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Seeking Lessons in Swine Flu Fight

By LAWRENCE K. ALTMAN, M.D.

As the three-month-old outbreak of swine flu raises havoc during the winter season in the Southern Hemisphere, officials in the United States are carefully seeking clues from there to deal with its likely return in this country in the fall, before a vaccine can protect large numbers of people.

Although much about the swine flu pandemic and the virus remains unknown, experts say this outbreak has exposed several weaknesses in the world's ability to respond to the sudden emergence of a widespread illness.

Over all, the pandemic's severity has been "moderate" compared with past influenza pandemics, the World Health Organization says, although it has spread with "unprecedented speed" to at least 168 countries. And although influenza typically strikes in colder months, the swine flu virus, A(H1N1), has swept through summer camps in the United States and Canada. That pattern has led to the prevailing belief that many more people will get swine flu than seasonal influenza this fall and winter, but that the country could face outbreaks of both strains, perhaps at different times.

One of the weaknesses that officials and experts point to is that despite years of planning it is evident that the infrastructure of the health departments in many countries, including the United States, is inadequate (in varying degrees) to deal with the sudden appearance of a new strain of influenza. Also, the number of beds in hospital intensive-care units and emergency rooms is limited, as is equipment like mechanical respirators to help patients breathe when the virus attacks the lungs.

Another problem is communication.

Officials and experts say they have learned a lot about human swine influenza. But relatively little of that information, including periodic summaries of what has been learned since the beginning of the pandemic, has been reported and published. Some experts said researchers were waiting to publish in journals, which can take months or longer. Journals impose severe penalties for disclosing information before publication, although they say they exempt matters of public health importance. Whatever the reason, delays in reporting such information can hamper plans for public health responses.

Few experts can match the personal overview that Dr. Richard P. Wenzel, chairman of the department of internal medicine at Virginia Commonwealth University in Richmond, has had of the swine flu virus's activity in the United States, Mexico and four South American countries. At the invitation of former trainees in those countries and aided by some travel support from industry, he has visited them to observe cases, advise on control measures and critique their data.

Dr. Wenzel, a former president of the International Society for Infectious Diseases, said he had observed a broad spectrum of illness from human swine influenza: people who experienced few or no symptoms to those who rapidly developed complications and died.

The standard definition of influenza includes a fever. But an odd feature of the new virus is the lack of fever in a significant proportion of documented cases, even after some patients become seriously ill. In Chile, it was about half, in Mexico City about a third and elsewhere, less, Dr. Wenzel said. Lack of fever has been noted by other observers in several Canadian cases.

Analysis of data from specimens yet to be tested may shed light on how often infected individuals who have no fever spread the virus.

Epidemiologists stress the need for rigorous methodology to produce the solid data that is crucial for planning. For example, a need exists to account for the several-week delay that can occur between the onset of symptoms and death in influenza and other illnesses. Failure to take that time lag into account can seriously underestimate the death rate, depending on when in the course of the pandemic the information is obtained.

So absence of fever among substantial proportions of patients, when fever is specified in the definition, can cause serious underestimation of case totals.

Also, absence of fever limits the usefulness of thermal scans to identify people who have the virus and thus control the pandemic.

Diarrhea is a symptom that appears to be occurring in a larger percentage of cases than in seasonal influenza, giving clear reason to reinforce the importance of frequent hand washing.

Dr. Wenzel said he had urged his doctor hosts to test patients' stools to determine how often the virus is present and the extent to which it is responsible for transmission.

Few such studies have been done, and there are reports that laboratories have received samples inadequate for testing.

Little specific information is available about when infected people stop shedding the virus, and thus stop spreading the illness. That information is particularly needed for those with impaired immune systems from H.I.V. infection, chemotherapy and anti-rejection drugs used in organ transplants.

Mexican doctors found the swine influenza virus on the hands of workers, on tables next to patients' beds, on other hard surfaces and on a computer mouse, Dr. Wenzel said. So, he added, "infection control in hospitals must be assiduous to prevent spread, particularly those with impaired immune systems."

The course of illness can become life-threatening in just a few hours among patients who had shown only mild symptoms, Dr. Wenzel said, but his visits showed that "doctors know little about what treatment works in severe cases."

Mexican and Argentinian doctors have noted that cases peak over a four-week period, drop substantially over succeeding weeks to very low numbers, and then pop up elsewhere in the countries, Dr. Wenzel said.

Two more unusual features of the new virus are that pregnancy, particularly in the third trimester, and obesity seem to increase the risk for complications of the infection.

Dr. Anthony E. Fiore, an influenza epidemiologist at the Centers for Disease Control and Prevention in Atlanta, said that "we were unable to find" published articles that looked at obesity as a risk factor.

Studies are under way, he said, to clarify whether obesity is an independent risk factor for complications of influenza or whether obese people have conditions like heart disease, asthma and other chronic lung ailments that put them at such risk.

Dr. William Schaffner, chairman of preventive medicine at Vanderbilt University in Nashville, said many people were reluctant to acknowledge that they or family members are obese. The 10 centers in a C.D.C.-sponsored program to track influenza hospitalizations, he said, have started collecting information on height, weight and body index to better determine obesity's predisposition to complications.

Doctors actively involved in patient care are hampered by the lack of a standard, reliable rapid test to determine if a patient has swine influenza or some other respiratory illness. The diagnosis of swine influenza A(H1N1) has to be made through special tests known as P.C.R., for polymerase chain reaction. The tests are used in research laboratories but otherwise are generally available only through local and state health departments.

The P.C.R. tests, even if offered by a commercial laboratory, generally cannot be done in time to help a doctor determine whether a patient in an office, a clinic or a hospital has seasonal or swine influenza — a factor in determining what treatment to offer.

That situation has imposed new demands for local and state health departments that are working under severe budget restraints. Health departments doing the tests may be able to tell medical practitioners about swine influenza activity in geographical regions, but not in individual cases.

"We are stuck diagnostically," Dr. Schaffner said. He added, "While we have increased expectations of what public health departments can do, and the science behind it, we do not have the infrastructure to do it."

For example, last spring, Dr. Schaffner's team at Vanderbilt conducted drills to retest their pandemic plans and learned that while some things worked very well, others had problems. The area assigned for setting up an expanded outpatient clinic no longer existed because a new building had been constructed. "So we had to quickly find a new place," Dr. Schaffner said. In addition, some elements of the pandemic plan had not been completed because the staff had been busy with other things.

The drills also showed the need to better plan for replacing absent hospital administrators "who are critical in determining which phase of your pandemic plan you are going to move into."

Dr. Schaffner is trying to alert other institutions to the kinds of gaps identified by Vanderbilt, which has strived to be well prepared. Health professionals and the public, Dr. Schaffner said, should be receiving more information in a timelier way about what has been learned about the swine influenza pandemic. Some such information is often reported at scientific meetings, but the summer is the doldrums for such gatherings.

Speaking about some of the gaps in clinical and epidemiological details, Dr. Schaffner said that "it is worth being tough and saying how come we do not know more."

http://www.nytimes.com/2009/08/11/health/11docs.html?_r=1&nl=health&emc=healthupdateema1

Self-help 'makes you feel worse'

Bridget Jones is not alone in turning to self-help mantras to boost her spirits, but a study warns they may have the opposite effect.

Canadian researchers found those with low self-esteem actually felt worse after repeating positive statements about themselves.

They said phrases such as "I am a lovable person" only helped people with high self-esteem.

The study appears in the journal Psychological Science.

A UK psychologist said people based their feelings about themselves on real evidence from their lives.

The suggestion people should "help themselves" to feel better was first mooted by Victorian Samuel Smiles 150 years ago.

