels and Lausanne, Switzerland. Four of these paintings hang in the Chicago show behind a wall flanked by dire parental warnings, showing them to be almost anti-public compared with most of his subsequent work.

“Puppy” also provided a karmic bookend for an occurrence that happened almost exactly three years before its Arolsen debut: the removal, in March 1989, of Richard Serra’s “Tilted Arc” from the plaza at the Jacob K. Javits Federal Building in Lower Manhattan. The dismantling came after a court ruling, complaints by the people who worked in the building — they hated the Serra — and days of acrimonious public hearings overseen by the General Services Administration.

“Tilted Arc” was in many ways the dark before the dawn not only of the Koons “Puppy,” but also of the shining achievement of Mr. Serra’s post-Arc work. He has in essence taken his revenge on the public by making stronger, more elaborate pieces that it could not resist — judging from how people line up these days to walk through his torqued ellipses, spirals and arcs.

The “Puppy” set a high standard that Mr. Koons reached again only with his recent works in gleaming high chromium stainless steel, especially his big hatched egg and his prim yet erotic “Balloon Dog”

sculptures. The dogs imbue a greatly enlarged child's party toy with the tensed stillness of an archaic Greek horse while subtly evoking various bodily orifices and protrusions. "Balloon Dog (Yellow)" is on the roof of the Metropolitan Museum of Art, where it draws crowds, functions as a photo op and yet retains its dignity. "Balloon Dog (Orange)" is among the Chicago survey's high points.

That show is almost a primer of dos and don'ts in public sculpture. The best of its 60 pieces have the same irresistibility of "Puppy": you are drawn to them by their familiarity only to realize that they are unprecedented. Spanning from 1979 to 2007, it has been organized by Francesco Bonami, the museum's former senior curator, and is the most comprehensive museum survey of Mr. Koons's career. It reveals an artist whose work has proceeded in fits and starts and has improved as it has shed its often abstruse conceptual, not so vaguely Scientological story line.

Mr. Koons's theme is transformation, enacted literally with familiar restated objects in uncharacteristic material or scale. It is a basic Pop Art strategy but much easier to pull off on canvas than in sculpture, where it requires a level of perfection, the pursuit of which has, at times, nearly brought Mr. Koons's art to a standstill.

The show demonstrates that his work has constantly returned to notions of weightlessness, floatation and levitation, often conflated with innocence, and that his progress has to some extent been a matter of getting his elaborate sculptural chops together. He broached weightlessness from the start, first with simple Duchampian ready-mades: plastic inflatable flowers and bunnies; vacuum cleaners set aglow by fluorescent light tubes and sealed in Plexiglas cases; and finally basketballs afloat, embryolike, in aquariums. In Chicago it is a little startling to see how much of middle-period Koons — the late 1980s bronze casts of an aqualung and life raft, the stainless-steel casts of portrait busts, a Baccarat decanter set or a miniature train (also liquor decanters) so central to his early reputation — now seems inert, heavy with irony, kitschy obviousness and sheer material. The most overt sign of the Koons to come is "Rabbit," the 1986 stainless steel cast of an inflatable bunny that joins weightlessness and reflectivity and remains his best-known work.

Mr. Koons's art enacts the basic exchange of public sculpture. We literally see ourselves in his alluring reflective surfaces; his buoyant forms reach deep into our childhood with its feelings of hope and optimism. At the moment his biggest projects include an enormous public sculpture commissioned by the Los Angeles County Museum of Art, which, echoing his stainless steel liquor train, will involve a locomotive suspended from a crane. He also has a show at Versailles opening Sept. 10 that could build on the felicitous placement of the Arolsen "Puppy."

Ever since Jasper Johns's flags and targets pointedly addressed the viewer with "things the mind already knows," much, maybe most art has set out one way or another to reach a broader audience more directly. The welter of strategies began simply enough, with the elimination of the sculpture's pedestal and the siphoning of images from pop culture, and it now extends to the Internet. The revival of public sculpture is perhaps only the latest ripple in this continuing wave, but it is also the most public. Its manifestations are out there and easy to find.

http://www.nytimes.com/2008/08/24/arts/design/24smit.html?_r=1&th=&oref=slogin&emc=th&pagewanted=print

Solar plane makes record flight

By Jonathan Amos
Science reporter, BBC News

Solar plane's 3 day flight

A UK-built solar-powered plane has set an unofficial world endurance record for a flight by an unmanned aircraft.

The Zephyr-6, as it is known, stayed aloft for more than three days, running through the night on batteries it had recharged in sunlight.

The flight was a demonstration for the US military, which is looking for new types of technology to support its troops on the ground.

Craft like Zephyr might make ideal platforms for reconnaissance.

They could also be used to relay battlefield communications.

Chris Kelleher, from UK defence and research firm QinetiQ, said Unmanned Aerial Vehicles (UAVs) offer advantages over traditional aircraft and even satellites.

"The principal advantage is persistence - that you would be there all the time," he told BBC News. "A satellite goes over the same part of the Earth twice a day - and one of those is at night - so it's only really getting a snapshot of activity. Zephyr would be watching all day."

Deployment close

The latest flight was conducted at the US Army's Yuma Proving Ground in Arizona.

The Zephyr flew non-stop for 82 hours, 37 minutes.

That time beats the current official world record for unmanned flight set by the US robot plane Global Hawk - of 30 hours, 24 minutes - and even Zephyr's own previous best of 54 hours achieved last year.

However, the Yuma mark remains "unofficial" because QinetiQ did not involve the FAI (Federation Aeronautique Internationale), the world air sports federation, which sanctions all record attempts.

The US Department of Defense funded the demonstration flight under its Joint Capability Technology Demonstration (JCTD) programme.

This programme is designed to advance the technologies American commanders would most like to see in the field.

"We think Zephyr is very close to an operational system - within the next two years is what we're aiming for," Mr Kelleher said. "We have one more step of improvements; we trying to design a robust and reliable system that will really sit up there for months; and we want to push the performance."

Energy density

The trial, which took place between 28 and 31 July, also included the participation of the UK Ministry of Defence.

The 30kg Zephyr was guided by remote control to an operating altitude in excess of 18km (60,000ft), and then flown on autopilot and via satellite communication.

It tested a communications payload weighing approximately 2kg.

At first sight, the propeller-driven Zephyr looks to be just another model aircraft, and it is even launched by hand. But this "pilotless" vehicle with its 18-metre wingspan incorporates world-leading technologies.

Its structure uses ultra-lightweight carbon-fibre material; and the plane flies on solar power generated by amorphous silicon solar arrays no thicker than sheets of paper. These are glued over the aircraft's wings.

To get through the night, the propellers are powered from lithium-sulphur batteries which are topped up during the day.

"A lot of effort has gone into power storage and light-weighting the systems," explained Mr Kelleher. "Lithium sulphur is more than double the energy density of the best alternative technology which is lithium polymer batteries.

"They are an exceptional performer. We've worked with the Sion Corporation. They've had them in development for years. We're actually the first application in the world for them."

Vulture venture

Zephyr has demonstrated that it can cope with extremes of temperature - from the blistering 45C heat found at ground level in Arizona's Sonoran Desert, to the minus 70C chill experienced at altitudes of more than 18km (60,000ft).

The engineers from the Farnborough-based company are now collaborating with the American aerospace giant Boeing on a defence project codenamed Vulture.

This would see the biggest plane in history take to the sky, powered by the sun and capable of carrying a 450-kilo (1,000lb) payload.

US commanders say the design must be able to maintain its position over a particular spot on the Earth's surface uninterrupted for five years.

QinetiQ is also developing UAV technology for civilian uses.

It has been working recently with Aberystwyth University on field monitoring trials, plotting areas of ground that may or may not need fertiliser applications.

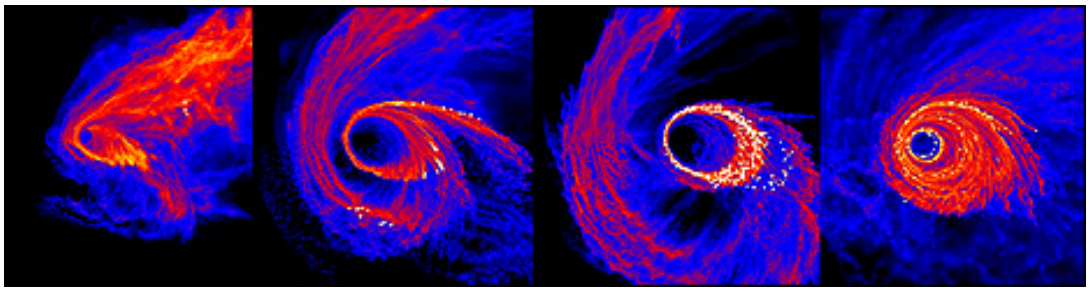
Lightweight plane (30-34kg/70lb) is launched by hand
Coms or surveillance payload of about 2kg (4.5lb)
Flies autonomously and can climb to more than 18km (60,000ft)
By day, Zephyr flies on solar power and recharges its batteries
Advanced amorphous silicon solar arrays supplied by Unisolar
Rechargeable lithium-sulphur batteries supplied by Sion Corp

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7577493.stm

Published: 2008/08/24 04:21:42 GMT

Black hole star mystery 'solved'

Astronomers have shed light on how stars can form around a massive black hole, defying conventional wisdom.



Scientists have long wondered how stars develop in such extreme conditions.

Molecular clouds - the normal birth places of stars - would be ripped apart by the immense gravity, a team explains in Science magazine.

But the researchers say stars can form from elliptical discs - the relics of giant gas clouds torn apart by encounters with black holes.

They made the discovery after developing computer simulations of giant gas clouds being sucked into black holes like water spiralling down a plughole.

"These simulations show that young stars can form in the neighbourhood of supermassive black holes as long as there is a reasonable supply of massive clouds of gas from further out in the galaxy," said co-author Ian Bonnell from St Andrews University, UK.

Ripped apart

Their findings are in accordance with actual observations in our Milky Way galaxy that indicate the presence of a massive black hole, surrounded by huge stars with eccentric orbits.

The simulations, performed on a supercomputer - and taking over a year of computing time - followed the evolution of two separate giant gas clouds up to 100,000 times the mass of the Sun, as they fell towards the supermassive black hole.

The simulations show how the clouds are pulled apart by the immense gravitational pull of the black hole.

The disrupted clouds form into spiral patterns as they orbit the black hole; the spiral patterns remove motion energy from gas that passes close to the black hole and transfers it to gas that passes further out.

This allows part of the cloud to be captured by the black hole while the rest escapes.

In these conditions, only high mass stars are able to form and these stars inherit the eccentric orbits from the elliptical disc.

These results match the two primary properties of the young stars in the centre of our galaxy: their high mass and their eccentric orbits around the supermassive black hole.

"That the stars currently present around the galaxy's supermassive black hole have relatively short lifetimes of [about] 10 million years, which suggests that this process is likely to be repetitive," Professor Bonnell explained.

"Such a steady supply of stars into the vicinity of the black hole, and a diet of gas directly accreted by the black hole, may help us understand the origin of supermassive black holes in our and other galaxies in the Universe."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7574255.stm

Published: 2008/08/23 04:07:36 GMT

Daily aspirin in middle-age call

Emma Wilkinson
Health reporter, BBC News

Men and women over a certain age should take aspirin daily to prevent heart attacks, experts say in Heart journal.

Nottingham and Sheffield universities' analysis of almost 12,000 patients found men from the age of 48 and women from 57 would benefit from the drug.

Heart attacks occur when a blood vessel is blocked by a clot, but aspirin makes it harder for blood clots to form.

The British Heart Foundation said more research was needed before "blanket prescribing" could be recommended.

> **We would encourage everyone to examine their own individual risk and take steps to reduce it by adjusting their lifestyle**
> Dr Mike Knapton
> British Heart Foundation

Under existing recommendations, a GP will prescribe the drug if a person has already suffered a heart attack or a stroke.

It is also prescribed if factors such as high blood pressure put a patient at high risk of having such an "event" in the next few years.

But the researchers said, in reality, many people are not treated.

Some have speculated it may be easier to treat everyone over a specific age threshold such as 50 years.

Risks

An analysis of almost 12,000 patients aged between 30 and 75 showed that by the age of 47 in men and 58 in women, the 10-year coronary heart disease risk is 10% - a risk worth treating, the researchers said.

At that point, unless someone is at risk of dangerous side effects because they have a condition such as a stomach ulcer, the benefits outweigh the disadvantages, they concluded.

But this did not apply to people with diabetes or those at high risk of bleeding, the researchers said.

Although diabetics are likely to benefit from aspirin treatment because of their high heart disease risk, the evidence is not yet quite clear, they added.

And in anyone over the age of 75 years, the decision whether or not to take aspirin must be made on an individual basis, because they are more likely to suffer bleeding complications.

Study leader Dr Iskandar Idris, an honorary senior lecturer at Sheffield University, said routinely prescribing aspirin in these age groups was a feasible option.

But he added: "The final decision about use of aspirin must eventually be made after discussion with a healthcare provider."

Dr Mike Knapton, director of prevention and care at the British Heart Foundation, said: "Currently the recommendations in the UK are that aspirin is prescribed after a full risk assessment under medical supervision to those who have established cardiovascular disease.

"Further robust research is needed before aspirin should be considered as a blanket primary prevention measure in the UK.

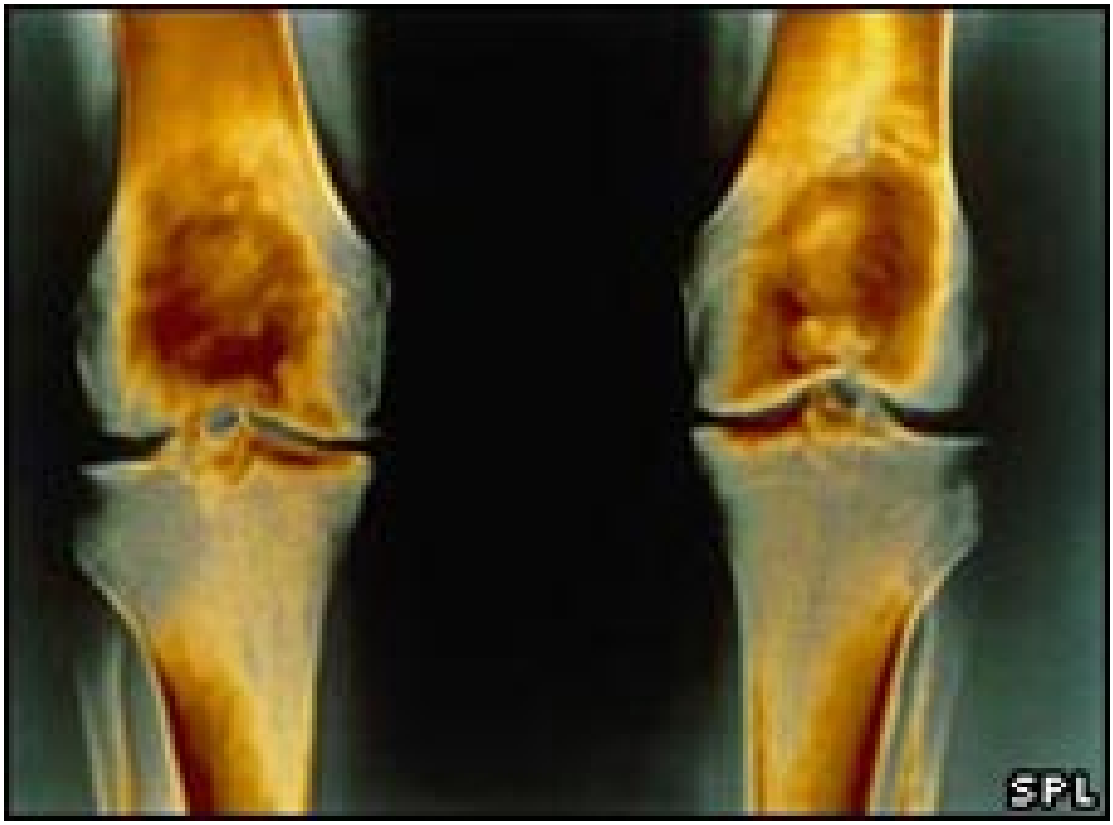
"We would encourage everyone to examine their own individual risk and take steps to reduce it by adjusting their lifestyle."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7576723.stm

Published: 2008/08/23 23:33:04 GMT

Hope over 'early arthritis test'

A new way of scanning joints which may reveal early warning signs of arthritis is being developed by US researchers.



The MRI scan looks for low levels of the chemical glycosaminogycan, which helps cartilage in joints hold the water that makes it tough and elastic.

New York University researchers told the American Chemical Society conference early diagnosis could reduce the need for surgery later in life.

The Arthritis Research Campaign said the scan could help assess treatments.

> **Our methods have the potential for providing early warning signs for cartilage disorders like osteoarthritis, thus potentially avoiding surgery and physical therapy later on**
> Dr Alexej Jerschow
> New York University

The weakening and breakdown of cartilage, which cushions the moving parts of joints, is a key factor in the development of osteoarthritis, which is common in the over-40s.

There are an estimated eight million people in the UK who have the problem in some form or another, and in severe cases patients can require constant painkillers or even joint replacement surgery.

Cartilage is tough and elastic because of its high water content, and existing MRI scans look for lower levels of this as a sign that the disease is developing.

The team is trying to spot the disease even earlier by looking for a substance called glycosaminogycan (GAG), which helps the cartilage hold plenty of water.

The scientists found a way to make the hydrogen atoms attached to GAG emit a signal which can be picked up by the scanner.

Dietary supplements

Dr Alexej Jerschow, one of the researchers, said: "Our methods have the potential for providing early warning signs for cartilage disorders like osteoarthritis, thus potentially avoiding surgery and physical therapy later on."

He said that a patient given early notice of impending arthritis could take steps to protect their joints, perhaps using dietary supplements such as glucosamine and chondroitin, which may be able to slow or halt joint degeneration.

The next stage now is to test the technique in trials.

However, Professor Alan Silman, the medical director of the Arthritis Research Campaign, said that the practical implications of the research were "currently very limited".

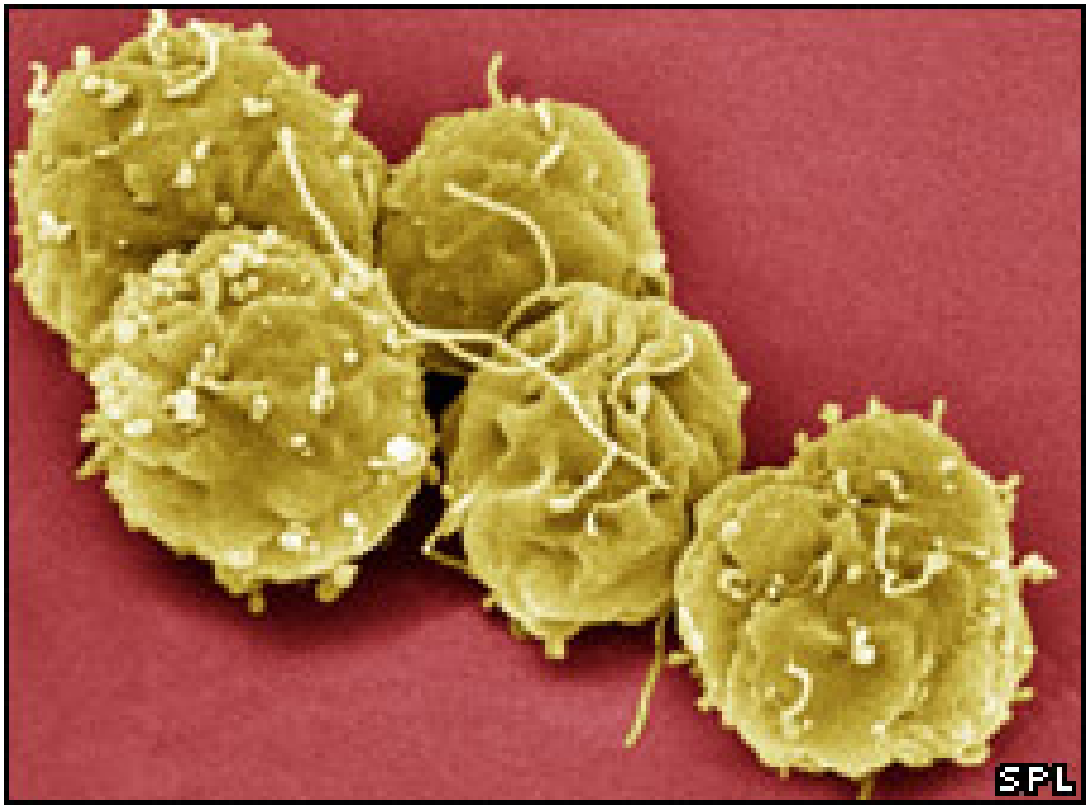
"Unfortunately at the moment there is no treatment that could be offered that would change the situation.

"What it may prove to be is a very sensitive test of drug treatment response as new agents are developed."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7574707.stm

Published: 2008/08/22 23:00:17 GMT

Stem cells 'created from teeth'



Japanese scientists say they have created human stem cells from tissue taken from the discarded wisdom teeth of a 10-year-old girl.

The researchers say their work suggests that wisdom teeth could be a suitable alternative to human embryos as a source for therapeutic stem cells.

Research involving stem cells is seen as having the potential to treat many life-threatening diseases.

But some people believe using human embryos is ethically controversial.

The researchers, based at the National Institute of Advanced Industrial Science and Technology (AIST), say it will be at least five years before their findings result in practical medical applications.

Dual benefit

Stem cells have the ability to develop into other kinds of human cells, and experts believe they may eventually lead to treatments for some of the most intractable conditions, such as cancer and diabetes.

The AIST researchers said they had identified a form of stem cell in the wisdom teeth which had the capability to develop and be grown successfully into other forms of cell outside the body.

The cells they harvested continued to grow in the laboratory for just over a month, they added.

The leader of the team, Hajime Ogushi, said the research was significant in two ways.

"One is that we can avoid the ethical issues of stem cells because wisdom teeth are destined to be thrown away anyway," he told the AFP news agency.

"Also, we used teeth that had been extracted three years ago and had been preserved in a freezer. That means that it's easy for us to stock this source of stem cells."

In the US, dentists are starting to offer to store stem cells taken from wisdom teeth and from baby teeth, another potential source, for therapeutic purposes in the future.

Last year, a team of US and Japanese scientists announced they had managed to produce stem cells from skin.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/asia-pacific/7576131.stm

Published: 2008/08/22 10:45:59 GMT

Positive thinkers 'avoid cancer'

Women who have a positive outlook may decrease their chances of developing breast cancer, say Israeli researchers.

The small study, published in the BioMed Central journal, also found that getting divorced, or being bereaved could increase the risk.

But the researchers admitted that women were questioned after their diagnosis, which might significantly change their outlook on life.

UK experts said it was hard to compare different women's emotional stresses.

> **Emotional stress is highly subjective and is difficult to measure accurately**
> Dr Sarah Cant
> Breakthrough Breast Cancer

The role of mental outlook on cancer remains controversial, with some studies suggesting that it might play a role.

Meanwhile, others have found no significant effect, either on the likelihood of developing the illness in the first place, or on your chances of surviving it.

The latest study looked at 255 women with breast cancer and compared their answers in a questionnaire on mental outlook and life events with 367 healthy control subjects.

They found that a generally positive outlook appeared to reduce the chance of breast cancer by a quarter.

In addition, exposure to one or more of the traumatic "life events" such as loss of a parent or a spouse increased the risk by more than 60%.

Lead researcher Dr Ronit Peled, from Ben-Gurion University, said that women who had been exposed to a number of negative events should be considered an "at-risk" group for breast cancer.

"We can carefully say that experiencing more than one severe and/or moderate life event is a risk factor for breast cancer among young women.

"On the other hand, a general feeling of happiness and optimism can play a protective role."

'Complex disease'

But Dr Sarah Cant, from Breakthrough Breast Cancer, maintained that there was no clear evidence that positive or negative experiences could affect breast cancer risk.

"Emotional stress is highly subjective and is difficult to measure accurately.

"Women in this study were interviewed after breast cancer was diagnosed when they may be more likely to recall feeling depression and anxiety.

"The researchers also didn't account for other factors known to affect breast cancer risk such as family history or weight.

"Breast cancer is a complex disease and there is unlikely to be one single cause."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7574938.stm

Published: 2008/08/22 10:10:15 GMT

The Locavore's Dilemma

In planning a diet based on global concerns, sometimes it's better that there are miles to go before you eat.

- By: Joan Melcher | August 21, 2008 |

You may have estimated your own carbon footprint, but do you know the footprint of that apple you're about to buy?

Do you know its food miles?

The term *food miles* — the distance food travels from production to plate — was coined by a British professor in London in the 1990s. A related word emerged in 2003 when four women in California's Bay Area declared themselves "locavores" — people who eat food grown within their locale.

The main idea: to ensure freshness, support local producers and slash the average number of miles food travels from farm to dinner table from an average of 1,500 to something like 56.

Locavore had legs. A mere three years later, it was *The New Oxford American Dictionary*'s 2007 word of the year. Trendy restaurants were quick to tout their use of locally grown food. New farmers' markets sprouted, and old ones blossomed. Food miles and the benefits of keeping food production close to consumption became concepts worthy of study in agriculture and environmental studies programs throughout the country.

But *locavore* is not a new idea. Back in the old days, Grandma spent weeks putting up canned fruits and vegetables and kept a cellar for root crops. She was the ultimate locavore.

Grandma didn't have much of a choice if she wanted to keep fruits and vegetables in her diet over the winter. Some might say the complexity of the food system and the choices we have today are part of the problem — not only in evaluating the increasing distances our food travels but in the larger picture of its carbon footprint, which *really* gets complicated.

A more pertinent measure of agriculture's impact on the planet than food miles, some researchers say, is to look at greenhouse gas (GHG) emissions associated with the entire food delivery system.

Two researchers at Carnegie Mellon University in Pittsburgh found, while analyzing the whole food cycle — from production of fertilizer for crops to that steamed veggie on your plate — that food miles contributed about 11 percent of total GHG emissions. Production was responsible for about 83 percent of the total, and final delivery from producer to retailer was responsible for about 4 percent.

Authors Christopher L. Weber and H. Scott Matthews wrote in *Environmental Science & Technology* that different food groups have widely varying ranges of GHG intensity. Red meat, for example, is about 150 percent more GHG intensive than chicken or fish.

If you want to address global warming, they concluded, you would do better to modify your diet to limit red meat. Just shifting fewer than one day a week from red meat and dairy products to chicken, fish, eggs or a vegetable-based diet will result in more GHG reduction than buying all locally sourced food.

Talk about taking the air out of a locavore — how can not transporting food 1,500 miles, processing and packaging it and refrigerating and storing it for days have so limited an impact, one might ask?

One answer is that the Weber-Matthews study didn't break down the 83 percent of production costs, and many of those costs fall when food is grown and sold locally and fall even more when it is grown organically.

The GHG emissions tally in the Weber-Matthews study included methane and nitrous oxide emissions from cattle operations — which, together, are much higher than carbon dioxide emissions. Also included were emissions from gas-fired power plants for nitrogenous fertilizer production and transportation.

This would not be a factor in an organic farm, say locavores (who tend to support organic farms, most of which produce their own fertilizers). They also could argue that the costs of refrigeration — both for transport and in the home — are less with locally purchased food, as are processing and packaging costs.

An Earth Policy Institute report released in 2005 analyzed energy use (as opposed to the broader analysis of GHG emissions). The study by Danielle Murray revealed growing food accounts for 21 percent of the 10 quadrillion Btu the U.S. food system uses each year. Murray breaks the remaining 79 percent into home refrigeration and preparation (a surprising 31 percent); processing (16 percent); transport (14 percent); packaging and restaurants (7 percent each); and food retail (4 percent).

Founded in 2001 by Lester Brown and Rhea Janise Kauffman, the Earth Policy Institute prepares studies and publishes books on sustainable systems with an emphasis on agriculture and renewable energy.

Janet Larsen, director of research for the organization, deems the Weber-Matthews report "an important contribution" to the food cycle debate, although she points out that the authors drew data from 1997 and noted in the study that food miles have increased since that time. Increasingly, she said, it's becoming clear that the GHG emissions associated with eating high on the food chain are the main problem when considering global warming.

Like others studied on the topic, Larsen believes food miles still have a role to play in the general debate. "There's so many reasons to go local, and food miles is one of them," she said. "For many people, the bigger draw is knowing where your food is coming from — and also taste and nutrition values."

Some are holding up the food miles concept to carbon footprinting and finding surprising dichotomies. The British Broadcasting Company recently posted a story by Caroline Stacey on its Web site that analyzed Britain's food cycle — a third of the carbon footprint of United Kingdom households.

Stacey noted that one report suggested growing tomatoes in Spain and importing them by lorry is more energy efficient than growing them in a heated greenhouse in the U.K. Another study — by Lincoln University in New Zealand — "concluded that rearing and distributing British lamb produces more CO2 emissions than importing the meat 11,000 miles by sea."

The reason: New Zealand farmers use more renewable energy and less fertilizer.

The Carbon Trust, a government-funded independent company in the U.K., has developed a label that will show carbon emission in grams. Walkers brand cheese and onion crisps are the first to be adorned, but smoothies are also being measured, and Stacey reported that it's been shown that only a quarter of the carbon emission tally on a mango and passion fruit smoothie can be attributed to the fruits' journey from India. (Food miles would be in the thousands.)

This would seem to jibe with the Weber-Matthew report and others in terms of carbon footprint since international transport has a relatively low percentage of the carbon footprint when considering overall costs of production. Unlike most fruit, mangoes don't require air transport; they can come by boat, which releases about 0.2 per million ton-kilometer GHG emissions as compared to the 10 per million ton-kilometer attributed to air travel.

Amid all of this information, taking a trip to the grocery store can be a little disconcerting. The food cycle and its attendant costs are so complicated they would try the patience of Job.

What Can You Do?

Say you're looking to lower your food's carbon footprint.

You want to buy an apple. But fruit has a fairly high carbon footprint because of the need — with fresh and frozen produce — for refrigeration. The plus side with fresh fruit: no need for packaging or processing. Many apples readily available today are grown in New Zealand; you opt for the American apple, which only had to be trucked, not flown, saving big in food miles but not necessarily in carbon footprint. (The BBC story noted that although air-freighted produce accounts for less than 1 percent of total U.K. food miles, it is responsible for about 11 percent of the total GHG emissions.)

You also have been hungry for a good old hamburger. Do you buy the beef raised organically, frozen and shipped 2,000 miles? Or do you buy the conventionally raised beef that is freshly ground and comes from a few hundred miles away? Remember, organic growing has a lower carbon footprint, and refrigeration is expensive. Or do you skip that and go with chicken or tofu, as recommended by Weber and Matthews?

Months pass, and it's winter. You're really hungry for a cherry. You don't want to buy those tempting cherries flown to California from New Zealand and trucked from there.

If you're altruistic, you may shrug off the cost of air transport because New Zealand is generally more environmentally conscientious in agriculture and uses renewable energy.

Other factors come into play as well. About 1 million African farmers' incomes are tied to global sales of fruits and vegetables. Do you really want to penalize the poorest producers in the global economy to lower your food's carbon footprint? What do you suppose those African farmers' carbon footprint is?

You could try a canned or frozen fruit grown on this continent, but you wouldn't be saving a whole lot in GHG emissions because of the costs of processing, packaging and, for the frozen goods, constant refrigeration. (Don't forget refrigeration is a key part of energy use, and trucking accounts for about 39 percent of the GHG emissions in the Weber-Matthews study.)

If you want to really get serious and eliminate the general confusion, you could be like Grandma and grow your own fruit and vegetables or buy them in bulk and can them yourself.

Of course, you'll have to buy a whole lot of jars, prepare to pay a higher utility bill, acquire some new skills and take a month or more off from your job.

Did I say this was going to be easy?

Locavore or carbon footprint: Pick your passion.

http://www.miller-mccune.com/article/554#

No Weighting

Oregon researchers develop counseling approaches that reduce anorexia, bulimia and obesity among young women — apparently for years.

- By: Valerie Brown | August 14, 2008

BrandXPhotos/Newscom

If an alien were to tune in to an Earth television broadcast, it would gain an impression of humans as very thin yet very muscular, with prominent cheekbones and jaw lines, sculpted torsos and long, shapely legs. If the alien then landed on the street of nearly any American city, it would be in for the shock of loose clothing and guts peeking out from under T-shirt hems. This extreme discrepancy — between the norm of form and figure and what our culture and media offer up as the ideal — is the source of much emotional pain and huge social costs.

The conventional wisdom is that fatness is a simple function of the first law of thermodynamics: There must be a balance between energy intake (food) and energy expenditure (exercise). And in America, it is deeply and widely held that anybody out of balance on the intake side is a slovenly weakling. Thin people must be stronger, smarter and more disciplined than the fat. As the saying goes, "You can never be too thin or too rich."

Experts know, though, that many factors influence the thermodynamic equation, including mood, self-image, genetics, chemical exposure, brain chemistry and cultural norms. And there is a connection, not yet fully understood, between the pressure to be thin and the perception of being fat. In some people, primarily young women, negative body images give rise to extreme attempts to conform to the "thin ideal of female beauty."

Science has thus far failed to find preventions or cures for obesity or eating disorders. But a simple and inexpensive treatment may transform the landscape. Clinical psychologist Eric Stice and his colleagues at the Oregon Research Institute in Eugene have developed two group-counseling interventions that reduce the risk for eating disorders and obesity. If the interventions can be refined and widely disseminated, Stice says, "we could reduce the health care expenses in America by a very big amount."

The ORI study recruited 481 female high school and college students who felt dissatisfaction with their bodies — a purposely nonspecific criterion — but who did not have an eating disorder and were not obese. As reported in the April *Journal of Consulting and Clinical Psychology*, the participants were divided into four groups. In one of two experimental groups — called the healthy-weight intervention — the subjects learned about metabolism, nutrition and exercise and were encouraged to think carefully about what they ate, rather than taking an easy but unhealthy option (such as having a pizza delivered to the dorm instead of going to the cafeteria salad bar).

In the other experimental group — known as the dissonance intervention — counselors led participants through a script designed to induce cognitive dissonance. A technique in widespread clinical use as a treatment for a number of psychological disorders, cognitive dissonance is a mental state in which a person realizes that there is a logical conflict between a belief and a behavior. Thus, if girls aspire to the thin ideal but simultaneously understand that is actually unattainable and will not make them happy, they run head-on into cognitive dissonance. For this study, the dissonance-group participants came up with arguments against the thin ideal; role-played a conversation they might have with a younger girl to dissuade her from trying to attain the thin ideal; and took a variety of actions related to society's judgment of thinness, such as placing anti-thin-ideal posters in school bathrooms and confronting peers who bullied or teased others about fatness. There were also two control groups in the experiment whose activities were not designed to control obesity or eating disorders directly.

Each of the four groups met for only three one-hour sessions, with follow-up interviews at six months and then annually for three years. Participants' current behaviors and emotional states, as well as their risk of developing an eating disorder, were evaluated in the follow-up interviews via standardized psychological tests. Even after three years both experimental groups showed striking differences from the controls: In the healthy-weight group, there was a 61 percent reduction in the risk of developing an eating disorder and a 55 percent reduction in the risk of obesity; in the dissonance group, there was a 60 percent reduction in the risk of developing an eating disorder.

Anorexics starve themselves. Binge eaters overeat to an extreme degree. Bulimics binge and then purge by vomiting or using laxatives. Although not everyone who is obese has an eating disorder, binge eating, Stice says, is a "huge driving force of obesity." Anorexia, bulimia and obesity all pose huge health risks and exact huge health costs from the economy.

According to the World Health Organization, in 2005, there were approximately 1.6 *billion* overweight adults worldwide, including 400 million obese adults. Obesity is a risk factor for most of the killer diseases of modern industrialized nations, including cardiovascular problems, cancers and diabetes.

About 3 percent of the U.S. population — that is, some 9 million people — are binge eaters, 1 to 3 percent are bulimic and 0.3 to 1 percent are anorexic, according to the Academy for Eating Disorders, a nonprofit professional organization based in Deerfield, Ill. The percentage of the population with subclinical and/or intermittent manifestations of these disorders is unknown but estimated to be much higher. Up to 20 percent of young women engage in "unhealthy patterns of dieting, purging and binge-eating," the academy says. Left untreated, about 20 percent of people with serious eating disorders die, according to Anorexia Nervosa and Related Eating Disorders Inc.

While eating-disorder therapies seek to relieve sufferers of the shame and excessive sense of guilt for what appears to be compulsive behavior, the underlying theory still relies on that pesky law of thermodynamics. The field has yet to address emerging evidence that environmental exposures, especially

in the womb, can affect appetite and metabolism. "The bottom line is if you're overweight, you're not balancing input and output," Stice says.

Yet a number of studies have shown that prenatal chemical exposures can lead to adult-onset obesity independent of energy intake and expenditure. For example, a study by Retha Newbold, a researcher in the Laboratory of Molecular Toxicology of the National Institute of Environmental Health Sciences, found that mice exposed to diethylstilbestrol in the womb or as newborns became obese even though they ate and exercised as much as the control mice. And molecular biologist Bruce Blumberg of the University of California, Irvine has shown that prenatal exposure to the hormone-disrupting chemical tributyltin produces a propensity toward obesity in mice.

These studies have convinced Blumberg that exposure to certain environmental chemicals or estrogen "permanently alters the way an individual processes calories such that there is a predisposition to weight gain." Failing to account for the profound effects of such environmental influence on an individual's weight fate is "to put one's head in the sand," Blumberg says.
Some psychologists and psychiatrists, meanwhile, are exploring brain chemistry to identify mechanisms driving the painful emotional states of people with eating disorders. In brain imaging studies, Walter Kaye, a psychiatrist at the University of California, San Diego and a board member of the National Eating Disorders Association, has found that serotonin receptors in brain regions involved with the experience of reward may be faulty in people with eating disorders. Stice also has data from a functional magnetic resonance imaging study now under peer review that shows obese subjects are deficient in the neurotransmitter dopamine, which regulates motivation, emotion and the experience of pleasure.

With the chemical and theoretical underpinnings in flux, many mental health professionals believe that proving the causes of compulsive eating behaviors and obesity is less important than finding ways to stop them. The cognitive dissonance approach appears to be extremely effective. Moreover, the protocol for facilitating a dissonance group is easy to learn. According to Stice, the dissonance program has been replicated in seven other labs and been administered by school nurses. "Real world school staff can recruit (participants) and lead this intervention, and it seems to work," Stice says.

Carolyn becker, an associate professor of psychology at Trinity University in San Antonio, Texas, has taught the dissonance protocol to undergraduates who have successfully led interventions with peers who have eating disorders. She has also hit upon an effective method of distributing the treatment to the adolescent and young adult women at highest risk of developing eating disorders: She's taught it in sororities. First she worked with sororities at Trinity University; the response was so positive that some of them now require the training every year for new pledges. About three years ago, the national organization of Delta Delta Delta (Tri-Delt) became interested in the intervention and now runs the program at a dozen chapters across the country.

Becker sees sororities as an ideal network for distribution of the dissonance method of preventing eating disorders, not because sororities are full of women with anorexia and bulimia but because they are strongly bonded national networks that encourage members to serve the wider community. The Tri-Delts are contemplating deploying members trained in the program to high schools to intervene earlier against the thin ideal and warn young women about the torment of body image shame. One 16-year-old girl liked her experience in the ORI dissonance group because "they were trying to tell girls it's OK to be who they are, and they don't need to be super skinny. I think a lot more people should (experience the intervention) if they have any concerns."

Although further research will presumably refine and clarify the way the healthy-weight and dissonance interventions exert their apparently long-lasting effects, Stice confesses to feeling very excited about his results to date. "There's reason for optimism with regard to preventing the onset of obesity and eating disorders," he says. "Three years ago, I had a lot less confidence in that ever working out."

http://www.miller-mccune.com/article/577

Burning Down the House to Keep Warm

Only a fool would support expanded domestic exploration — offshore or elsewhere — under the Bush administration's dysfunctional energy policies. Here's how those policies need to change for America to responsibly find the energy it needs.

- By: Hal Herring | August 19, 2008

Antelope at a Shell natural drilling site in Pinedale, Wyo.Zumawirewestphotos/Newscom

During the first weeks of June, a barrage of editorials appeared in newspapers across the U.S., all with a theme: It is time to develop America's domestic energy resources, too long shut away by bans or restrictions. Gasoline prices hovered around $4 per gallon, which seemed to be the proverbial tipping point where concern turned to fear. Whirlwinds of information and misinformation swept the land, along with dust devils of blame.

George Will penned a column for *The Washington Post* titled "The Gas Prices We Deserve," denouncing anyone who questioned the need for more domestic drilling. Like many of my neighbors in Augusta, Mont., I received a petition called "Drill Here, Drill Now, Pay Less" from a group called American Solutions for Winning the Future. The literature accompanying the petition featured former House Speaker Newt Gingrich, who wrote that member s of Congress who opposed increased development "won't accept the idea that 21st century energy technology can protect the environment." Actor Chuck Norris appeared in one ad, seeming exasperated as he filled a big pickup truck with gas and told viewers to sign the American Solutions petition to Congress.

Along the way, President Bush lifted a White House ban on most offshore drilling, and Republican presidential candidate John McCain pushed Congress to legislate an end to its 1981 drilling moratorium.

Even some advisers to Democratic candidate Barack Obama were saying Republicans had scored political points by advocating for more domestic exploration during the gasoline price crunch.

But in this case, the politics of the moment are based on utter delusion. The recent record of the energy industry and the federal government in regard to domestic production is so poor — the system for balancing the need for energy with environmental protection and economic common sense has become so utterly dysfunctional — that until the system is fixed, no rational person with knowledge of it could in good conscience support expanded exploration.

So far, the major effects of this dysfunction have been hidden away in the relatively empty spaces of the American West, on the austere sagebrush steppes of Wyoming, in the foothills of some of the less visited parts of the Colorado Rockies, amid the deserts of New Mexico. But the Bush administration's many counterproductive gifts to industry — the exemptions from the Clean Water Act and the Safe Drinking Water Act, the mandates to ignore protections for wildlife and public lands, the insistence that the energy industry have priority over every other use of every last bit of public land — have been absolutely poisonous. The fouling of streams, rivers and groundwater and the destruction of land and the wildlife that depends on it have raised an outcry, even in the Interior West, that conservative, politically quiescent land of utilitarianism and natural resource economies.

Until now, it's been, literally, a protest in the wilderness.

But if those calling for expanded domestic energy exploration have their way, the dysfunction of U.S. energy policy will come not only to the Florida and California coastlines but also to new gas fields in Pennsylvania, West Virginia, Kentucky and Alabama. And when the unchecked exploitation that is the norm in the West arrives in the rest of the country, there will be a storm of outrage, an environmental disaster or both. The current policies - which maximize waste and environmental destruction while minimizing benefit for everyone except energy companies - will simply not be tolerated. We might as well change them now, without wasting time, and get on with developing our domestic resources in a sensible manner that could be, but is not now, supported by federal policy or the debased culture of the executive branch agencies that carry it out.

Although the energy industry regularly decries the supposed restrictions it faces on the production of domestic energy, a variety of authoritative sources note that about 88 percent of all federal lands are open to oil and gas leasing, with 63 percent available for lease without restriction. Just 12 percent of public land is unavailable for energy exploration, mostly because it is in national parks or designated wilderness areas.

According to a report from U.S. Rep. Nick Rahall, D-W.Va., who chairs the House Committee on Natural Resources, 47.5 million acres of onshore public lands had been leased to energy companies by early 2008. Some 13 million acres of those leases, almost all of them in the Rocky Mountain West, are now under development, with 65,591 producing wells on public land. Colorado's natural gas production alone has increased by 500 percent since 1990. For nine years in a row, Wyoming has increased its natural gas production, producing a record-setting 2.11 trillion cubic feet of gas in 2006. (The entire U.S. production equaled 18.47 trillion cubic feet; the nation consumes about 21.65 trillion cubic feet annually.)

During all this time of vastly increasing production in the Rocky Mountain states, the price of natural gas has also increased by about 500 percent. This situation has been called the "natural gas treadmill" by some analysts, because even as industry develops new ways to extract gas, overall production in big producing states like Louisiana is declining.

The "treadmill" is powered by factors other than falling production from older gas fields: One is a U.S. energy grid that operates at extraordinarily primitive levels of efficiency. One-third of all natural gas used in the country is burned to generate electrical power, but according to Colorado energy analyst Randy

Udall, the most advanced natural-gas-fired power plants in the U.S. operate at only 55 percent efficiency. Most gas power plants waste two-thirds of the gas that goes into them.

Meanwhile, the history of efficiency standards for appliances like air conditioners, clothes dryers, furnaces and boilers makes tedious and frustrating reading. Approved by Congress in 1987, the standards are supported by almost everyone from The Dow Chemical Company, which uses tremendous amounts of natural gas in its business, to manufacturers of appliances, who worry that states will eventually have to take over regulating the standards themselves, creating a dreaded collage of conflicting regulations.

But through three different presidential administrations, the Department of Energy, which has final say in enforcing the efficiency standards, has fallen down on the job. Under President George W. Bush, the DOE has held the line at a standard of 80 percent efficiency for natural-gas-fired home furnaces, even as consumers faced with record power bills flock to purchase new models that burn 90 percent or more of the gas that goes into them. The only efficiency standard the Bush administration DOE has enacted is one affecting air conditioners, and the one it chose mandates a 20 percent increase in efficiency rather than the Clinton-era demand for 30 percent (which was never put into place). The difference between those efficiency levels is the amount of electrical power that would be produced by 12 new 400-megawatt power plants. And this is just air conditioners.

In effect, the U.S. has engaged in a crash program to lease the public lands of the West, limit or eliminate regulations on drilling them and bring as much natural gas to market as quickly as possible - only to squander any advantage the additional production might have brought. "By very narrowly focusing on drilling," Udall says, "we are making a choice of using energy instead of ingenuity."

Hunting guide, cattle rancher and former Chevrolet dealership owner Alan Lackey of Roy, N.M., who has been a leader in fighting for the protection of wild lands in the face of unrestricted drilling, puts it this way: "This is a giveaway of public resources at the cost of every other value we hold. The whole plan is like burning down your house to keep warm for one night."

In the late summer of 2003, the White House told employees of the Bureau of Land Management and other federal land agencies to institute new policies aimed at "reducing or eliminating impediments to oil and gas leasing." Among those impediments were protections for wildlife on public lands, which, the orders said, "should be the least restrictive necessary." Given that the BLM is responsible for 258 million acres of federal land, the new mandates were extraordinarily wide-ranging. At first, though, most people in the West thought that there were enough checks in the system to prevent serious problems. The laws to protect wildlife still existed, for instance, and the BLM was still staffed, supposedly, by professional land managers.

In Wyoming's Green River Valley, some of the most famous and healthiest wildlife country left on the planet, the BLM took the new energy mandates to heart, to an extent that residents — mostly hunters and fishermen, ranchers with grazing leases or others with interests on the land — could not have imagined. According to an analysis by the nonpartisan Wildlife Management Institute, the Pinedale, Wyo., field office of the BLM quickly began granting energy companies exemptions to long-standing rules to protect the enormous wildlife resources of the area, which serves as the winter range for as many as 6,000 mule deer and 3,000 pronghorn antelope. The greater sage grouse, already extinct over much of its range and severely threatened in most of the rest, maintained a stronghold here, with as many as 4,000 birds gathering each spring for the extravagant courtship displays that led the Shoshone to name the Green River *Seeds-kee-dee-Agie* ("the river of the prairie grouse") and that have fascinated almost every white traveler in the region since Lewis and Clark.

Yellowstone ecosystem.Krtphotoslive/Newscom

In 2003, the Pinedale office granted 80 percent of the requests by industry to drill the rich natural gas resources in the designated "critical winter range" of what locals call "the Mesa" and the energy industry

calls "the Pinedale Anticline." Even though the sage grouse was widely recognized to be in severe decline across the West, every request for exemption from rules designed to protect sage grouse was granted. By the end of 2005, biologists counted 11,000 vehicle trips in one month on the roads built to service the growing matrix of wells on the Mesa, where there had been no roads and access was severely restricted to protect wintering wildlife.

The Jonah natural gas field, in Wyoming's upper Green River Valley, at the southern end of the greater The results were predictable. By 2006, a five-year study conducted by biologist Hall Sawyer and partly funded by energy companies concluded that the mule deer herds on the Mesa had declined by 46 percent during the course of the development. Pronghorn antelope studies faltered; all the animals had disappeared.

By 2006, biologist Matt Holloran concluded his research in the Pinedale area and found that the development made it impossible for the sage grouse to survive. "Energy development and sage grouse just don't mix," Holloran says. "The sage grouse is not one of these iconic Western species, I know, but it is the ultimate sagebrush obligate. As the grouse goes, so goes the sagebrush [ecological] community, and that includes all your big-game species and the predators they support."

About 4,000 more wells are planned for the Mesa.

Unless you live in the West, you are probably unaware of the boom there in the harvesting of coal bed methane, which involves the high-pressure injection of "fraccing fluids" into subterranean coal seams. This process fractures the seam so underground water, which often contains high levels of salt and other minerals, can be pumped out, freeing valuable gas formerly trapped in the seam. The gas is then collected on the surface.

This technique was developed by the Halliburton Company in 1949, and Halliburton remains one of the top three companies involved in hydraulic fracturing technologies. According to a comprehensive 2004

story by Tom Hamburger and Alan Miller in the *Los Angeles Times*, Halliburton's original fraccing fluids were a mixture of napalm, gasoline, crude oil and sand. Since then, various substances have been employed to fracture the coal seams, but diesel fuel mixed with water and sand (which sticks in the fractures, keeping them open so gas will flow) has often been used. According to the New Mexico-based Oil and Gas Accountability Project, a citizens' group based in Durango, Colo., EPA investigators have found a more exotic brew of chemicals — including benzene, naphthalene and fluorines — in the fluids. The EPA says its studies show that about half the time, these chemicals entered groundwater following the fraccing procedure.

Nevertheless, the EPA issued a decision in 2004 holding that the process posed no threat to drinking water supplies. This decision led to a whistleblower complaint from senior engineer Weston Wilson in the Denver offices of the EPA. Wilson wrote that the EPA had not proven that the fracturing technique used in 90 percent of oil and gas wells did not affect drinking water supplies; he also claimed that the agency was aware that the fluids used in the process sometimes contained hazardous chemicals. In 2004, Wilson wrote a report outlining his concerns to Colorado's congressional delegates; it was titled "EPA Allows Hazardous Fluids to Be Injected Into Groundwater." A storm of controversy resulted, but no changes were made in policy, because the Energy Policy Act of 2005 specifically exempted hydraulic fracturing from regulation under the Safe Drinking Water Act.

The new Energy Policy Act also addressed the problem of the enormous volumes of salty, mineral-laden "produced water" being pumped to free methane trapped in coal seams. The new act defined this saline groundwater as nonpolluting and exempt from regulation under the Clean Water Act, allowing it to be dumped into waste pits or simply poured into rivers and streams. Rural Westerners, many of them actively hostile to agencies like the EPA and the whole concept of environmentalism, began to understand that there was an entirely new regulatory order on public lands, and it did not include them.

The BLM has estimated that during the course of coal bed methane production in the Powder River Basin of Montana and Wyoming, industry will need to pump about 4 trillion gallons of water, much of it saline, from coal seams. Methane drillers in Wyoming have dumped produced water into the Tongue and Powder rivers, which flow north into Montana, where they provide the source for irrigated agriculture, which could be destroyed by salt.

In 2003, a ranchers' group, the Northern Plains Resource Council, took Montana's Department of Environmental Quality to state court over its failure to list wastewater from methane wells as a pollutant subject to regulation. The ranchers won, with the result that energy producers in Montana are supposed to reinject the water deep underground or treat it to remove salts before dumping it. Industry raised an outcry that was immediately — and strangely — joined by the U.S. Department of Energy, which claimed that the ruling would affect national security by shutting down the coal bed methane industry, even though it is widely believed that, with the price of gas at record highs, the wastewater could be treated or reinjected with little loss of profit.

The energy industry and the state of Wyoming have now brought a federal lawsuit against the Montana DEQ for enforcing standards that they claim will hinder energy production. In 2008, the case was made more complicated when the EPA approved Montana's regulations, saying that they were in clear accordance with the Clean Water Act. But of course, energy development has already been exempted from many provisions of the Clean Water Act.

The conflict continues as I write this article.

Thirty-two miles south of Pinedale, the Jonah Field sprawls over 30 square miles of north-central Wyoming, just 100 miles south of Grand Teton National Park. The Jonah Field is a roaring industrial zone that just six years ago was isolated grazing and wildlife land. About 450 miles of roads cover the land now like a spider web. In January 2007, a well-service truck struck and killed 21 antelope — in a

single collision! Smog levels on some winter days in Pinedale, once a scenic ranching supply town that is now surrounded by nearly 5,000 gas wells (with thousands more approved), match those of Los Angeles.

The BLM has now decided to grant new permits, allowing industry to place one well on every 10 acres of the Jonah Field; in some places, well densities may fall to as low as a well to every 2.5 acres, which, since the bulldozed area for a well pad is almost 2 acres, means that the developed sites will almost touch — for miles. Ex-BLM biologist Steve Belinda, who quit the agency in protest against the reckless development of public lands in the Green River, says that the Jonah Field and the Pinedale Anticline are disturbing not just in themselves but for their implications. "They are using what is happening here as a prototype," Belinda says, "and it does not work here at all."

This prototype is not necessarily the most efficient way to develop natural gas resources; it is simply the cheapest for industry. Public land managers have always walked a fine line in balancing the uses of federal lands among wildlife and recreation, leases for livestock grazing, mining and energy development. But now the line is clearer: Energy development is the top priority. "Every suggestion we made as land managers or biologists had to be based on what the energy industry would accept," Belinda says, and for those who objected to the new focus, there was not much to do. For top BLM officials, "The intention of the BLM is for the process not to function" and for that dysfunction to be institutionalized so energy development can continue unquestioned. "The BLM has brought in a lot of new blood," Belinda says, "all of them on probation, where they can be let go in a moment for any reason. They are indoctrinating these new people to say that there's no need for environmental impact statements. The older land managers don't want to deal with this climate. There is a lot of bitterness, and a lot of them are quitting or retiring.

"What this means is that we will be dealing with completely dysfunctional management for years to come."

Enormous sums of money are being made off the new BLM attitude. The natural gas under the Jonah Field alone is estimated to be worth between $42 billion and $65 billion, with the cost to drill and extract it only about $6 billion.

In late May, the latest BLM director, Jim Caswell, announced the release of a new study that, he said, "represents the first truly national assessment of the restrictions and impediments to oil and gas exploration and development." To almost no one's surprise, the study found that too many resources were off limits due to restrictions to protect wildlife and resources.
In a subsequent news conference, Caswell repeated the new energy-exploration mantra: Sensitive new technologies have reduced the impact of oil and gas development to an extent that restrictions to protect wildlife and other resources are no longer necessary. When asked where a person could go to view these new technologies, Caswell said that they were in use in the Jonah Field.

Indeed, new technologies that lessen the impacts of energy development do exist. In the hands of hyper-skilled drillers, ingenious directional-drilling techniques can now access multiple pockets of gas from a single two-acre well pad, replacing, in some cases, 16 individual wells and the roads that connect them, the multiple compressors that pump the gas from them, the pipelines that carry the gas away and the service traffic that is deadly to wildlife, from snakes to pronghorn antelope. The potential of these technologies to protect the land and wildlife from damage is enormous. It has been estimated that directional drilling adds only an extra $200,000 to the average $1.8 million cost of drilling a natural gas well.

But under current regulations, the use of such technologies is voluntary. Some energy companies that started using them in 2004 have since abandoned them because of the expense. Nowhere in the West are low-impact drilling technologies the norm. When asked what percentage of the planned development on BLM lands will use the lower-impact techniques or what percentage of the development is using them now, BLM officials say they do not know.

When the increased volume of energy leasing began to concern Western ranchers, hunters and other users of public lands, the BLM created a set of guidelines, so-called best management practices. The guidelines addressed energy industry standards in regard to the spread of invasive and noxious weeds, impacts on wildlife and livestock grazing and the protection of rivers and streams.

The best management practices are voluntary, too.

Though exploration standards that would protect public land and the wildlife, ranchers, hunters, fishermen and outdoorsmen who use it have remained voluntary and minimal, energy development has spread like wildfire. How much of this development, exactly, is under way across the West?

Here is a quick rundown on the 47.5 million acres of public land now leased by energy companies: Wyoming's Red Desert is slated for 20,000 new wells. The Piceance Basin of Colorado will have 13,000 wells, including extensive development of the unique and pristine Roan Plateau, in Garfield County near Rifle, one of the most controversial leases in the U.S. Analyst Randy Udall predicts about 100,000 natural gas and coal bed methane wells across Colorado by midcentury. (This does not include the new push for oil shale developments in this region, which, under current regulations, could lead to the largest energy-development project the world has ever seen, with the largest strip mines ever created, a series of coal-fired power plants to extract the oil from the shale and new towns to house workers.) The Powder River Basin in Montana and Wyoming will have 82,000 wells, 26,000 miles of new roads and 53,000 miles of pipelines. New Mexico currently has 110,000 wells producing, with thousands more planned on over 4 million acres of leased public land.

Reasonably planned and implemented, such a level of development would be a windfall for states, the federal government, energy companies and the energy consumers of the U.S. But the entire Western energy boom — which could be so welcome —has turned into a low-grade war, with the states and a variety of public interest groups on one side and the federal government and energy companies on the other.

Announcing a lawsuit against the BLM over drilling on the pristine Otero Mesa in April 2005, New Mexico Gov. Bill Richardson said, "This lawsuit is the result of the Bureau of Land Management's willful disregard for the state of New Mexico's interests." Critics have noted that gas reserves in the Otero Mesa equal about 30 hours' worth of U.S. national consumption. Richardson's Attorney General, Patricia Madrid, explained: "By filing this lawsuit, we seek to protect one of the most biologically diverse and endangered ecosystems. The Bush administration has chosen special interests, namely the oil and gas industry, over their duty to protect this land for generations to come."

The Theodore Roosevelt Conservation Partnership has so far filed two lawsuits against the BLM for what it says are multiple violations of federal law. The first, filed in 2007, was in response to the permitting of 2,000 new wells on public lands in a part of south-central Wyoming revered by big-game hunters, a development that, according to the BLM's own studies, would transform the land into "an industrial area." The hunting and conservation group stated that the BLM was acting on behalf of a "single user group, the energy industry." The second lawsuit came in 2008. The conservation group's vice president, Tom Franklin, says it has been forced to intervene because "our inaction would enable the continued mismanagement of Western lands and the loss of our outdoor heritage."

As the U.S. Forest Service, led by former timber lobbyist and Bush appointee Mark Rey, prepared to issue new drilling leases in some of the most valued hunting country in Wyoming along the ramparts of the Wyoming Range, billboards appeared along the interstates, put up by a group called Sportsmen for the Wyoming Range. The signs read, "We're Mother Nature's bodyguards. And yes, we're heavily armed."

In December, U.S. District Judge B. Lynn Winmill of Boise, Idaho, ordered the U.S. Fish and Wildlife Service to re-evaluate a 2006 decision that the greater sage grouse was not in need of further protection under the Endangered Species Act. That Fish and Wildlife decision, Winmill wrote, "... was tainted by the

inexcusable conduct of one of its own executives. Julie MacDonald, a deputy assistant secretary who was neither a scientist nor a sage-grouse expert, had a well-documented history of intervening in the listing process to ensure that the ‘best science' supported a decision not to list the species. Her tactics included everything from editing scientific conclusions to intimidating FWS staffers. Her extensive involvement in the sage-grouse listing decision process taints the FWS's decision and requires a reconsideration without her involvement."

The sage grouse issue was only one of many problems with MacDonald's brief tenure. She resigned from the Department of the Interior in May 2007, amid charges that she rewrote scientific documents, leaked information to industry, intimidated scientists and undermined wildlife protections in many ways.

McDonald is not the only problem, of course.

In 2001, Steven J. Griles was a lobbyist, working for, among other clients, Yates Petroleum, for which he advocated energy development on the Otero Mesa of New Mexico, and Devon Energy, which he represented on matters pertaining to the development of the Powder River Basin. Later that year, Griles was appointed deputy secretary of the Interior Department and worked on many of the same issues. He resigned from the Interior Department in 2004, amid multiple charges of conflict of interest, and pled guilty in March 2007 to obstruction-of-justice charges related to the Jack Abramoff lobbying scandal. Rebecca Watson, an assistant secretary of the Interior Department during President Bush's first term, said in a 2004 interview that big game animals "go somewhere else" during energy development operations; she now works for a Denver law firm where she represents clients from the energy industry.

Her former boss, Secretary of Interior Gale Norton, is an attorney employed by Royal Dutch Shell, PLC.

The men and women who wrote and carried out the nation's energy policies over the past seven years were extremists. For them, it must have seemed that the fortunes of the energy industry were the fortunes of the nation, that if one prospered, so must the other. It is not a new mistake, but it is a serious one.

It is not in the national interest to plunder our lands and wildlife, extract the very finite resources of oil, coal and gas, and then squander them by dumping them into a power and transportation grid that would be the laughingstock of any efficiency analyst. Immediate profits might be astronomical, but they are based on the losses and tribulations of generations living and unborn. The current policies also ensure conflict and gridlock, at a time when real and responsible energy development is critical to the national interest.

What would responsible domestic energy development look like? There is no reason to reinvent the regulatory wheel. The U.S. was once among the world's visionaries in environmental protection, and many of those protections came into being under the Republican administration of Richard Nixon. Nothing is gained by exempting energy development from the Clean Air Act, the Clean Water Act or the Safe Drinking Water Act. These exemptions have reduced innovation by energy companies and resulted in a rising tide of fury among the residents of America's energy heartland. When the Marcellus shale of the east becomes the next methane bonanza, there will be rebellion. All of the public relations money on Earth will not be enough to compensate for lost drinking water supplies or the efforts to remedy contamination.

If presented with proper incentives, the energy industry would take its record profits and use the environment-protecting technologies that it claims to use already. Wherever possible, directional drilling should be required so that one well pad to a section of land — that is, to 640 acres — is the norm. Reclamation bonds must be changed to reflect the modern costs of restoring drilled lands so they can support wildlife and livestock grazing once energy production is complete. Energy development must be phased, not conducted in a rush, so that biologists and land managers can try to mitigate the damage and loss of other resources. And impacts on wildlife can and must be a part of the decision whether or not to permit energy development.

If these common-sense regulations slow domestic energy development to some degree, what exactly is lost? The grid can be modernized and made more efficient in the meantime; the market, responding to higher energy prices, will help boost efficiency all the more. Can anyone argue that natural gas and oil will be less valuable in years to come than they are right now?

With common-sense regulation in place, unconventional gas can be harvested in the East without fear that drinking water supplies will be forever poisoned. The Powder River Basin can surrender its gas supplies to heat the homes of millions without salting the farmlands of Montana. Sage grouse can drum and dance on their breeding grounds in Wyoming, as they have since the days when men hunted them with throwing sticks. And then, exploration on our coastlines can be pursued without the surety of disaster.

http://www.miller-mccune.com/article/585

Next Steps for E-Texts

Predicting when e-textbooks will become a viable alternative to the dead-tree variety churned from printing presses to millions of college students a year is a bit like asking whether newspapers will give way to the Internet. Everyone thinks they will, but it's a question of when, and what the new paradigm will look like.

At the beginning of this year, Amazon's newly released Kindle electronic reader, along with its competitors, sparked renewed interested in digital books in general, and their application to instructional materials in particular. More recently, some tech prognosticators are sounding downright bullish on Kindle's future prospects, or at least the probability that in the near future, e-readers will become adopted by a critical mass of consumers.

In other words, more predictions, despite the fact that previous projections of major adoption of electronic books have not historically panned out. But gradually, as the trickle of students and professors who use e-textbooks starts to grow, advances in hardware and an evolving market — not to mention increasing complaints about textbook costs — are sure to speed along continuing changes in reading (and studying) habits.

"Most students still buy print versions of textbooks, and carrying them around is as big a pain as it has been for past generations of students," wrote Michael Arrington last month in the popular blog TechCrunch, which tracks Internet start-ups and emerging trends. "Most publishers now offer electronic versions of their textbooks — McGraw-Hill Education, for example, publishes 95% of their books electronically as well as in print. But there is no compelling device to read them on....

"A new large-screen Kindle would solve those problems. The battery life is much longer than most electronic devices, and carrying a large Kindle is still a lot better than carrying ten heavy textbooks. Our guess is that Amazon will make a major push into the educational markets next year — it's the only obvious reason to create a large-screen Kindle" — which Arrington predicted would be released next year.

Developments in hardware accompany a batch of new initiatives and partnerships from colleges as well as stakeholders not popularly associated with radical changes in the industry: textbook publishers themselves, and independent bookstores. As it turns out, neither is quite as opposed to a digital revolution in publishing as it might initially seem — especially in the case of publishers, who have invested in e-books for at least a decade.

"The answer is yes, it's happening already, it's going to be happening more swiftly in the coming years. There's been a feeling of inevitability about it," said Joseph J. Esposito, president of the management consulting firm Portable CEO, who has worked in traditional publishing and advised both scholarly presses and Internet companies.

Latest Developments

More and more, colleges are getting into the mix as they start their own initiatives or partner with consortiums or start-ups testing new business models. For colleges, the impetus is to address cash-strapped students' concerns about textbook costs in a lagging economic environment, while publishers get the benefit of increased visibility. Last year, according to the Association of American Publishers, e-textbooks sold by major publishers in the United States added up to $241 million out of about $3.5 billion in sales by major publishers.

As part of its Textbook Affordability Symposium, the University System of Ohio is planning to offer incentives to professors who significantly reduce textbook costs for their students, including grants — five, to the tune of $50,000 each — to instructors who help create free materials for the state's most commonly taught courses. In a partnership with CourseSmart, a consortium of major publishers seeking to jump-start an e-textbook market, the system will allow students to use the existing university Web portal, OhioLINK, to buy electronic textbooks directly, said Sean Devine, CourseSmart's CEO.

That agreement follows an ongoing CourseSmart partnership at San Diego State University, where a "substantive number" of courses, at least 200, have their materials available in electronic format, Devine said. The e-books can be purchased directly through the campus store, which he said provides students with "definitive knowledge" about course lists and the ability to use any financial aid benefits. Moreover, CourseSmart recently finalized an agreement with the wholesaler MBS Direct, which will make its member publishers' e-books available on Textbooks.com and in various college bookstores.

Partnering with stores is part of CourseSmart's overall strategy, Devine said. "What we believe is that students are going to purchase their textbooks in a number of different places, and there's not kind of a monolithic approach to this." (Others in the space, such as CaféScribe, remain online only.)

Esposito said publishers have been eager to jump into the e-textbook market in hopes of shutting out the used-book market — which some estimate makes up to a third of textbook sales — once and for all. (Already, several online services offer students the ability to compare prices for used textbooks.) They're "drooling, salivating, rubbing their hands together" at the thought, he said. "They've been dying to do this for decades." Many of the available e-textbook platforms, CourseSmart included, operate on a subscription model that presumably expires once the semester is over, much like a library or an online video rental service.

At the same time, publishers stand to gain from the ability to track which digital materials are used by professors and institutions, he said. That would be a potential boon for developers of the next generation of teaching materials. And e-textbooks would easily integrate with existing course management systems, providing students with opportunities for increased collaboration with classmates and instructors. Esposito flagged Pearson's acquisition last year of eCollege, a provider of course management, assessment and e-learning software, as a potential signal of future trends.

Meanwhile, start-ups are jumping in to test competing business models. Flat World Knowledge, for example, plans on offering free and open textbook materials to participating institutions, while drawing revenue from add-ons such as study guides and print editions. Other efforts seek to bypass revenue models altogether and promote the adoption of free, ready-to-edit open-source content, a movement that, while miniscule in comparison to print and even electronic textbooks from publishers so far, has attracted significant interest online.

Remaining Obstacles

Whether — or when — e-textbooks become as ubiquitous as laptops or smartphones on campuses depends on several factors that continue to hinder widespread adoption. Observers of the nascent market point variously to available hardware, consumer demand and the dearth of content made specifically for digital formats.

"We believe firmly that the most significant gating factor in prior eras of this has been that there hasn't been a critical mass of inventory available on a single platform. So that student that wanted to try it had to wonder ... 'Is it going to be on a platform that's compatible? Do I have to have multiple books on [different] platforms?'" Devine said.

"We believe as standards emerge, the market will grow, and as common platforms emerge, the market will grow. We don't even necessarily believe it has to be our platform."

In Ohio, especially, Devine stressed the key combination of a "critical mass of content," a single platform and a pre-existing portal that students already heavily use. If it's successful, it could be seen as a model for future e-textbook ventures.

Esposito, meanwhile, stressed that until professors start assigning e-textbooks on a widespread basis — or nudging their students to use them — the market will continue to respond to demand for print materials. He added that the level of adoption may vary by institution type, noting that some community college systems have more top-down control over curriculums, allowing for coordinated changes in formats.

And even if e-textbooks catch on, he warned that there is no reason to suppose that they would completely take over the higher education market. “People don’t get into foolish false dichotomies. It’s not either-or, it’s supplemental,” he said.

Besides having a widely used device and e-textbook platform — say, something as common as the iPod and iTunes for music — an important factor in the medium’s development may be the growth of content that’s “born digital” rather than merely transposed from print, said Bob Stein, founder of the Institute for the Future of the Book.

“We’re getting close in the sense that we might see the right device in the next three to five years, and I think that we’ll start to see some credible examples. How long it takes for things to flip, that really depends on the device more than anything else.”

— Andy Guess

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/08/26/etextbooks.

War and Peace

By MAX RODENBECK

A PATH OUT OF THE DESERT

A Grand Strategy for America in the Middle East

By Kenneth M. Pollack

539 pp. Random House. $30

Back in 2002, I ran into one of the Brookings Institution's top Middle East hands at the inaugural session of the United States-Islamic World Forum, a now annual event that Brookings sponsors jointly with the government of Qatar. "How's it going?" I asked, expecting to hear about clashing misperceptions across the cultural divide. "Good," came the gruff reply. "They're beginning to realize that they are the problem."

Reading this big, ambitious book by Kenneth M. Pollack, who is the head of research at Brookings's Saban Center for Middle East Policy, it is hard not to wish that what he refers to as Washington's "policy community" would more often realize that they are the problem. It would have been nice, for instance, had Pollack himself thought harder before arguing, in scholarly papers and his widely read 2002 book, "The Threatening Storm," that America had "no choice" but to invade Iraq. That ostensibly sober appraisal, coming from a former C.I.A. analyst, Clinton official and self-described liberal, arguably added more gravitas to the shrill cries for war than any other voice.

Pollack has long since confessed to having been wrong about Iraq. "A Path Out of the Desert" includes other mea culpas. "There has been far too little asking the people of the region themselves what they thought and what they wanted," he ruminates at one point, though the book offers slim evidence of his having pursued this advice. While the administration that Pollack served gets some light wrist-slapping, it is the following eight years of Bush policy that he calls "breathtakingly arrogant, ignorant and reckless."

Many of Pollack's other judgments are as sound as is this criticism of the Bush administration. Since most of the post-cold-war world has stabilized, democratized and prospered, it is probably correct to suggest, as he does, that America should commit itself to helping the messy Middle East come up to par.

His proposal of a Grand Strategy to achieve this, which is to say a generation-long effort of a scale and intensity similar to America's engagement with Europe after World War II, is challenging but not irrational, given the world's growing dependency on Middle Eastern oil. And Pollack is right to say that violence and tyranny are not hard-wired into Islam, and to conclude that the threat of Islamist terror has been overblown. He is also right that internal unrest in Middle Eastern states is quite likely to be a strategic threat, and that this danger will not pass until they manage to produce better schools, more opportunities for youth, wider social justice and more inclusive, accountable government. He is correct, too, in describing the region's current regimes as singularly awful, and even in admitting that George Bush showed unwonted acuity when he called for draining the swamps of extremism by promoting reform.