" **Repeating positive self-statements may benefit certain people, such as individuals with high self-esteem, but backfire for the very people who need them the most** "
Joanne Wood University of Waterloo

His book, called simply "Self Help", sold a quarter of a million copies and included guidance such as: "Heaven helps those who help themselves".

Self-help is now a multi-billion pound global industry.

'Contradictory thoughts'

The researchers, from the University of Waterloo and the University of New Brunswick, asked people with high and low self-esteem to say "I am a lovable person."

They then measured the participants' moods and their feelings about themselves.

In the low self-esteem group, those who repeated the mantra felt worse afterwards compared with others who did not.

However people with high self-esteem felt better after repeating the positive self-statement - but only slightly.

The psychologists then asked the study participants to list negative and positive thoughts about themselves.

They found that, paradoxically, those with low self-esteem were in a better mood when they were allowed to have negative thoughts than when they were asked to focus exclusively on affirmative thoughts.

Writing in the journal, the researchers suggest that, like overly positive praise, unreasonably positive self-statements, such as "I accept myself completely," can provoke contradictory thoughts in individuals with low self-esteem.

Such negative thoughts can overwhelm the positive thoughts.

If people are instructed to focus exclusively on positive thoughts, negative thoughts might be especially discouraging.

Real life

The researchers, led by psychologist Joanne Wood, said: "Repeating positive self-statements may benefit certain people, such as individuals with high self-esteem, but backfire for the very people who need them the most."

However, they say positive thinking can help when it is part of a broader programme of therapy.

Simon Delsthorpe, a psychologist with Bradford District Care Trust and spokesman for the British Psychological Society, said self-esteem was based on a range of real life factors, and that counselling to build confidence - rather than telling yourself things are better than they are - was the solution.

"These are things like, do you have close family relationships, a wide network of friends, employment and appearance.

"If you're not close to your parents, don't have many friends, are unemployed and are unhappy with your appearance, it might be hard to have high self-esteem.

"But if your experience is the reverse of that it would be much easier to say 'I'm OK' and believe that."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8132857.stm

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Bradford reflects on many shades of Englishness

It's 75 years since Bradford-born JB Priestley wrote his classic English Journey, a snapshot of his travels around the country chronicling the thoughts of ordinary people. What did it mean to be English? We revisit Bradford - a city transformed by mass immigration, but cited in a recent survey for its essential 'Englishness' - and ask what that means today

1936, Teacher Miss B. Casey coaches the boys from the football team in the school playground in Bradford, England. Photograph: Corbis

There is a dead man standing in the centre of Bradford. He stands perfectly still, his flowing overcoat blown back by the wind, clasping a pipe in his hand as his stone-cold eyes appraise the city that stretches out before him. Men and women hurry past him, occasionally turning to glance in his direction, but he does not move. His name is John Boynton Priestley and he was born in 1894 and died in 1984, 12 years before this statue was unveiled. JB Priestley was many things - a prolific novelist, essayist and playwright - and his most influential work was a book published exactly 75 years ago. It was called English Journey and it was subtitled "a rambling but truthful account of what one man saw and heard and felt and thought during a journey through England during the autumn of the year 1933". Priestley travelled across England, from Southampton to Birmingham, Leicester to Lancashire and from Bradford to Norfolk recording the England he saw.

In capturing and describing England and its people, usually ignored in literature of its kind, English Journey influenced the thinking and attitudes of an entire generation. It spawned the Mass-Observation and Documentary movements, provided the inspiration for George Orwell's The Road To Wigan Pier and helped formulate a public consensus that led to the formation of the welfare state. The book is a vividly drawn portrait of an England still reeling from the first world war and anticipating the second; it is also a country that has yet to absorb the effects of Commonwealth immigration or the full impact of globalisation on its culture. The England of 1933 may seem a world away but Priestley wrestles with a question that could hardly be more contemporary: what does it mean to be English? And that is why I am here in Bradford on an overcast Friday afternoon staring up at the statue of Priestley. I am here to see how this city has changed since Priestley's day and to explore what Englishness looks like today. I am on another English journey in another England.

A blue plaque on a three-storey house built from pale yellow Yorkshire sandstone. Martial hip-hop beats blare from the top-floor sash window as a woman in a pink shalwar kameez follows a man with a snowy beard down the sloping road. This is the house where JB Priestley was born, Saltburn Place, a mile from the city centre and in his day home to the lower middle class but not far from working-class housing, mills and factories. His father was a teacher and the young Jack attended Bradford grammar school but left at 16 to work as a clerk in a wool merchant's office, before joining the army in 1914. He never settled back in the city again. In English Journey Priestley is both warm and cool towards Bradford. "It is a city entirely without charm, though not altogether ugly," he notes but he also recalls that it was "at once one of the most provincial and yet one of the most cosmopolitan of English provincial cities".

Bradford had long been a cosmopolitan city with Flemish weavers, German wool merchants, Irish navvies and eastern European refugees. But the influx of immigrants from the subcontinent has been of a different magnitude and has had a greater consequence. According to the last census, 17% of the city's population is Asian, the vast proportion from Pakistan. Walking around the city, past the sari stores and Indian restaurants and jewellery shops I could see how Bradford has earned its nicknames of "Little Pakistan", "Bradistan" and so on. It is a huge change in a comparatively short time and it is why Bradford has been a city where the question of English identity has been most fiercely contested, and one which has regularly attracted writers searching for the heart of Englishness.

"The England admired throughout the world is the England that keeps open house," Priestley wrote. "History shows us that the countries that have opened their doors have gained." By the time Beryl Bainbridge retraced Priestley's journey for a BBC series and book 50 years later the city was home to Pakistani immigrants who had begun arriving since the early 60s. Bainbridge found that Priestley's optimistic vision of cosmopolitan Bradford had given way to discontent, as unemployment among the Asian population exceeded 50%, and an increasingly confident community agitating on issues such as single-sex schools. In 1986 Hanif Kureishi visited Bradford for an issue of Granta magazine devoted to travel writing. He had come "because Bradford seemed a microcosm of a larger British society that was struggling to find a sense of itself, even as it was undergoing radical change".

Elsie and Percy are sitting at a wooden table. She is 85 and he is 89 and they have spent the last three years at the Elderthorpe residential home. Percy has throat cancer so mostly communicates in gestures. The couple have spent their whole lives in Bradford, leaving school at 14 to work as weavers in the textile mills. During the war Percy joined the Black Watch and his wife helped build the bombs that defeated the Germans. "I remember dressing up in our Sunday best with rouge and a two-piece," she says, "and going promenading after dinner. We were dressed to kill, we were." She laughs.

"For my dad, being English was about being a patriot," says Charles, their son who is visiting from Australia, where he has lived for the past 40 years. "It meant empire and the monarchy and it was about being part of a big family and a strength in families that you don't find today." I ask Elsie how Bradford had changed. "You don't feel like it's our town like you used to," she says diffidently. "It has a different feel to it." Different how, I ask. "It's not Bradford like I knew it," she explains. "It has been taken over by Asians."

"You can't get English food any more," says Pat, who works at the home. "No meat and potato pie, no pie and peas and black pudding. Even the good old English pub has gone." Reduced to words on a page, such sentiments may make Elsie and Pat seem reactionary, possibly racist, but I am sure they are not. When I ask if it is possible to be Asian and English, both are certain that it is. "If you're born here you're English," says Pat. "What I don't understand is why the Asians who have been born here want to fly the Pakistan flag? They're English."

But what does it mean to be English and who gets to call themselves English? "Priestley argued in favour of a civic rather than ethnic idea of Englishness," Ken Smith tells me. He is former chairman of the JB Priestley Society and I meet him in a large room at the University of Bradford that stores the Priestley archive. "Priestley assumed that anyone who came here would buy into certain things - Shakespeare, Magna Carta, free speech and so on," Smith says. To be English was to live in England: it was about

sharing a set of assumptions, batting for the same side. "He had not envisaged that there would be people who would look beyond these shores for their identity," says Smith, "and he would have had great difficulty grappling with the notion that some people's identity would be bound up in religion."