The argument weakens when Pollack tries to prescribe just what America can do to cure the Middle East. Much of his suggested treatment consists of vague outlines and policy homilies. Out of nearly 500 pages, very few describe concrete measures for how to achieve such things as spreading democracy or upgrading education in the face of governments that mistrust reform and peoples that mistrust America. Among

other things, he proposes to increase military aid to friendly regimes. This, he says, can create a kind of golden leash that makes governments more compliant to American wishes.

But surely, one can't help gasping, the last thing more guns will bring is political reform. And surely, those Arabs are not so dumb that they don't read this stuff. Elsewhere, he suggests tying aid to Egypt to the lifting of the country's notorious emergency law. Perhaps he is unaware that Congress has already tried conditioning aid on reform, or that the Egyptians, who have grown skilled at circumventing tiresome Western admonishments, have already amended their constitution to incorporate "emergency" strictures under ordinary law. One is left with the impression that should a Democratic administration hire Pollack to try his Grand Strategy, he might soon be reduced to throwing "spaghetti against the wall" to "see if it sticks," as he quotes a rueful Bush official describing that team's effort to reform the Middle East.

Beyond the reform promotion agenda, which is the book's main thrust, Pollack is surprisingly reticent about the most pressing current issues, namely how to get out of Iraq and what to do about Iran (though in recent op-ed essays he has made it clear that he worries about pulling out of Iraq too quickly). In fact, he simply sketches well-known policy options without passing judgment. And, sadly, this thick book's thinness in ideas is not its only flaw.

Pollack raises loud alarms, for instance, over the Middle East's high rates of population growth, urbanization and joblessness. Actually, these are decades-old trends. He fails to note that population growth rates have plunged in recent years. Some scholars even assert that this phase of "demographic transition," in which there is a relatively high ratio of working-age people to young or old dependents, should accelerate the region's economic growth just as it did America's in the late 19th century, and East Asia's more recently.

Pollack commits errors that, despite his years in the corridors of power and some 70 pages of footnotes, betray a lack of genuine intimacy with his subject. It is not true, as he asserts, that education in the Persian Gulf emirates is largely private. Nor is it true, any longer, that virtually the only foreign investment in Arab countries goes toward pumping more oil: real estate, tourism, banking, telecoms and even heavy industry now lure investors, too.

It is an outdated generalization to state that "Arab bureaucracies . . . create interminable delays with customs regulations, inspections and other red tape." Try telling that to Dubai Ports World, a company that runs 45 container terminals in 29 countries, or to the operators of the giant, state-of-the-art transshipment hubs in Egypt and Morocco that are set to dominate Mediterranean trade. It is even more misleading to assert that "the Arab regimes have implicitly or explicitly backed a range of terrorist groups." Pray, which Arab governments does he mean, and which groups is he talking about?

Pollack also shows a shaky grasp of history. We know that the Ottoman Empire declined and fell, but to have endured for five centuries, and for half those as the biggest state in Europe, the Mediterranean and the Middle East, does not make the Ottomans "unsuccessful." Elsewhere he tells us sagely that "over time, the stagnation of the Arab economies has created considerable poverty," as if there were no poor Arabs before, and as if one of the most startling modern examples of mass impoverishment was not the Clinton-era sanctions on Iraq, which destroyed its middle class and set the stage for postwar chaos.

America gets off rather lightly in general, in Pollack's account, compared with the sad Arabs whom we must help to be like us. We are told, for instance, that the United States only grudgingly became involved in the grisly Iran-Iraq war of the 1980s when it nobly undertook to reflag oil tankers in order to protect the flow of oil. No mention here of Donald Rumsfeld's back-slapping with Saddam Hussein or the supply of satellite intelligence to him or the exchange of American weapons to Iran for hostages — all of which helped prolong the slaughter.

Pollack seems oddly unaware of history's motivating forces. To assert that "what triggers revolutions, civil wars and other internal unrest is psychological factors, particularly feelings of extreme despair," is

plain silly. The Boston Tea Party could not have been prevented by Prozac. Similarly, he ascribes feelings to broad categories of Middle Easterners, devoid of any context or explanation. They are "angry populations" who suffer "inchoate frustration" and "a pathological hatred of the status quo." We repeatedly hear of "Arab rage at Israel" and "Arab venom for Israel." Nowhere is there a hint that such attitudes might bear some relation to the plight of the Palestinians, the agony of military defeat or the humiliation of life under Israeli occupation.

In fact, the book's most salient distortions stem from Pollack's protectiveness toward Israel. He makes some absurdly cockeyed assertions, like, "America's support for Israel over the years has even been a critical element in winning and securing Arab allies." He offers misleading false alternatives, declaring, for instance, that there is "absolutely no reason to believe that ending American support for Israel would somehow eliminate" the risk of Islamist zealots taking power and cutting oil exports. How about making aid to Israel, and not just to Arabs, conditional, or aiming at mitigating, rather than eliminating, such risks? Pollack makes a peculiarly acrobatic effort to prove that hostility to Israel is not a prime motivating factor behind militant jihadism, repeating this assertion no fewer than four times in two paragraphs. Has he not bothered to listen to Osama bin Laden's addresses to the American people, where he said that what converted him from dreamer to murderous activist was Israeli bombs falling on Beirut in 1982?

Even more disingenuously, Pollack repeats the myth that Al Qaeda has never attacked Israel. One might argue that its bombings of synagogues in Djerba and Istanbul, and against Jewish targets in Casablanca, in which dozens of people died, were anti-Semitic rather than anti-Israeli. But the November 2002 attacks in Kenya were aimed specifically at Israeli tourists. Thirteen people, among them three Israelis, died in a resort hotel, and had the missiles fired simultaneously at an Israeli charter plane with 261 passengers aboard not missed, this would have been Al Qaeda's goriest "success" since the twin towers. This may seem like nit-picking, particularly since Pollack is, after all, on the side of those who believe it is in America's own interest to make peace between Israelis and Arabs, or at least to pretend to try.

What is troubling about Pollack's view, which is fairly representative of his fellow liberal interventionists, who are likely to be in power soon, is its lack of clarity. Can't we just admit that American support for Israel is strategically burdensome and is driven by the passion of several domestic constituencies rather than cold cost-benefit geopolitics? Can't we see that the temptation to intervene in places like the Middle East arises as much because "they" are weak as because "we" are just and noble? No matter what good will America's "policy community" proclaims toward the Middle East, this mix of blinkered indulgence of Israel and disdain for the rest of the region, as well as a predilection for Wilsonian dreams over achievable goals, suggests we will remain in the wilderness for some time to come.

Max Rodenbeck is the Middle East correspondent for The Economist.

http://www.nytimes.com/2008/08/24/books/review/Rodenbeck-t.html?_r=1&8bu&emc=bua1&oref=slogin

Mailer's Great American Meltdown

By PAUL BERMAN

Some 40 years ago, the cumulatively unbearable stresses of war in Vietnam, a revolution in civil rights and a series of unexpected, bug-eyed cultural uprisings sent America into a psychological meltdown. Norman Mailer wrote a two-volume participant-observer journalistic portrait of the experience — "The Armies of the Night" (one of his masterpieces), on the antiwar movement in the fall of 1967, and "Miami and the Siege of Chicago" (a non-masterpiece, but good enough as a follow-up), on the Republican and Democratic National Conventions in the summer of 1968. The books, looked at today, are terrifying. "Miami and the Siege of Chicago" (New York Review Books, $14.95) has just been republished with an admirably self-effacing preface by Frank Rich. I have read it anew, and it gives me the willies.

The blandly creepy triumph of Richard Nixon at the Republican convention, the six-hour line of working-class New Yorkers filing past the casket of Robert F. Kennedy, the Chicago police's running amok during the Democratic convention in that city, the National Guard, the tear gas, the dry police humor ("I'm glad to hear that, Mr. Mailer. But it's your reputation that you like to get arrested") — these are not the most serene of themes. But Mailer's journalism gives me the willies mostly because of Norman Mailer.

There were two Mailers, Irving Howe observed — a "reflective private Norman" and a "noisy public Norman." Mailer's genius in those two volumes was to show how, under the right sort of midnight pressure, one of those Normans was perfectly capable, as if pulled by lunar tides, of transmogrifying into the other. It is horrifying to see. The two books paint a picture of America at a bad moment. But they are also a werewolf autobiography.

The reflective, private Norman, as Howe described him (in his own autobiography, "A Margin of Hope"), was someone who "wondered whether there might be a speck of truth in the cautions of his liberal and socialist friends" — which is a phrase that, especially in its mention of socialists, connoted a precise group of sharply opinionated and insistently sober people. Howe was the editor of Dissent magazine, on

whose editorial board Mailer uncomfortably sat, and the socialist and even some of the liberal friends constituted the mini-faction that used to be known, in times gone by, as the anti-Stalinist left. Mailer made his political home among those people for a while in his younger years (the period he evoked in "Barbary Shore"). Their lore was his, and likewise their sophistication. And here lay a complexity.

Mailer took a hard line against the Vietnam War, but given his anti-Stalinist sophistication, his hard line could not be a simple line. He understood that in Vietnam, America's enemies were Communists, and not just nationalists with a red star; and he wished Communism on nobody. He knew that America's antiwar doves were, in overwhelming numbers, hopelessly muddled on Communist themes. A good many young stalwarts of the New Left and a few of the older people, too, were openly pro-Communist, in one fashion or another. A still larger number, "a firm minority" of the antiwar movement, in his description, were secretly pro-Communist, at least in regard to Asia. And the dove majority avoided facing the problem posed by Communism altogether.

What would happen to Indochina and the rest of the world if Communism were to carry the day in Vietnam? The dove majority, in Mailer's judgment, "simply refused to face the possibility." The mass peace movement, its grown-ups, anyway, had compressed a hostility to the war into what he called a "hopeless mélange, somehow firmed, of Pacifism and closet Communism." And the resulting national debate over Vietnam seemed to him twisted and fake: "The hawks were smug and self-righteous, the doves were evasive of the real question."

You could wonder, reading those acrid observations, why Mailer wanted anything to do with antiwar demonstrations. But he had his reasons, which combined a pragmatic assessment with a larger political prognostication; and this larger prognostication of his turns out to have been 80 percent brilliant. Mailer prophesied that Communism, based on its inbuilt inadequacies, was going to collapse. There was no reason to go to war against it. His analysis would loom today as totally brilliant if only he had added a 20 percent tip about what was meanwhile likely to happen to the unhappy people of Indochina during the interval between America's withdrawal from the war and the Communists' eventual withdrawal from Communist doctrine — the interim experiences of policy-driven famine and poverty in Vietnam, extreme oppression, "boat people" fleeing for their lives and Cambodian horrors: the Indochinese catastrophes that have still not registered in the consciences of Americans when they are feeling dovish, just as Hiroshima and Nagasaki have not yet registered in the consciences of Americans when they are feeling hawkish. But this is merely to say that Mailer's political journalism of 1967 and '68 was wonderfully nuanced and sophisticated, even if not wonderfully enough.

And one complexity led to another. In the America of that time, given the psychological meltdown, people were in no mood to entertain any sort of nuance at all. Irving Howe stuck by his own anti-Stalinist sophistication — critical of the left, critical of the right and relatively indifferent to what anyone else might think of him. This sort of lonely stance came naturally to Howe. Grumpiness was his strength. He was handsome in his isolation. Mailer, though, had chosen a different path. He had set out to experience the spirit of the age in his own flesh, and to send back firsthand reports. And since everyone else, minus a handful, was slipping into hysteria, who was Mailer to do anything less? He slipped, therefore. He did this by adopting new and wild opinions, not instead of his old nuanced anti-Stalinism, but on top of it. And he vented his gaseous new opinions in fits of oratory at antiwar demonstrations, as recounted in his books.

His oratory was alcoholic. At a demonstration in 1967, he finds himself delivering somehow a Christian peroration. "Wow," he reflectively observes. In Chicago outside the Democratic convention he delivers a drunken speech in the middle of the night, calling for a militant march that never took place. Those are disgraceful speeches, and are meant to be disgraceful — speeches by a man who wants you to know that his own fist-waving blather is appalling to him, at least in some degree. It is always said of Mailer that he was possessed of a huge ego. But that is only half the story. No man likes to picture himself as a drunken fool. Mailer in these classic volumes nonetheless devoted his muscular energy to the task of making himself look asinine, and he did so because, in addition to an ego, he was possessed of an accusatory superego — otherwise known, by the editor of Dissent, as "the cautions of his liberal and socialist

friends." And the whole of his self-portrait gives me the willies because here we are, 40 years down the road, and hawks, some of them, are still "smug and self-righteous," and doves, a good many, are still "evasive of the real problem." And the temptation for many a fine citizen remains irresistible to go on waving a militant fist in a style that pretends to be civic and nowadays even sober (because times have changed), even while reflecting (because times have not changed) the same jumble of admirable, execrable and crowd-pleasing impulses that Mailer in his self-mortifying candor revealed so cannily on those long-ago pages.

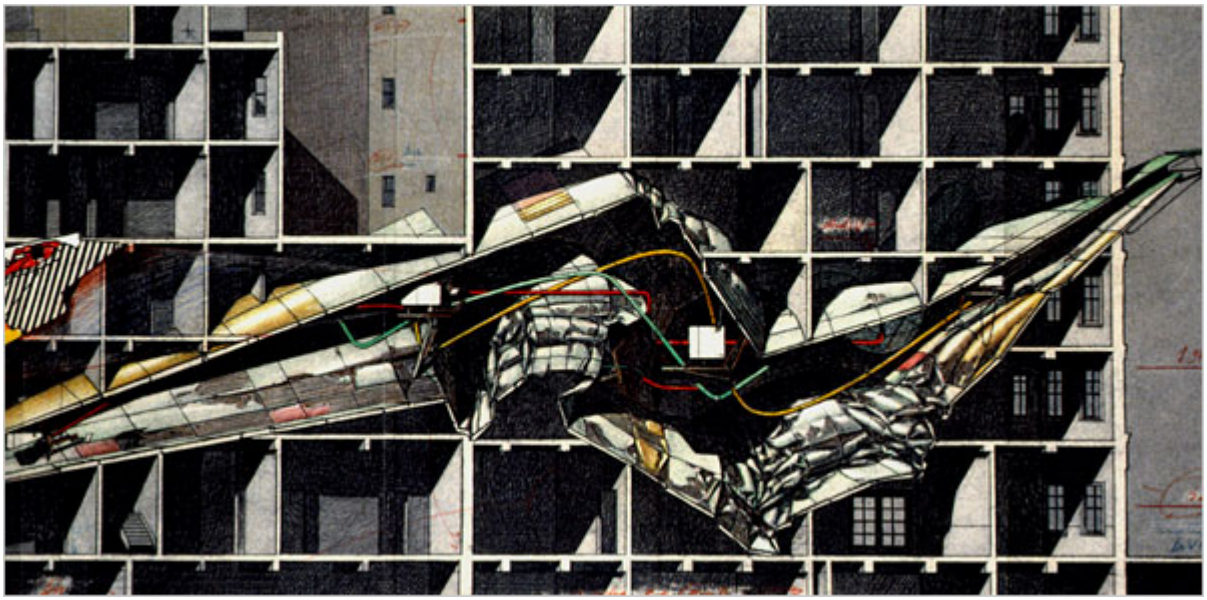
A footnote: 1968 marked a turning point in race relations. Mailer was short on sympathetic insights into this event, possibly because he was, on his own admission, "getting tired of Negroes and their rights." Still, he thought to mention that at the Democratic convention, the name of Channing Phillips of Washington, D.C. — a Robert F. Kennedy delegate, except that Kennedy had already been assassinated — was entered into nomination. Phillips, as Mailer observes, was the first black politician to be nominated for president at a major party convention. He received the ballots of 67› delegates. The wilderness trek from that first step until now has lasted 40 years to the week — a freakishly biblical span of time. Wow.

Paul Berman, a writer in residence at New York University, is the author of "A Tale of Two Utopias," "Power and the Idealists" and "Terror and Liberalism."

http://www.nytimes.com/2008/08/24/books/review/Berman-t.html?8bu=&emc=bub1&pagewanted=print

An Architect Unshackled by Limits of the Real World

By NICOLAI OUROUSSOFF



These are lonely times for Lebbeus Woods.

In the early 1990s this irreverent New York architect produced a series of dark and moody renderings that made him a cult figure among students and academics. Foreboding images of bombed-out cities populated by strange, parasitic structures, they seemed to portray a world in a perpetual state of war, one in which the architect's task was to create safe houses for society's outcasts.

Since then Mr. Woods has become his own kind of outcast.

Architecture is big business today. While most of his friends and colleagues have abandoned their imaginary cities to chase lucrative commissions, Mr. Woods has shown little interest in building. Instead he continues to work at a small drafting table in a corner of his downtown apartment, a solitary, monklike figure churning out increasingly abstract architectural fantasies, several of which are on view in the "Dreamland" show at the Museum of Modern Art.

Some question the wisdom of his choices. (They certainly haven't made him a rich man.) But that he now stands virtually alone underscores a disturbing shift in the architectural profession during the past decade or so. By abandoning fantasy for the more pragmatic aspects of building, the profession has lost some of its capacity for self-criticism, not to mention one of its most valuable imaginative tools.

Not so long ago many of the world's greatest architectural talents behaved as though the actual construction of buildings was beneath them. During the 1960s firms like Superstudio in Florence, Italy, and Archigram in London were designing urban visions intended to shake up the status quo. These projects — walking, mechanized cities and mirrored megastructures that extended over mountain ranges and across deserts — were stinging attacks on a professional mainstream that avant-garde architects believed lacked imaginative energy.

When I was an architecture student in New York in the early 1990s, the architects my peers and I admired most were famous for losing competitions, not winning them. For us it simply meant that their work was too radical, too bold for the cultural establishment.

This was not just youthful idealism. Free of mundane professional considerations like budgets, clients and zoning laws, these architects were able to produce works that were aesthetically inventive and piercing social commentaries. And their designs were wildly influential, closely studied by younger architects who sought to apply their ideas in the real world.

Mr. Woods, now 68, was a regular fixture of that scene. In the early 1990s he published a stunning series of renderings that explored the intersection of architecture and violence. The first of these, the Berlin Free-Zone project, designed soon after the fall of the Berlin Wall, was conceived as an illustration of how periods of social upheaval are also opportunities for creative freedom.

Aggressive machinelike structures — their steel exteriors resembling military debris — are implanted in the abandoned ruins of buildings that flank the wall's former death zone. Cramped and oddly shaped, the interiors were designed to be difficult to inhabit — a strategy for screening out the typical bourgeois. ("You can't bring your old habits here," he warned. "If you want to participate, you will have to reinvent yourself.")

Some critics condemned the design for its coldblooded imagery. But it also turned cold-war Modernism on its head. In the 1950s American architects were striving to retool wartime military production for the construction of a peacetime paradise. One result was the mind-numbing conformity of suburban subdivisions. Mr. Woods, by comparison, has never been so utopian. In his drawings society seems to be coming apart at the seams. His glistening pods, armored against the surrounding mayhem, are intended as sanctuaries for society's most vulnerable: outcasts, rebels, heretics and dreamers.

This vision reached its extreme in a series of renderings he created in 1993 in response to the war in Bosnia. Inspired by sci-fi comics and full of writhing cables, crumbling buildings and flying shards of steel, these drawings seem to mock the old Modernist faith in a utopian future. Their dark, moody atmosphere suggests a world in a constant struggle for survival.

Things began to change, however, at the end of the last millennium. High-end architecture was suddenly a valuable commodity. Architects like Daniel Libeskind and Rem Koolhaas, once relegated to the halls of academia, were suddenly struggling to handle an abundance of new commissions coming not only from elite cultural institutions but also from mainstream developers and wealthy corporations.

Mr. Woods, a large, burly man who still likes an occasional cigarette, doesn't try to hide his disdain for this new reality. "Big corporations today want to present themselves as benefactors of the human race," he told me recently, summing up the current state of affairs. "ExxonMobil runs ads about the ecology now. And architecture is part of this. It's a business."

It's hard to disagree with the main thrust of his argument: that architecture has always needed a place that is wholly free of self-censorship, and that this place does not exist in the often-contentious exchange between architect and client. Most of us remember, for example, what happened to Mr. Koolhaas in the 1997 competition for a major expansion to the Museum of Modern Art. Choosing to ignore the museum's internal politics, he indiscreetly highlighted the museum's corporate agenda in his design. An enraged MoMA board instantly dropped him.

The pressure to smooth over anything in a design that might be perceived as threatening has only increased in recent years, as a lot of architecture has begun to look like a sophisticated form of marketing. Architects who once defined themselves as rebels are now designing luxury residential towers for the super-rich.

The greatest influence of this trend, however, may be on a younger generation of architects. Reared in an era when there seems to be an irresistible supply of work, these architects often seem eager to build at any

cost. And their facility with computer software can make it easy to churn out seductive designs without digging deeply into hard social truths.

As Mr. Woods put it: “With the triumph of liberal democracy and laissez-faire capitalism, the conversation came to an end. Everyone wanted to build, which left less room for certain kinds of architecture.”

Meanwhile, as his peers moved on to bigger, more lucrative commissions, Mr. Woods’s work has become more and more abstract. In 1999 he began working on a series of designs whose fragmented planes were intended to reflect the seismic shifts that occur during earthquakes. (“The idea is that it’s not nature that creates catastrophes,” he said. “It’s man. The renderings were intended to reflect a new way of thinking about normal geological occurrences.”)

Last year the architect Steven Holl, a close friend, hired him to design a pavilion for a housing complex in Chengdu, China. A towering composition of crisscrossing bridges and ramps, the project is the closest Mr. Woods has come to real architecture: a dense Piranesian space in which people can climb to peer out at the urban sprawl of the new China.

“I’m not interested in living in a fantasy world,” Mr. Woods told me. “All my work is still meant to evoke real architectural spaces. But what interests me is what the world would be like if we were free of conventional limits. Maybe I can show what could happen if we lived by a different set of rules.”

http://www.nytimes.com/2008/08/25/arts/design/25wood.html?ref=design

Huge statue of Roman ruler found

By Paul Rincon
Science reporter, BBC News

Parts of a giant, exquisitely carved marble sculpture depicting the Roman emperor Marcus Aurelius have been found at an archaeological site in Turkey.

Fragments of the statue were unearthed at the ancient city of Sagalassos.

So far the statue's head, right arm and lower legs have been discovered, high in the mountains of southern Turkey.

Marcus Aurelius was portrayed by Richard Harris in the Oscar-winning 2000 film Gladiator and was one of the so-called "Five Good Emperors".

He reigned from 161AD until his death in 180AD.

In addition to his deeds as emperor, Marcus Aurelius is remembered for his writings, and is considered one of the foremost Stoic philosophers.

The partial statue was unearthed in the largest room at Sagalassos's Roman baths.

The cross-shaped room measures 1,250 sq m (13,500 sq ft), is covered in mosaics and was probably used as a *frigidarium* - a room with a cold pool which Romans could sink into after a hot bath.

It was partially destroyed in an earthquake between 540AD and 620AD, filling the room with rubble. Archaeologists have been excavating the *frigidarium* for the past 12 years.

The dig is part of wider excavations at the ruined city, which was once an important regional centre.

Imperial gallery

Last year, the team led by Prof Marc Waelkens, from the Catholic University of Leuven in Belgium, uncovered fragments of a colossal marble statue of the emperor Hadrian in the rubble.

This month, the researchers found a huge head and arm belonging to Faustina the Elder - wife of the emperor Antoninus Pius.

Archaeologists now think the room hosted a gallery of sculptures depicting the "Antonine dynasty" - rulers of Spanish origin who presided over the Roman Empire during the second century AD.

Early on 20 August, a huge pair of marble lower legs, broken just above the knee, turned up in the debris.

They also found a 1.5m-long (5ft-long) right arm and hand holding a globe which was probably once crowned by a gilded bronze "Victory" figure.

But it was the giant marble head which identified this statue as the young Marcus Aurelius. The colossal head, which is just under 1m (3ft) in height, is said to bear his characteristic bulging eyes and beard.

Prof Waelkens said the pupils were gazing upwards "as if in deep contemplation, perfectly fitting of an emperor who was more of a philosopher than a soldier".

He added that this was one of the finest depictions of the Roman ruler.

The emperor wore exquisitely carved army boots decorated with a lion skin, tendrils and Amazon shields.

The torso was probably covered in bronze armour filled inside with terracotta or wood. When the niche's vault collapsed in the earthquake, the torso would have exploded.

Bath complex

The statue of Hadrian was found lying halfway down in the *frigidarium* 's rubble.

This initially led archaeologists to think it had been hauled in there from another part of the huge bath complex, perhaps to remove its gilded bronze armour, or to burn the huge marble pieces to make cement in a nearby lime kiln.

However, they now think sculptures of Hadrian, his wife Vibia Sabina, another Roman emperor Antoninus Pius, his wife Faustina the Elder, and Marcus Aurelius all once adorned niches situated around the room.

There were three large niches on both the western and eastern sides. The fragments of Hadrian's statue were found near the south-west niche.

The front parts of two female feet were discovered in the opposite niche, on the room's south-eastern side.

The archaeologists now think these belonged to a colossal figure of Vibia Sabina, who was forced into marriage with the homosexual Hadrian at the age of 14.

Remains of the statue depicting Faustina the Elder were found further along, on the eastern side.

In the opposite niche, they found the front parts of a pair of male feet in sandals, which could belong to her husband, Antoninus Pius - who succeeded Hadrian as emperor.

The experts suggest Antonine emperors occupied niches on the western side of the room, while their spouses stood opposite, on the east side.

Five good emperors

After the discovery of Faustina and her male counterpart, the archaeologists guessed the north-western niche would contain a colossal statue of Marcus Aurelius - the longest-surviving successor of Antoninus Pius.

The discovery on Wednesday confirmed this prediction, and suggests the north-eastern niche may contain remains of a statue depicting Faustina the Younger, Marcus Aurelius's wife.

Archaeologists will get the opportunity to excavate this part of the room next year.

Despite his philosophical leanings, Marcus Aurelius had to spend much of his reign fighting Germanic tribes along the Austrian Danube where, in 180AD, he died in nearby Carnuntum.

The part of Marcus Aurelius in Gladiator was one of Richard Harris's last roles (the actor died in 2002). Although much of the storyline is fictional, it is set against an historical backdrop of the imperial succession from Marcus Aurelius to his son Commodus.

While Marcus Aurelius is considered, along with Nerva, Trajan, Hadrian and Antoninus Pius, as one of Rome's Five Good Emperors, Commodus's reign was marked by internal strife, cruelty and conspiracies.

Commodus took part, naked, in gladiatorial battles - which he always won. Opponents, whose lives were apparently spared, would eventually submit to the emperor.

He was murdered in 192AD - not by a general called Maximus, but by an athlete named Narcissus, sent by conspirators to strangle the megalomaniac emperor in his bath.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7580745.stm

Published: 2008/08/25 19:20:55 GMT

Cattle shown to align north-south

By Elizabeth Mitchell
Science reporter, BBC News

Have you ever noticed that herds of grazing animals all face the same way?

Images from Google Earth have confirmed that cattle tend to align their bodies in a north-south direction.

Wild deer also display this behaviour - a phenomenon that has apparently gone unnoticed by herdsmen and hunters for thousands of years.

In the Proceedings for the National Academy of Sciences, scientists say the Earth's magnetic fields may influence the behaviour of these animals.

The Earth can be viewed as a huge magnet, with magnetic north and south situated close to the geographical poles.

Many species - including birds and salmon - are known to use the Earth's magnetic fields in migration, rather like a natural GPS.

A few studies have shown that some mammals - including bats - also use a "magnetic compass" to help their sense of direction.

Dr Sabine Begall, from the University of Duisburg-Essen, Germany, has mainly studied the magnetic sense of mole rats - African animals that live in underground tunnels.

"We were wondering if larger animals also have this magnetic sense," she told BBC News.

Dr Begall and colleagues first decided to study the natural behaviour of domestic cattle.

The researchers surveyed Google Earth images of 8,510 grazing and resting cattle in 308 pasture plains across the globe.

"Sometimes it took hours and hours to find some pictures with good resolution," said Dr Begall.

The scientists were unable to distinguish between the head and rear of the cattle, but could tell that the animals tended to face either north or south.

Their study ruled out the possibility that the Sun position or wind direction were major influences on the orientation of the cattle.

Dr Begall said: "In Africa and South America, the cattle (were) shifted slightly to a more north-eastern-south-western direction.

"But it is known that the Earth's magnetic field is much weaker there," she explained.

The researchers also recorded the body positions of 2,974 wild deer in 277 locations across the Czech Republic.

Their fieldwork revealed that the majority of grazing and resting deer face northward. About one-third of the deer faced southward.

"That might be some kind of anti-predatory behaviour," speculated Dr Begall.

Willy Miller - a Scottish cattle farmer - remarked: "I've never noticed that my cows all face the same way."

Cows are social animals: "[They] all sit down before it rains [and] huddle together in a circle formation during blizzards. But from a cow's point of view, that's just sensible," he told BBC News.

Professor John Phillips, a sensory biologist from Virginia Tech University, US, commented that this sixth magnetic sense might be "virtually ubiquitous in the animal kingdom".

He added: "We need to think about some really fundamental things that this sensory ability provides in animals."

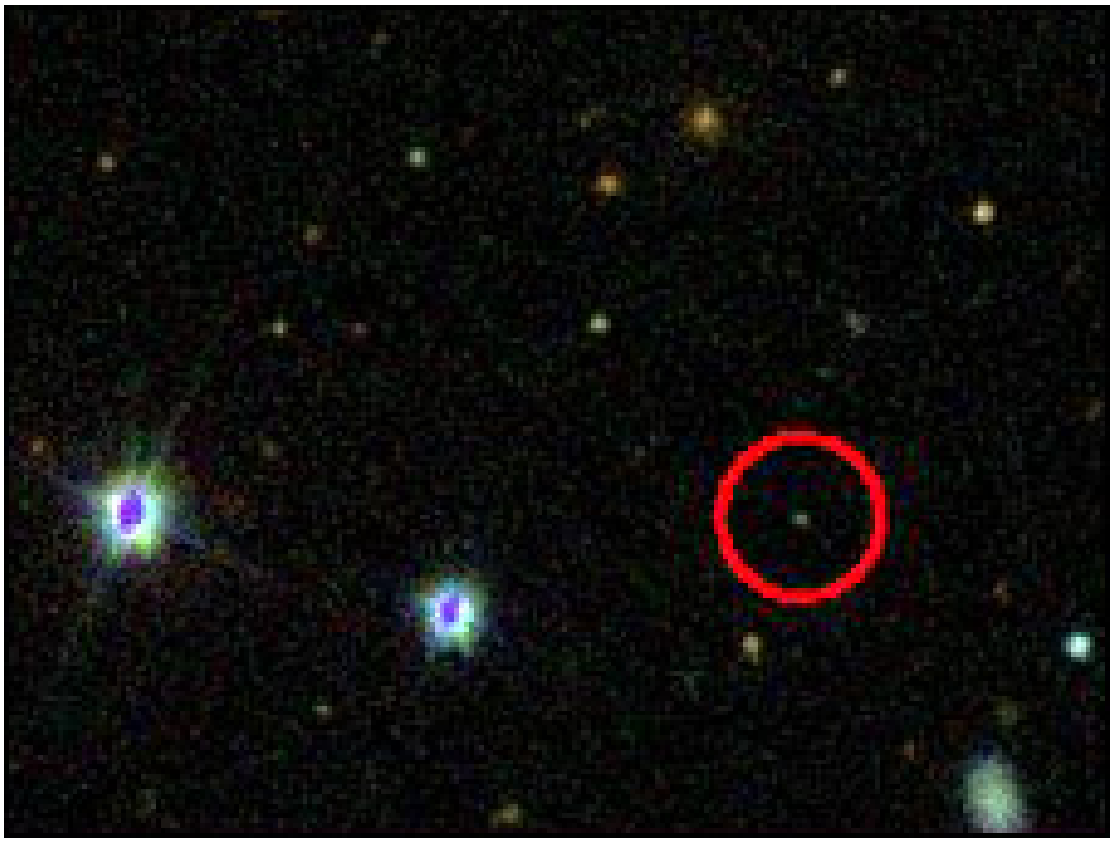
The challenge remains for scientists to explain how the animals behave in this way - and if Scottish cattle are the exception to the rule!

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7575459.stm

Published: 2008/08/25 21:04:01 GMT

Sky survey yields new cosmic haul

By Dr Chris Lintott
Co-presenter, BBC Sky at Night



Astronomers looking through the data from the Sloan Digital Sky Survey, the world's largest survey of galaxies, have found a new haul of objects closer to home - including one with a potentially exotic origin.

By searching through a survey region known as Stripe 82, a team led by Dr Andrew Becker of the University of Washington, has discovered almost 50 new asteroid-sized bodies in the outer regions of our Solar System.

As part of a search for supernovae - exploding stars in distant galaxies - the robotic Sloan telescope in New Mexico revisited this area of the southern sky every three days.

By comparing images taken on different nights, the Washington team was able to detect the asteroids as they moved across the sky.

It's probably a mixture of ice and rock, rather like a comet
Dr Andrew Becker, University of Washington

As team member Dr Lynne Jones pointed out: "If you can find things that explode, you can also find things that move, but you need different tools to look for them."

While most of the newly discovered objects are normal members of the Kuiper belt, a large band of icy bodies stretching beyond the orbit of Neptune, there were also surprises.

The team discovered two Neptunian Trojans, asteroids which share the same orbit as the outermost giant planet.

"Jupiter has plenty of trojans," Dr Becker told me, "and we knew that Neptune must have a similar population of objects. Surprisingly, not many had been found before this survey."

The team's prize find is an object given the temporary designation of 2006 SQ372. This icy body is currently roughly two billion miles away, just closer to the Sun than Neptune, but is beginning a journey that will take it out to a distance of 150 billion miles from the Earth.

Unpredictable fate

The new object is only 30-60 miles across, and not a normal asteroid: "It's probably a mixture of ice and rock, rather like a comet although it never comes close enough to the Sun to develop a tail," said Dr Becker.

The new object's orbit is also unusual; only one other object - Sedna, discovered in 2003 - might come from the same region of the Solar System.

Dr Becker told me that simulations carried out by a third member of the team, Nathan Kaib, show that 2006 SQ372 won't stay in its current orbit for long (by astronomical standards at least).

"Sedna is in a stable orbit, and has probably been there for billions of years, but in more than half of our simulations our new object got too close to either Uranus or Neptune within 180 million years," he explained.

An interaction with either of its large neighbours would send 2006 SQ372 spinning in a random direction, leaving its fate impossible to predict.

In the meantime, Sedna and 2006 SQ372 might represent the first two known objects to have come from the inner edge of the Oort cloud, a vast reservoir of cometary material believed to exist right on the edge of the Solar System.

Only further study will confirm if this really is the new object's home, but in the meantime the discoverers are thinking of a permanent name, presenting Dr Becker with a dilemma.

"It will end up with the name of either a centaur, or a mythological name associated with the underworld or creation," he pondered.

"I would certainly prefer the underworld scenario! Too much heavy metal music in my iPod!"

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7580539.stm

Published: 2008/08/25 10:22:48 GMT

Drought-tolerant Corn Developed

Dr. Wenwei Xu, Texas AgriLife Research corn breeder at Lubbock, explained to producers at a recent field day his breeding strategy for developing drought tolerant corn. Producers were able to see the hybrid vigor expressed in the new lines because both parent lines were planted beside the hybrid or cross. (Credit: Texas AgriLife Research photo by Kay Ledbetter)

ScienceDaily (Aug. 26, 2008) — At the end of the day, drought tolerance in corn has to equate to good yields and good quality, not just good looks, said a Texas AgriLife Research scientist.

Dr. Wenwei Xu, AgriLife Research corn breeder from Lubbock, is working with crosses between temperate and tropically adapted varieties of corn to find a drought-tolerant plant that performs well under reduced irrigation.

"With the continuing decline of the Ogallala Aquifer water level and increasing cost of pumping water, the use of drought-tolerant and high-yield corn hybrids is a key for sustainable corn production under limited irrigation," Xu said.

A field day was held recently at the North Plains AgriLife Research Station near Etter to demonstrate the differences between the parent plants and the offspring, or crosses.

"We hope to reduce the amount of water required for corn by at least 10 percent," Xu said.

Already the AgriLife Research program out of Lubbock has released four inbred lines of corn and numerous others are in the process for release, he said.

"The new multiple-stress-tolerant corn lines can be used to produce corn hybrids adapted to Texas and other southern states," Xu said. "They can be a powerful tool to save water and produce crops with yield and grain quality under stressful environments."

The research station at Etter is one of three test sites in Xu's program. The others are located at Halfway and Lubbock.

About 500 hybrids are being evaluated this year for either grain yield or silage yield and quality, he said.

Xu said there has been an increasing demand for silage corn in the Texas High Plains, and producers need new hybrids adapted to the local environment. Corn produced in the U.S. is primarily based on two races of maize, but there are more than 250 races identified around the world, Xu said.

"Most of our breeding efforts start by crossing tropical corn with temperate elite lines," he said. "Then we select for desirable traits to broaden genetic diversity and introduce useful genes from exotic corn to improve stress tolerance, agronomic productivity, disease resistance, insect resistance and value-added grain characteristics."

Xu said some of the experimental hybrids they are working with have produced the same silage yield under irrigation equaling 75 percent evapotranspiration as with 100 percent evapotranspiration irrigation.

Evapotranspiration is the loss of water from the soil both by evaporation and by transpiration from the plants, and is reported on a daily basis through the Texas High Plains Evapotranspiration Network.

Bruce Spinhirne, AgriLife Research associate based in Lubbock, said they reduced the irrigation on a few hybrids by 50 percent and had a severe yield and quality limitation, so they followed that by the 75 percent water application.

Those results are due in part to the use of stored moisture in the soil profile, Spinhirne said.

"At 75 percent (evapotranspiration), you have 3 to 4 inches of available moisture that is used, where if you are watering at 100 percent, it is wasted," he said.

The average silage yield of 20 corn hybrids at two locations (Etter and Halfway) was 26.84 tons per acre under 75 percent evapotranspiration irrigation, just slightly lower than the 27.49 tons per acre under 100 percent evapotranpiration irrigation, Spinhirne said.

However, he said, there were significant differences among hybrids in each environment.

"One of our experimental hybrids produced the same amount of silage in both locations when irrigation was reduced from 100 percent to 75 percent," Spinhirne said.

"Developing and using new corn hybrids with improved tolerance to drought and other stresses is important and a viable water-saving approach," he said.

Adapted from materials provided by Texas A&M University.

http://www.sciencedaily.com:80/releases/2008/08/080825175041.htm

Cells In Eye Could Help Control Sleep

A set of nerve cells in the eye control our levels of sleepiness according to the brightness of our surroundings, Oxford University researchers have discovered. The cells directly regulate the activity of sleep centres in the brain, providing a new target for the development of drugs to control sleep and alertness. (Credit: iStockphoto/Maciej Laska)

ScienceDaily (Aug. 26, 2008) — A set of nerve cells in the eye control our levels of sleepiness according to the brightness of our surroundings, Oxford University researchers have discovered. The cells directly regulate the activity of sleep centres in the brain, providing a new target for the development of drugs to control sleep and alertness.

Immune systems, cognitive performance, and mental health are all affected by the body's sleep-wake cycle. Sleep disruption is known to be associated with a range of problems, including depression, immune impairment and a greater risk of cancer. Many drugs have been developed to modify sleep-wake cycles but these are crude, affecting many chemical pathways and different parts of the brain at the same time, and have side-effects.

'Sleep and the disruption of sleep patterns is a huge problem in the 21st century,' says Professor Russell G. Foster of Oxford's Nuffield Laboratory of Ophthalmology, who led the work. 'Our working culture of long hours and shift work, with the 24/7 availability of almost everything, have conspired to demote sleep in our priorities.'

The presence and absence of light can affect levels of sleepiness and alertness. It's why dimly lit rooms lead us to feel drowsy, while bright lights stimulate wakefulness. During the Second World War it was

shown that brightly lit factories had a more alert and productive workforce than dimly lit factories, but until now little was known about how this happened.

'We have discovered a new pathway that modulates sleep and arousal,' Professor Foster explains. 'If we can mimic the effect of light pharmacologically, we could turn sleep on and off.'

Professor Foster and colleagues have previously shown that the eye contains a subset of retinal nerve cells that are sensitive to light. Working on mouse models in which these retinal ganglion cells have been turned off genetically, the research team found that the effects of light on sleep and alertness were completely abolished. The work was supported by the Wellcome Trust and a European Commission grant.

Mice are nocturnal animals, so show the opposite light response to humans. They are alert and active in the dark, but go to sleep in the light.

The Oxford team videoed mice and monitored their muscle and brain activity for four hours in the dark. The lights were then switched on for an hour and after 15–20 minutes the mice went to sleep. Turning off the light-sensitive retinal ganglion cells abolished this behaviour. The mice stayed awake when the lights were on.

'There was absolutely no effect on the mice. This was a very clear and very surprising result,' comments Professor Foster.

The researchers were able to track this sleep pathway to the brain. They showed that two sleep-inducing centres in the brain are directly activated by the cells, turning on or turning off sleep. By defining the whole light-responsive system that regulates sleep and alertness, the researchers have found a new pathway that could provide a new therapeutic target for manipulation of sleep and arousal in humans.

Adapted from materials provided by University of Oxford.

http://www.sciencedaily.com/releases/2008/08/080825204822.htm

75 Percent Of Athletes' Parents Let Their Child Skip Exams For A Game

ScienceDaily (Aug. 26, 2008) — Three quarters of parents of young athletes let their child forgo an exam for an important game, a new study conducted at the University of Haifa has found. In comparison, only 47% of parents of young musicians will agree to their child choosing a performance over an exam. "Parents usually don't understand their role in the course of their child's career development, and cross the line between involvement and intervention," the study's authors said.The study, which was conducted by Sharon Yaniv, Prof. Ron Lidor and Prof. Avigdor Klingman, examined 203 students from 7th to 12th grade in four different schools in northern Israel who participate in high school sports leagues. Some of the students were on their school all-star teams (basketball, volleyball and athletics); others were active in various sports leagues (basketball, soccer and athletics); and the rest, as the control group, were student-musicians. Seventy parents, 6 coaches, 4 team managers, 10 educational counselors and 5 school principals also took part in the study.

The findings showed a distinct difference between all-star athletes, athletes in local leagues and musicians, in almost all of the parameters examined. For example, participation in sports has different effects on teenagers' moods. A high percentage of all three groups reported that their participation in sports causes them to be in a good mood; 97% of all-star players; 92% of those in sports leagues; and 88% of musicians. However, 80% of all-star sportsmen reported that their sports participation may cause them to be in a bad mood, compared to just 51.5% of those involved in sports leagues and 28% of musicians.Participation in sports also causes all-star athletes more disappointment - 70% of all-star athletes compared to 60% of league players and 28% of musicians. The findings are much the same in causing frustration – 66% of all-star athletes felt frustrated by their sporting endeavors compared to 50% of those in leagues and 32% of musicians.

One of the accepted assumptions among high school students is that the athletes who represent the school receive preferential treatment, and the study reinforces this assumption - 63% of all-star athletes responded that the school gave them special consideration, compared to 52% of musicians and 41% of those in leagues. In addition, 66% of all-star athletes reported that their school helped them in extending deadlines for assignments and exams, compared to 44% of musicians and 30% of those in sports leagues. Also, 63% of the all-star athletes responded that their school helped them with tutoring sessions – compared to 11% of those in leagues and 8% of musicians.In light of these findings, it is no surprise that school principals interviewed for the study said: "Sports is one of the most popular interests in the school. This can be seen by the fact that the athletes' needs are met through designing special programs, consideration of their needs, consideration of their teachers, competitions and placing the school athletics program high on our list of priorities." And "Sports is as popular a subject as communications and electronics, but sports raise school pride while other areas of study do not."

And what do the educational counselors say about the young athletes? "They are cognizant of their own needs but not the needs of others. It's not a good part of their character, or their personality; the contempt for others, their condescending behavior and their feeling of superiority," said one of the counselors in the study.

"For young athletes, those that are active in sports leagues and primarily those that represent their school, there are unique needs that require special handling. Given that, the focus on athletic achievements and the pride they bring the school could harm other educational values that students should be taught," the researchers summarized.

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

http://www.sciencedaily.com/releases/2008/08/080825092351.htm

Monkeys Enjoy Giving To Others, Study Finds

Capuchin monkeys, just like humans, find giving to be a satisfying experience, new evidence suggests. (Credit: iStockphoto/Robert Deal)

ScienceDaily (Aug. 25, 2008) — Researchers at the Yerkes National Primate Research Center, Emory University, have shown capuchin monkeys, just like humans, find giving to be a satisfying experience. This finding comes on the coattails of a recent imaging study in humans that documented activity in reward centers of the brain after humans gave to charity.

Empathy in seeing the pleasure of another's fortune is thought to be the impetus for sharing, a trait this study shows transcends primate species.

Frans de Waal, PhD, director of the Living Links Center at the Yerkes Research Center, and Kristi Leimgruber, research specialist, led a team of researchers who exchanged tokens for food with eight adult female capuchins. Each capuchin was paired with a relative, an unrelated familiar female from her own social group or a stranger (a female from a different group).

The capuchins then were given the choice of two tokens: the selfish option, which rewarded that capuchin alone with an apple slice; or the prosocial option, which rewarded both capuchins with an apple slice. The monkeys predominantly selected the prosocial token when paired with a relative or familiar individual but not when paired with a stranger.

"The fact the capuchins predominantly selected the prosocial option must mean seeing another monkey receive food is satisfying or rewarding for them," said de Waal. "We believe prosocial behavior is empathy based. Empathy increases in both humans and animals with social closeness, and in our study, closer partners made more prosocial choices. They seem to care for the welfare of those they know," continued de Waal.

de Waal and his research team next will attempt to determine whether giving is self-rewarding to capuchins because they can eat together or if the monkeys simply like to see the other monkey enjoying food.

The research was supported by a grant from the National Science Foundation and by the Yerkes base grant from the National Institutes of Health.

Journal reference:

1. Frans B. M. de Waal; Kristin Leimgruber; Amanda R. Greenberg. **Giving is self-rewarding for monkeys**. *Proceedings of the National Academy of Sciences*, [link]

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

http://www.sciencedaily.com/releases/2008/08/080825175005.htm

How To Get A College Roommate You Can Live With

ScienceDaily (Aug. 25, 2008) — Anxious college freshmen can relax. No matter who will be sharing their dorm room, they have the power to make the relationship better, University of Michigan research suggests.The research, published in the September 2008 issue of the Journal of Personality and Social Psychology, was conducted by psychologists Jennifer Crocker and Amy Canevello at the U-M Institute for Social Research.

"Roommate relationships can be really good or they can be really bad. And the fear is that they'll go from bad to worse," said Crocker, a social psychologist who studies how our own behavior and attitudes affect the kinds of relationships we experience. "But our study shows that you can create a supportive relationship and turn the stranger who's your roommate into a friend."For the research, funded by the National Institutes of Health, Crocker and Canevello studied more than 300 college freshmen who were assigned to share rooms with other students they didn't know at the start of the first semester. In one study, participants were surveyed once a week for 10 weeks about their attitudes toward friendships in general, and about their feelings of loneliness and experiences of conflict. In a second study, 65 roommate pairs completed daily reports about their relationships during a three-week period in the middle of the semester.

The goal was to see how students' own approaches to relationships affected the quality of their relationships with roommates and their own emotional health. Among the questions students were asked: How often do you try to be supportive of others? How often do you avoid being selfish or self-centered? And how often do you avoid showing weakness? They were also asked about feelings of loneliness and closeness to other people.During the first week of the study, 32 percent reported always or almost always feeling lonely, compared to only about 17 percent in the 10th week of the study.

In the first week, about 34 percent said they always or almost always avoided showing weakness in their friendships, compared to only about 13 percent in the 10th week of the study.Crocker and Canevello found that students who were invested in enhancing and protecting their own self-images were less likely to report that their relationships with their roommates were getting better.

An essential element in reducing loneliness and building a good roommate relationship involves moving away from what Crocker calls an 'ego-system' approach, in which people focus on their own needs and try to shore up their self-image, toward an 'eco-system' approach, in which people are motivated by genuine caring and compassion for another person."Basically, people who give support in response to another person's needs and out of concern for another person's welfare are most successful at building close relationships that they find supportive," Canevello said. "We get support, in other words, by being supportive.""The transition from high school to college is challenging for a variety of reasons," Crocker said. "The academic environment is usually more difficult and more competitive, and moving away from the nuclear family for the first time disrupts established social support networks. Along with meeting academic challenges, creating and maintaining friendships ranks among the most important tasks of the first semester of college.

"So these findings provide some good news---students can be the architects of their roommate relationships, enhancing or undermining the quality of these important relationships."

Adapted from materials provided by University of Michigan.

http://www.sciencedaily.com/releases/2008/08/080825175039.htm

Anti-cancer Flower Power: Researchers Combat Cancer With A Jasmine-based Drug

Jasmine (Iasminum officinale). (Credit: iStockphoto/Tatiana Buzuleac)

ScienceDaily (Aug. 25, 2008) — Could a substance from the jasmine flower hold the key to an effective new therapy to treat cancer?

Prof. Eliezer Flescher of The Sackler Faculty of Medicine, Tel Aviv University thinks so. He and his colleagues have developed an anti-cancer drug based on a decade of research into the commercial applications of the compound Jasmonate, a synthetic compound derived from the flower itself. Prof. Flescher began to research the compound about a decade ago, and with his recent development of the drug, his studies have now begun to bear meaningful fruit.

“Acetylsalicylic acid (aspirin) is based on a plant stress hormone,” says Prof. Flescher. “I asked myself, ‘Could there be other plant stress hormones that have clinical efficacy?’ While various studies have suggested that aspirin can prevent cancer, especially colon cancer, I realized that there could be a chance to find a potent plant hormone that could fight cancer even better. I pinpointed jasmonate.”

A Natural Leap to the Drugstore Shelf

Both blood cancers and solid tumors seem to be responsive to the jasmonate compound, known also as methyl jasmonate. Prof. Flescher refers to it as the “jasmonate scaffold,” a basis for developing a series of chemical derivatives. In terms of bioavailability and safety, early first-in-man studies have proven successful, and Prof. Flescher is hopeful that an anti-cancer drug based on jasmonate could be on the shelf in America within four years through the activity of Sepal-Pharma which licensed his research from Ramot, the technology transfer arm of Tel Aviv University.

Normally drug development takes much longer. “The jasmonate compound is used widely in agriculture and in cosmetics,” says Prof. Flescher. “Proven to be non-toxic, it has the same regulatory status as table

salt. That and the fact we are working on a natural chemical gives us a good starting point for launching a new drug."

Optimistic Responses from Peer Researchers

Other research groups are taking notice. Since Prof. Flescher started publishing papers on jasmonate (most recently in the academic journal Oncogene), six new research groups around the world have initiated research on the subject.

Peer commentary in Oncogene is positive about Prof. Flescher's promising research. "Methyl jasmonate," says the commentary, "has already been shown to have selective anticancer activity in preclinical studies, and this finding may stimulate the development of a novel class of small anticancer compounds."

Prof. Flescher's research is the foundation of a promising new biotech company, Sepal-Pharma, where Prof. Flescher serves on the scientific advisory board. Sepal-Pharma is developing new compounds based on the Jasmonate Scaffold. Sepal-Pharma has also been actively funding research done at Prof. Flescher's lab.

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

http://www.sciencedaily.com/releases/2008/08/080825132111.htm

How 'Secondary' Sex Characters Can Drive The Origin Of Species

Differences in horn size in horned beetles may be the result of evolutionary changes that favor the creation of new species. Shown here are males from two species of the genus Onthophagus, O. watanabei and O. sagittarius (Credit: Photo by Armin Moczek)

ScienceDaily (Aug. 25, 2008) — The ostentatious, sometimes bizarre qualities that improve a creature's chances of finding a mate may also drive the reproductive separation of populations and the evolution of new species, say two Indiana University Bloomington biologists.

In the September 2008 issue of Evolution (now online), Armin Moczek and Harald Parzer examine males from four geographically separated populations of the horned beetle species Onthophagus taurus. The beetles have diverged significantly in the size of the male copulatory organ, and natural selection operating on the other end of the animal -- horns atop the beetles' heads -- seems to be driving it.

"Biologists have known that in these beetles there is an investment trade-off between secondary sexual characters and primary sexual characters," Moczek said. "As horns get bigger, copulatory organs get smaller, or vice versa. What was not known was how frequently and how fast this can occur in nature, and whether this can drive the evolution of new species."

Structures directly involved in mating are known as primary sexual characters, whereas combat structures like horns -- or seductive attributes like a cardinal's vibrant plumage or a bullfrog's deeply resonant baritone -- are known as secondary sexual characters.

Evolutionary biologists believe changes in copulatory organ size and shape can spur speciation by making individuals from different populations sexually incompatible.

Native to Italy, O. taurus exists in other parts of the world only because of recent human activity. This means, Moczek and Parzer say, that the marked divergences they observed in O. taurus's horn and copulatory organ size must have occurred over an extremely short period of time -- 50 years or less.

Despite what many of us are led to believe, variation in male copulatory organ size within species tends to be very low, humans and beetles included. Yet the four O. taurus populations Moczek and Parzer studied in the U.S. (North Carolina), Italy, and western and eastern Australia, exhibit substantial changes in both horn and genitalia length -- as much as 3.5 times, in terms of an "investment" index the scientists devised that takes body size into account.

The scientists examined 10 other Onthophagus species, and as expected, they found vast differences between the species regarding horn and male copulatory organ size. Moczek says this suggests that trade-offs between primary and secondary sexual traits continue to shape the way species diverge well after speciation has occurred.

The speed and magnitude of divergence within O. taurus presents something of a paradox. How is it that copulatory organ size can be so rigorously maintained within the populations of a single species, yet appear so restless to change?"In terms of the integrity of a species, it's important for these things not to change too much," Moczek explains. "So there is a lot of evidence suggesting that within species or within the populations of species, natural selection maintains genital characters. But if these primary sex characters are linked to other characters that can change readily, then you've got what we think is a very exciting mechanism that could prime populations for reproductive isolation."

Horn length and shape can change for many reasons, Moczek says. Among densely populated species, fighting (which favors large horns) may not be an effective strategy for winning mates. As combative males fight each other, a diminutive, smaller-horned male could simply employ a sneaking strategy to gain access to unguarded females. Under these circumstances, reduced investment in horns seems to result in larger copulatory organs. Alternately, in lower density populations, most male beetles spend a great deal of time fighting. Longer, bigger horns could serve these males well -- and also lead to smaller genitalia.

"If this is all it takes to change genitalia, it may be easier to make new species than we thought," Moczek said.The notion that genital size is related to the origin of species is not new. But how they are related has perplexed evolutionary biologists. The individuals of most species do not choose mates according to the size and shape of genitalia. Indeed, genitalia may not be relevant until the latter stages of courtship, if at all.

An early "lock and key" model of reproductive isolation was first proposed by L. Dufour in 1844 to explain why some pairs of species, outwardly identical in every way, are unable to mate.

Research discussed in the Evolution paper was supported by grants from the National Science Foundation.

Journal reference:

1. Harald F. Parzer and Armin P. Moczek. **Rapid Antagonistic Coevolution Between Primary And Secondary Sexual Characters In Horned Beetles**. *Evolution*, 2008; DOI: 10.1111/j.1558-5646.2008.00448.x

Adapted from materials provided by Indiana University.

http://www.sciencedaily.com/releases/2008/08/080825103553.htm

Tahitian Vanilla Originated In Maya Forests, Says Botanist

Pesach Lubinsky, a postdoctoral researcher in UC Riverside's department of botany and plant sciences, attends to a vanilla orchid. (Credit: UCR Strategic Communications)

ScienceDaily (Aug. 25, 2008) — The origin of the Tahitian vanilla orchid, whose cured fruit is the source of the rare and highly esteemed gourmet French Polynesian spice, has long eluded botanists. Known by the scientific name Vanilla tahitensis, Tahitian vanilla is found to exist only in cultivation; natural, wild populations of the orchid have never been encountered.

Now, a team of investigators led by Pesach Lubinsky, a postdoctoral researcher with Norman Ellstrand, a professor of genetics in UC Riverside's Department of Botany and Plant Sciences, claims to have traced Tahitian vanilla back to its true origins.

In the August issue of the American Journal of Botany, Lubinsky and colleagues use genetic and ethnohistoric analysis to argue that Tahitian vanilla began its evolutionary journey as a pre-Columbian Maya cultivar inside the tropical forests of Guatemala.

"All the evidence points in the same direction," Lubinsky said. "Our DNA analysis corroborates what the historical sources say, namely, that vanilla was a trade item brought to Tahiti by French sailors in the mid-19th century. The French Admiral responsible for introducing vanilla to Tahiti, Alphonse Hamelin, used vanilla cuttings from the Philippines. The historical record tells us that vanilla – which isn't native to the Philippines – was previously introduced to the region via the Manila Galleon trade from the New World, and specifically from Guatemala."

The Manila galleons (1565-1815) were Spanish trading ships that sailed once or twice each year across the Pacific Ocean between Manila in the Philippines and Acapulco, Mexico. The ships brought Chinese porcelain, silk, ivory, spices, and other exotic goods to Mexico in exchange for New World silver.

The genetic data Lubinsky and his colleagues obtained confirmed that the closest relatives to Tahitian vanilla, from among 40 different Vanilla species they analyzed from across the world, were two species

that grow naturally only in the tropical forests of Central America: Vanilla planifolia and Vanilla odorata. V. planifolia is also the primary species cultivated for commercial vanilla, and is grown principally in Madagascar and Indonesia. V. odorata has never been cultivated.

Yet, even with this initial genetic data, the researchers faced a conundrum. They could find no Tahitian vanilla growing wild in Guatemala, which is where its closest relatives grew. The researchers decided to give their genetic data a second look. This time, by comparing patterns of relatedness in DNA sequences from both the nucleus and the chloroplast (a plant cell's photosynthetic factory), they discovered that Tahitian vanilla fit the pattern of being a hybrid offspring between V. planifolia and V. odorata.

"And that's where the Maya cultivators come in," Lubinsky explained. "The pre-Columbian Maya had been managing their forests for millennia to cultivate cacao and to make chocolate, and we know they were also cultivating vanilla to use it as a chocolate spice. The Maya created these forest gardens by introducing different types of species of wild cacao and vanilla from the surrounding forests, which meant that species that had previously been geographically separated were then able to hybridize because they were in the same place. That's the scenario we present in our research paper for how Tahitian vanilla got started. It is an evolutionary product, but also a Maya artifact."

Seung-Chul Kim, an assistant professor of systematics in the Department of Botany and Plant Sciences and a coauthor on the research paper, served as an advisor to Lubinsky on the project.

"Pesach has demonstrated that Vanilla species can exchange genes quite frequently across species barriers," Kim said. "This provides an opportunity to breed new commercial varieties of vanilla through hybridization in the future."

Lubinsky, Kim and their colleagues plan to do further research on vanilla. In January 2009, they will begin mapping cacao-vanilla forest gardens in Belize, southern Mexico and Guatemala. They also are actively advising on sustainable agricultural development projects using vanilla in Mexico and Belize, and have plans to assemble a vanilla germplasm collection.

Lubinsky and Kim were joined in the research by Kenneth M. Cameron of the University of Wisconsin, Madison, Wis.; María Carmen Molina of Escuela Superior de Ciencias Experimentales y Tecnología, Móstoles, Spain; Maurice Wong and Sandra Lepers-Andrzejewski of the Etablissement Vanille de Tahiti, French Polynesia; and Arturo Gómez-Pompa of the Universidad Veracruzana, Veracruz, Mexico. A UCR professor emeritus of botany who was named a University Professor, Gómez-Pompa is now the director of the Universidad Veracruzana's Centro de Investigaciones Tropicales (Center of Tropical Research or CITRO). He also served as Lubinsky's advisor on the research project.

The research was funded by the Graduate Research Fellowship Program of the National Science Foundation; the University of California Institute for Mexico and the United States (UC MEXUS); a University of California Office of the President Pacific Rim mini-grant; and UCR's Department of Botany and Plant Sciences.

Adapted from materials provided by University of California - Riverside.

http://www.sciencedaily.com/releases/2008/08/080821164558.htm

GOCE Earth Explorer Satellite To Look At The Earth's Surface And Core

GOCE positioned on the rotary table for alignment check, during launch campaign at the Plesetsk Cosmodrome. (Credit: ESA)

ScienceDaily (Aug. 25, 2008) — The European Space Agency is about to launch the most sophisticated mission ever to investigate the Earth's gravitational field and to map the reference shape of our planet – the geoid - with unprecedented resolution and accuracy.

The Gravity field and steady-state Ocean Circulation Explorer (GOCE) will be placed onto a low altitude near sun-synchronous orbit by a Russian Rockot vehicle launched from the Plesetsk Cosmodrome in Northern Russia, some 800 km north of Moscow. Lift-off is scheduled to take place at 16:21 CEST (14:21 UTC) on Wednesday 10 September. The launcher is operated by Eurockot Launch Services, a joint venture between EADS Astrium and the Khrunichev Space Centre (Russia).

ESA's 1-tonne spacecraft carries a set of six state-of-the-art high-sensitivity accelerometers to measure the components of the gravity field along all three axes. The data collected will provide a high-resolution map of the geoid (the reference surface of the planet) and of gravitational anomalies. Such a map will not only greatly improve our knowledge and understanding of the Earth's internal structure, but will also be used as a much better reference for ocean and climate studies, including sea-level changes, oceanic circulation and ice caps dynamics survey. Numerous applications are expected in climatology, oceanography and geophysics, as well as for geodetic and positioning activities.

To make this mission possible, ESA, its industrial partners (45 European companies led by Thales Alenia Space) and the science community had to overcome an impressive technical challenge by designing a

satellite that will orbit the Earth close enough to gather high-accuracy gravitational data while being able to filter out disturbances caused by the remaining traces of the atmosphere in low Earth orbit (at an altitude of only 260 km). This resulted in a slender 5-m-long arrowhead shape for aerodynamics with low power ion thrusters to compensate for the atmospheric drag.

GOCE is the first Core Mission of the Earth Explorer programme undertaken by ESA in 1999 to foster research on the Earth's atmosphere, biosphere, hydrosphere, cryosphere and interior, on their interactions and on the impact of human activities on these natural processes. It will be the first in a whole series of Earth Explorer missions with five launches to take place within the next two years.

Two more Core Missions, selected to address specific topics of major public concern are already under development: ADM-Aeolus for atmospheric dynamics (2010), and EarthCARE to investigate the Earth's radiative balance (2013). Three smaller Earth Explorer Opportunity Missions are also in preparation: CryoSat-2 to measure ice sheet thickness (2009), SMOS to study soil moisture and ocean salinity (2009) and Swarm to survey the evolution of the magnetic field (2010).

Adapted from materials provided by European Space Agency.

http://www.sciencedaily.com/releases/2008/08/080822093720.htm

M&Ms As Diet Food? 100-calorie Pack Misconceptions

ScienceDaily (Aug. 25, 2008) — Beware of mini-packs and mini-foods, especially if you're a dieter.

Chronic dieters tend to consume more calories when foods and packages are smaller, according to a new study in the Journal of Consumer Research. Authors Maura L. Scott, Stephen M. Nowlis, Naomi Mandel, and Andrea C. Morales (all Arizona State University) examined consumer behavior regarding "mini-packs," 100-calorie food packages that are marketed to help people control calorie intake.

"Interestingly, one group that over-consumes the mini-packs is chronic dieters—individuals constantly trying to manage their weight and food intake," write the authors.

The researchers believe their research shows that the ubiquitous small packages may actually undermine dieters' attempts to limit calories. "On the one hand, consumers perceive the mini-packs to be a generous portion of food (numerous small food morsels in each pack and multiple mini-packs in each box); on the other hand, consumers perceive the mini-packs to be diet food. For chronic dieters, this perceptual dilemma causes a tendency to overeat, due to their emotion-laden relationship with food."

In a series of studies, the researchers assessed peoples' perceptions of M&Ms in mini-packs versus regular-sized packages. They found that participants tended to have conflicting thoughts about the mini-packs: They thought of them as "diet food," yet they overestimated how many calories the packages contained. In subsequent studies, the researchers assessed participants' relationship with food, dividing them into "restrained" and "unrestrained" eaters. The "restrained" eaters tended to consume more calories from mini-packs than "unrestrained" participants.

The authors conclude that dieters should keep an eye on small packages: "While restrained eaters may be attracted to smaller foods in smaller packages initially, presumably because these products are thought to help consumers with their diets, our research shows that restrained eaters actually tend to consume more of these foods than they would of regular foods."

Journal reference:

1. Scott et al. **The Effects of Reduced Food Size and Package Size on the Consumption Behavior of Restrained and Unrestrained Eaters**. *Journal of Consumer Research*, 2008; 0 (0): 080716090056599 DOI: 10.1086/591103

Adapted from materials provided by University of Chicago Press Journals.

http://www.sciencedaily.com/releases/2008/08/080822160345.htm

Converting Sunlight To Cheaper Energy

Scientists are working with new materials that can make devices used for converting sunlight to electricity cheaper and more efficient. (Credit: iStockphoto)

ScienceDaily (Aug. 25, 2008) — Scientists are working to convert sunlight to cheap electricity at South Dakota State University. Research scientists are working with new materials that can make devices used for converting sunlight to electricity cheaper and more efficient.

Assistant professor Qiquan Qiao in SDSU's Department of Electrical Engineering and Computer Science said so-called organic photovoltaics, or OPVs, are less expensive to produce than traditional devices for harvesting solar energy.

Qiao and his SDSU colleagues also are working on organic light-emitting diodes, or OLEDs.

The new technology is sometimes referred to as "molecular electronics" or "organic electronics" — organic because it relies on carbon-based polymers and molecules as semiconductors rather than inorganic semiconductors such as silicon.

"Right now the challenge for photovoltaics is to make the technology less expensive," Qiao said.

"Therefore, the objective is find new materials and novel device structures for cost-effective photovoltaic devices.

"The beauty of organic photovoltaics and organic LEDs is low cost and flexibility," the researcher continued. "These devices can be fabricated by inexpensive, solution-based processing techniques similar to painting or printing."

"The ease of production brings costs down, while the mechanical flexibility of the materials opens up a wide range of applications," Qiao concluded.

Organic photovoltaics and organic LEDs are made up of thin films of semiconducting organic compounds that can absorb photons of solar energy. Typically an organic polymer, or a long, flexible chain of carbon-based material, is used as a substrate on which semiconducting materials are applied as a solution using a technique similar to inkjet printing.

"The research at SDSU is focused on new materials with variable band gaps," Qiao said.

"The band gap determines how much solar energy the photovoltaic device can absorb and convert into electricity."

Qiao explained that visible sunlight contains only about 50 percent of the total solar energy. That means the sun is giving off just as much non-visible energy as visible energy.

"We're working on synthesizing novel polymers with variable band gaps, including high, medium and low-band gap varieties, to absorb the full spectrum of sunlight. By this we can double the light harvesting or absorption," Qiao said.

SDSU's scientists plan to use the variable band gap polymers to build multi-junction polymer solar cells or photovoltaics.

These devices use multiple layers of polymer/fullerene films that are tuned to absorb different spectral regions of solar energy.

Ideally, photons that are not absorbed by the first film layer pass through to be absorbed by the following layers.

The devices can harvest photons from ultraviolet to visible to infrared in order to efficiently convert the full spectrum of solar energy to electricity.

SDSU scientists also work with organic light-emitting diodes focusing on developing novel materials and devices for full color displays.

"We are working to develop these new light-emitting and efficient, charge-transporting materials to improve the light-emitting efficiency of full color displays," Qiao said.

Currently, LED technology is used mainly for signage displays. But in the future, as OLEDs become less expensive and more efficient, they may be used for residential lighting, for example.

The new technology will make it easy to insert lights into walls or ceilings. But instead of light bulbs, the lighting apparatus of the future may look more like a poster, Qiao said.

Qiao and his colleagues are funded in part by SDSU's electrical engineering Ph.D. program and by National Science Foundation and South Dakota EPSCoR, the Experimental Program to Stimulate Competitive Research.

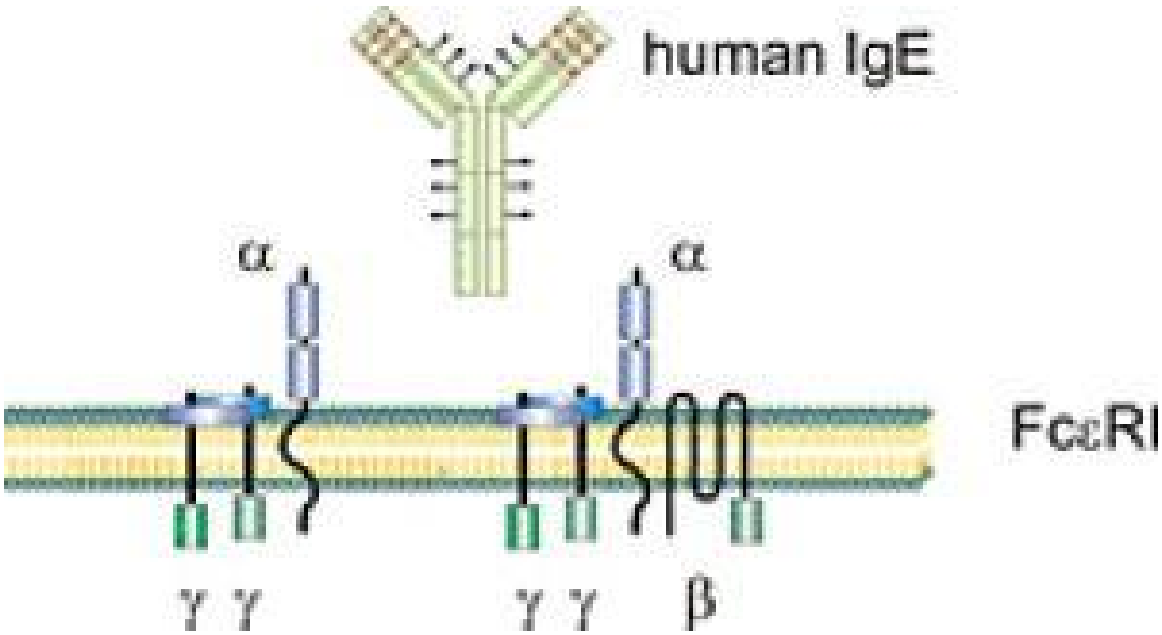
In addition Qiao is one of about 40 faculty members from SDSU, the South Dakota School of Mines and Technology and the University of South Dakota who have come together to form Photo Active Nanoscale Systems (PANS).

The primary purpose is developing photovoltaics, or devices that will directly convert light to electricity.

Adapted from materials provided by South Dakota State University, via Newswise.

http://www.sciencedaily.com/releases/2008/08/080821212854.htm

Key Allergy Gene Discovered



Schematic representation of the high affinity receptor for IgE. Variants within the gene encoding the alpha chain are associated with increased levels of IgE antibodies. (Credit: Image courtesy of Helmholtz Zentrum Muenchen - German Research Centre for Environmental Health)

ScienceDaily (Aug. 25, 2008) — Together with colleagues from the Department of Dermatology and Allergy and the Center for Allergy and Environment (ZAUM) of the Technische Universität München, scientists at the Helmholtz Zentrum München have pinpointed a major gene for allergic diseases.

The gene was localized using cutting edge technologies for examining the whole human genome at the Helmholtz Zentrum München.