"This is the spot," says Husman Khan. "This is where I was with the rest of them." Khan is 41 with a neat beard and wearing a sensible beige jacket. I am standing with him outside Bradford magistrates court in the shadow of the town hall where, 20 years ago, Khan was among the young Bradford Muslims who gathered to burn copies of Salman Rushdie's The Satanic Verses. "I was well caught up in it," he says. "We were being told about the book in the mosques so I was in the mob chanting with the others - we used coathangers and broomsticks to make sure we didn't burn ourselves when we were doing it."

The controversy that engulfed the publication of The Satanic Verses was the start of a new chapter in the conversation about what it means to be English. That conversation is going on still, and Bradford has continued to be at its centre: it was here that young Muslims rioted in the summer of 2001 and when the BBC aired its White Season last year - which examined the impact on the English white working class of immigration - they located two of their programmes in the city. The prevailing mood of that series was one of loss, a sense that as the children of immigrants have become more confident so the indigenous peoples have lost their confidence in all the things that made them proud to be English.

I say goodbye to Khan and head north of the city centre to nearby Saltaire, an industrial model village built by the Victorian philanthropist Titus Salt to house his employees. Walking past the neat terraced streets, I reach the grounds of Saltaire Cricket Club. Formed in 1869 it is unique in encouraging racially mixed teams. Cricket in Bradford is a metaphor for the divided city: communities living apart, playing in separate leagues with all-white and all-Pakistani teams. Saltaire is different. "We actively hold out our hand to different communities," explains chairman Ed Duguid. "We recruit from an area that has the highest proportion of Asians in the whole of Britain but we also have white players on the team."

On the pitch the junior team is warming up for the match. Joe Hicks is 18 and keeps wicket. He went to sixth form at Bradford grammar, the same school as JB Priestley, and has been playing here for eight years. "There is a different atmosphere here than at other clubs," he tells me. "It's mixed so we don't have the drinking atmosphere that there is in white clubs, and also the banter is different." I ask him if playing in a racially mixed team has made him more tolerant. "I have white friends who will say things that are a bit stereotypical and ignorant because they don't know any Asians," he says. "Like if a student is at private school people will say his parents only got the money through drugs or something but because I know how hard Asian parents work for their children I can correct my mates." What does Englishness mean to you, I ask. There is a long pause. "I don't really know," he says. "I can't think of anything ... I'm not sure." Everyone, it seems, from the Muslims to the Scots to the Welsh to the Jews know who they are, except the English.

I leave Joe and his fellow team members and head back into the city centre. The metropolitan district of Bradford takes in surrounding farmland, dales and the moors. This countryside and the small towns that fringe Bradford are where the whites who have fled the city now live. It is a world of teashops and brass bands and morris dancing societies. There was some surprise this year when Bradford was declared by a St George's Day study as one of the three most English places in the country, but it was this "greater" Bradford, that the study was describing, not the actual city.

I return to the city itself and meet John Baxendale, who has written a book about JB Priestley's England. I want to know if it is true that things were more settled in Priestley's time and that our common sense of Englishness is unravelling. "We tend to romanticise the past and pretend everyone was united back then," he told me. "In fact when you look at the 30s, England was hugely divided - this was the time of the General Strike, England losing its Victorian self-confidence, the shadow of the Great War and the Depression and the threat from Hitler in Germany and Oswald Mosley in this country." Englishness always seems to be more simple in retrospect and deeply vulnerable in the present. That vulnerability, exploited in the past by Mosley's Blackshirts, helped the BNP win a seat in the European parliament for the constituency that includes Bradford. JB Priestley was living in Bradford before mass immigration

from the subcontinent but his words on the threat from the far right are eerily prescient. He wrote: "Behind all the new movements of this age - nationalistic, fascistic, communistic - has been more than a suspicion of the mental attitude of a gang of small-town louts ready to throw a brick at the nearest stranger."

Gerry Sutcliffe is the local Labour MP and his constituency has two BNP councillors. "I think what you're seeing is that the white working class feel challenged by their environment and are looking to lash out," he tells me, "plus the BNP has changed their image and send young women out knocking doors rather than men." Sutcliffe tells me that in the past those who had voted BNP would not look him in the eye on the doorstep but now they will confidently say that they have done it.

My time in Bradford is drawing to an end. What I have found is a more complicated picture than I had expected. The city did feel divided and I can see why some whites could feel that much of Bradford more closely resembles Pakistan than England and are turning to extremist parties. And yet digging deeper I also found signs of hope in places like Saltaire Cricket Club. Things were rarely quite what they appeared. Ed, the chairman of the cricket club, was white but adamant he was not English since he had spent the first seven years of his life in Scotland. Meanwhile his friend Anil had been born in India but said that he felt utterly English. And then there was Husman Khan. He was the one who had been in the throng burning copies of The Satanic Verses, but not long after the book-burning Khan met a girl -a white girl from Halifax, whom he married and with whom he has four children. I met his 16-year-old daughter, Najda, her head covered in a headscarf that she had bought, she told me, "in a hippie clothing shop". She belongs to a generation whose identity is as much about the music on their digital devices as the heritage of their parents. What does Englishness mean to you, I ask. "It's about being prim and proper," suggests Najda. "You either laugh or cry and the English laugh at it all."

Khan himself views his fiery youth with regrets. "When I look back at how I was 20 years ago I was wrong," he told me. "I didn't know anything. I now realise I have a history in this country: I am English." And is it just because you were born here that you think you're English? "Well, I'm a member of the National Trust and we like going on holiday to Scarborough, if that means anything," he laughs. Khan now believes he has a stake in the inheritance Priestley wrote about. It seems quite a journey, from burning books to visiting Scarborough - how had Husman become English? The answer, I think, is that he has become middle class. "The true definition of a middle class is that it bridges extremes," Jim Greenhalf, author of a book on the history of Bradford, had told me. "I see the burgeoning of an Asian middle class and it is there that the aspirations, energy and enthusiasm for change and tolerance lies." There is, of course, a rich working-class English history, of brass bands and working men's clubs, but that history is more excluding and appears on the decline - not because of immigration, but due to the glittering temptations of the modern day. The middle class may not be the saviours of Englishness but, at the very least, they help strengthen it.

Englishness, I concluded as I prepared to leave Bradford, is not really about a thing - the countryside, the city, the pub or the cricket ground - and it is not about Shakespeare or the Brontë sisters. Being English is about behaving and feeling and responding in ways that are quintessentially English. During my curry with members of Saltaire Cricket Club one evening, we discussed what it meant to be English. But it was only when Anil began complaining that most Asians were too lazy to have proper gardens and that his Slovakian tenants were ruining his garden - "They start fires on my lawn!" - that we hit upon what being English means.

I began my journey standing by the statue of JB Priestley wondering what he would have made of his city and country. Coming to Bradford it is easy to be blinded by the changes and to believe that England today is an utterly different country than in Priestley's day. But Englishness is more resilient than we suspect, changing out of all recognition and yet remaining the same. As I walked to the train station I saw a young black girl with her arms around a white boy. Minutes later I saw an Asian girl, in a short summer skirt and body-hugging T-shirt, holding hands with her white boyfriend. There is a dead man standing in the centre of Bradford guarding the past as all around him the young are busy writing the future.

The way we were

	1934	2009
UK population	40m	61m (ONS)
Proportion of adult women in work	24%	69.3% (ONS)
FA Cup winner	Manchester City (beat Portsmouth 2-1)	Chelsea (beat Everton 2-1)
Bestselling novel	Anthony Adverse by Hervey Allen	New Moon by Stephenie Meyer
Biggest hit at the box office	*The Man Who Knew Too Much*, directed by Alfred Hitchcock	*Transformers: Revenge of the Fallen*, directed by Michael Bay
Price of a loaf of white bread in today's prices	1.4p	£1.13
Most popular babies' names	John, Margaret	Jack, Olivia

How things have changed since the 1930s

JB Priestley - biography

1894 Born 13 September in Bradford.
1914-1919 Serves in the first world war; matriculates at Cambridge after.
1922 Settles in London and establishes himself as a critic and commentator.
1925-28 Publishes early critical writings, including The English Comic Characters and The English Novel
1929 Novel The Good Companions brings national success.
1932 Play Dangerous Corner is produced in London.
1934 An English Journey published.
1940 Presents Postscripts on radio.
1946-47 Play An Inspector Calls opens.
1958 Founder member CND.
1977 Awarded Order of Merit.
1984 Dies 14 August.
Ollie Brock

http://www.guardian.co.uk/stage/2009/jul/05/bradford-englishness-jb-priestley

The nature of temptation

Why those who speak against vice so often fall for it.

By Drake Bennett | July 5, 2009

THERE ARE PLENTY of people who cheat on their spouses, plenty of people who hire prostitutes. It's hardly unheard of for an office to be plagued by a boss sending sexually explicit emails to underlings, even much younger ones, or for a man to solicit sex in a public restroom or to hire a male prostitute and then buy drugs from him.

In other words, it's not just public figures with careers built around denouncing moral turpitude - crusading prosecutors like Eliot Spitzer, evangelical leaders like Ted Haggard, socially conservative politicians like Mark Foley, David Vitter and Larry Craig - who end up confessing to those very acts. And yet, with the back-to-back revelations of marital infidelity by Nevada senator John Ensign and South Carolina governor Mark Sanford, two more cultural conservatives, the question once again arises: why is it that people who set themselves up as moral paragons seem to have the hardest time living up to their own standards?

It's an apparent paradox. After all, even if the beliefs weren't deeply held, even if those espousing them were utterly cynical, the special vehemence that the public reserves for scolding hypocrites should be deterrence enough. And yet the steady parade of shamefaced press conferences suggests otherwise. It's almost as if a reputation for morality is a gateway into vice.

And in fact, according to a growing body of psychological research, that may be exactly what's going on. The study of how we form opinions of our own moral worth is a budding field, and it suggests that the human mind works in powerful, subtle ways to make hypocrites out of all of us - especially those who hold themselves in the highest moral esteem. People who inveigh against a vice in others are often themselves fixated on it, and more likely to succumb to its allure. And, the research suggests, virtuous deeds are often a form of penance for thoughts a person is ashamed of.

Indeed, recent work has suggested that the very act of seeing oneself as a good person can make it harder to avoid doing immoral things. In part it's a matter of rationalization, and the better a person we think we are, the better we are at rationalizing. In part it stems from the oddly perishable nature of human self-control, and the way that, like a muscle, it tires after extended use. But also in operation, the researchers suggest, is a sort of moral "set point": an innate human sense that there is such a thing as too much moral

behavior. And when we stray too far from the mean in either direction - even if it's toward saintliness - we revert, sometimes spectacularly.

"If you have a holier-than-thou attitude about temptation, you probably are ushering it in," says Loran Nordgren, a social psychologist and assistant professor at Northwestern's Kellogg School of Business who has studied how people underestimate the power of their impulses.

This new research may help explain the philandering of family-values politicians, but as a portrait of virtue it can feel a bit impoverished. Rather than a guide to a properly lived life, personal morality becomes a spur that grows out of guilt, or an after-the-fact story we tell ourselves about actions already decided on. And rather than a moral compass, what we may have is closer to a thermostat, stubbornly set to a comfortable moral mediocrity.

When asked about the phenomenon of the hypocritical moralizer, psychologists will often point to "projection," an idea inherited from Freud. What it means - and there is a large literature to back it up - is that if someone is fixated on a particular worry or goal, they assume that everyone else is driven by that same worry or goal. Someone who covets his neighbor's wife, in other words, would tend, rightly or wrongly, to see wife-coveting as a widespread phenomenon, and if that person were a politician or preacher, he might spend a lot of his time spreading the word about the dangers of adultery.

But more dangerous than this solipsistic misreading of others may be just how much we misapprehend ourselves. Psychologists and economists have repeatedly found that people are no good at predicting the power of their own urges, whether it's sex, drugs, gambling, hunger, or simply spending too much money. George Loewenstein, a leading behavioral economist and a professor at Carnegie Mellon University, calls this inability to imagine our way into the heat of the moment the "cold-to-hot empathy gap."

And, according to work Nordgren has done, people with the most favorable opinion of their own moral fortitude seem to have the widest empathy gaps. In one study, Nordgren looked at a group of people trying to quit smoking and found that it was those who rated their willpower particularly highly who were most likely to end up smoking again within a few months. The reason, Nordgren argues, is that they were more cavalier about exposing themselves to situations where they might be tempted to smoke. It's a tendency that he argues extends far beyond smokers. Mark Sanford's admission this week that in the lead-up to his affair he had flirtatious extramarital relationships that "didn't cross the sex line" with multiple women suggests, perhaps, a similarly reckless faith in his own willpower.

Other studies have found links between moral-mindedness and cheating. One 2007 paper looked at college students who, when asked to describe themselves, used words like "caring" or "fair." Unsurprisingly, some of those students reported cheating less than their classmates. Others among them, however, reported cheating more - much more.

What's behind this odd split is the link between self-image and rationalization, argues one of the authors of the study, a University of Washington psychology professor named Scott Reynolds. People who think of themselves in moral terms, Reynolds suggests, are particularly prone to explaining their actions as part of the larger moral mission of their lives, and that goes even for actions that are themselves patently immoral. Cheating, the justification might go, will get them into medical school so that they can dedicate their lives to fighting neglected tropical diseases. Such a student, in Reynolds' words, is "a more motivated rationalizer," and, as a result, a more indiscriminate cheater.

There is other support for the idea that a strong sense of one's own moral goodness may in fact trigger immoral or deeply selfish acts. Psychologists have started to look at what they call a "moral credentialing" effect. In this model, the 'credential' is a part of our self-image, a sort of merit badge we earn by doing - or merely thinking - things that make us feel good about ourselves as people.

Psychologists who study moral credentialing argue that the credentials themselves are highly perishable - people who have felt the glow of having done a good deed have also felt how quickly it begins to fade. But research suggests that during that span, when people are feeling particularly good about themselves, they're less likely to do another good deed if the opportunity arises. A paper published this spring by Sonya Sachdeva, Rumen Iliev, and Douglas Medin of the psychology department at Northwestern University found that, if people were primed to think of themselves as good, caring people, they were actually less generous with donations, and less likely to advocate spending money on costly environmental protection measures, than people primed to think of themselves as selfish and cruel. A 2001 study by Benoît Monin and Dale Miller, two Stanford psychology professors who helped create the idea of moral credentialing, found that people given a chance to showcase their progressive views on race and gender were then more likely to make a discriminatory decision in a mock hiring setting.

"People feel like they have a free pass because they've amassed those moral credits as a good person," Monin says. Someone who is constantly being reminded of their moral worth, a televangelist, say, or a strong-chinned prosecutor, might be more likely to lapse, because in a sense they're constantly being recredentialed.

Medin, a professor, and Sachdeva, a graduate student, describe an inner moral regulator that's something like a thermostat: it prevents our moral self-image from dropping too low, but it also keeps us from trying to push it up too high. After all, we have limited resources of attention and energy, and plenty of duties and desires that require them. Being seen as a good person is important to most people, but it's not the only thing.