The newly discovered FCER1A gene encodes the alpha chain of high affinity IgE receptor, which plays a major role in controlling allergic responses. The team of scientists led by Dr. Stephan Weidinger from the Technische Universität München and Dr. Thomas Illig from the Helmholtz Zentrum München found that certain variations of the FCER1A gene decisively influence the production of immunoglobulin E (IgE) antibodies. IgE antibodies are a particular type of antibody that is normally used to protect against parasites. In Western lifestyle countries with less contact, however, elevated IgE levels are associated with allergic disorders.

In genetically susceptible individuals the immune system becomes biased and produces IgE antibodies against harmless agents such as pollen, dust mites or animal hair. These IgE antibodies then work in conjunction with certain cells to get rid of the allergens, a process that gives rise to the symptoms of allergy such as allergic rhinitis (hay fever), atopic dermatitis or asthma.

“Most people with allergies are atopic - meaning they have a genetic tendency to develop allergies. To detect the genetic factors we examined the genomes of more than 10,000 adults and children from the whole of Germany" explained Stephan Weidinger.

Most of the persons examined for the study come from the population studies of the KORA (co-operative health research in the Augsburg region) research platform, which is led by Prof. Dr. H.-Erich Wichmann, the Director of the Institute of Epidemiology at the Helmholtz Zentrum München. The allergological

examinations were carried by the Department for Dermatology and Allergy of the Technische Universität München headed by Prof. Dr. Dr. Johannes Ring.

Although in its early stages, the new knowledge on the regulation of IgE production does have the potential to guide the development of new drugs.

Journal reference:

1. Weidinger et al. **Genome-Wide Scan on Total Serum IgE Levels Identifies FCER1A as Novel Susceptibility Locus**. *PLoS Genetics*, 2008; 4 (8): e1000166 DOI: 10.1371/journal.pgen.1000166

Adapted from materials provided by Helmholtz Zentrum Muenchen - German Research Centre for Environmental Health.

http://www.sciencedaily.com/releases/2008/08/080822085111.htm

A New Biopesticide For The Organic Food Boom

Powdery mildew on cucumber (left) disappears when treated with Marrone Organic's new pesticide, MOI-106. (Credit: Marrone Organics International, Inc.)

ScienceDaily (Aug. 25, 2008) — With the boom in consumption of organic foods creating a pressing need for natural insecticides and herbicides that can be used on crops certified as "organic," biopesticide pioneer Pam G. Marrone, Ph.D., is reporting development of a new "green" pesticide obtained from an extract of the giant knotweed in a report scheduled for presentation here today at the 236th national meeting of the American Chemical Society.

That 12-foot-high Goliath, named for the jointed swollen nodes on its stem, invaded the U.S. from Japan years ago and grows along the East Coast and other areas. "The product is safe to humans, animals, and the environment," says Marrone, founder and CEO of Marrone Organic Innovations Inc., in Davis, Calif.

The new biopesticide has active compounds that alert plant defenses to combat a range of diseases, including powdery mildew, gray mold and bacterial blight that affect fruits, vegetables, and ornamentals. The product will be available this October for conventional growers, according to Marja Koivunen, Ph.D., director of research and development for Marrone Organic Innovations. A new formulation has also been developed for organic farmers and will be available in 2009.

In one of the presentations by Marrone Organic Innovations (MOI), the progress toward discovery of an "organic Roundup" — the Holy Grail of biopesticide research — an environmentally friendly and natural version of the world's most widely used herbicide was discussed.

Biopesticides are derived from plants, microbes, or other natural materials and are proven to be safer for humans and the environment. The active ingredient in one of the company's first products, GreenMatch EX, came from lemongrass oil, and microorganisms from around the world are studied in the search for novel and effective natural pesticides. Currently, the MOI R&D team is working on an organic rice

herbicide based on an extract from a marine microorganism, as well as on insecticides and nematocides to kill insect pests and soil-inhabiting, parasitic roundworms that affect plants and animals.

Although sales of synthetic pesticides dominate the $30 billion pesticide market, the use of biopesticides is increasing. Officials from MOI estimate that global sales will hit $1 billion by 2010 and grow 10 percent a year on average. Biopesticides could make up 4.25 percent of the global pesticide business in 2010, up from 2.5 percent in 2005. As they become more popular, synthetic pesticides are expected to shrink by 1.5 percent each year over the same period.

What accounts for the changing numbers? Public awareness, Koivunen said. "I think the time is right, there's more demand," she said. "People are becoming more aware of the negative effects of conventional pesticides. At the same time, growers are more willing to switch. They have more choices and incentive compared to 10 years ago."

All organic farmers must have markets for their food — markets that might not have been available to them a decade ago, Koivunen said. Why are people switching to organic food? "I think there has been enough scientific evidence that there's a difference between, let's say, conventional tomatoes and organic tomatoes in terms of pesticide residues but also improved taste and higher levels of antioxidants," she said.

Koivunen adds that the growing popularity of biopesticides and organic foods is not a fluke. In fact, it is part of a much larger development.

"I think it's a combination of the movement of green chemistry, trying to protect the environment and people's thoughts about their own health — maybe not even their health but their kids; and grandkids' health."

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

http://www.sciencedaily.com/releases/2008/08/080821110106.htm

The Angel of the North: welcome to the age of the 'enginartist'

Last Updated: 12:01am BST 26/08/2008

A stunning giant sculpture three times the size of 'The Angel of the North' will for the first time see an engineer given equal billing with an artist. John Whitley meets them

Looming high above the traffic on the A1 outside Gateshead, Antony Gormley's towering Angel of the North sculpture has spawned a whole family of imitators in the North-East as councils attempt to regenerate their decaying constituencies with a nice piece of public art.

But now the scale of public sculpture is about to be changed. Before this winter's first frosts, a steel monster will creep across the debris around the old Tees Dock in Middlesbrough. At 164ft, it will stand almost three times the Angel's height and its 360ft span will stretch the length of several city streets.

'Brunel did it, and he was a hero. Why can't engineering create?'

This pioneer is named Temenos and will be the first of five Tees Valley giants striding across the landscape at a total cost of £15 million, the money coming from a variety of sources including Middlesbrough Football Club.

But its size is not the most radical thing about this behemoth, due for completion next year. What is even more significant is that its conceptual and technical demands have forged an entirely new idea of the artist. Instead of the sole creator, it has given birth to a two-headed visionary partnership, an "enginartist" in whom engineering and aesthetic powers meet on equal terms.

In the ego-driven stratosphere of high art and high architecture, such a willingness to share talent - and credit - is rare indeed. Though many sculptors rely on skilled assistants, they habitually claim sole ownership of the result, and starry architects are equally reluctant to share their limelight with the engineers who ensure that their masterpieces don't fall down.

As Cecil Balmond, the engineering half of this new partnership, acknowledges, "Engineering's not sexy to talk about. The annoying thing is that engineers are supposed to be calculating machines, mathematically brilliant technocrats, but they're denied creativity.

Brunel did it, and he was a hero - why can't engineering create? It is hard when you are working with

someone, inventing, but your work is absorbed into the author's credit."

Balmond should know. At 65 he is the deputy chairman of Arup, long the world's leading structural engineers, and has tangled with architects from "Big Jim" Stirling to Daniel Libeskind and Toyo Ito. The 2006 pavilion at the Serpentine was his, with Rem Koolhaas, and so is the CCTV Tower now rising in Beijing.

But it's his current partnership with sculptor Anish Kapoor that marks a break with tradition: Temenos can claim to be the first landscape artwork in which artist and engineer share equal billing. It is, says Balmond, "on absolutely the same terms.

We both got the contract and though there is a sort of tension in our work, it's that tension that makes a collaboration. I challenge him and he challenges me."

Kapoor certainly makes a challenging partner for anyone. Now 54 and among the world's finest abstract sculptors, he makes vast, vividly glittering shapes that light up city centres from New York to Chicago and São Paulo; a winner of the Turner Prize and the Venice Biennale, he's not an obvious candidate for playing second fiddle.

But here he is, in his labyrinthine studios in south London, bubbling with ideas for the giants. Although funding for the next four is as yet a distant dream, he and Balmond have a folder full of exotic shapes.

Apart from a proposal for a 520ft serpentine footbridge at Hartlepool - a "kissing bridge", Kapoor calls it, that will advance and contract to allow boats through - these ideas remain secret. But a tower of Babel might seem appropriate, and there would certainly be space on some shoreline for one of the artist's trademark mirrors.

First, though, this odd couple must prove that they can carry through Temenos without coming to blows. "Well," laughs Kapoor, "certainly, we have heated arguments. I don't think I could work like this with anyone except Cecil. We have a very similar way of thinking about certain things - a similar approach to geometry, similar notions of form."

The pair first showed their compatibility with the installation of Marsyas in the Tate's Turbine Hall in 2002. This vast, sleekly red PVC envelope was devised and signed by Kapoor but effectively realised by Balmond: "I shaped the fabric - I wanted to explore form, that's basically what I do," says Balmond.

But the massive civil engineering project along the Tees demands a wholeheartedly symbiotic partnership. "I thought, I'm an ambitious chap but this is bloody ambitious," recalls Kapoor. "Then I made a proposal to Cecil for the whole project and we began playing around with various models.

"We throw around a range of ideas and they are mixed up with other realities like the money available, the force of the wind, can it be covered up, the eventual use of the object. In the end, with him filtering and me filtering we come up with something that we both feel good about.

"So it's not strictly me saying, here's an idea, let's make a bridge like this. There is a process like any human situation, in which there is an aesthetic world that we want to hold on to but that also has to relate to a physical logic. If we're going to do something, we want it to be done in such a way that the means by which it's achieved have a purity."

Any threats of rampant egotism may be diluted by the fact that both men originate in the East, Kapoor the son of an Indian rear-admiral and Balmond of an eminent Sri Lankan historian. And their shared preoccupation with geometry, turning space inside out, has inspired Temenos as it did Marsyas.

It is shaped from thousands of stainless steel "cords" stretched between two hoops, but this simple arrangement will provide an endless variety of vistas: "It's two rings, a pole and a lot of tension," says Kapoor with a laugh. "That's what it's about - how to do that with clarity."

Kapoor may have thought up the shape and title - "temenos" means "sacred space" in Greek - but Balmond adds the nuts and bolts: "I have this plinth and you stretch these wires up from it and it will seem to vanish and then return as you walk round it and as the light changes. It'll be mysterious, it's a sort of threading in space and it is surely the biggest risk I've ever taken."

One worth taking, though: "For me, the attraction was that he was thinking like I would like to think," says Balmond. "Put aside the fame, put aside the glory. When you begin, you come as two people for a debate - Anish comes as the artist, so he's complaining about a show or something. But then we start on the piece and about half an hour into the discussion will come a moment that matters, where we really are locked into something.

"I don't know what it is but we're trying to find something. I've tried to do that in my career all the time, and to find someone else doing it from his side kind of bonded us. We felt we were on a like journey."

http://www.telegraph.co.uk:80/arts/main.jhtml?xml=/arts/2008/08/26/bakapoor126.xml

The man who saw the future

In the 1970s, visionary architect Paolo Soleri built an extraordinary eco-city in the Arizona desert. Did it work? Steve Rose tracks down a guru who now finds himself back in demand

- **Steve Rose**
- The Guardian,
- Monday August 25 2008

The round window in the Crafts III building at Arcosanti, the eco-city that Paolo Soleri built in the Arizona desert in the 1970s. Photograph: GE Kidder Smith/Corbis

Wind-bells tinkle and cypresses sway in the breeze. The sun casts sharp shadows across an undulating landscape. There are strange concrete forms everywhere: giant open vaults, painted half-domes with strange crests, an amphitheatre ringed by buildings with giant circular openings, little houses sunk into the hillside. Healthy-looking, vaguely hippy-ish people, young and old, stride about in dusty jeans and T-shirts. Beyond are the scrub-covered hills of the Sonoran desert. This not your typical American settlement. In fact, it's not your typical Earth settlement. For one thing, there are no cars or roads. Everything is connected by winding footpaths. Nor are there shops, billboards, or any other garish commercial intrusion. It looks like the set of a sci-fi movie designed by Le Corbusier. Round the next corner, you might expect to bump into Luke Skywalker, or Socrates, or a troupe of dancers doing Aquarius.

This is Arcosanti, 70 miles from Phoenix, Arizona. It's a curious taste of what an environmentally friendly US town could look like, but probably never will. It was designed by Paolo Soleri, an Italian-born architect, who originally came to Arizona to work for Frank Lloyd Wright, but soon set off on his own idiosyncratic path. Soleri is a genuine visionary architect. In the early 1970s, his designs and fantastical writings made him a big-hitter in architectural circles, up there with other postwar sci-fi modernists such as Buckminster Fuller. Then he all but disappeared, becoming, for the past 30 years, little more than an obscure curiosity. Yet today, as the world wakes up to the grim realities of climate change, peak oil and sustainability, Soleri's path looks less idiosyncratic. In fact, he's now something of a guru: in

demand on the lecture circuit and, recently, offering sage advice in Leonardo DiCaprio's "how can we save the world?" documentary The 11th Hour.

Soleri invented "ecotecture" before the word even existed. In the 1960s, he derived a similar term, "arcology", to describe low-impact, environmentally oriented design. But Soleri's arcology went beyond mere architecture. He developed an entire philosophy of civilisation, laid out in his 1969 book, The City in the Image of Man. It is a wondrous tome, full of lucid rhetoric, almost impenetrable diagrams and spectacular drawings of "arcologies": fantasy cities of the future intricately rendered. Rather than inefficient, land-hungry, low-rise, car-dependent cities (like nearby Phoenix), Soleri's arcologies are dense, compact, car-free, and low-energy. Their gigantic structures leave nature unspoilt and readily accessible. Some are hundreds of metres high, designed to accommodate six million people; others are built on top of dams, or form artificial canyons, or float in the open sea.Four decades on, Soleri is still happy to expound on the state and the fate of the city. He welcomes me to Arcosanti, then gets straight down to business, explaining what he tried to set up here by first rounding on his old mentor Frank Lloyd Wright for glamorising suburbia. This, says Soleri, actually leads to the breakdown of the city, as what he calls "the hermitage" begins: "Instead of people gathering to develop a culture, they want to escape from other people. Individuals believe they can reach a level of self-sufficiency that can isolate them - or their family - in an ideal place. Then they somehow expect the civilisation that has made them to serve them. It's a parasitic kind of life."

In the 1970s, Soleri's vision of an alternative drew hundreds of student volunteers from all over the world to build Arcosanti, a prototype arcology with a projected population of 5,000. They worked for free in the sweltering heat, sleeping outside and learning from the master - who, judging by the photos, was usually to be found in swimming trunks and a short-sleeved shirt, digging alongside them. "It was not a community for community's sake, eating tofu and giving each other back rubs," says Roger Tolman, who oversaw construction. "It was the opposite of the hippy scene: a community of construction workers. If you were going to be here, you were going to work - harder than you'd ever worked in your life."In the 1950s, Soleri built a base in Scottsdale, a desert town that has since been engulfed by Phoenix. He still lives there now. Named Cosanti, it was the prototype for Arcosanti: a complex of experimental, sculptural buildings born of low-energy construction methods such as "earthcasting": build a mound of earth, pour a layer of concrete over it, take away the earth and, hey presto, you've got a dome. Curiously, Soleri's main source of income was not architecture but windbells. Soleri wind-bells, cast from ceramic and bronze, still sell well. The windbell money, combined with lecture circuit cash, meant Soleri could buy the land for Arcosanti outright.

"It was very exciting," says Tolman. "Paolo was central to everything. He was an unbelievably dynamic speaker. Everywhere he went, his energy was obvious. Through word of mouth, a steady stream of people came. We had to send people away in the end. The kitchen couldn't cook more than 1,000 meals a day." Many of these people are still here. Tolman's wife, Mary, for example, is Soleri's assistant; there's Kerry, who does the guided tours; and Sue, who manages the archive, which contains vast scroll paintings by Soleri, one chronicling the intellectual evolution of mankind. It's 170ft long. Here, too, are sketchbooks, masterplans, essays, photos and press cuttings. One clipping is from the Guardian, recording Soleri's 1973 visit to London. "It may all sound impossibly utopian," the reporter writes of his arcological doctrine, "but at least Soleri is having a try."

Unfortunately, Arcosanti doesn't seem to have got much further since. Only 3% of the original design has been built; the rest doesn't look likely to spring out of the desert any time soon. Arcosanti never quite achieved the critical mass it needed. Its population reached a peak of about 200 in the mid-1970s, but today is lower than 60. That 1970s idealism gave way to 1980s "me generation" priorities and people moved on to "proper jobs", Tolman says. A regular flow of students still passes through, but they treat it more as a five-week work experience than an open-ended lifestyle experiment.

Soleri has slowed as well. Already in his 50s when he started Arcosanti, he is now 89, still fit and articulate, but that once hypnotic voice is now a hushed murmur, barely audible above the desert wind.

"The main fault is me," he says when I ask him why Arcosanti has not been completed. "I don't have the gift of proselytising. For years and years, they responded to me like, 'That crazy guy, what is he doing out there?'"

Inevitably, the real reason for Arcosanti's incomplete state is money. Visionary he might be, but Soleri never seems too bothered with finance. Did he really expect to be able to build a city by selling wind-bells? Soleri laughs. "I was driven by emotions. I never sat down and said, 'What am I going to do now?' I was too busy." But, I ask, is it possible to build a utopia without money?"Uh-oh," says Mary. Soleri mimes a curtain coming down and a bell chiming, as if the interview has ended. I've said the u-word, clearly in breach of house rules. But wouldn't Soleri describe himself as a utopian? "Oh Jesus!" he says, as if affronted that I've repeated the word. "Utopia is a pretty stupid notion. It says if any group anywhere develops some ideal condition, this condition is legitimate. And I say, 'Forget it!' If you are surrounded by all sorts of demeaning or painful conditions, then 'utopia' is just an arrogant notion that has no room for evolution."

But is Soleri guilty of a little arrogance himself? Utopian or not, his vision was never particularly practicable. Rather than addressing the problems of the existing urban realm, Soleri wants to build a new world, to his masterplan. This was always going to be a challenge, especially with limited cash.

The tragedy is that, judging by the buildings completed at Arcosanti, Soleri was a terrific architect. These are mostly bare-faced concrete, but they incorporate wood, murals, tiles and intricate details that lend them a homely, handbuilt quality, like the best of Le Corbusier's later work. They might have taken a long time to build, but they possess a spatial richness and geometric coherence that most modern boxes lack, both inside and out. And they are exemplary in their incorporation of simple, low-tech environmental principles. Concrete apses are oriented to capture the heat and light of the low winter sun, yet also provide shade when it is at its highest in summer. And the roads, of course, are relegated to the perimeter. Later phases in Arcosanti's design would have called for 25-storey towers, transforming the village-like settlement into a dense city. They wouldn't be difficult to construct. If this was China, you could probably complete Arcosanti in about a year. But what exists there already is rather compelling - a persuasive alternative to current urbanism. In fact, it could represent the kind of sustainable, low-energy lives we are belatedly coming to realise we should have been living all along.

Rather than a "crazy guy" ranting in the wilderness, Soleri has proved to be a voice of reason. Nobody wanted to hear his diagnosis of the ills of US society, but it has been proved right - the car-centric, inefficient, horizontal suburban model has left us in poor shape to cope with climate-change problems. Yet Soleri is sceptical of new-found admirers of his philosophy. "They take a very shallow understanding of it," he says. In Soleri's view, we need to reformulate, rather than simply reform, our strategy for civilisation. His outlook is not hopeful. "Materialism is, by definition, the antithesis of green," he says. "We have this unstoppable, energetic, self-righteous drive that's innate in us, but which has been reoriented by limitless consumption. Per se, it doesn't have anything evil about it. It's a hindrance. But multiply that hindrance by billions, and you've got catastrophe." Soleri long ago came to terms with the fact that Arcosanti will not be completed in his lifetime. What will happen after his death is up for debate. Some trustees of the Arcosanti Foundation want to see it completed to his original vision; others think it should be opened up to other architects, or even turned into a health spa to generate revenue. Soleri suggests it could be sold to a university or architectural research organisation. Whatever happens, Soleri's ideas could well be of benefit to future architects, if not as a wholesale solution, then at least as a source of inspiration.

Perhaps Soleri was simply too far ahead of his time. "I've put quite a lot of work into this," he says, looking out over his domain. "But there's no point in sitting and moaning".

http://www.guardian.co.uk/artanddesign/2008/aug/25/architecture.ethicalliving

How Cancer Cells Come Unstuck And Spread

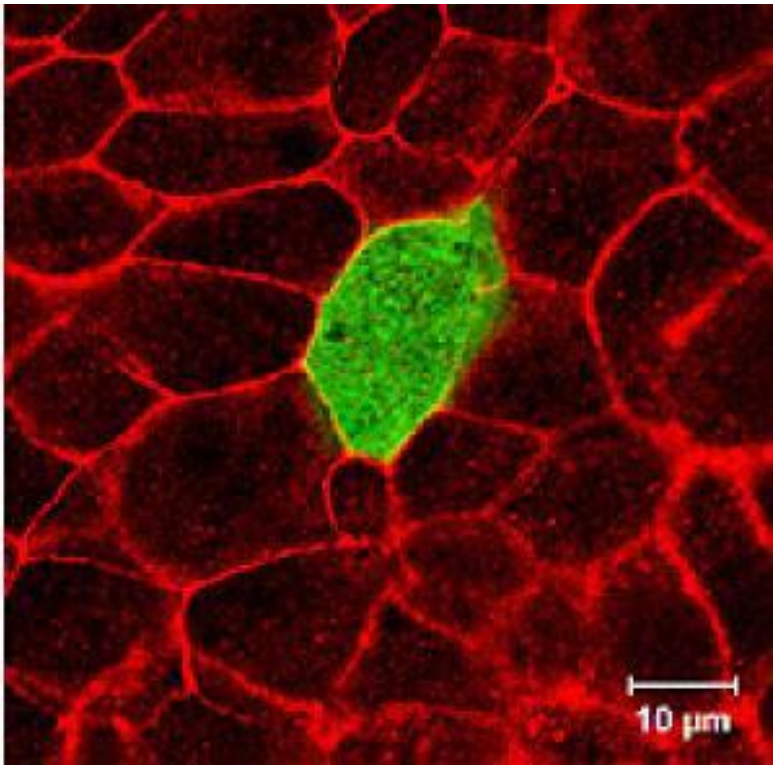


Photo of kidney cells with an experimental cell in green and junctions on cell surface in red. (Credit: Image courtesy of University of Bath)

ScienceDaily (Aug. 25, 2008) — Scientists in the Department of Biology & Biochemistry at the University of Bath have started a three year study into the junctions that hold cells together, giving insight into how cancer cells can break off and spread to other parts of the body.

Cancer affects one in three people at some point in their lives, with most cancer deaths being caused by the development of secondary tumours in other parts of the body. This research, funded by leading medical charity Cancer Research UK, could help scientists better understand what causes cancer to spread and may suggest new ways it could be treated in the future.Normal cells are held together by junctions on the cell surface, but in some cancers these junctions are lost. This makes the cancerous cells more likely to break off and spread tumours to other parts of the body. Dr Andrew Chalmers and Dr Paul Whitley, both lecturers from the Department of Biology & Biochemistry, are studying how a group of proteins called ESCRTs are involved in the loss of these junctions in kidney and intestine cells.

“ESCRTs are like the recycling units of the cell; they oversee the constant intake, break down and replenishing of junctions on the cell surface,” explained Dr Chalmers.“In a cancer cell where ESCRTs are damaged, the junctions may not be restored properly; this can cause cells to separate and migrate to form secondary tumours in other parts of the body.

“Previous studies have shown a link between ESCRTs and the loss of junctions in cells of fruit flies, so we want to see whether this is also true in humans.”During this three year project, the researchers plan to block ESCRTs in cells grown in the lab to see the effects on the junctions. They will also be looking at whether mutations of ESCRTs are more common in certain types of cancer.

Dr Paul Whitley added: “This work should tell us more about the role of ESCRTs in cancer and provide possible new targets for therapy in the future.”

Adapted from materials provided by University of Bath.

http://www.sciencedaily.com/releases/2008/08/080821110414.htm

Picking Out Specific Sounds In A Complex Scene: Researchers Study 'Cocktail Party Effect', Measure Auditory Dynamics Of Selective Attention

Researchers are studying how an individual can participate in a one-on-one conversation within a cluster of people, switch to another, pick up important comments while tuning out others, change topics and return to the first conversation. (Credit: iStockphoto/Vinko Murko)

ScienceDaily (Aug. 25, 2008) — Call it the cocktail party effect: how an individual can participate in a one-on-one conversation within a cluster of people, switch to another, pick up important comments while tuning out others, change topics and return to the first conversation.

This selective switching of attention which relies on disengaging and re-engaging attention to different voices on a time scale of a tenth of a second, can pose challenges for anyone with normal hearing.

However, the same crowded scene presents far more problems for the hearing impaired who have trouble listening to one sound and ignoring others in everyday settings like a restaurant or in a business meeting. They struggle to listen -- even with a hearing aid -- and are often exhausted and frustrated by their efforts, unable keep pace with other people who can tune out voices and more precisely pick out and stay with one conversation.

A first step toward helping hearing impaired listeners requires a better understanding of how people with normal hearing perceive and process a mix of sounds over time. This auditory ability to switch attention and, in the next instant, reset focus on whatever the new speaker says is something about which little is known. The dynamics of this process-- the time it takes to more precisely hear what is being said in environments with competing sounds – has received little study in the field of neuroscience. It is also the subject of a recently completed research study published online in the Proceedings of the National Academy of Sciences (PNAS).

The authors are Barbara Shinn-Cunningham, a Boston University professor and Director of Graduate Studies in the Department of Cognitive and Neural Systems, and graduate students Virginia Best, Erol J. Ozmeral and Norbert Kopco.

The research team measured this complex acoustic scene by studying how switching attention spatially influenced a listener's ability to recall a sequence of spoken digits. Five loudspeakers were distributed horizontally in front of the listener. The listener identified sequences of four digits presented either from the same loudspeaker or from different ones chosen randomly on each digit. Visual cues – lights – indicated the target loudspeaker at each temporal position in the sequence. The remaining four loudspeaker presented simultaneous distractor digits, the study noted.

The study also examined normal listeners' reactions when the target voice changed from digit to digit as well as conditions in which the target voice was the same.

The results showed that the recall of the spoken digits was best when they all came from the same loudspeaker compared to hearing each number from different speakers. Recall of the sequence degraded when listeners had to instantaneously switch attention to a new location for each digit. Thus a listener got better at filtering out sounds from others when they focused attention to a voice at a fixed location.

Sustaining attention to one continuous auditory stream led to refinements in selective attention over time. This improvement over time depended on the perceived continuity of the stream of target digits—the improvement was greatest when the digits sounded like they came from one person talking from a fixed location. The progress was reduced when different voices spoke each target digit and when delays between the digits were abnormally long (so that each digit was perceived as an isolated number). Researchers also measured how fast a listener would switch or redirect their hearing the stream of digits – the finite time required to disengage and then re-engage attention.

"These findings shed light on why, in listening environments such as noisy parties or restaurants, it is more difficult to follow a conversation involving many people (where the relevant talker often and unexpectedly changes locations) than to focus on one talker (at one location) exclusively," the study concludes. "In addition, these results may have implications for visual attention in tasks where object formation and target segmentation is challenging, or where the identity of a visual object depends upon continuity of visual features over time."

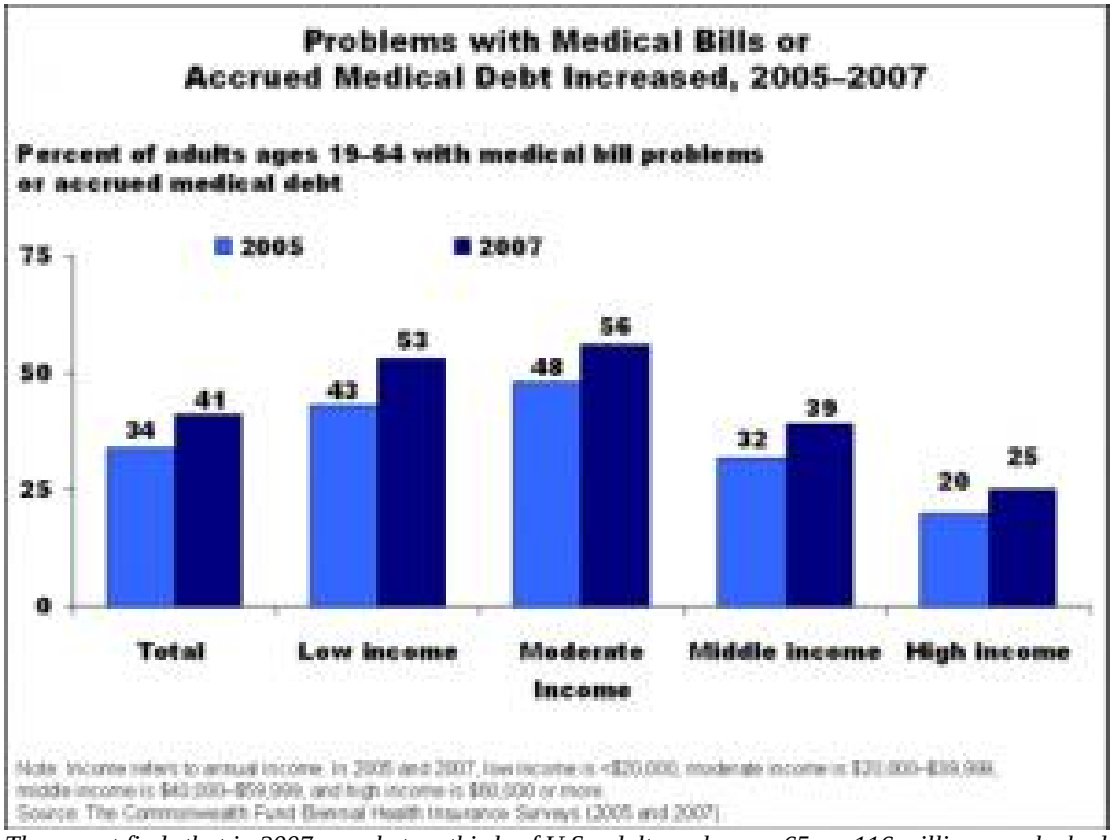
Prof. Shinn-Cunningham will be continuing studies of how the brain controls auditory attention in complex settings through a National Security Science and Engineering Fellowship. The prestigious fellowship, recently awarded to six individuals from an initial pool of over 500 applicants, will enable Shinn-Cunningham to undertake a five-year program that uses both behavioral experiments and direct, non-invasive measures of electrical brain activity to extend her studies of how attention enables us to communicate in settings with multiple, competing sounds.

Journal reference:

1. Virginia Best, Erol J. Ozmeral, Norbert Kop%u010Do, and Barbara G. Shinn-Cunningham. **Object continuity enhances selective auditory attention**. *Proceedings of the National Academy of Sciences*, 2008; DOI: 10.1073/pnas.0803718105

Adapted from materials provided by Boston University.
http://www.sciencedaily.com/releases/2008/08/080821164607.htm

79 Million US Adults Have Medical Bill Problems Or Are Paying Off Medical Debt



The report finds that in 2007, nearly two-thirds of U.S. adults under age 65, or 116 million people, had medical bill problems or debt, went without needed care because of cost, were uninsured for a time, or were underinsured—insured but had high out-of-pocket medical expenses or deductibles relative to income. (Credit: Image courtesy of Commonwealth Fund)

ScienceDaily (Aug. 25, 2008) — The proportion of working-age Americans who have medical bill problems or who are paying off medical debt climbed from 34 percent to 41 percent between 2005 and 2007, bringing the total to 72 million, according to recent survey findings from The Commonwealth Fund. In addition, 7 million adults age 65 and over also had problems paying medical bills, for a total of 79 million adults with medical bill problems or medical debt.

In a new Commonwealth Fund report about the survey findings, Losing Ground: How the Loss of Adequate Health Insurance is Burdening Working Families, the authors describe how working-age adults are becoming more exposed to the rising costs of health care, either because they have lost insurance through their jobs or because they are paying more out of pocket for their health care. This combination of factors, along with sluggish growth in average family incomes, is contributing to problems with medical bills and cost-related delays in getting needed health care.

The report finds that in 2007, nearly two-thirds of U.S. adults under age 65, or 116 million people, had medical bill problems or debt, went without needed care because of cost, were uninsured for a time, or were underinsured—insured but had high out-of-pocket medical expenses or deductibles relative to income.

"We are seeing a perfect storm of negative economic trends threatening working families in the United States," said Sara Collins, Commonwealth Fund Assistant Vice President, and the study's lead author. "While gas and food prices are increasing and home values are declining, the rise in health care costs is surpassing income growth and fewer people have adequate insurance. As a result, working people are struggling to pay their bills and accruing medical debt."

While the increase in problems paying medical bills or carrying unpaid medical bills cuts across income brackets, low and moderate income families are burdened the most. The report finds that more than half of working-age adults earning less than $40,000 a year reported problems paying medical bills or being in debt due to medical expenses. Medical bill problems included not being able to pay bills, being contacted by a collection agency about an unpaid bill, and changing one's way of life in order to pay medical bills.

Those with medical bills and medical debt are increasingly facing serious financial problems and sometimes facing trade-offs among immediate life necessities. Thirty-nine percent of those with bill problems or debt say they have used up all of their savings to pay their health care bills; 29 percent are unable to pay for basic necessities like food, heat, or rent; and 30 percent took on credit card debt. Twenty-four percent of adults under age 65 with medical debt owe $4,000 or more and 12 percent owe $8,000 or more in unpaid medical expenses.

In a new Commonwealth Fund issue brief which accompanies the report, Seeing Red: The Growing Problem of Medical Debt and Bills, the authors explain that uninsured and underinsured adults are more at risk of having medical bill problems and medical debt than those with adequate insurance coverage. Three in five adults who are uninsured or underinsured face these challenges, more than double the rate of those who had adequate insurance all year (26 percent). Notably, adults 65 years and older were far less likely to report medical bill problems or debt than younger adults because they are covered by Medicare and may also have supplemental private coverage, and in the case of low-income individuals, may have Medicaid. Just 19 percent of adults over 65—half the rate for adults under 65 (41%)—reported any medical bill problems or debt.

"The current economic slowdown makes it even more urgent for a new Administration to make universal and affordable health insurance a high priority in 2009, to ensure that no American suffers financial hardship as a result of serious illness," said Commonwealth Fund President Karen Davis.

The report also finds that more working-age adults are delaying or avoiding needed medical care, such as skipping doses of medication or not filling prescriptions, because of health care costs. Forty-five percent of adults reported problems getting care because of costs in 2007, a dramatic increase from 29 percent in 2001. Increasing numbers of adults are spending high proportions of their income on health care. One-third of U.S. working-age adults spent 10 percent or more of their income on out-of-pocket medical expenses and health insurance premiums in 2007, up from 21 percent in 2001.

The proportion of Americans who are uninsured continues to grow. More than one-quarter (28%) of U.S. adults ages 19 to 64, or an estimated 50 million people, were uninsured for some time in 2007, compared with 24 percent in 2001. But even having insurance coverage does not guarantee protection from medical bill problems and debt. The proportion of those who are underinsured increased from 9 percent to 14 percent, or 25 million people, between 2003 and 2007. Sixty-one percent of those with medical bill problems or accumulated medical debt were insured at the time care was provided.

Other key survey findings include:

- Among the medical bill problems reported in the survey: 28 percent are paying off medical bills over time, up from 21 percent in 2005, and 27 percent of adults under age 65 said they had problems paying or were unable to pay their bills in 2007, up from 23 percent in 2005.