"There's a sort of goal turnoff effect," says John Bargh, a Yale psychology professor who has done seminal work on unconscious motivation. "We've got a lot of different goals, from eating and drinking, and maybe sex, to higher-level ones like getting work done and making your parents proud of you. As soon as we feel like we've taken care of one, it drops down the list."

Does that mean everyone with higher moral ambitions is destined to someday follow the tear-stained path of Jimmy Swaggart? Obviously not. For one thing, there is such a thing as purely instrumental, Elmer Gantry-style hypocrisy, and some measure of that might be required to feed truly epic deceptions. And being in a position of power, psychologists have shown, wreaks its own havoc on the human mind, creating blind spots and distorting our sense of what we can get away with.

Sachdeva suggests that, for those who worry about the complacency that moral self-satisfaction can bring, the key may lie in seeing our good deeds as individually unimportant. Rather than thinking of moral acts as accomplishments - thereby triggering the cooling effect on our inner moral thermostat - we should strive to make them habitual, almost rote, so they're not competing with all of our other goals. Writing of "moral habits" two millennia ago, Aristotle argued for something similar.

But can people actually raise their moral set point? Psychologists are intensely curious about the question, and a few ongoing studies are looking obliquely at it, but so far, researchers say, they just don't know.

Medin, for his part, suspects there may be some wiggle room. At the very least, there are famous examples of people who seem to have reset theirs. "If you take someone like Mother Teresa," he says, "I doubt that she was good all day and then lapsed into - well, use your own imagination - at night."

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http://www.boston.com/bostonglobe/ideas/articles/2009/07/05/the_nature_of_temptation/

Why You Can't Keep Your Foot Out of Your Mouth

- By Brandon Keim

It's one of the more frustrating aspects of human nature: The harder we try not to say or do or think something, the more likely we are to slip — and often at the worst possible time. But maybe science can help.

More than a decade after the inability of a Dostoevsky protagonist to stop thinking about a white bear inspired his first experiments, Harvard University psychologist Daniel Wegner has become one of the world's foremost experts on what are now known as ironic processes.

Using ingenious experiments to reveal the brain's hidden machinations, Wegner and others have found that our brains expend steady, conscious effort to avoid talking about ex-girlfriends on first dates, sending putts off the green, or letting slip the real reason you were late for work.

But when our conscious minds are stressed and preoccupied — by, for example, a desire not to screw up — a subconscious process devoted to guarding against the mistake slips through. Unwanted thoughts pop into the forefront of your mind.

"Even though your conscious mind is trying to do the right thing, the unconscious mind is looking for the worst. It's trying to protect you, but it's actually more resistant to distraction than the conscious mind," said Wegner. A bit of distraction "will unveil the process that's looking for the worst that could happen."

Wired.com spoke to Wegner about his research and whether it might be possible to avoid these dreaded faux pas.

Wired.com: Does this happen to everyone?

Dan Wegner: It seems to be a pretty widespread phenomenon, but it occurs under very unusual conditions. Most of the time, when we want to think something or do something or behave in a certain way, it works.

But when we're really striving for something, when we're under extreme stress or high mental load, that's when we tend to get these ironic effects.

The simplest example I have is if you hold a weight on a string — a necklace, something like that — and keep your eye on it, it'll just move a little bit. But if you try hard not to move it in a certain direction, it'll pretty regularly start moving in that direction. Just a little bit, but enough to measure the part of you that's energized by the very desire not to do something.

Wired.com: What are some of the tests you've used to study these processes?

Wegner: One of the things we did at first was ask people to give their stream of consciousness into a tape recorder while trying not to think of something. They'd mention it repeatedly. That's not very great evidence, because it's self-reported, so we asked people to try not to think about something that makes them aroused, and increased their skin conductance level in a measurable way. If you ask people to try not to think about sex, they tend to have it come back to mind repeatedly, and become aroused.

Another way to get at this is the Stroop color-word task. I ask you to try not to think about something, then show you words on a computer screen and ask you to name the colors they're printed in. If you're trying not to think about something, and that word appears on the screen, your color naming is slower. Apparently the idea of what's on the screen pops to mind so quickly that it interferes with naming.

Wired.com: How do you extrapolate conscious and unconscious mechanisms from this?

Wegner: The main tool we have is the use of these mental loads. If something happens when a person is under mental load, then we tend to attribute it to an unconscious process. A lot of our research is asking people to do a task that requires mental control, but at the same time as they're remembering a six-digit number or monitoring something on TV. There are also studies where we've given people alcohol, and found that it undermines the ability of the mind to control itself.

Wired.com: Do you know specifically what's happening in the brain?

Wegner: There are several studies of this. You find that one part of the brain is indeed associated with the conscious search for the right thing to do. Another part of the brain is watching for the ironic, wrong thing to do. Depending on what stage it is in the sequence of a person trying not to think about something, you can see these two different areas becoming activated.

Wired.com: But do you know what those areas are doing?

Wegner: Right now, all we know is that they're activated while these thoughts are in mind. We don't really know about the causal sequence. That's one of the big problems with brain imaging in general — knowing whether we're seeing a vehicle moving at high speed, or looking at the speedometer.

But it's an interesting direction for this research to go. One of the things I'm most interested in is knowing how we can overcome these problems. I think they underlie a lot of difficulties we have with daily life. When a person wants to avoid nervousness, when someone wants to get in a good mood or say the right thing at a party, we'd love to have control over our minds. What we'd like is a system that would allow us to do this on a regular basis.

Our theory suggests a simple solution. Whenever you're trying to control your mind, it's a good idea to have lots of spare mental capacity. Trying to do this when you're under stress, have a lot of work, or something is taking your mind off-task, is going to reduce the effectiveness of your conscious mind in exerting control.

Wired.com: It doesn't seem practical to say, "Don't try to think about not spilling wine on the carpet in a stressful situation," when being at the party in the first place is stressful.

Wegner: Sometimes you're stuck. The great leveler is making these processes automatic. In sports, people do things over and over until the action is automatic. It becomes so automatic that you don't have the same mental process to engage. The whole thing has become unconscious. That only comes with practice.

The person who wants to avoid saying awkward things on the first date — well, by the 30th date, they're not doing it anymore. They have to just brave it. In sports we know this, but we don't think of social life the same way.

Wired.com: Have you found anyone who's freakishly able to avoid these errors?

Wegner: People who are very susceptible to hypnosis, and are hypnotized into having mental control, are virtuosos on these tests.

Wired.com: Why shouldn't we just have ourselves hypnotized into not slipping up?

Wegner: Just a small percentage of the population is so susceptible to hypnosis that it might be useful, and this is largely untested. We're talking about just a couple of experiments. Nobody's looking at it as a practical matter, and much of the research on this is just beginning.

Wired.com: What's next in your own research?

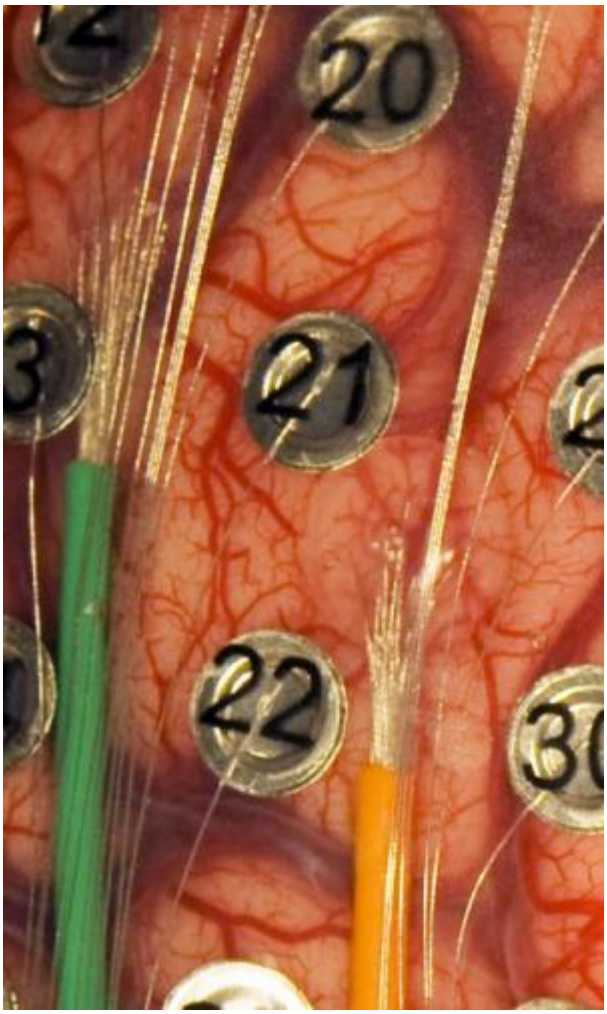
Wegner: These effects tend to be real problems for people who are trying to overcome prejudices. Suppose you're trying to be color-blind, and not notice someone's racial or ethnic group while hiring for a job. Can you do that? One of the new frontiers for study in this area is figuring out how we can control our social prejudices.

Wired.com: Wouldn't it be better to give up trying to control one's prejudices, because that extra effort just pushes them closer to the surface?

Wegner: I'm not sure giving up control is the answer. It may be that realizing you're going to have problems with control is good. We can be more fair if we take as a given that we're probably going to be prejudiced, and arrange our lives in ways that help overcome this.

http://www.wired.com/wiredscience/2009/07/fauxpas/

Paralyzed People Using Computers, Amputees Controlling Bionic Limbs, With Microelectrodes On (Not In) Brain



Microwires emerging from the green and orange tubes connect to two arrays of 16 microelectrodes. Each array is embedded in a small mat of clear, rubbery silicone. The mats are barely visible in this image. These microelectrode arrays sit on the brain without penetrating it, a step toward longer-lived, less invasive versions of "neural interfaces" that in recent experiments elsewhere have allowed paralyzed people to control a computer cursor with their thoughts. The new microeletrode arrays were placed in two patients at the University of Utah who already were undergoing brain surgery for severe epilepsy. The larger, numbered, metallic electrodes are used to locate the source of epileptic seizures in the brain, so the patients allowed the micoelectrodes to be placed on their brains at the same time. (Credit: University of Utah Department of Neurosurgery)

ScienceDaily (July 6, 2009) — Experimental devices that read brain signals have helped paralyzed people use computers and may let amputees control bionic limbs. But existing devices use tiny electrodes that poke into the brain. Now, a University of Utah study shows that brain signals controlling arm movements can be detected accurately using new microelectrodes that sit on the brain but don't penetrate it.

"The unique thing about this technology is that it provides lots of information out of the brain without having to put the electrodes into the brain," says Bradley Greger, an assistant professor of bioengineering and coauthor of the study. "That lets neurosurgeons put this device under the skull but over brain areas where it would be risky to place penetrating electrodes: areas that control speech, memory and other cognitive functions."

For example, the new array of microelectrodes someday might be placed over the brain's speech center in patients who cannot communicate because they are paralyzed by spinal injury, stroke, Lou Gehrig's disease or other disorders, he adds. The electrodes would send speech signals to a computer that would covert the thoughts to audible words.

For people who have lost a limb or are paralyzed, "this device should allow a high level of control over a prosthetic limb or computer interface," Greger says. "It will enable amputees or people with severe paralysis to interact with their environment using a prosthetic arm or a computer interface that decodes signals from the brain."

The study is scheduled for online publication July 1 in the journal *Neurosurgical Focus*.

The findings represent "a modest step" toward use of the new microelectrodes in systems that convert the thoughts of amputees and paralyzed people into signals that control lifelike prosthetic limbs, computers or other devices to assist people with disabilities, says University of Utah neurosurgeon Paul A. House, the study's lead author.

"The most optimistic case would be a few years before you would have a dedicated system," he says, noting more work is needed to refine computer software that interprets brain signals so they can be converted into actions, like moving an arm.

An Advance over the Penetrating Utah Electrode Array

Such technology already has been developed in experimental form using small arrays of penetrating electrodes that stick into the brain. The University of Utah pioneered development of the 100-electrode Utah Electrode Array used to read signals from the brain cells of paralyzed people. In experiments in Massachusetts, researchers used the small, brain-penetrating electrode array to help paralyzed people move a computer cursor, operate a robotic arm and communicate.

Meanwhile, researchers at the University of Utah and elsewhere are working on a $55 million Pentagon project to develop a lifelike bionic arm that war veterans and other amputees would control with their thoughts, just like a real arm. Scientists are debating whether the prosthetic devices should be controlled from nerve signals collected by electrodes in or on the brain, or by electrodes planted in the residual limb.

The new study was funded partly by the Defense Advanced Research Projects Agency's bionic arm project, and by the National Science Foundation and Blackrock Microsystems, which provided the system to record brain waves.

House and Greger conducted the research with Spencer Kellis, a doctoral student in electrical and computer engineering; Kyle Thomson, a doctoral student in bioengineering; and Richard Brown, professor of electrical and computer engineering and dean of the university's College of Engineering.

Microelectrodes on the Brain May Last Longer than Those Poking Inside

Not only are the existing, penetrating electrode arrays undesirable for use over critical brain areas that control speech and memory, but the electrodes likely wear out faster if they are penetrating brain tissue rather than sitting atop it, Greger and House say. Nonpenetrating electrodes may allow a longer life for devices that will help disabled people use their own thoughts to control computers, robotic limbs or other machines.

"If you're going to have your skull opened up, would you like something put in that is going to last three years or 10 years?" Greger asks.

"No one has proven that this technology will last longer," House says. "But we are very optimistic that by being less invasive, it certainly should last longer and provide a more durable interface with the brain."

The new kind of array is called a microECoG – because it involves tiny or "micro" versions of the much larger electrodes used for electrocorticography, or ECoG, developed a half century ago.

For patients with severe epileptic seizures that are not controlled by medication, surgeons remove part of the skull or cranium and place a silicone mat containing ECoG electrodes over the brain for days to weeks while the cranium is held in place but not reattached. The large electrodes – each several millimeters in diameter – do not penetrate the brain but detect abnormal electrical activity and allow surgeons to locate and remove a small portion of the brain causing the seizures.

ECoG and microECoG represent an intermediate step between electrodes the poke into the brain and EEG (electroencephalography), in which electrodes are placed on the scalp. Because of distortion as brain signals pass through the skull and as patients move, EEG isn't considered adequate for helping disabled people control devices.

The regular-size ECoG electrodes are too large to detect many of the discrete nerve impulses controlling the arms or other body movements. So the researchers designed and tested microECoGs in two severe epilepsy patients who already were undergoing craniotomies.

The epilepsy patients were having conventional ECoG electrodes placed on their brains anyway, so they allowed House to place the microECoG electrode arrays at the same time because "they were brave enough and kind enough to help us develop the technology for people who are paralyzed or have amputations," Greger says.

The researchers tested how well the microelectrodes could detect nerve signals from the brain that control arm movements. The two epilepsy patients sat up in their hospital beds and used one arm to move a wireless computer "mouse" over a high-quality electronic draftsman's tablet in front of them. The patients were told to reach their arm to one of two targets: one was forward to the left and the other was forward to the right.

The patients' arm movements were recorded on the tablet and fed into a computer, which also analyzed the signals coming from the microelectrodes placed on the area each patient's brain controlling arm and hand movement.