- More than half (53%) of insured working-age adults who have deductibles that represent 5 percent or more of their income reported medical bill burdens and debt; one-third of adults with lower deductibles face these kinds of difficulties.
- While adults in families with incomes under $20,000 a year report the highest rates of lacking coverage during the year, more adults in moderate income families are going without insurance. In 2007, 41 percent of adults in families earning between $20,000 and $40,000 a year reported a time uninsured during the year, up from 28 percent in 2001.
- Most people who were uninsured at any point in the last year are in working families. Of the estimated 50 million American adults who were uninsured in the last year, 58% were in families where at least one person was working full-time.
- People who are uninsured or underinsured experience inefficient care; nearly half of adults (47%) under age 65 who had gaps in their health insurance or were underinsured reported they had experienced problems such as test results not being available on time, receiving duplicate medical tests, and delays in receiving results of abnormal test results; in contrast just 26 percent of adults who are adequately insured reported these inefficiencies.

Methodology

Data come from the Commonwealth Fund Biennial Health Insurance Survey (2007), a national telephone survey conducted June 6 through October 24, 2007 among a nationally representative sample of 3,501 adults age 19 and older living in the continental United States. The 25-minute telephone interviews were completed in both English and Spanish, according to the preference of the respondent. The survey achieved a 45-percent response rate (calculated according to the standards of the American Association for Public Opinion Research). The survey sample was drawn using standard list-assisted random digit dialing methodology, which selected telephone numbers disproportionately from area-code/exchange combinations with higher-than-average density of low-income households. Using this stratified sampling design, this study obtained an oversample of low-income, African American and Hispanic adults. To correct for the disproportionate sample design and make the final total sample results representative of all adults age 19 and older living in the continental U.S, the data are weighted by age, sex, race/ethnicity, education, household size, and geographic region, using the U.S. Census Bureau's 2006 Annual Social and Economic Supplement (ASEC). The report restricts the analysis to the 2,616 respondents under age 65. The resulting weighted sample is representative of the approximately 177 million adults ages 19 to 64. The survey has an overall margin of sampling error of ±2 percent at the 95 percent confidence level.

Adapted from materials provided by Commonwealth Fund.

http://www.sciencedaily.com/releases/2008/08/080820080343.htm

The Big Gulp: Consumers Avoid Extremes In Soda Sizes

ScienceDaily (Aug. 25, 2008) — As portion sizes have increased, Americans' waistlines have expanded. And as a new study in the Journal of Consumer Research demonstrates, consumers are tricked into drinking more soft drinks when retailers eliminate small drink sizes.

No matter what the volume of the soft drink, customers tend to avoid the largest and smallest options, according to authors Kathryn M. Sharpe, Richard Staelin, and Joel Huber (all Duke University). "Our basic premise is that consumer purchases are altered by the portfolio of drink sizes made available," the authors explain.

Fast-food restaurants, in an attempt to boost profit margins, have eliminated smaller drink sizes and added even larger sizes. The authors believe these policies have led to a 15 percent increase in the consumption of these high-calorie drinks. "Consumers who purchased a 16-ounce drink when a 12-ounce drink was available later chose a 21-ounce drink when the 12-ounce drink option was removed, since now the 16-ounce soda is the smallest option," they write. "This effect also occurred at the large end of the spectrum; people who purchased a 21-ounce drink when the 32-ounce drink was the largest size available moved up to the 32-ounce drink when a 44-ounce drink was added to the range of drink sizes available."

By adding the 44-ounce option, the restaurant is able to shift the demand curve upward, even though the authors believe customers still want 12-ounce drinks.

The researchers go on to simulate policy directions for slimming America's waistlines. Their models show that for flat taxation of soft drinks to reduce consumption by 10 percent, it would need to be 28 cents per drink and would reduce corporate profits by at least 7 percent.

But by simply reversing the trend they started in the first place, retailers could do their part to improve public health. If they eliminated the largest drink size and brought back the smallest, retailers could help curb soft drink consumption with only a slight reduction in profit (less than 2 percent).

Journal reference:

1. Sharpe et al. **Using Extremeness Aversion to Fight Obesity: Policy Implications of Context Dependent Demand**. *Journal of Consumer Research*, 2008; 0 (0): 080416123650803 DOI: 10.1086/587631

Adapted from materials provided by University of Chicago Press Journals.

http://www.sciencedaily.com/releases/2008/08/080822160343.htm

Agile Approach Slashes Software Development Time

ScienceDaily (Aug. 25, 2008) — Results of the EUREKA ITEA software Cluster AGILE project make it possible for European manufacturers to develop high quality embedded software in markedly shorter times and at much lower costs than possible with traditional techniques.

Applying the approach to 68 pilot case studies in industries from avionics and telecommunications to consumer electronics, the project demonstrated clearly that 'agile' methodology can lead to massive improvements in embedded software engineering. Suitable tooling was also demonstrated to simplify application of the agile approach. As a result, much more software development can be carried out cost effectively in Europe rather than being outsourced to Asia.

Use of embedded software in electronics devices is growing even faster than advances in electronics themselves. Yet human capabilities for producing software have not increased in Europe over the past decade. "The amount of software is growing very rapidly and it is increasingly difficult to find the people and resources necessary to develop it all," explains Dr Pekka Abrahamsson of project coordinator VTT Technical Research Centre in Finland. "As a result, Europe is seeing a lot of development work transferring to India and other countries. An additional problem lies in the speed of development as it is necessary to get solutions to market in optimum time and with sufficient reliability that it works properly."

AGILE therefore focused on processes and technologies needed to develop software systems faster and more reliably and to meet changing market needs. "Agile is a new paradigm for software development that emerged around eight years ago in the USA," says Dr Abrahamsson. "When we started the ITEA project in 2004, we did not know whether this new methodology could be exploited for embedded software in avionics, telecommunications, automotive and consumer electronics."

One of the principals underlying this new paradigm is that it welcomes change even late in the project. Change had always been seen as a very problematic but with the agile approach it is possible to add new features even a few days before entering the market with a product.

In addition, software-based features are often poorly used with only some 5% of features offered by a system effectively used by the consumers. "We turned this around to identify those critical features that would be used and put the emphasis on getting them to market first," adds Dr Abrahamsson. "So we are not always talking about technical issues when developing software but focusing on business-level issues and this was part of the methodology of our development."

EUREKA labelling was sought for the project because the eight-country consortium involved had a strong industrial commitment. "EUREKA projects involve a lot less bureaucracy than with the EU Framework Programme projects," points out Dr Abrahamsson. "Moreover, over three years, the world changes and with EUREKA, you can change the direction of the project, meeting better the demands of the industrial partners – this is the clear advantage of EUREKA. In addition, ITEA offers a community that meets on a yearly basis and people get to know each other; I think both industry and academia find this big networking element strengthens their capabilities."

Short turn around

Agile technology involves a methodology that stretches from the beginning to the end of the development process but is mostly focused on the actual processes and techniques and the tools used to get the systems out. "A set of values and a set of 12 principles provide the underlying rationale for why we operate in this way," says Dr Abrahamsson. "And the process is very tightly time framed with delivery in monthly or

even fortnightly cycles – in previous approaches we were trying to deliver working systems in maybe three-month, six-month or even one-year cycles.

"These short cycles demand a radical change in thinking in the development of large hardware-bound systems. It requires the ability to deliver every two weeks or monthly and so requires rethinking of the whole system – how we plan and how we estimate the costs of the development. Another crucial element is technological – requiring investment but the benefits are quite clear."

Moreover, AGILE devised an approach that meets the demands of highly regulated industries such as avionics where systems developments are subjected to a wide range of standards.

Outsourcing to Europe

Some 68 pilot developments were carried out involving 1800 software engineers from 17 companies in short and long projects. "We showed we could actually achieve up to 70% reduction in lead time and costs," says Dr Abrahamsson. "If these results could be sustained in the larger area of European software development, it would be cheaper to outsource from India to Europe than the other way round!"

AGILE also succeeded in developing 12 tools that enable the use of these ideas. Three of these tools are ready for commercialisation since the end of the project; and the ATO tool from Belgian partner E2S is already being marketed. Moreover, several partners – such as Nokia – have now taken up the 'agile mode' within their companies, which means their whole production is transformed.

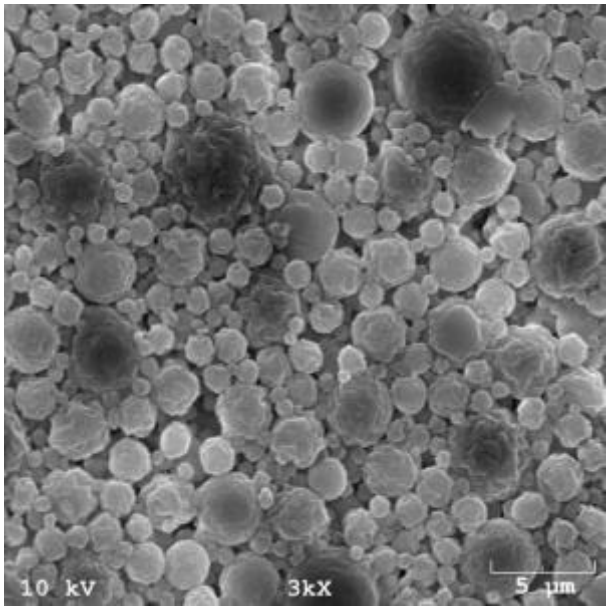
"We set a benchmark that we can achieve dramatic improvements in all areas in terms of time, cost and quality, which help shape the future of software development in Europe," adds Dr Abrahamsson. "We have been able to go beyond what is being done in the USA currently, putting Europe ahead. And, while development teams in India and other countries have now set up their own technologies in this area, Europe has a competitive edge that should last several years."

Establishment of an Embedded Agile Institute and scaling up of AGILE's results in the ITEA2 FLEXI project should extend the approach to business and innovation processes.

Adapted from materials provided by Eureka, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/08/080819160419.htm

Biodegradable Polymers Show Promise For Improving Treatment Of Acute Inflammatory Diseases



Scanning electron microscope image of polyketal microparticles loaded with the therapeutic enzyme superoxide dismutase, which is used to treat acute liver failure. (Credit: Georgia Tech image courtesy of Niren Murthy)

ScienceDaily (Aug. 24, 2008) — A family of biodegradable polymers called polyketals and their derivatives may improve treatment for such inflammatory illnesses as acute lung injury, acute liver failure and inflammatory bowel disease by delivering drugs, proteins and snips of ribonucleic acid to disease locations in the body.

"The polyketal microparticles we developed are simply a vehicle to get the drugs inside the body to the diseased area as quickly as possible," said Niren Murthy, assistant professor in the Coulter Department of Biomedical Engineering at Georgia Tech and Emory University. "The major advantage to using these polyketals to deliver drugs is that they degrade into biocompatible compounds that don't accumulate in a patient's tissue or cause additional inflammation."

Details about the polyketals and clinical applications were described during three presentations on August 18-20 at the 236th American Chemical Society National Meeting in Philadelphia. This research – initially started in 2003 – is funded by the National Science Foundation and the National Institutes of Health.

In a presentation on August 19, graduate student Scott Wilson detailed a new polyketal derivative aimed at enhancing the treatment of inflammatory bowel disease – an illness that causes the large and small intestines to swell.

The new polymer has the advantage of stability in both acids and bases. It degrades only in the presence of reactive oxygen species, which are present in and around inflamed tissue. Cell culture experiments have demonstrated that the microparticles degraded more rapidly in cells that overproduced superoxide, a reactive oxygen species.

The researchers are currently collaborating with Didier Merlin, a professor in the Division of Digestive Diseases at Emory University, to investigate loading these polyketals with therapeutics to treat inflammatory bowel disease.

"We think these microparticles are going to be fantastic for oral drug delivery because they can survive the stomach conditions before they release their contents in the intestines," noted Murthy.

Murthy's group is also examining the use of polyketals to treat acute liver failure – a condition when the liver stops functioning because macrophages in the liver create reactive oxygen species. One treatment is the delivery of superoxide dismutase, an enzyme that detoxifies superoxide. Incorporating the enzyme inside a polyketal – poly(cyclohexane-1,4-diyl acetone dimethylene ketal) – allows the enzyme to be released very quickly in an acidic environment.

"Patients with acute liver failure need drugs as soon as possible or else they'll die," said Murthy. "We've tailored the polyketal's hydrolysis rates to deliver the drug in one or two days."

Nick Crisp, professor of microbiology and immunology at the University of Rochester Medical Center, and Robert Pierce, currently head of anatomic pathology at Schering-Plough Biopharma Schering-Plough Biopharma and formerly of the University of Rochester Medical Center, are collaborating on this project. Georgia Tech, Emory and the University of Rochester have filed three patent applications on the polyketal drug delivery system.

To treat other illnesses, it may be necessary to deliver proteins to a diseased organ. In a presentation on August 18, Georgia Tech researchers described such a method, which was developed by Murthy, Michael Davis, an assistant professor in the Coulter Department of Biomedical Engineering, and graduate student Jay Sy.

"Delivering proteins inside microparticles has been limited because getting the protein into the microparticles required organic solvents that frequently destroyed the proteins," explained Murthy. "To overcome this problem, we developed a method of simply immobilizing the protein on the surface of the microparticles."

The researchers incorporated a nitrilotriacetic acid-lipid conjugate into the polyketal. In a one-step procedure, they mixed the microparticles with the proteins and centrifuged them. That immobilized the proteins on the surface of the polyketals. Laboratory experiments conducted under physiological conditions have shown that half of the bound proteins were released within 24 hours.

Also in collaboration with Davis, the researchers are testing the ability of the protein-bound polyketals to treat heart attacks.

In the next few years, Murthy and his team of graduate students and collaborators plan to continue developing new polyketals and conducting efficacy tests in cell cultures and animal studies.

"In the past few years, we have developed methods to tailor the polyketal's properties, which have already allowed us to target many different medical conditions, but our end goal is to test these treatments in humans," noted Murthy.

Adapted from materials provided by Georgia Institute of Technology.

http://www.sciencedaily.com/releases/2008/08/080820163115.htm

Pangea Conundrum

ScienceDaily (Aug. 23, 2008) — The existence of the supercontinent Pangea, which formed about 300 million years ago and broke up about 200 million years ago, is a cornerstone of plate tectonics, and processes resulting in its assembly and fragmentation have governed the evolution of Earth's crust for 500 million years.

Over the past 20 years, evidence has been amassing that Pangea is just the latest in a series of supercontinents that formed repeatedly since the Archean, only to break up and reform again.

Although the mechanisms responsible are controversial, many geoscientists agree that repeated cycles of supercontinent amalgamation and dispersal have had a profound effect on the evolution of Earth's crust, atmosphere, climate, and life.

The geological record for the past one billion years is sufficiently well documented that we have a first-order picture of the changing positions of continents. Using these reconstructions in combination with other data, Murphy and Nance show that supercontinents form by different mechanisms and that many current geodynamic models cannot explain the processes that led to the amalgamation of Pangea.

These models suggest that plate tectonics is primarily driven by subduction and that supercontinents break up and migrate from sites of mantle upwelling to reassemble at sites of mantle downwelling where subduction zones exist.

Such models would predict that the young oceans created by the breakup of a supercontinent some 600 million years ago would have continued to expand as the continental fragments migrated toward sites of mantle downwelling that existed in the older ancestral Pacific Ocean. Instead, Pangea assembled as a result of the closure of the young oceans.

The geologic record suggests that there are geodynamic linkages between the younger and older oceans that deserve more detailed study; it also suggests that, in the case of Pangea, the reversal in continental motion may have coincided with emergence of a superplume 460–400 million years ago that produced mantle upwelling in the ancestral Pacific.

If so, the top-down geodynamics driven by subduction, which accounts for the assembly of the supercontinent that broke up 600 million years ago, may have been overpowered by bottom-up geodynamics involving large-scale mantle upwelling that led to the amalgamation of Pangea.

Journal reference:

1. Brendan Murphy and R. Damian Nance. **The Pangea conundrum**. *Geology*, 2008; 36 (9): 703 DOI: 10.1130/G24966A.1

Adapted from materials provided by Geological Society of America.

http://www.sciencedaily.com/releases/2008/08/080822093722.htm

The 160-mile Download Diet: Local File-sharing Drastically Cuts Network Load

ScienceDaily (Aug. 23, 2008) — Ever since Bram Cohen invented BitTorrent, Web traffic has never been the same. Whether that's a good thing or a bad thing, however, is a matter of debate.

Peer-to-peer networking, or P2P, has become the method of choice for sharing music and videos. While initially used to share pirated material, the system is now used by NBC, BBC and others to deliver legal video content and by Hollywood studios to distribute movies online. Experts estimate that peer-to-peer systems generate 50 to 80 percent of all Internet traffic. Most predict that number will keep going up.

Tensions remain, however, between users of bandwidth-hungry peer-to-peer users and struggling Internet service providers.

To ease this tension, researchers at the University of Washington and Yale University propose a neighborly approach to file swapping, sharing preferentially with nearby computers. This would allow peer-to-peer traffic to continue growing without clogging up the Internet's major arteries, and could provide a basis for the future of peer-to-peer systems. A paper on the new system, known as P4P, will be presented this week at the Association for Computing Machinery's Special Interest Group on Data Communications meeting in Seattle.

"Initial tests have shown that network load could be reduced by a factor of five or more without compromising network performance," said co-author Arvind Krishnamurthy, a UW research assistant professor of computer science and engineering. "At the same time, speeds are increased by about 20 percent."

"We think we have one of the most extensible, rigorous architectures for making these applications run more efficiently," said co-author Richard Yang, an associate professor of computer science at Yale.

The project has attracted interest from companies. A working group formed last year to explore P4P and now includes more than 80 members, including representatives from all the major U.S. Internet service providers and many companies that supply content.

"The project seems to have a momentum of its own," Krishnamurthy said. The name P4P was chosen, he said, to convey the idea that this is a next-generation P2P system.

In typical Web traffic, the end points are fixed. For example, information travels from a server at Amazon.com to a computer screen in a Seattle home and the Internet service provider chooses how to route traffic between those two fixed end points. But with peer-to-peer file-sharing, many choices exist for the data source because thousands of users are simultaneously swapping pieces of a larger file. Right now the choice of P2P source is random: A college student in a dorm room would be as likely to download a piece of a file from someone in Japan as from a classmate down the hall.

"We realized that P2P networks were not taking advantage of the flexibility that exists," Yang said.

For the networks considered in the field tests, researchers calculated that the average peer-to-peer data packet currently travels 1,000 miles and takes 5.5 metro-hops, which are connections through major hubs. With the new system, data traveled 160 miles on average and, more importantly, made just 0.89 metro-hops, dramatically reducing Web traffic on arteries between cities where bottlenecks are most likely to occur.

Tests also showed that right now only 6 percent of file-sharing is done locally. With the tweaking provided by P4P algorithms, local file sharing increased almost tenfold, to 58 percent.

The P4P system requires Internet service providers to provide a number that acts as a weighting factor for network routing, so cooperation between the Internet service provider and the file-sharing host is necessary. But key to the system is that it does not force companies to disclose information about how they route Internet traffic.

Other authors of the paper are Haiyong Xie, a Yale graduate now working at Akamai Technologies Inc., Yanbin Liu, at IBM's Thomas J. Watson Research Center, and Avi Silberschatz, professor and chair of computer science at Yale. The UW research was supported by the National Science Foundation.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2008/08/080819170441.htm

Is It Possible To Teach Experience? European Researchers Say Yes

ScienceDaily (Aug. 23, 2008) — Business veterans claim you cannot teach 'experience', but European researchers say you can. The team developed software that helps players acquire real-life skills and realistic experiences through game playing. But this game is no executive toy.

The interactive software has caught the imagination of world-class business colleges in the USA and elsewhere and it has prompted enormous interest in Europe's leading corporations. ChangeMasters represents an emerging shift in business education, based on realistic computer games.

Colleges and companies believe it gives students real-world skills through 'experience'. "Experience is the best and simplest way to learn anything, that is why it is so valued in the business world," explains Professor Albert Angehrn.

ChangeMasters focused on change management, one of the most important elements of modern business. Change is essential to responding to dynamic markets, consumers, competitors and innovation, and change is one of the most important themes in corporation history.

Protectionism was replaced by globalisation, in-house departments to outsourcing, functional to process-oriented organisation. Change is constant. Even housekeeping tasks, like moving to new computer systems, or daily business activities like new product development require changes to the way an organisation works.

Become a master in the martial art of business, the gaming software way.

Executive games, seriously

But change is hard, rarely goes smoothly and often courts disaster. ChangeMasters plans to make the process easier by equipping executives with real-life skills and realistic project management experience using a serious game. Serious games attempt to achieve real-world results through videogame technology.

The ChangeMasters game contains hundreds of parameters to define the corporation, its people and the project. "It defines the corporation's character and culture, formal and informal networks, all the elements that compose the dynamics of an organisation," reveals Angehrn.

It can even represent Western, Latin American or Asian cultural attitudes accurately. "In China, for example, etiquette and attitudes are very different, so a successful strategy in Europe might fail in China. ChangeMasters can reflect these cultural differences," Angehrn notes.

But it also makes clever use of informal aspects of corporate life. Informal networks, like the water cooler or coffee room, the psychological attitude of individuals, like openness or resistance to change, and even the status of individuals within the organisation.

"Some people have enormous influence in a corporation or department through their reputation, or their informal networks of co-workers," notes Angehrn.

Typically, teams of managers work together to play a game for 90 minutes. "It is not aimed at individuals," says Angehrn, "And we recommend that it is run as a seminar, with a large number of staff forming teams to run through the change scenario, but some companies, like Ikea, run the game in small workshops."

The limits of compulsion

The game allows teams to employ theory through various strategies, including compulsion, but each strategy chosen affects other parameters that can blow up later. “Compulsion is not very effective,” warns Angehrn, “Because it can increase resistance.” Just like in real life.

Afterwards, the game players are debriefed on their strategy and the lessons of the exercise are driven home.

The game is very difficult. “Nobody wins, nobody manages a painless project. I think this is the way it should be, it should be challenging and it should reflect real life. It tests the limits of managers’ confidence. The idea is for people to learn lessons and acquire new skills before carrying out a task in a realistic scenario,” Angehrn explains.But for all its difficulty, ChangeMasters is not insincere. “People wouldn’t play the game, or would complain about it loudly if they thought it was ‘fixed’,” reveals Angehrn.

In fact the opposite is the case, and players rave about the impact of learning sessions with ChangeMasters, commenting that it has changed their way of approaching a project. They say it gives them new tools, and a new understanding of the issues involved in change management.

Not quite Second Life

The game does not look like many modern games. “We initially produced an interface like the online game, Second Life. It had a 3D, richly visual environment. But executives spent too much time exploring the environment rather than playing through the games,” he says.Instead, the screen uses graphs, text and buttons to offer an overview of the game status, track emerging developments and offer players a choice of actions.

The game incorporates the familiar tools of corporate communication, including newsletters, emails, memos, executive information systems (EIS) and formal networks like personnel in a specific department.Ultimately, though, the game is about helping executives to acquire and practise useful skills, and many organisations, like Ikea, Fiat and the Scottish government, believe ChangeMasters achieves that.

Some of the world’s top universities, too, are enthusiastic, and ChangeMasters is used at Cambridge and INSEAD in Europe, Yale, MIT, Stanford and many other of the top-tier institutions in the USA, and CEIBS, the top Chinese school. The ChangeMasters simulations were based on work at INSEAD’s Centre for Advanced Learning Technologies (CALT).ChangeMasters has refined the technical platform and is launching offices all over Europe under the brand AlphaExperiences. Initially, it is offering change management as the primary product, but the game engine itself could be adapted to other scenarios, like product development, and the partners will work on expanding that content.

Ultimately, however, ChangeMasters has an even larger vision, where it will offer a channel for other high-quality business education software to one day, perhaps, become the Amazon of executive education.The ChangeMasters project received co-funding from the eTen Programme of the European Commission.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/08/080821110410.htm

Amazon Relies on Customers to Pimp the Kindle
By Edmund Lee, Portfolio.com

Mike Pfeffer, a 26-year-old IT professional, was thinking about buying a Kindle, Amazon's pricey new digital book reader, but he wanted to look at the screen and touch the buttons before shelling out $359 for it.

So he went to the Amazon site and, through the See a Kindle in Your City message board, found a current Kindle owner in Manhattan who was willing to meet up. The woman worked in the building across the street from him and enthusiastically showed him everything from how the screen looked to how to turn pages on the device.
"I told her she should go work for Amazon," says Pfeffer, who wound up buying a Kindle the very next day.
To help sell its high-priced digital reading device, Amazon is relying more than ever on its tried-and-true sales strategies of word of mouth and customer reviews, and it appears to be working, although the total market for the device is questionable.
In August, Citigroup analyst Mark Mahaney projected that Amazon would sell 380,000 Kindles this year, up from an earlier estimate of 190,000, adding in a report that "Kindle is becoming the iPod of the book world" since its release in November 2007. (However, Mahaney's estimate that about 240,000 Kindles have been sold so far this year was, by his own admission, based on fuzzy numbers since Amazon hasn't released any sales numbers for the Kindle, and Amazon has reportedly sought to distance itself from those numbers.) Another analyst, Tim Bueneman from McAdams Wright Ragen, reported last week that several new versions of the device are in development, including a textbook model.
Amazon says its approach to selling the Kindle—no outside advertising and just relying on the Kindle community and stumping by Jeff Bezos to drive sales—is deliberate. The Kindle currently has over 4,200 customer reviews on the Amazon website, more than for any other top-selling item in Amazon's electronics category, and the vast majority are positive.
"Customer reviews of Kindle have been terrific—that tends to help sell the product," says Ian Freed, the Amazon executive in charge of the Kindle. More than three quarters of the reviewers give the Kindle at least four stars out of five, with many using words like fabulous, must-have, and changed my life.
The See a Kindle in Your City program, which was started in May, is just another extension of that idea. Freed and members of his group saw that people were especially curious when they saw one in public and decided to capitalize on the phenomenon.
"We tapped right into that, allowing customers to create a space where potential customers could physically meet, like at a coffee shop or a restaurant, and show each other Kindles," says Freed. Since the Kindle is an expensive new technology, selling the device at retail outlets where customers could see and touch it would seem to make sense, but Freed says that would diminish the community-based marketing that's propelling sales. But there may be another reason for See a Kindle in Your City—it could be that stores just don't want to carry the device.
"Kindle is actually a tough product to sell at retail," says Michael Gartenberg, vice president of mobile strategy at Jupitermedia. Sony's e-book reader, a similar product, may have set the tone. It was released earlier than the Kindle in September 2006 and uses the same E Ink technology for its screen—and doesn't seem to have sold particularly well as a retail product at either Sony's own stores or at Borders, although Sony, like Amazon, has not released any kind of sales figures for its device. "It's going to take a fair amount of evangelizing to explain the product, and the best people to evangelize are the users of the products," says Gartenberg of the Kindle.
Among the features that Kindle users have been most enthusiastic about is the wireless-downloading feature that differentiates it from Sony's reader, which requires a computer to first receive the books. Digital books can be delivered almost anywhere to users in less than a minute using Sprint's nationwide high-speed wireless network, fulfilling users' desires for instant gratification. Indeed, instead of cannibalizing sales of physical books, Freed says Amazon's statistics show that Kindle owners more than doubled their overall number of book purchases after getting the device, and that they still bought just as many physical books after getting one as they had before.
Those avid Kindle users have become effective proselytizers, often talking up the device with the zeal of religious converts. Citigroup's Mahaney raves about the ease of taking e-books with him when he travels,

and one journalist (who wished to remain anonymous) says that he was initially skeptical about the whole notion of e-books and only got a review copy of it to trash it. "But I love it," he says. "I couldn't find anything bad about it. I use it all the time."
Though the idea of Kindle get-togethers may sound suspiciously like Tupperware parties, Gartenberg thinks Amazon's strategy is different.
"There's a difference between selling and evangelizing," he explains. "Amazon is not asking its customers to sell, it's asking its fans to sell. And they're not making any commission on those sales."
To be sure, Amazon's call to Kindle fans to push the product has had its detractors.
"What an outrageous request from Amazon!" one respondent wrote when Amazon introduced its See a Kindle in Your City message forum. "Take your time, go out in public with your Kindle, and help us sell more Kindles and make more money. I appreciate the offer to become an unpaid pimp for the Kindle, but no thanks, Amazon."
http://www.wired.com:80/techbiz/media/news/2008/08/portfolio_0826

Secret Of Newborn's First Words Revealed

A new study could explain why "daddy" and "mommy" are often a baby's first words -- the human brain may be hard-wired to recognize certain repetition patterns. (Credit: iStockphoto/Aldo Murillo)

ScienceDaily (Aug. 27, 2008) — A new study could explain why "daddy" and "mommy" are often a baby's first words – the human brain may be hard-wired to recognize certain repetition patterns.

Using the latest optical brain imaging techniques, University of British Columbia post-doctoral fellow Judit Gervain and a team of researchers from Italy and Chile documented brain activities of 22 newborns (2-3 days old) when exposed to recordings of made-up words.

The researchers mixed words that end in repeating syllables – such as "mubaba" and "penana" – with words without repetition – such as "mubage" and "penaku." They found increased brain activities in the temporal and left frontal areas of the newborns' brain whenever the repetitious words were played. Words with non-adjacent repetitions ("bamuba" or "napena") elicited no distinctive responses from the brain.

"It's probably no coincidence that many languages around the world have repetitious syllables in their 'child words' – baby and daddy in English, papa in Italian and tata (grandpa) in Hungarian, for example," says Gervain from UBC Dept. of Psychology's Infant Studies Centre.

Scientists have studied how older children and adults acquire grammatical structures. This is one of the first studies on a newborn infant's innate ability to decipher structural patterns in language.

"The language centre of most right-handed adults is located on the left side of the brain," says Gervain. "This is consistent with our finding with new born babies and supports our belief humans are born with abilities that allow us to perceive and learn our mother tongue systematically and efficiently."

"The brain areas that are responsible for language in an adult do not 'learn' how to process language during development, but rather, they are specialized – at least in part – to process language from the start."

The study is published in the current issue of the Proceedings of the National Academy of Sciences online Early Edition.

Adapted from materials provided by University of British Columbia.
http://www.sciencedaily.com/releases/2008/08/080826144854.htm

Brain Candy

By DANIEL J. LEVITIN

HUMAN

The Science Behind What Makes Us Unique

By Michael S. Gazzaniga

447 pp. Ecco/HarperCollins Publishers. $27.50

My dog, Shadow, does not have an intact disgust module. Neither did the succession of best friends who preceded him. Dogs will eat or roll in practically anything, without any trace of an emotion that seems to be uniquely human. Human infants don't show disgust until they're 5 to 7 years old.

Disgust, Michael S. Gazzaniga argues in his new book, "Human," is one of the five emotional modules that distinguish us from other species. Other modules are common across species. Neither adults, nor human infants nor wallabies, for example, have to be explicitly taught to avoid certain dangers. Encountering a large, fast-approaching creature with sharp teeth — even if you have never encountered it before — causes an automatic fear and avoidance reaction. Evolution has hard-wired a general fear response into our brains, rather than a fear of specific things — you never know what you might encounter, and you don't want to sit there ruminating about it while you become lunch. Speaking of rumination, part of what makes human brains special is that we are the only animals who even bother to ask the question of why we're special.

Gazzaniga, a cognitive neuroscientist at the University of California, Santa Barbara (and one of the inventors of the field), takes us on a lively tour through the latest research on brain evolution. (Full disclosure: the book discusses three of my papers, among hundreds by others.) Human brains turn out to be less different from other animal brains than you might think. Language and social cognition fall along a continuum across species. Deception, for instance, long thought to be unique to humans, is present in monkeys and crows, which can even hide their attempts to deceive. Counterintuitively, much of what makes us human is not an ability to do more things, Gazzaniga writes, but an ability to inhibit automatic responses in favor of reasoned ones; consequently, we may be the only species that engages in delayed gratification and impulse control (thank you, prefrontal cortex).

Gazzaniga doesn't shy away from hard problems, like why humans, alone among species, have art. The attraction to stories, plays, paintings and music — experiences with no obvious evolutionary payoff — is puzzling. "Why does the brain contain reward systems that make fictional experiences enjoyable?" he asks. Part of the answer, he argues, is that fictional thinking engages innate "play" modules that enhance evolutionary fitness (that is, the ability to propagate one's genes) by allowing us to consider possible alternatives — hypothetical situations — so that we can form plans in advance of dangers or even just unpleasant social situations. "From having read the fictional story about the boy who cried wolf when we were children," he writes, "we can remember what happened to him in the story and not have to learn that lesson the hard way in real life." Art may be more than a leisure activity. Artistic, representational thinking could have been fundamental in making us the way we are. As Gazzaniga concludes, "The arts are not frosting but baking soda."

In a hair-raising final chapter, Gazzaniga turns to the question of whether technology may eventually make us something other than human, exploring such potential enhancements as brain implants and germ-line gene therapy, which alters the DNA in sperm, egg or embryo (thus passing the changes on to future generations). It's one thing to eliminate genes that cause cystic fibrosis or muscular dystrophy, which

tests already allow us to detect in developing embryos. But what happens, Gazzaniga asks, when we identify genes that indicate a high probability of developing diabetes or heart disease in middle age? Will we toss the embryo, "start all over again and try for a better one?" Or change the offending genes based on probabilistic outcomes?

You may reject out of hand the idea of a neural implant, a computer chip grafted to your brain. But the lines become blurred. We already alter our neurochemistry through caffeine and alcohol (not to mention Prozac). People with thyroid or pituitary problems use pills or injections to restore their hormonal balance. Others have cochlear implants or electrodes to stimulate injured parts of the brain. If a chip could mediate thyroid function, that doesn't seem so different. A neural implant might also stimulate the prefrontal cortex and brain stem the way caffeine or Ritalin or Prozac do. But will we accept an implanted memory restorer for people with Alzheimer's? What about intelligence-enhancement chips for schoolchildren? Gazzaniga imagines the conversation: "Honey, I know that we were saving this money for a vacation, but maybe we should get the twins neural chips instead. It is hard for them in school when so many of the other kids have them and are so much smarter." If this is fundamentally different from discussions about glasses, hearing aids or Ritalin, that difference is not obvious.

And if neural implants could keep Shadow from rolling in dead squirrel, maybe they wouldn't seem so disgusting after all.

Daniel J. Levitin is a professor of psychology and behavioral neuroscience at McGill University and the author, most recently, of "The World in Six Songs: How the Musical Brain Created Human Nature."

http://www.nytimes.com/2008/08/24/books/review/Levitin-t.html?_r=1&scp=32&sq=august+24+2008&st=nyt&oref=slogin

The Theory That Ate the World

By GEORGE JOHNSON

THE BLACK HOLE WAR

My Battle With Stephen Hawking to Make the World Safe for Quantum Mechanics

By Leonard Susskind

470 pp. Little, Brown & Company. $27.99

This is your universe on acid: 10 dimensions of space, seven of which we cannot see, filled almost entirely with dark matter and dark energy — invisible thought stuff that serves to make the cosmologists' equations come out right.

The cosmologists are stuck, with the rest of us, in Dimensions 1 through 3, and we are all made from what Earthlings quaintly regard as ordinary particles, the tiny fraction of matter that radiates and reflects mysterious waves called light. Compounding the indignity, this afterthought of an existence may be only an illusion — a holographic projection of some two-dimensional flatland that stretches like a timpani skin across the very edge of space. Plato had it backward. It's the shadows on the wall that are real.

At night when our brains are unplugged from our senses and error-correction is off, we dream furiously. And so it is with 21st-century physics. Undeterred by experimental data — it would take a particle accelerator as big as the galaxy to test some of the latest cosmological contrivances — theorists have found a new role as entertainers, scientific Scheherazades.

Leonard Susskind, a professor of theoretical physics at Stanford, is one of the wiliest. Three years ago in "The Cosmic Landscape: String Theory and the Illusion of Intelligent Design," he spun a tale of a multitude of different universes — nooks and crannies of a transcendent multiverse, or "landscape," each ruled by a different physics. This is probably the most controversial interpretation of superstring theory (some of Susskind's colleagues absolutely hate the idea), but it has its appeal. With so many universes out there, the fact of our own existence need not inspire worship and awe. We just happen to occupy one of the niches where the laws are favorable to carbon-based life.