The study showed that the microECoG electrodes could be used to distinguish brain signals ordering the arm to reach to the right or left, based on differences such as the power or amplitude of the brain waves.

The microelectrodes were formed in grid-like arrays embedded in rubbery clear silicone. The arrays were over parts of the brain controlling one arm and hand.

The first patient received two identical arrays, each with 16 microelectrodes arranged in a four-by-four square. Individual electrodes were spaced 1 millimeter apart (about one-25th of an inch). Patient 1 had the ECoG and microECoG implants for a few weeks. The findings indicated the electrodes were so close that neighboring microelectrodes picked up the same signals.

So, months later, the second patient received one array containing about 30 electrodes, each 2 millimeters apart. This patient wore the electrode for several days.

"We were trying to understand how to get the most information out of the brain," says Greger. The study indicates optimal spacing is 2 to 3 millimeters between electrodes, he adds.

Once the researchers develop more refined software to decode brain signals detected by microECoG in real-time, it will be tested by asking severe epilepsy patients to control a "virtual reality arm" in a computer using their thoughts.

Adapted from materials provided by University of Utah.

http://www.sciencedaily.com/releases/2009/06/090629081137.htm

Once-a-month Pill For Both Fleas And Ticks In Dogs And Cats

Golden retriever and domestic cat. Scientists in New Jersey are describing discovery and successful tests of the first once-a-month pill for controlling both fleas and ticks in domestic dogs and cats. (Credit: iStockphoto/Mitja Mladkovic)

ScienceDaily (July 6, 2009) — Scientists in New Jersey are describing discovery and successful tests of the first once-a-month pill for controlling both fleas and ticks in domestic dogs and cats.

Peter Meinke and colleagues at Merck Research Laboratories note the need for better ways of controlling fleas and ticks, driven in part by increases in pet ownership. Estimates suggest that there were 71 million pet dogs and 81 million pet cats in the United States alone in 2007 — up from 61 million and 70 million in 2001.

Although many powders, sprays and other topical agents are on the market, many pet owners prefer the convenience of pills. Products given orally can reach more parts of an animal's body, do not wash off in rain or bath water, and don't transfer from pets to people. At least one existing pill fights fleas in pets, but does not appear effective for ticks.

In tests on fleas and ticks in dogs and cats, a single dose of the new pill was 100 percent effective in protecting against both fleas and ticks for a month. There were no signs of toxic effects on the animals. Scientists obtained the flea and tick fighter from a substance first found in a fungus that "has the potential to usher in a new era in the treatment of ecoparasitic [ticks and fleas, for instance] infestations in companion animals."

Journal reference:

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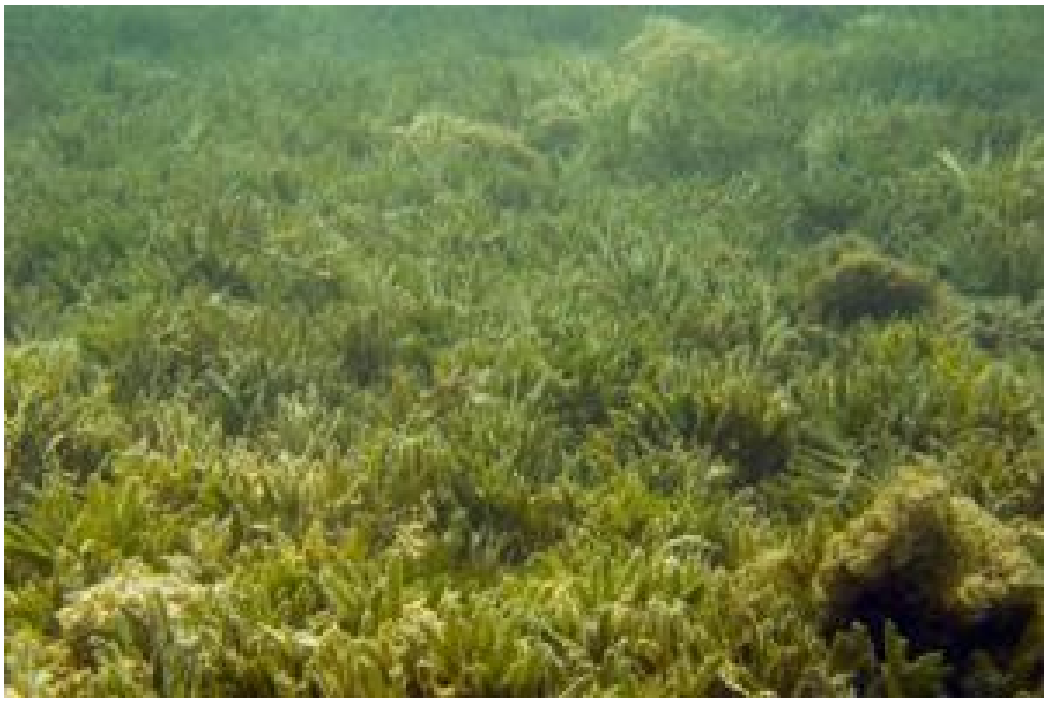
Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com/releases/2009/06/090629100639.htm

Disappearing Seagrass Threatening Future Of Coastal Ecosystems Globally



New research shows that 58 percent of world's seagrass meadows are currently declining. (Credit: iStockphoto)

ScienceDaily (July 6, 2009) — An international team of scientists warns that accelerating losses of seagrasses across the globe threaten the immediate health and long-term sustainability of coastal ecosystems. The team has compiled and analyzed the first comprehensive global assessment of seagrass observations and found that 58 percent of world's seagrass meadows are currently declining.

The assessment, published in the *Proceedings of the National Academy of Sciences*, shows an acceleration of annual seagrass loss from less than 1 percent per year before 1940 to 7 percent per year since 1990. Based on more than 215 studies and 1,800 observations dating back to 1879, the assessment shows that seagrasses are disappearing at rates similar to coral reefs and tropical rainforests.

The team estimates that seagrasses have been disappearing at the rate of 110 square-kilometers (42.4 square-miles) per year since 1980 and cites two primary causes for the decline: direct impacts from coastal development and dredging activities, and indirect impacts of declining water quality.

"A recurring case of 'coastal syndrome' is causing the loss of seagrasses worldwide," said co-author Dr. William Dennison of the University of Maryland Center for Environmental Science. "The combination of growing urban centers, artificially hardened shorelines and declining natural resources has pushed coastal ecosystems out of balance. Globally, we lose a seagrass meadow the size of a soccer field every thirty minutes."

"While the loss of seagrasses in coastal ecosystems is daunting, the rate of this loss is even more so," said co-author Dr. Robert Orth of the Virginia Institute of Marine Science of the College of William and Mary. "With the loss of each meadow, we also lose the ecosystem services they provide to the fish and shellfish relying on these areas for nursery habitat. The consequences of continuing losses also extend far beyond the areas where seagrasses grow, as they export energy in the form of biomass and animals to other ecosystems including marshes and coral reefs."

"With 45 percent of the world's population living on the 5 percent of land adjacent to the coast, pressures on remaining coastal seagrass meadows are extremely intense," said co-author Dr. Tim Carruthers of the University of Maryland Center for Environmental Science. "As more and more people move to coastal areas, conditions only get tougher for seagrass meadows that remain."

Seagrasses profoundly influence the physical, chemical and biological environments of coastal waters. A unique group of submerged flowering plants, seagrasses provide critical habitat for aquatic life, alter water flow and can help mitigate the impact of nutrient and sediment pollution.

The assessment was conducted as a part of the Global Seagrass Trajectories Working Group, supported by the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, California, through the National Science Foundation.