In his new book, "The Black Hole War: My Battle With Stephen Hawking to Make the World Safe for Quantum Mechanics," Susskind's cosmos gets even weirder. Black holes already seemed scary enough, with their ability to swallow everything, including light. For a while, we learn, physicists were faced with the possibility that these cosmic vortexes might also be eaters of order, sucking up and destroying information. Like the Echthroi, the evil demons of entropy in Madeleine L'Engle's novel "A Wind in the Door," black holes might be chomping their way through the universe, ploughing sense into nonsense.

The story of how Susskind and a colleague, the Dutch physicist Gerard 't Hooft, disproved (or at least undermined) the theory begins in 1983 at a San Francisco mansion owned by, of all people, Werner Erhard, the New Age entrepreneur who had made his fortune with a profitable cult called EST. Erhard, we're told, was also a "physics groupie," and he presided over salons in which some of the world's great theorists came to butt minds.

The trouble began when Stephen Hawking made an astonishing prediction about what happens when information — a book, a painting, a musical recording or any pattern of matter or energy — falls into a black hole. Earlier, Hawking had proved that black holes eventually evaporate — at which point, he now claimed, everything inside them disappears from the universe.

That might not sound like such a big deal. Just find another copy of whatever was lost. But that, Susskind realized, was not the point. Among the fundamentals of physics is that information must always be conserved. Even if you throw a DVD into a wood chipper, it is possible in theory (important weasel words) to chase down the splinters and recover the songs. Burned books can be reassembled from the smoke and ashes. Physics, in other words, dictates that everything that happens must be reversible. And that means information cannot be allowed simply to vanish. Even worse, quantum mechanics predicts that empty space seethes with tiny "virtual black holes," popping in and out of existence and gobbling up bits. If Hawking was right, Susskind concluded, "the foundations of our subject were destroyed."

Not everyone was quite so alarmed. But Hawking's information paradox, as it came to be called, opened an arena in which two great theories of physics — general relativity, describing gravity, and quantum mechanics, describing everything else — duked it out. I was eager to learn how, in the end, Susskind and company showed that Hawking was probably wrong — that information is indeed conserved. But first I had to get through a 66-page crash course on relativity and quantum mechanics. Every book about contemporary physics seems to begin this way, which can be frustrating to anyone who reads more than one. (Imagine if every account of the 2008 presidential campaign had to begin with the roots of Athenian democracy and the heritage of the French Enlightenment.)

Finally we get to the heart of the story, and it turns out to be a mind-bender. To make sense of Hawking's paradox one must consider how much information, measured in bits, the 1s and 0s of binary code, can fit inside a black hole. The amount, it turns out, does not depend on the black hole's volume, as one might expect, but on the area of its "horizon" — the flat, funnel-like mouth of the cosmic rabbit hole.

Susskind explains this dizzying notion about as clearly as is probably possible. Every time a bit falls into a black hole, its opening expands by one square Planck length — an area billions and billions of times smaller than a proton. It is because of this phenomenon, Susskind contends, that the information isn't lost. A description of everything that falls into a black hole, whether a book or an entire civilization, is recorded on the surface of its horizon and radiated back like imagery on a giant drive-in movie screen. As with a hologram, three dimensions are contained within two.

Strangest of all, we learn, this holographic conjecture — elevated in the book, perhaps prematurely, to the holographic principle — may apply to the entire universe. Hence the notion of our own reality as an illusory projection of some flatlanders' membrane world. It's as though the pixilated people we see on television are real and the actors are only secondary manifestations. Or something like that. How this all fits together is still pretty murky. "Getting our collective head around the holographic principle is probably the biggest challenge that we physicists have had since the discovery of quantum mechanics," Susskind admits. He speculates at one point that our big bang of a universe is some kind of "inside-out black hole" — one that spews everything outward instead of sucking it in.

But wait. Maybe it just looks that way because time is moving backward! Or — who knows? — maybe our universe is really a 3-D projection of a 4-D world falling through some hyperdimensional gullet! Toward the end of the book Susskind quotes Hawking: "We are just an advanced breed of monkeys on a minor planet of a very average star. But we can understand the universe."

Maybe. But not without a lot more data.

George Johnson is the author of "Fire in the Mind: Science, Faith, and the Search for Order." His most recent book is "The Ten Most Beautiful Experiments."

http://www.nytimes.com/2008/08/24/books/review/Johnson-t.html?scp=39&sq=august+24+2008&st=nyt

Cancer Breath? New Tool Aims To Detect Cancer Early In Exhaled Air

ScienceDaily (Aug. 27, 2008) — Early cancer detection can significantly improve survival rates. Current diagnostic tests often fail to detect cancer in the earliest stages and at the same time expose a patient to the harmful effects of radiation.

Led by Dr. Patrick McCann, a small group of internationally known researchers at the University of Oklahoma with expertise in the development of mid-infrared lasers is working to create a sensor to detect biomarker gases exhaled in the breath of a person with cancer.

Proof-of-concept detection of a suspected lung cancer biomarker in exhaled breath has already been established as reported by the Oklahoma group in the July 2007 issue of Applied Optics. The research was inspired by studies showing that dogs can detect cancer by sniffing the exhaled breath of cancer patients. For example, by smelling breath samples, dogs identified breast and lung cancer patients with accuracies of 88 and 97 percent, respectively, as reported in the March 2006 issue of Integrative Cancer Therapies. The evidence is clear—gas phase molecules are uniquely associated with cancer.

Intrigued by the concept of using breath analysis to detect cancer, McCann saw an opportunity to use mid-infrared laser technology to help elucidate the relationship between specific gas phase biomarker molecules and cancer. He believes it is possible to develop easy-to-use detection devices for cancer, particularly for hard-to-detect cancers like lung cancer. McCann says we need sensors that detect these gas phase cancer biomarkers. “A device that measures cancer specific gases in exhaled breath would change medical research, as we know it.”

McCann says the science and technology exist to support the development of a new tool to detect cancer, but the research will take from five to 10 years to get low-cost devices into the clinic. OU may have the strongest contingent of researchers dedicated to providing a solution to the problem using this approach. Even though studies confirm that dogs can detect cancer by smelling the gases, they can’t tell us what gases they smell. It’s up to the medical research community using the best measurement tools to figure that out.

According to McCann, “Improved methods to detect molecules have been demonstrated, and more people need to be using these methods to detect molecules given off from cancer. We have developed laser-based methods to detect molecules. Mid-infrared lasers can measure suspected cancer biomarkers—ethane, formaldehyde and acetaldehyde.” McCann will use nanotechnology to improve laser performance and shrink laser systems, which would allow battery-powered operation of a handheld sensor device.

“You often have to go outside your discipline to pioneer new areas of research and Oklahoma has an advantage with so many experts in other fields. But getting funding for interdisciplinary research is challenging. However, more capital and research infrastructure are needed for this device to become a reality. As we build upon our existing capabilities Oklahoma can become more widely known as a center of excellence in this important area.”

Even though McCann is not a cancer researcher, he wants his research on developing innovative laser technology to benefit the millions of people who would otherwise suffer from a late-stage cancer diagnosis. McCann knows it can be done. He says, “The science supports it, and the dogs tell us there is something there.”

Adapted from materials provided by University of Oklahoma.

http://www.sciencedaily.com/releases/2008/08/080826124401.htm

A blueprint for good

A new movement aims to change the world through free architecture

By Francie Latour | August 24, 2008

(Perkins+Will) A room for a children's hospital in Minnesota is one recent effort to achieve a design that is sophisticated, user friendly, and affordable.

FROM THE SOARING steel and glass of Seattle's Central Library to the titanium-sheathed curves of the Guggenheim Bilbao museum, top architects looking to make a statement in today's urban landscape generally go for huge scale, impossible geometry, and a dazzling, futuristic skin.

But in San Francisco, an ambitious architecture firm is launching its own groundbreaking public space. It's called the day labor station.

The day labor station is a semi-permanent open box with a canopy, and it does exactly what it suggests: It gives the workers who gather at street corners and parking lots every day in cities across the country a place to wait for work. But it also does more than that. With an elegance worthy of a high-end design firm, it provides a place to make or sell food, use the bathroom, hold meetings, and store tools. The station uses green materials, and it can operate almost entirely off the grid. For now, it exists only in prototype, though a few cities are exploring the idea.

The station is the brainchild of Public Architecture, a nonprofit design firm started by John Peterson in 2002. With a simple structure, he and his colleagues flipped the idea of an architect's project on its head. No client came to them; instead, they sought out clients who had real needs but no money, or any sense that their lives could be improved by design. At the same time, their creation achieved what the best built environments around us do all the time, without us ever noticing: it found a three-dimensional solution to complex problems. It speaks to police, whose tendency to steer clear of day labor groups can make them breeding grounds for crime. It speaks to business owners, whose parking lots and sidewalks can appear unsafe or unseemly, becoming flashpoints of controversy. And by offering a shadow immigrant population basic human needs - shelter, sanitation, and a safe place to seek work - the station suggests a

powerful idea for everyone involved to consider: that day laborers have worth and a place in the social fabric.

In the age of "starchitecture," where prestige buildings and celebrity designers reign supreme, Peterson and his colleagues might be making some of the boldest statements in urban design today. Their declaration couldn't be more simple: Good design can drive social justice. It's a message that borrows elements from progressive design movements of the past. But what Public Architecture and groups like it are after is also distinctly new. They are challenging their entire profession to take the high design standards usually reserved for elite clients and systematically deliver them to society's most vulnerable: to design hospital rooms that give the chronically ill a sense of control over their lives, libraries that will make children spend hours with a book, or simple structures that grant working immigrants new dignity. In other words, to convince ordinary people and those on the margins that architects don't just make giant, radical shapes. They can make giant, radical change.

"I think there's a lot of confusion about what architects do," said Brandy Brooks, the executive director of Community Design Resource Center of Boston, a local design nonprofit and partner of Public Architecture. "Does it mean you make pretty spaces? Does it mean, you put some nice gables up there and that's what it is to be an architect? Well, no. It's supposed to be about the health and safety and welfare of people, and how well this building you're in - your house or office or school - helps you live or work or learn there."

The problem, Brooks said, is that "people don't recognize that they have a right to well-designed buildings and spaces. That this isn't just an artistic service. It's essential."

With an ambitious campaign it calls "the 1%," Public Architecture has launched a mechanism for public-minded design that is fundamentally foreign to architecture practice - a national network of design firms willing to pledge 1 percent of their billable hours to pro bono work, formalizing architecture's commitment to pro bono service the way it has long been enshrined in the legal and medical professions. After a fledgling start in 2005, the campaign is now gaining major traction: In the last nine months, the number of 1% firms has shot up dramatically, from 150 to just over 400 firms across 42 states. This week, Public Architecture is set to release a new survey showing that more than half of responding 1% firms are donating 2 percent or more of their time. And the top criteria driving the kinds of pro bono projects they take on is social relevance.

Not everyone believes that architecture can follow the pro bono models of medicine or law. For one, architects don't make the kind of money doctors or lawyers do, one of the biggest hurdles the 1% effort faces. But the idea has pushed Public Architecture to the forefront of a growing movement among design nonprofits, think tanks, and scholars to tackle social problems from immigration to pollution to poverty. The Boston Society of Architects, the largest chapter of the American Institute of Architects and a major supporter of Public Architecture, has launched a committee to support pro bono work. And this year, the national organization that represents architecture schools will make public architecture its central platform.

If the quarter-million or so US architecture professionals donated 1 percent of their time, Public Architecture estimates, it would amount to some 5 million hours. That would arguably constitute the biggest practice in the world, a 2,500-person firm working full time for the public good.

"If doctors said they were only going to treat the medical needs of the wealthy, we would be outraged," said Thomas Fisher, dean of the University of Minnesota College of Design and incoming president of the Association of Collegiate Schools of Architecture. "But that is what architecture has done. And it's not acceptable."

Like the channels that provide a lawyer or doctor to anyone who needs them, Public Architecture has begun to carve out an infrastructure to connect 1% firms with a growing roster of nonprofit causes

looking for design help. And it is churning out resources to nurture those connections, showcasing pro bono projects on its website and rolling out 1% user guides that read more like calls to action: "You could have been anything. You chose to be an architect. Why? Doctors save lives. Architects _____."

All of this is the kind of idealistic talk that would have sent Public Architecture's founder running, screaming, not too long ago. "I don't actually come from a background of feeling responsibility to work for social causes," said Peterson, a high-end residential architect whose private practice, along with foundation and grant money, helps to pay Public Architecture's bills. "I'm very much like the students and practitioners who came out of design-centered schools: There needed to be a purity about the design. If you muddied it with a social agenda, or even with financial issues, it would dilute the design quality."

But six years ago, Peterson began to crave a challenge bigger than building the next $5 million home. He found it right outside his office, in a light-industrial warehouse district of San Francisco whose influx of new residents had triggered problems. The open space consisted of parks closed off by imposing stretches of black fence. There was little access to public transportation. And the zooming, one-way traffic on road arteries through the area made creating a neighborhood fabric literally hazardous.

As the solutions Peterson designed to these problems gained traction with the city - including innovative sidewalk plazas that opened up pockets of open space - it began to dawn on him that he could impact a much larger group of people not just in his neighborhood, but in other city neighborhoods experiencing similar problems. Hooked on public architecture, he founded Public Architecture.

"I actually still deeply believe in purity of design. I just think the issues we should be tackling need to expand," Peterson said. "It has to include social justice. And I don't think that mission needs to limit the design opportunity in any way. . . . The idea that all these other people may have an influence on the work - well, that's architecture."

But the idea of an institutionalized pro bono system is not architecture, at least not the way it is practiced today. Today, when pro bono architecture happens - and it does happen frequently - it is often haphazard, undocumented, and done on an architect's personal time, without the brainpower or dollars that an entire firm could bring to bear. And because pro bono is seen as do-gooder work, many firms don't call attention to it, for fear of appearing to exploit it.

That is the model Public Architecture wants to change: If architecture itself is the building, Peterson and his colleagues are trying to design the room inside it where systematic pro bono work can live. In that new room, they argue, pro bono projects will no longer be projects that firms shy away from advertising. Because those projects won't be special or alternative or do-gooder architecture. They will just be architecture.

"Our work is only going to be truly successful if it's actually considered mainstream," said Liz Ogbu, Public Architecture's design campaign manager. "If it's considered mainstream, then it means that the principles we're espousing with the 1% projects become part of any project, no matter who it's for or what it's for."

In some cases, the projects of 1% firms haven't just entered the conversation, their designs have won awards. In New York, a groundbreaking design for elementary school libraries by Tod Williams Billie Tsien Architects and the Robin Hood Foundation earned national acclaim, using cutting-edge technology, private alcoves, and whimsical fixtures to create a sense of wonder and discovery, and draw students into its world in droves. In San Francisco, a project begun to increase security at a Planned Parenthood clinic turned into an award-winning partnership with Fougeron Architecture that reimagined ways to keep staff and patients safe while giving low-income women and their children an intimate and inviting healthcare environment.

And in Minneapolis, a radically new design for a children's hospital room by the firm Perkins+Will last year won a series of awards, including an international award for lighting. (In that category, the firm shared recognition with a four-year project to relight the interior of London's St. Paul's Cathedral.)

The hospital room project began simply, with a conversation between an architect and his neighbor. But the outcome - the product of a two-year collaboration with the nonprofit group Adopt-A-Room, the University of Minnesota, families, caregivers, and seriously ill children - was a boundary-breaking design of the space where kids and their families must spend weeks or months of their lives.

Gone were the comfortless quarters that poorly accommodated families, and the Disneyesque imagery that covered patients' walls, whether they were infants or teenagers. In their place, Perkins+Will built an enlarged, intensely user-friendly space whose floor plan allows parents to sleep with comfort, work from their kids' bedsides, and replicate a sense of home with a kitchen area. The room offers children a virtual skylight that can change the room's color or create a sense of day or night, and a "magic wall," an oversized plasma screen for movies, video games, and Internet connections to home, friends, and school. And it keeps the medical mission at the forefront of its design with, among other features, special sound-absorbing panels based on studies showing that quiet can accelerate the healing process.

Like other 1% projects, the room became a lab not just for innovative design but for the hard work of innovative financing among the nonprofit, the hospital, private funders, and the firm (Perkins+Will donated two-thirds of its time at no cost). Two prototype rooms are now in use at the University of Minnesota Children's Hospital Fairview.

"It wasn't trying to be an award-winning architectural project," said John Spohn, a senior associate. "We were just trying to fulfill the needs of vulnerable patients, families, and caregivers. Now we can look at this approach and how to integrate elements of it in other possible settings, like intensive care."

It's the kind of example Public Architecture likes to use to show how 1% can pay back dividends to an architect's practice - raising a firm's design standards, its business profile, its standing in the community, and ultimately, attracting more for-profit contracts. Pro bono work doesn't have to just feel good, goes their pitch. It can be a viable business model.

Still, not everyone in the design world is convinced. "There have been firms that we've been courting for years to come on board who are still saying, 'I don't know about this,' " said Ogbu.

But some design leaders say the consequences of not engaging in the public interest could be far more damaging to architecture's future.

"My answer to the cry of 'I can't afford pro bono' is, look, we are having our lunch eaten by all the other professions," said Richard Swett, an architect, former ambassador and member of Congress, and the author of "Leadership by Design: Creating an Architecture of Trust."

"This is a time where architects and the profession have two simple choices," Swett said. "They can continue going down this path of star architects and marginalize themselves further and further into oblivion. Or they can choose to become leaders who can solve the very complicated problems of society today. Not because these problems are all three-dimensional or design-oriented, but because architecture is a profession that understands how to integrate very disparate, competing interests into complicated systems that ultimately serve everybody."

If architects are going to emerge as those kinds of leaders again, design leaders say, it isn't just the way architects practice that will have to change. It is the way they are schooled. After training a generation of students to concern themselves only with theory, individual creativity, and, by extension, the pursuit of fame, architecture programs are slowly but surely beginning to get on board the public architecture train.

At the University of Minnesota, Thomas Fisher's students are learning a very important lesson about being architects: before they can be creative, they have to listen. After starting a project to help build homeless shelters, they began to talk to homeless people and discovered that shelters were irrelevant to them. What they wanted was for the police to stop taking and trashing their stuff when they drive them out from under bridges or tunnels.

As it turned out, their biggest complaint had a design solution: The students created highly magnetized packs in metallic colors that served to camouflage them. When the police come, their users can throw the bags up to the closest metal structure, and they stick.

"I actually think what we're about to see is the emergence of almost two different professions," said Fisher, whose students also collaborated with a private practice and the group Architecture for Humanity to make "clean hubs," self-contained ecosystem structures that generate electricity, provide water, and process human waste. They are now being used in New Orleans. "The reality is that no amount of pro bono can come close to meeting the needs out there that exist, because the needs are so vast. A public health version of our field is going to have very different clients and a very different business model. You'll be designing different things, but they'll be things that can potentially be replicated millions of times to benefit millions of people."

Francie Latour is an associate editor at Wellesley magazine. She worked as a Globe reporter from 1996 to 2007. ■

http://www.boston.com/bostonglobe/ideas/articles/2008/08/24/a_blueprint_for_good?mode=PF

A Portrait by Leonardo? Scholars and Skeptics Differ

By ELISABETTA POVOLEDO

VINCI, Italy — A 19th-century German School portrait that sold for $21,850 at a Christie's auction in 1998 has now been attributed to Leonardo da Vinci by some art and scientific experts.

A spokesman for the mixed-media portrait's Swiss owner, who wishes to remain anonymous, said offers to buy it have already started pouring in. He said the top bid so far was more than $50 million, by an intermediary acting on behalf of a Russian.

But the attribution has not gone unchallenged. The 13-by-9.4-inch work — which might be a betrothal portrait — did not cause a furor when it went on sale at Christie's in New York. At the auction, it was bought by a dealer based in the United States, who sold it last year.

If it is in fact a Leonardo, skeptics say, it went unrecognized by experts at the auction house, as well as the specialized dealers who attended the sale, including the one who bought it.

"The market is a fairly efficient place," said Hugh Chapman, assistant keeper at the department of prints and drawings at the British Museum in London. "This would be an amazing miss."

Still, there are those who believe the work is a genuine Leonardo. "This profile is almost too beautiful to be true," said Alessandro Vezzosi, director of the Museo Ideale Leonardo da Vinci, pointing to a photograph of the work that now hangs here. Scientific studies aside, he said, "the iconography and the aesthetic speak clearly" that it is a Leonardo. Mr. Vezzosi included the portrait in a Leonardo monograph he published in July.

Christie's said in a statement that it "cannot comment on this particular work until it has been the subject of comprehensive and conclusive academic and scientific analysis."

Other experts point out that modern connoisseurship — a convergence of wide-ranging technical examinations and the expert's eye — remains an imperfect science. And building consensus around an attribution can be a long and challenging process.

The story of how a Swiss collector bought a pretty portrait in January 2007 and ended up with a work that might be by a Renaissance master is a "rags-to-riches story, except that the owner is not exactly in rags," said Peter Silverman, a Canadian collector who is a friend of the owner.

Eighteen months ago, Mr. Silverman said, the Swiss collector showed the portrait to him, and he was the first to suspect that his friend might have made an amazing investment. "I saw it, but I didn't dare speak the L-word," Mr. Silverman said in a telephone interview.

The two collectors took the portrait to Lumiere Technology, a Paris-based company specializing in multispectral digital technology that had already digitized two works by Leonardo: the Mona Lisa at the Louvre and "Lady With an Ermine" at the Czartoryski Museum in Krakow, Poland.

"The first time that the owner gave me this drawing he didn't say a thing; the author was secret," said Pascal Cotte, Lumiere Technology's chief technical officer.

Though Mr. Cotte carried out a series of tests on the work for nearly four weeks, he said, it did not take him long to come up with a name. "I went to the owner and said, 'I have a feeling it's a drawing by Leonardo,' and he said, 'We're here for just that.' "

In June, Lumiere announced that its examination had led to the authentication of the work as a Leonardo.

Carbon 14-dating tests carried out by the Swiss Federal Institute of Technology Zurich and released this month place the work's date between 1440 and 1650.

But art dealers and art historians interviewed recently had mixed opinions about the portrait. Scientific tests "can be very useful, but they can't guarantee an attribution because the first criterion is quality and that can't be discerned through mechanical means," said Jean-Luc Baroni, a London-based art dealer.

Nicholas Turner, a former curator of drawings at the British Museum and the J. Paul Getty Museum in Los Angeles, saw the work last December and was struck by the left-handed shading — Leonardo was left-handed — as well as the physiognomy and the details. They all point in the direction of Leonardo, he said, adding, "I recommended that that avenue of inquiry be pursued among Leonardo specialists."

After viewing the digitized images produced by Lumiere, Mr. Turner discounted the possibility that the work could be a fake. "Fakes fall apart, especially when you magnify them," he said. "It's difficult to produce anything that can convince people that they're genuine."

Carlo Pedretti, the Armand Hammer Chair in Leonardo Studies at the University of California, Los Angeles, described the portrait as "a magnificent thing, worthy of Leonardo, even if strangely cool and lifeless." If it really is by Leonardo, he said, it would be a discovery comparable to the "early 19th-century re- establishment" of "The Lady With the Ermine" as an autograph work.

That is reason enough to encourage further tests and consultations with art historians at scholarly institutions, Professor Pedretti said. "I am prepared to be fully convinced that it's a Leonardo, but let's say I'm still on the cautious side."

Martin Kemp, a professor of art history at Oxford University, said, "Throw everything at it." He said that he had not seen the original, which is kept in a Swiss vault, but that based on the digital images he was "pretty convinced that it's the real thing."

Other experts are more skeptical. Carmen C. Bambach, curator of drawings and prints at the Metropolitan Museum of Art in New York and one of the world's leading Leonardo specialists, said in an e-mail exchange that based on the photograph of the portrait the "work does not seem to resemble the drawings and paintings by the great master."

Others have noted that it would be the first work by Leonardo on vellum. "It makes the portrait harder to compare to a more validated Leonardo," said Claire Farago, an expert in the intellectual tradition of Leonardo who teaches at the University of Colorado at Boulder. She pointed out that there were many painters working in Leonardo's circle emulating his style.

In the end, Mr. Chapman of the British Museum said, "there will be a scholarly opinion, but it takes time to make its way through the system. The scholarly world needs time to digest this thing; it can't make a snap decision."

Still a lot is at stake, in terms of both prestige and money.

Leonardo is a star at auctions in part because little of his work goes up for sale. A silverpoint study of a horse and rider by him sold at Christie's in London in 2001 for $11.5 million. "I get on a weekly basis things that are more or less close to Leonardo that the owners are convinced are some great lost original," Professor Kemp said.

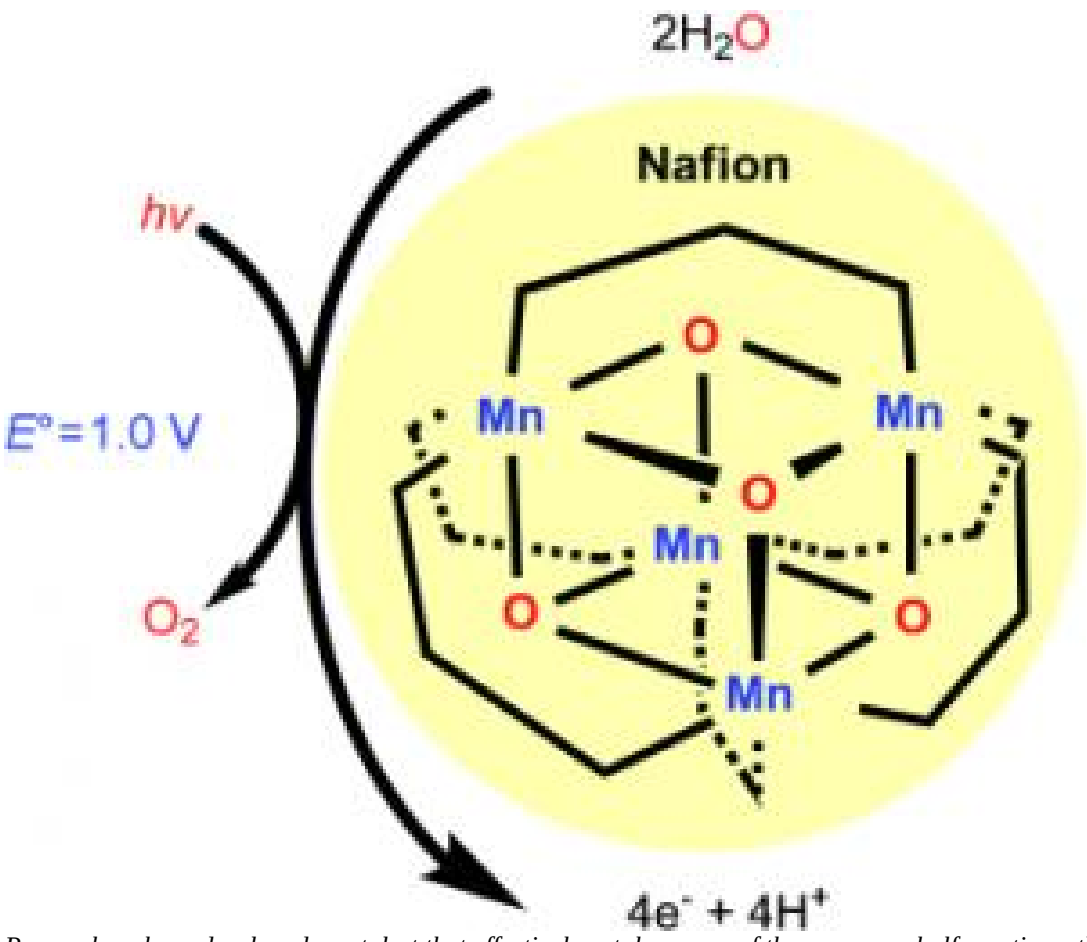
Noting that a Leonardo would most likely sell in the double-digit million-dollar range, he said, "You could see why they indulge in wishful thinking."

Mr. Silverman, the collector, said the owner had no immediate plans to sell the work.

But until a definite attribution is made, its market value cannot be pinned down. "If one expert says yes and the other says no, it makes it unsellable, " Mr. Baroni, the art dealer, said. "No one will buy until you have certainty. If you are buying a Leonardo you want to be convinced it's a Leonardo."

http://www.nytimes.com/2008/08/23/arts/design/23leon.html?em

Catalyst For Water Oxidation Adopted From Plants: A Means For Energy-efficient Production Of Hydrogen?



Researchers have developed a catalyst that effectively catalyzes one of the necessary half reactions, the photooxidation of water. (Credit: Image courtesy of Wiley-Blackwell)

ScienceDaily (Aug. 27, 2008) — Hydrogen will be one of the most important fuels of the future. It would be ideal to obtain hydrogen by splitting water instead of from petroleum. However, the electrolysis of water is a very energy intensive process, making it both expensive and unsustainable if the electricity necessary to generate it comes from the burning of fossil fuels. Photolysis, the splitting of water by light, is a highly promising alternative.

A team of Australian and American researchers has now developed a catalyst that effectively catalyzes one of the necessary half reactions, the photooxidation of water. As it reports in the journal Angewandte Chemie, the core of the catalyst is a manganese-containing complex modeled after those found in photosynthetic organisms.

Electrolysis is the reverse of the process that occurs in a battery: that is electrical energy is converted to chemical energy. The electrolysis of water involves two half reactions: at the cathode, protons (positively charged hydrogen ions) are reduced to hydrogen, whereas at the anode the oxidation of water produces oxygen. The goal of the researchers is to use sunlight to get this energy-intensive process going. To make this work, the light-harvesting power of modern solar cells must be combined with effective photocatalysts for the oxidation of water and reduction of hydrogen ions into hydrogen gas.

The biggest hurdle to overcome in the photocatalytic splitting of water to date has been the lack of a robust catalyst that oxidizes water. In fact, the best known catalyst, which very effectively oxidizes water when irradiated with visible light, is a manganese-containing enzyme in the photosynthetic apparatus of living organisms.

Robin Brimblecombe and Leone Spiccia at Monash University (Australia), Gerhard F. Swiegers at the Commonwealth Scientific and Industrial Research Organisation (CSIRO, Australia), and G. Charles Dismukes at Princeton University (USA) have used this structure as a model for their photocatalyst.

The catalyst in question is a manganese oxo complex with a cubic core made of four manganese and four oxygen atoms capped by ancillary phosphinate molecules. The catalytically active species is formed when energy from light causes the release of one the capping molecules from the cube.

However, the manganese complex is not soluble in water. The researchers have overcome this problem by coating one electrode with a wafer-thin Nafion membrane. Housed within the aqueous channels of this membrane, the catalytic species is stabilized and has good access to the water molecules. Irradiation with visible light under an applied 1.2 volts leads to the effective electro-oxidation of water.

This anodic half-cell could be easily paired with a catalytic hydrogen-producing cathode cell. This would result in a photoelectrochemical cell that produces pure hydrogen and oxygen from water and sunlight.

Journal reference:

1. Robin Brimblecombe, Gerhard F. Swiegers, G. Charles Dismukes, Leone Spiccia. **Sustained Water Oxidation Photocatalysis by a Bioinspired Manganese Cluster**. *Angewandte Chemie*, Published Online: Aug 1 2008 DOI: 10.1002/anie.200801132

Adapted from materials provided by Wiley-Blackwell.

http://www.sciencedaily.com/releases/2008/08/080826100829.htm

Why Do Eyelids Sag With Age? Mystery Is Solved

A UCLA study finds that lower baggy eyelids are caused by fat expansion in the eye socket. (Credit: American Society for Aesthetic Plastic Surgery)

ScienceDaily (Aug. 27, 2008) — Many theories have sought to explain what causes the baggy lower eyelids that come with aging, but UCLA researchers have now found that fat expansion in the eye socket is the primary culprit.

As a result, researchers say, fat excision should be a component of treatment for patients seeking to address this common complaint.

The study, published in the September issue of the peer-reviewed Journal of Plastic and Reconstructive Surgery, is the first to examine the anatomy of multiple subjects to determine what happens to the lower eyelid with age. It is also the first to measure what happens to the face with age using high-resolution magnetic resonance imaging (MRI).

"A common treatment performed in the past and present is surgical excision of fat to treat a 'herniation of fat' — meaning that the amount of fat in the eye socket does not change but the cover that holds the fat in place, the orbital septum, is weakened or broken and fat slips out," said lead author Dr. Sean Darcy, a research associate in the division of plastic and reconstructive surgery at the David Geffen School of Medicine at UCLA and a plastic surgery resident at the University of California, Irvine. "This orbital septum weakening or herniation-of-fat theory is what most plastic surgeons have been taught.

"However, our study showed there is actually an increase in fat with age, and it is more likely that the fat increase causes the baggy eyelids rather than a weakened ligament," Darcy said. "There have been no studies to show that the orbital septum weakens."

The study looked at MRIs of 40 subjects (17 males and 23 females) between the ages of 12 and 80. The findings showed that the lower eyelid tissue increased with age and that the largest contributor to this size increase was fat increase.

According to a recent report by the American Society of Plastic Surgeons, nearly 241,000 Americans underwent eyelid surgery in 2007, making it one of the top four surgical cosmetic procedures performed.

Currently, many plastic surgeons performing procedures to treat baggy eyelids do not remove any fat at all. They reposition the fat or conduct more invasive tightening of the muscle that surrounds the eye, or they tighten the actual ligament that holds the eyeball in place. These procedures are performed despite there being no data indicating that these structures change with age.

"Our findings may change the way some plastic surgeons treat baggy eyes," said study co-author Dr. Timothy Miller, professor and chief of plastic surgery at the Geffen School. "Our study showed that a component of a patient's blepharoplasty procedure should almost routinely involve fat excision rather than these procedures."

Blepharoplasty refers to surgical rejuvenation of the upper or lower eyelids, or both, depending on the extent of aging or disease. The procedure is usually performed on the lower eyelid because the most common complaint patients have is that their eyes appear tired, puffy or baggy. The surgeon makes external incisions along the natural skin lines of the eyelid to remove the excess fat and improve the contour of the lower eyelid.

"Although baggy lower eyelids are a significant result of aging and fat expansion, there are other factors that can contribute too," Miller said. "We recommend that surgeons evaluate each component and address them accordingly in an individualized approach to blepharoplasty."

The next phase of research will be to perform MRIs of people with baggy eyelids.

The study was supported in part by a UCLA research-enabling grant and a U.S. Public Health Service grant.

Other study authors included Dr. Robert A. Goldberg, Dr. J. Pablo Villablanca, Dr. Joseph L. Demer and senior author Dr. George H. Rudkin, all of UCLA. None of the authors have any commercial associations or financial relationships that would pose a conflict of interest.

Adapted from materials provided by University of California - Los Angeles, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/08/080826135941.htm

Exploring The Function Of Sleep

ScienceDaily (Aug. 27, 2008) — Is sleep essential? Ask that question to a sleep-deprived new parent or a student who has just pulled an "all-nighter," and the answer will be a grouchy, "Of course!"

But to a sleep scientist, the question of what constitutes sleep is so complex that scientists are still trying to define the essential function of something we do every night. A study published this week in PLoS Biology by Chiara Cirelli and Giulio Tononi addresses this pressing question.

The search for the core function of sleep can seem as elusive as the search for the mythological phoenix, says Cirelli, an associate professor of psychiatry at the University of Wisconsin School of Medicine and Public Health in Madison.

Some scientists argue that sleep is merely a way to impose a quiet, immobile state (rest), and isn't important by itself in mammals and birds. This is the so-called "null hypothesis," and Cirelli and Tononi reject it.

"We don't understand the purpose of sleep, but it must be important because all animals do it," Cirelli says.

There's no clear evidence of an animal species that doesn't sleep, she says. Even the dolphin—which is sometimes held up as an animal that doesn't sleep because it moves continuously—will show "unihemispheric sleep" with one eye closed and one half its brain showing the slow waves characteristic of deep sleep.

"The very fact that dolphins have developed the remarkable specialization ..., rather than merely getting rid of sleep altogether, should count as evidence that sleep must serve some essential function and cannot be eliminated," Cirelli says.

She also argues that sleep is strictly regulated by the brain, because sleep deprivation is followed by a rebound, in which the sleep-deprived animal either sleeps longer, or spends more time in the deeper sleep characterized by large slow brain waves.

Prolonged sleep deprivation has been shown to kill rats, flies and cockroaches. Humans who have a genetic insomnia can also die. In less extreme cases, sleep deprivation affects cognitive function in animals ranging from flies to rodents. Rats kept awake will engage in "micro-sleep" episodes, and sleep-deprived humans tend to fall asleep even in the most dangerous circumstances.

Because it is universal, tightly regulated, and cannot be lost without serious harm, Cirelli argues that sleep must have an important core function. But what?

"Sleep may be the price you pay so your brain can be plastic the next day," Cirelli and Tononi say.

Their hypothesis is that sleep allows the brain to regroup after a hard day of learning by giving the synapses, which increase in strength during the day, a chance to damp down to baseline levels. This is important because the brain uses up to 80 percent of its energy to sustain synaptic activity.

Sleep may also be important for consolidating new memories, and to allow the brain to "forget" the random, unimportant impressions of the day, so there is room for more learning the next day. This could be why the brain waves are so active during certain periods of sleep.

"While there may still be no consensus on why animals need to sleep, it would seem that searching for a core function of sleep, particularly at the cellular level, is still a worthwhile exercise," she concludes.

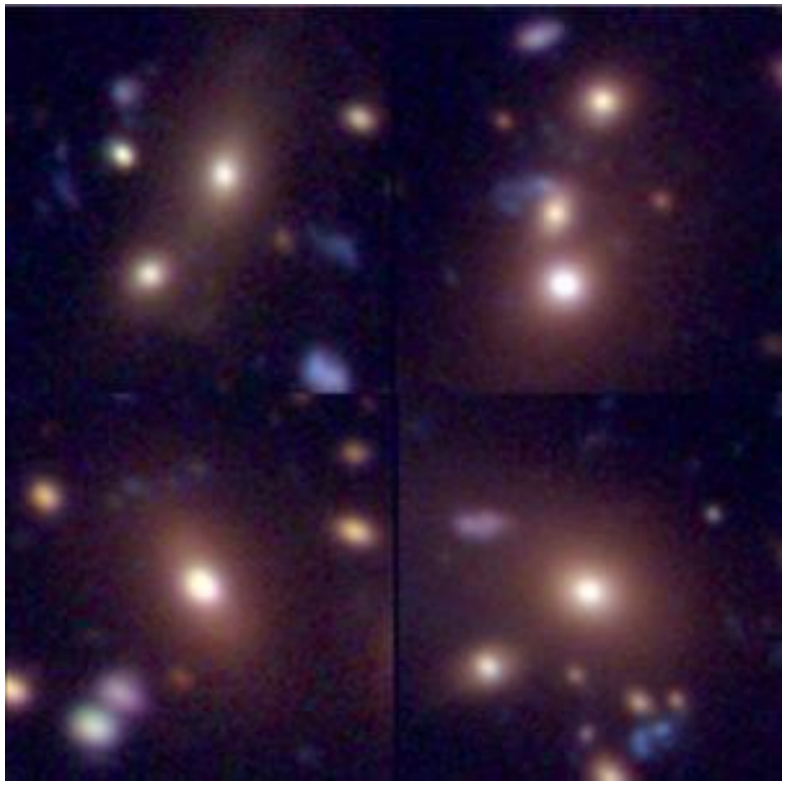
Journal reference:

1. Cirelli C, Tononi G. **Is sleep essential?** *PLoS Biol*, 2008; 6(8): e216 DOI: 10.1371/journal.pbio.0060216

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

http://www.sciencedaily.com/releases/2008/08/080825203918.htm

How Do Galaxies Grow? Massive Galaxies Caught In The Act Of Merging



Composite colour-image of the brightest galaxies in four groups located about 4 billion light-years away. The galaxies are ordered in increasing stellar mass, i.e. a rough time sequence (upper left, upper right, lower left, lower right). (Credit: Image courtesy of ESO)

ScienceDaily (Aug. 26, 2008) — Astronomers have caught multiple massive galaxies in the act of merging about 4 billion years ago. This discovery, made possible by combining the power of the best ground- and space-based telescopes, uniquely supports the favoured theory of how galaxies form.

How do galaxies form? The most widely accepted answer to this fundamental question is the model of 'hierarchical formation', a step-wise process in which small galaxies merge to build larger ones. One can think of the galaxies forming in a similar way to how streams merge to form rivers, and how these rivers, in turn, merge to form an even larger river. This theoretical model predicts that massive galaxies grow through many merging events in their lifetime. But when did their cosmological growth spurts finish? When did the most massive galaxies get most of their mass?

To answer these questions, astronomers study massive galaxies in clusters, the cosmological equivalent of cities filled with galaxies. "Whether the brightest galaxies in clusters grew substantially in the last few billion years is intensely debated. Our observations show that in this time, these galaxies have increased their mass by 50%," says Kim-Vy Tran from the University of Zürich, Switzerland, who led the research.

The astronomers made use of a large ensemble of telescopes and instruments, including ESO's Very Large Telescope (VLT) and the Hubble Space Telescope, to study in great detail galaxies located 4 billion light-years away. These galaxies lie in an extraordinary system made of four galaxy groups that will assemble into a cluster.

In particular, the team took images with VIMOS and spectra with FORS2, both instruments on the VLT. From these and other observations, the astronomers could identify a total of 198 galaxies belonging to these four groups.

The brightest galaxies in each group contain between 100 and 1000 billion of stars, a property that makes them comparable to the most massive galaxies belonging to clusters.

"Most surprising is that in three of the four groups, the brightest galaxy also has a bright companion galaxy. These galaxy pairs are merging systems," says Tran.

The brightest galaxy in each group can be ordered in a time sequence that shows how luminous galaxies continue to grow by merging until recently, that is, in the last 5 billion years. It appears that due to the most recent episode of this 'galactic cannibalism', the brightest galaxies became at least 50% more massive.

This discovery provides unique and powerful validation of hierarchical formation as manifested in both galaxy and cluster assembly.

"The stars in these galaxies are already old and so we must conclude that the recent merging did not produce a new generation of stars," concludes Tran. "Most of the stars in these galaxies were born at least 7 billion years ago."

The team is composed of Kim-Vy H. Tran (Institute for Theoretical Physics, University of Zürich, Switzerland), John Moustakas (New York University, USA), Anthony H. Gonzalez and Stefan J. Kautsch (University of Florida, Gainesville, USA), and Lei Bai and Dennis Zaritsky (Steward Observatory, University of Arizona, USA).

Journal reference:

1. Tran et al. **The Late Stellar Assembly of Massive Cluster Galaxies via Major Merging**. *The Astrophysical Journal*, 2008; 683 (1): L17 DOI: 10.1086/591422

Adapted from materials provided by ESO: European Organisation for Astronomical Research in the Southern Hemisphere.
http://www.sciencedaily.com/releases/2008/08/080826080808.htm

More Strawberries, More Antioxidant Absorption

Strawberries. (Credit: Photo by Ken Hammond)

ScienceDaily (Aug. 26, 2008) — Agricultural Research Service (ARS) scientists have assessed the human body's capacity for absorbing certain antioxidant compounds in strawberries, and have found that the absorption of one key beneficial plant chemical was not "maxed out" as volunteers ate more of this popular fruit. Foods high in antioxidants may be excellent sources of healthful compounds, and researchers are striving to learn more about their ability to be absorbed and utilized within the human body.

The study was conducted at the ARS Beltsville Human Nutrition Research Center (BHNRC) in Beltsville, Md., where scientists have pioneered methods for identifying and measuring various plant compounds in fruits and vegetables. Physiologist Janet Novotny, with the BHNRC's Food Components and Health Laboratory, led the study, which was published recently in the Journal of Nutrition.

Marketed year-round, strawberries are the fifth most consumed fresh fruit in the United States, and consumption more than doubled in the past decade, according to experts. Strawberry's antioxidants come in the form of both long-established vitamins and newly defined plant chemicals. Berries are particularly well endowed with a series of compounds called anthocyanins--the source of the berries' blue, purple and red pigments.

In the study, 12 volunteers consumed three different serving sizes of strawberries during three separate treatment periods. Each two-day meal treatment included either 3.5 ounces, 7 ounces, or 14 ounces of blended strawberries, along with a full diet of carefully controlled foods. Each treatment period was separated by a one-week break.

The study showed that the human body is capable of assimilating more anthocyanin pigments as intakes increase. The results will help nutrition scientists evaluate the healthful properties of individual anthocyanins and aid plant breeders in developing varieties with optimal anthocyanin content.

Adapted from materials provided by USDA/Agricultural Research Service. Original article written by Rosalie Marion Bliss.

http://www.sciencedaily.com/releases/2008/08/080825200552.htm

Alcohol Consumption Can Cause Too Much Cell Death, Fetal Abnormalities

Dr. Erhard Bieberich, biochemist in the Medical College of Georgia Schools of Medicine and Graduate Studies. (Credit: Image courtesy of Medical College of Georgia)

ScienceDaily (Aug. 26, 2008) — The initial signs of fetal alcohol syndrome are slight but classic: facial malformations such as a flat and high upper lip, small eye openings and a short nose.

Researchers want to know if those facial clues can help them figure out how much alcohol it takes during what point in development to cause these and other lifelong problems.

They have good evidence that just a few glasses of wine over an hour in the first few weeks of fetal life, typically before a woman knows she's pregnant, increases cell death. Too few cells are then left to properly form the face and possibly the brain and spinal cord.

"It’s well known that when you drink, you get a buzz. But a couple of hours later, that initial impact, at least, is gone," says Dr. Erhard Bieberich, biochemist in the Medical College of Georgia Schools of Medicine and Graduate Studies. "But, your fetus may have experienced irreversible damage."

He thinks the damage results from the death of neural crest cells, versatile cells that travel a lot during development, ultimately helping form bone, cartilage, connective tissue, the heart and more. These cells

are developing at the same time as neural tube cells that form the brain and spinal cord. Consequently, the telltale facial abnormalities in a newborn also may foretell problems with learning, memory, vision, hearing and more.

Some cells need to die during development. "There is always a very delicate balance between newly formed cells and dying cells," says Dr. Bieberich. "It's a very active period of that balance, because usually you develop a surplus of tissue then later melt it back down to acquire a specific shape." He likes to use the hands as an example of critical melting. "The digits form because the inter-digital tissue dies. If it did not die, we would have paddles instead of hands with fingers."

Cell death likely results from alcohol disturbing the metabolism of the lipids that help the hollow wad of stem cells that forms in the first day of life find direction and purpose, he says.

A grant from the March of Dimes, whose mission is to prevent birth defects and infant mortality, is enabling him to compare cell loss in mice following different levels of alcohol consumption to the usual loss that occurs in development.

His focus is these neural crest cells, which help form the upper part of the skull. Some neural crest cells stay in the brain and, early on, these cells share growth factors with neural tube cells. Cognitive and other brain damage is hard to quantify this early, but mice missing the neural crest gene also experience problems with skull and brain development.

Ideally his measurements will give women a better idea of the risk of alcohol consumption and point toward a way to reduce the damage. "You have to make people aware of the science behind the risk," Dr. Bieberich says. "We are not saying that every pregnant woman who drinks three or four glasses of wine in a short period will have a baby with birth defects, but it elevates the risk."

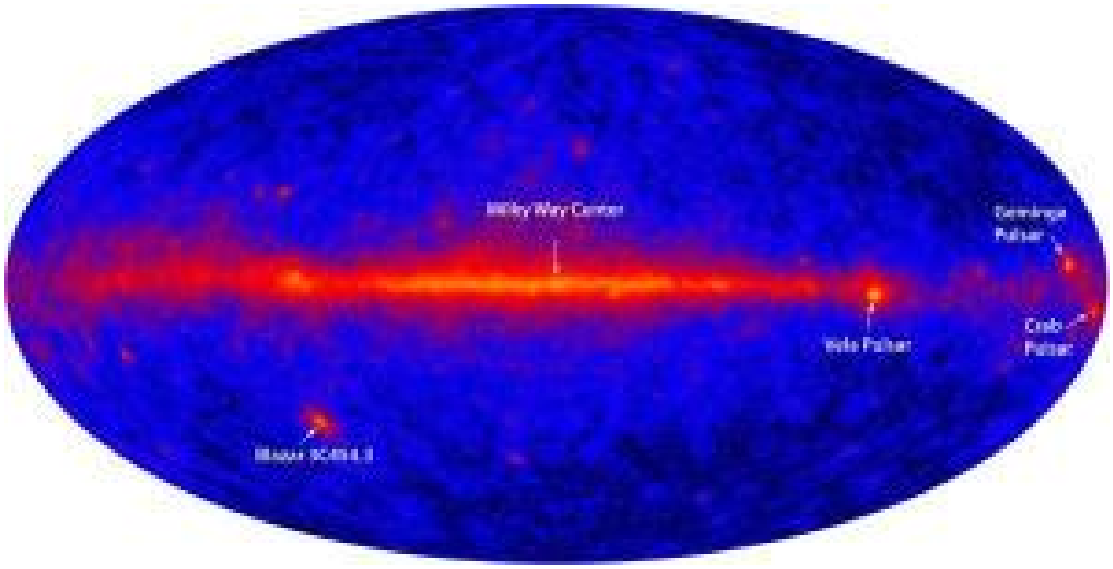
Fetal alcohol syndrome affects about 1 in 1,000 babies, according the Centers for Disease Control and Prevention. The CDC recommends that pregnant women and sexually active women not using effective birth control refrain from drinking.

Dr. Bieberich's collaborators include, Dr. Guanghu Wang, research assistant scientist; Kannan Krishnamurthy, fifth-year graduate student; and Dr. Somsankar Dasgupta, senior research scientist.

Adapted from materials provided by Medical College of Georgia.

http://www.sciencedaily.com/releases/2008/08/080825103531.htm

New Space Telescope Reveals Entire Gamma-ray Sky



This all-sky view from GLAST reveals bright emission in the plane of the Milky Way (center), bright pulsars and super-massive black holes. (Credit: NASA/DOE/International LAT Team)

ScienceDaily (Aug. 26, 2008) — NASA's Gamma-Ray Large Area Space Telescope (GLAST) has revealed its first all-sky map in gamma rays. Scientists expect the telescope will discover many new pulsars in our own galaxy, reveal powerful processes near super-massive black holes at the cores of thousands of active galaxies and enable a search for signs of new physical laws.

The onboard Large Area Telescope's (LAT) all-sky image—which shows the glowing gas of the Milky Way, blinking pulsars and a flaring galaxy billions of light-years away—was created using only 95 hours of "first light" observations, compared with past missions which took years to produce a similar image.

The NASA mission was made possible by collaboration with many U.S. and international partners. As part of its support for particle physics research, DOE contributed funding to the LAT—the primary instrument on GLAST—and DOE's Stanford Linear Accelerator Center (SLAC) managed the LAT construction. SLAC also played a key role in assembling the instrument and now plays the central role in LAT science operations, data processing and making scientific data available to collaborators for analysis.

"The DOE-NASA collaboration on this new observatory has been very successful and shows what can be accomplished when we work together," said Dennis Kovar, DOE Associate Director of Science for High Energy Physics. "We look forward to the scientific discoveries it will enable in both particle physics and astrophysics."

NASA also announced today that GLAST has been renamed the Fermi Gamma-ray Space Telescope. The new name honors Prof. Enrico Fermi (1901 - 1954), a pioneer in high-energy physics. "Enrico Fermi was the first person to suggest how cosmic particles could be accelerated to high speeds," said Paul Hertz, chief scientist for the Science Mission Directorate at NASA Headquarters in Washington, D.C. "His theory provides the foundation for understanding the powerful phenomena his namesake telescope will discover."

For two months following the mission's June 11, 2008 launch, scientists tested and calibrated its two instruments, the LAT and the GLAST Burst Monitor (GBM). "What impressed me the most is that

everything went by the book," said Peter Michelson, LAT principal investigator at Stanford University, Calif. "We're elated." The LAT has already verified sources found by other gamma-ray detectors — and discovered more.

The all-sky image shows gas and dust in the plane of the Milky Way glowing in gamma rays due to collisions with accelerated nuclei called cosmic rays. The famous Crab Nebula and Vela pulsars also shine brightly at these wavelengths. These fast-spinning neutron stars, which form when massive stars die, were originally discovered by their radio emissions. The image's third pulsar, named Geminga and located in Gemini, is not a radio source. It was discovered by an earlier gamma-ray satellite. The Fermi Gamma-ray Space Telescope is expected to discover many more radio-quiet pulsars, providing key information about how these exotic objects work.

A fourth bright spot in the LAT image lies some 7.1 billion light-years away, far beyond our galaxy. This is 3C 454.3 in Pegasus, a type of active galaxy called a blazar. It's now undergoing a flaring episode that makes it especially bright.

The LAT scans the entire sky every three hours when operating in survey mode, which will occupy most of the telescope's observing time during the first year of operations. These fast snapshots will let scientists monitor rapidly changing sources.

The LAT instrument detects photons with energies ranging from 20 million electronvolts to over 300 billion electronvolts. The high end of this range, which corresponds to energies more than 5 million times greater than dental X-rays, is little explored.

The spacecraft's secondary instrument, the GBM, spotted 31 gamma-ray bursts in its first month of operation. These high-energy blasts occur when massive stars die and when orbiting neutron stars spiral together and merge.

The GBM is sensitive to lower energy range gamma rays (8000 to 30 million electronvolts) than LAT. Bursts seen by both instruments will provide an unprecedented look across a broad gamma-ray spectrum, enabling scientists to peer into the processes powering these events.

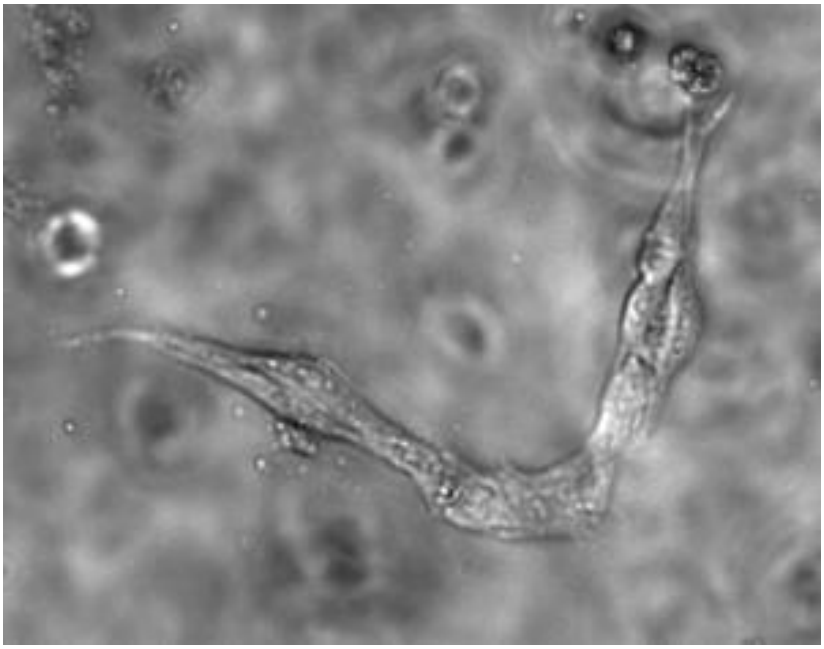
NASA's Fermi Gamma-ray Space Telescope is an astrophysics and particle physics partnership, developed in collaboration with the U.S. Department of Energy, along with important contributions from academic institutions and partners in France, Germany, Italy, Japan, Sweden and the United States.

For more information, and to view images and animations, visit: http://www.nasa.gov/glast and http://glast.slac.stanford.edu/

Adapted from materials provided by U.S. Department of Energy.

http://www.sciencedaily.com/releases/2008/08/080826144850.htm

Normalizing Tumor Vessels To Improve Cancer Therapy



In the lab, normal capillary cells form regularly-shaped capillaries when placed on a stiff surface mimicking a tumor's matrix; tumor cells, on the other hand, often form tangled capillaries that are bloated in some regions and excessively thin in others. Such vascular malformations are commonly seen in animal and human tumors, causing irregular blood flow that prevents chemotherapeutic drugs from being evenly distributed throughout the whole tumor. (Credit: Image courtesy of Children's Hospital Boston)

ScienceDaily (Aug. 26, 2008) — Chemotherapy drugs often never reach the tumors they're intended to treat, and radiation therapy is not always effective, because the blood vessels feeding the tumors are abnormal—"leaky and twisty" in the words of the late Judah Folkman, MD, founder of the Vascular Biology program at Children's Hospital Boston.

Now, Vascular Biology researchers have discovered an explanation for these abnormalities that could, down the road, improve chemotherapy drug delivery. Their findings were published in the August 12 issue of the Proceedings of the National Academy of Sciences.

A tumor's capillaries—small blood vessels that directly deliver oxygen and nutrients to cancer cells—are irregularly shaped, being excessively thin in some areas and forming thick, snarly clumps in others. These malformations create a turbulent, uneven blood flow, so that too much blood goes to one region of the tumor, and too little to another. In addition, the capillary endothelial cells lining the inner surface of tumor capillaries, normally a smooth, tightly-packed sheet, have gaps between them, causing vessel leakiness.

"These abnormal features of tumor vessels impair delivery of circulating chemotherapeutic drugs to the actual tumor site" says Kaustabh Ghosh, PhD, first author on the paper, and a postdoctoral fellow in the laboratory of Donald Ingber, MD, PhD, the paper's senior author and interim co-director of the Vascular Biology program.

The idea of a therapy aimed at normalizing a tumor's blood vessels, to ensure that chemotherapeutic agents reach the tumor, has already been explored, but these attempts have only targeted soluble factors,

particularly vascular endothelial growth factor (VEGF). Tumors secrete VEGF in abundance; it not only promotes blood vessel growth (angiogenesis), but makes them leaky. While blocking VEGF action helps reduce leakiness and improves vessel function, the effects have been transient, Ghosh says.

Ghosh and Ingber took a different approach, focusing on the role of mechanical forces on tumor blood vessels, which had previously been ignored. Past studies by Ingber and colleagues have shown that a capillary cell's sensitivity to soluble angiogenic factors like VEGF—and subsequent blood vessel formation—are determined by the mechanical balance between the cell's internal state of tension or contraction, and that of the surrounding support structure, or matrix, to which the cell adheres. These forces guide normal vascular pattern formation. Because tumor vessels are malformed, Ghosh wondered whether tumor capillary cells have lost the normal cells' ability to sense and respond to changes in matrix stiffness and distortion.

To address this question, the researchers studied capillary cells isolated from mice prostate tumors, provided by Andrew Dudley, PhD, in the lab of Michael Klagsbrun, PhD, in the Vascular Biology Program, and exposed them to cyclic mechanical stress—mimicking the pulsatile nature of blood flow and matrix distortion resulting from rhythmic heart beats. They found that normal capillary cells aligned themselves uniformly perpendicular to the force direction, but most of the tumor capillary cells failed to reorient, says Ghosh. These cells were "all over the place," and due to this lack of alignment, gaps appeared between neighboring cells, which may explain the increased vessel permeability.

Ghosh and colleagues also found that tumor capillary cells sense and respond to matrix rigidity differently than normal cells. When placed on a stiff surface, mimicking the tumor matrix, the cells tended to keep spreading even after normal capillary cells stopped doing so. Because of these differences in "mechanosensing," the tumor capillary cells were able to form capillaries even when cell densities were very low, while normal cells failed to do so. At higher cell densities, normal cells formed nice capillaries, whereas the tumor cells balled up into tangled clumps, creating the irregular patterns seen in many images of tumor blood vessels. "Because high cell density increases contractility across the entire cell layer, these findings suggested that tumor capillary cells are inherently hyper-contractile," says Ghosh.

The researchers went on to find that this hyper-contractility results from an increase in the levels of a protein called Rho-associated kinase (ROCK), which controls tension within the cell. When they treated tumor capillary cells with an inhibitor of ROCK, they normalized the behavior of the tumor capillary cells, so that the treated cells exhibited near-normal mechanical responses and formed more regularly-shaped tubular vessels.

"In this study, we've uncovered a previously unrecognized role for tumor capillary cell mechanosensing and contractility in the formation of irregular tumor vessels, and have identified potential new targets for vascular normalization therapy that might be implemented in the clinic someday," Ghosh says.

Adapted from materials provided by Children's Hospital Boston.

http://www.sciencedaily.com/releases/2008/08/080825141906.htm

Hydrogen-Producing Bacteria Provide Clean Energy

Researchers are now identifying nitrogen-fixing bacteria that release all of the hydrogen the microbes produce, which could lead to a new hydrogen source for fuel cells. (Credit: Photo courtesy of Department of Energy)

ScienceDaily (Aug. 26, 2008) — A new "green" technology developed cooperatively by scientists with the Agricultural Research Service (ARS) and North Carolina State University (NC State) could lead to production of hydrogen from nitrogen-fixing bacteria.

Renewable sources of energy—such as hydrogen—that don't produce pollutants or greenhouse gases are needed to solve global energy shortages. Fossil fuels such as coal, oil and natural gas are nonrenewable energy sources implicated in global warming.

The invention holds promise as a source of hydrogen for use in fuel cell technology. Fuel cell devices combine hydrogen and oxygen to produce electricity and water, and are considered efficient, quiet and pollution-free. Fuel cells are now being tested in a range of products, including automobiles that release no emissions other than water vapor.

ARS inventors Paul Bishop and Telisa Loveless and NC State inventors Jonathan Olson and José Bruno-Bárcena developed the patent-pending technology.

Nitrogen-fixing bacteria play a key role in agriculture. They live in soil and on certain plant roots, and convert nitrogen from the air into a chemical form that plants can use to grow. The researchers developed a way to identify strains of these bacteria that produce hydrogen gas.

Bishop first demonstrated novel aspects of bacterial nitrogen-fixing more than two decades ago. Building on that work, the team developed a method that uses a selecting agent to identify these special hydrogen-producing strains. The selecting agent allows researchers to identify these bacterial strains without the need for genomic sequencing or genetic modification.

Using the selecting agent, the inventors identified a gene that inactivates the bacteria's hydrogen uptake system so that all of the hydrogen produced is released. Because the bacterial cells cannot recycle the hydrogen, the hydrogen they produce can be captured and used as a fuel whose byproduct is water and heat.

Licensing information can be obtained by contacting the ARS Office of Technology Transfer or the Office of Technology Transfer at NC State.

ARS is a scientific research agency of the U.S. Department of Agriculture.

Adapted from materials provided by USDA/Agricultural Research Service. Original article written by Rosalie Marion Bliss.

http://www.sciencedaily.com/releases/2008/08/080825195852.htm

New Evidence Debunks 'Stupid' Neanderthal Myth

Early stone tool technologies developed by our species, Homo sapiens, were no more efficient than those used by Neanderthals (like the one shown in the above model), new research shows. (Credit: iStockphoto/Klaus Nilkens)

ScienceDaily (Aug. 26, 2008) — Research by UK and American scientists has struck another blow to the theory that Neanderthals (Homo neanderthalensis) became extinct because they were less intelligent than our ancestors (Homo sapiens). The research team has shown that early stone tool technologies developed by our species, Homo sapiens, were no more efficient than those used by Neanderthals.

Published in the Journal of Human Evolution, their discovery debunks a textbook belief held by archaeologists for more than 60 years.

The team from the University of Exeter, Southern Methodist University, Texas State University, and the Think Computer Corporation, spent three years flintknapping (producing stone tools). They recreated stone tools known as 'flakes,' which were wider tools originally used by both Neanderthals and Homo sapiens, and 'blades,' a narrower stone tool later adopted by Homo sapiens. Archaeologists often use the development of stone blades and their assumed efficiency as proof of Homo sapiens' superior intellect. To test this, the team analysed the data to compare the number of tools produced, how much cutting-edge was created, the efficiency in consuming raw material and how long tools lasted.

Blades were first produced by Homo sapiens during their colonization of Europe from Africa approximately 40,000 years ago. This has traditionally been thought to be a dramatic technological advance, helping Homo sapiens out-compete, and eventually eradicate, their Stone Age cousins. Yet when the research team analysed their data there was no statistical difference between the efficiency of

the two technologies. In fact, their findings showed that in some respects the flakes favoured by Neanderthals were more efficient than the blades adopted by Homo sapiens.

The Neanderthals, believed to be a different species from Homo sapiens, evolved in Ice Age Europe, while the latter evolved in Africa before spreading out to the rest of the world around 50-40,000 years ago. Neanderthals are thought to have died out around 28,000 years ago, suggesting at least 10,000 years of overlap and possible interaction between the two species in Europe.

Many long-held beliefs suggesting why the Neanderthals went extinct have been debunked in recent years. Research has already shown that Neanderthals were as good at hunting as Homo sapiens and had no clear disadvantage in their ability to communicate. Now, these latest findings add to the growing evidence that Neanderthals were no less intelligent than our ancestors.

Metin Eren, an MA Experimental Archaeology student at the University of Exeter and lead author on the paper comments: "Our research disputes a major pillar holding up the long-held assumption that Homo sapiens were more advanced than Neanderthals. It is time for archaeologists to start searching for other reasons why Neanderthals became extinct while our ancestors survived. Technologically speaking, there is no clear advantage of one tool over the other. When we think of Neanderthals, we need to stop thinking in terms of 'stupid' or 'less advanced' and more in terms of 'different.'"

Now that it is established that there is no technical advantage to blades, why did Homo sapiens adopt this technology during their colonization of Europe? The researchers suggest that the reason for this shift may be more cultural or symbolic. Eren explains: "Colonizing a continent isn't easy. Colonizing a continent during the Ice Age is even harder. So, for early Homo sapiens colonizing Ice Age Europe, a new shared and flashy-looking technology might serve as one form of social glue by which larger social networks were bonded. Thus, during hard times and resource droughts these larger social networks might act like a type of 'life insurance,' ensuring exchange and trade among members on the same 'team.'"

The University of Exeter is the only university in the world to offer a degree course in Experimental Archaeology. This strand of archaeology focuses on understanding how people lived in the past by recreating their activities and replicating their technologies. Eren says: "It was only by spending three years in the lab learning how to physically make these tools that we were able to finally replicate them accurately enough to come up with our findings."

This research was funded by the National Science Foundation of the USA and the Exeter Graduation Fund.

Journal reference:

1. Metin I. Eren, Aaron Greenspan, C. Garth Sampson. **Are Upper Paleolithic blade cores more productive than Middle Paleolithic discoidal cores? A replication experiment**. *Journal of Human Evolution*, Published online August 26, 2008

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

http://www.sciencedaily.com/releases/2008/08/080825203924.htm

Broccoli Could Reverse The Heart Damaging Effects Of Diabetes

ScienceDaily (Aug. 26, 2008) — Researchers have discovered eating broccoli could undo the damage caused by diabetes to heart blood vessels.

Professor Paul Thornalley and his team from the University of Warwick have found a broccoli compound called Sulforaphane. This compound can encourage the body to produce more enzymes to protect the vessels, as well as reduce high levels of molecules which cause significant cell damage.

Past studies have shown that a diet rich in vegetables – particularly brassica vegetables such as broccoli – is linked to decreased risk of heart disease and stroke. People with diabetes have a particularly high risk of heart disease and stroke and other health impairments, such as kidney disease, are linked to damaged blood vessels.

Professor Thornalley, at the University's Warwick Medical School, tested the effects of Sulforaphane on blood vessel cells damaged by high glucose levels (hyperglycaemia).

His team observed a significant reduction of molecules in the body called Reactive Oxygen Species (ROS). Hyperglycaemia can cause levels of ROS to increase three-fold and such high levels can damage human cells. The results of the study showed that Sulforaphane reversed this increase in ROS by 73 per cent.

They also found Sulforaphane activated a protein in the body called nrf2, which protects cells and tissues from oxidative stress by activating protective antioxidant and detoxifying enzymes. The study showed the presence of Sulforaphane in human microvascular cells doubled the activation of nrf2.

Professor Thornalley said: "Our study suggests that compounds such as Sulforaphane from broccoli may help counter processes linked to the development of vascular disease in diabetes. In future, it will be important to test if eating a diet rich in Brassica vegetables has health benefits for diabetic patients. We expect that it will."

The study was funded by the Juvenile Diabetes Research Foundation International, The Wellcome Trust and the Biotechnological and Biological Sciences Research Council.

Journal reference:

1. Xue et al. **Activation of NF-E2-related factor-2 reverses biochemical dysfunction of endothelial cells induced by hyperglycemia linked to vascular disease**. *Diabetes*, 2008; DOI: 10.2337/db06-1003

Adapted from materials provided by University of Warwick.

http://www.sciencedaily.com/releases/2008/08/080825210332.htm

Robo-skeleton lets paralysed walk

A robotic suit is helping people paralysed from the waist down do what was previously considered impossible - stand, walk and climb stairs.

ReWalk users wear a backpack device and braces on their legs and select the activity they want from a remote control wrist band.

Leaning forwards activates body sensors setting the robotic legs in motion.

Users walk with crutches, controlling the suit through changes in centre of gravity and upper body movements.

The device effectively mimics the exoskeletion of a crab.

Former Israeli paratrooper Radi Kaiof has been paralysed for the last 20 years following an injury during his service in the Israeli military.

He says the device has changed his life.

"I never dreamed I would walk again. After I was wounded, I forgot what it's like. Only when standing up can I feel how tall I really am and speak to people eye to eye, not from below."

Please turn on JavaScript. Media requires JavaScript to play.

Radi Kaiof 'walks' - footage from Argo Medical Technologies

Robo-suit

The device, which is now in clinical trials in Tel Aviv's Sheba Medical Centre, is the brainchild of engineer Amit Goffer, founder of Argo Medical Technologies, a small Israeli high-tech company.

It was Goffer's own paralysis that inspired him to look for an alternative to the wheelchair for mobility.

The company claims that by maintaining users upright on a daily basis, and exercising even paralysed limbs in the course of movement, the device can alleviate many of the health-related problems associated with long-term wheelchair use.

Kate Parkin, director of physical and occupational therapy at NYU Medical Center in the US said the potential benefits to the user were two-fold.

"Physically, the body works differently when upright. You can challenge different muscles and allow full expansion of the lungs.

"Psychologically, it lets people live at the upright level and make eye contact."

Dr Mark Bacon, an expert at the UK charity Spinal Research, said: "There are a number of devices about which stabilise the trunk and can help with gait.

"Often they are very bulky and are only used for rehabilitation in specialist centres."

He said ReWalk might be a good option for some people.

"Sitting down in a wheelchair can be an issue for some people. Devices like this one might be appealing. However, it might not be any better than a wheelchair in terms of convenience.

"And these devices are only suitable for people who still have good control over their hands and shoulders."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7582240.stm

Published: 2008/08/26 23:02:25 GMT

Students taught computer hacking

Postgraduate students at a Scottish university are to be taught the art of computer hacking.

The MSc Ethical Hacking and Computer Security course at Abertay University will explore the methods criminals use to attack networks.

Students will learn how to test systems for vulnerabilities and come up with ways to protect them.

It is predicted that a couple of years after completing the course graduates could be earning about £55,000.

The university already runs an undergraduate course in Ethical Hacking and Countermeasures.

Head of Computing Lachlan MacKinnon said: "One of the assumptions that people make is that if they buy virus protecting software that will protect them from all known viruses.

> **We're very careful to make sure that the people who are coming through are doing it for the right reasons**
> Lachlan MacKinnon
> Abertay University

"That may well be true but there's an awful lot out there that we don't know about.

"So designing more effective systems and designing security models to ensure that we don't have these problems is what the course is based around."

He added that big businesses and organisations should not be afraid of students turning "rogue" and using their skills for bad.

"In the industry we refer to people with white hats and black hats, which comes from the old Westerns," he said.

"But realistically we're very careful about the people we take onto the program.

"We have a strong vetting procedure - in the UK we use things like Disclosure Scotland to ensure that people that we're taking on aren't coming from a criminal background.

"We're very careful to make sure that the people who are coming through are doing it for the right reasons."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/tayside_and_central/7581809.stm

Published: 2008/08/26 09:33:25 GMT