Journal reference:

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Adapted from materials provided by University of Maryland Center for Environmental Science.

http://www.sciencedaily.com/releases/2009/06/090629200630.htm

World's Largest Aerosol Sensing Network Has Leafy Origins

The worldwide network of ground-based aerosol sensors has grown to 400 sites across seven continents, however, two-thirds of the planet is covered by ocean and aerosols are scarcely measured over the oceans. Usher in the Maritime Aerosol Network (MAN), which will send researchers with portable photometers on oceanographic research cruises (Credit: Image courtesy of NASA/Goddard Space Flight Center)

ScienceDaily (July 6, 2009) — Twenty years ago, Brent Holben was part of a NASA team studying vegetation from space. In an unlikely career twist, his research morphed into the study of a critical, if overlooked, subplot in the story of climate change.

From his office at NASA's Goddard Space Flight Center in Greenbelt, Md., Holben helps manage the world's largest network of ground-based sensors for aerosols -- tiny specks of solids and liquids that waft about in the atmosphere. These particles come from both human and natural sources and can be observed everywhere in the world.

Scientists know that some of them play an outsized role in Earth's climate. And much of that knowledge has come from the Aerosol Robotic Network, or AERONET, the collaborative, international sensor network which Holben leads.

"Aerosols play a key role in climate, and pretty much everybody who studies aerosols uses data from AERONET," said William Lau, director of the Atmospheric Sciences Division at Goddard. "Without AERONET, our understanding of the climate system simply wouldn't be where it is today."

Trouble Seeing the Forest and the Trees

The origins of AERONET date to the late 1980s, when Goddard researchers were attempting — and struggling — to study vegetation using satellites. "The atmosphere kept getting in the way," Holben said.

Satellites couldn't properly sense the vegetation through all the dust, minerals, soot, salt, and other atmospheric aerosols obscuring the view. The problem prompted Holben to put his vegetation research aside "temporarily" to tackle aerosols. In 1992, he planned a field campaign to the Amazon, where farmers were burning swaths of rainforest to clear the land. The heavy emissions from the fires made it an ideal environment to study aerosol particles. During that project, Holben began to develop a method for studying aerosols that became a template for future campaigns. He used lamp-sized instruments called sun-sky photometers to measure the intensity of light filtering through a given column of atmosphere. Aerosol particles scatter or absorb portions of the incoming light, allowing scientists to deduce their size, shape, and chemical composition. Often the instruments are installed on the roofs of universities, but solar-powered versions of the devices can also be deployed in remote corners of the world, far off the grid.

Intriguing results began to emerge from the Amazon campaign as well as others in Africa, Canada, and Hawaii. Though aerosols generally reside in the atmosphere for just a few weeks, the data from the Amazon showed that heavy fires could increase pollution levels dramatically for as long as two months after the burning season ended.

A Time to Plant, A Time to Reap

The timing of Holben's foray into aerosol research turned out to be impeccable. Around the time he was deploying photometers in the Amazon, the volcanic eruption of Mount Pinatubo in the Philippines flooded the atmosphere with sulfate aerosols. The burst blocked some solar radiation from reaching Earth's surface and caused global temperatures to drop by 0.5 °C (0.9 °F) for a few years. The eruption underscored the profound impact sulfate aerosols could have on climate. It also reminded researchers how poorly they understood many other types of aerosols. Deploying more photometers was a logical and relatively low-cost way to start filling the gaps in knowledge. Holben and colleagues slowly set up an array of sensors in the United States, while forging collaborations for similar networks in France, Brazil, Spain, Canada, and Japan. Soon, Holben and his collaborators realized that they had created a global network. In 1998, he described the network's potential in an article in Remote Sensing of Environment, laying out methods of calibrating the sensors and guidelines for collecting and interpreting data. With that paper, AERONET was officially born. Today AERONET consists of approximately 400 sites in 50 countries on all seven continents. There are AERONET stations on remote sand dunes in Mali, on the ice sheet at South Pole, and on the tiny island nation of Nauru in the South Pacific.

An Ever-Wider Net

By providing accurate measurements from the ground, AERONET has emerged as the best tool to validate the accuracy of new satellite instruments. For example, scientists have relied upon AERONET to reconcile differences between aerosol measurements from the Moderate-Resolution Imaging Spectroradiometer (MODIS) and the Multiangle Imaging SpectroRadiometer (MISR), two instruments on NASA's Terra satellite. "Without AERONET, we'd have no baseline for comparison," said Michael Mishchenko, a remote sensing expert at NASA's Goddard Institute for Space Studies in New York City and project scientist for NASA's upcoming Glory mission. Glory will rely on AERONET to validate the Aerosol Polarimetery Sensor, an innovative instrument that will distinguish between different types of aerosols from space. Though developed nations are dense with AERONET stations, coverage in many developing areas remains sparse. That's a problem because aerosols don't recognize borders and they aren't limited to land masses.

Gaps in coverage can lead to gaps in understanding, said Venkatachalam Ramaswamy, director of the National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory and a professor of geosciences at Princeton University, N.J. Compared to other factors that affect climate — such as the output of the Sun or greenhouse gases — aerosols are considered the least-well understood. So Holben and colleagues are working to expand AERONET and continue filling in the gaps. Zhanqing Li, an atmospheric scientist at the University of Maryland, College Park, Md. is leading an international field campaign in China, where aerosol loading is exceptionally high. The scientists are deploying

AERONET photometers and other instruments that gather information about the impact of aerosols on the region's climate, especially on the dynamics of the Asian monsoon.

In India, AERONET-affiliated researchers are deploying sensors along the flight track of NASA's CALIPSO satellite, which uses light detection and ranging (LIDAR) to measure aerosols. AERONET's open-source approach to data collection and analysis has also aided its expansion. All data is relayed through weather satellites to a centralized database at Goddard, where it quickly becomes available on the Internet.

"It's always been important to me that AERONET data be freely available," Holben said. "The taxpayers fund this project, and they deserve to know what we're finding."

"Scientists are typically protective of their data, so Holben's insistence on data sharing was a bit avant-garde," said Joel Schafer, a Goddard AERONET scientist. The strategy has paid off. The 1998 study Holben used to introduce AERONET recently passed an impressive academic milestone: it has been cited more than 1,000 times, making it one of the most referenced papers in contemporary earth science. With that accomplishment under his belt, perhaps Holben will have the time to turn back to that old vegetation research.

Adapted from materials provided by NASA/Goddard Space Flight Center. Original article written by Adam Voiland.

http://www.sciencedaily.com/releases/2009/06/090629165559.htm

Learning More About The Placebo Effect

ScienceDaily (July 6, 2009) — In a recent trial, a sample of alcohol-dependent patients received naltrexone, acamprosate or placebo for 12 weeks. While there were no differences in outcomes between treatment groups, those who believed they had been taking active medication consumed fewer alcoholic drinks and reported less alcohol dependence and cravings. That is, irrespective of actual treatment, perceived medication allocation predicted health outcomes.

Double-blind placebo-controlled trials are intended to control for the impact of expectancy on outcomes. Whether they always achieve this is, however, questionable.

Reanalysis of a clinical trial of naltrexone and acamprosate for alcohol dependence investigated this issue further. In this trial, 169 alcohol-dependent patients received naltrexone, acamprosate or placebo for 12 weeks. In addition to being assessed on various indices of alcohol dependence, they were asked whether they believed they received active medication or placebo.

While there were no differences in outcomes between treatment groups, those who believed they had been taking active medication consumed fewer alcoholic drinks and reported less alcohol dependence and cravings. That is, irrespective of actual treatment, perceived medication allocation predicted health outcomes. These results highlight the differences between treatment administration in clinical trials and standard medical practice, a discrepancy that may sometimes decrease the validity of these types of trials.

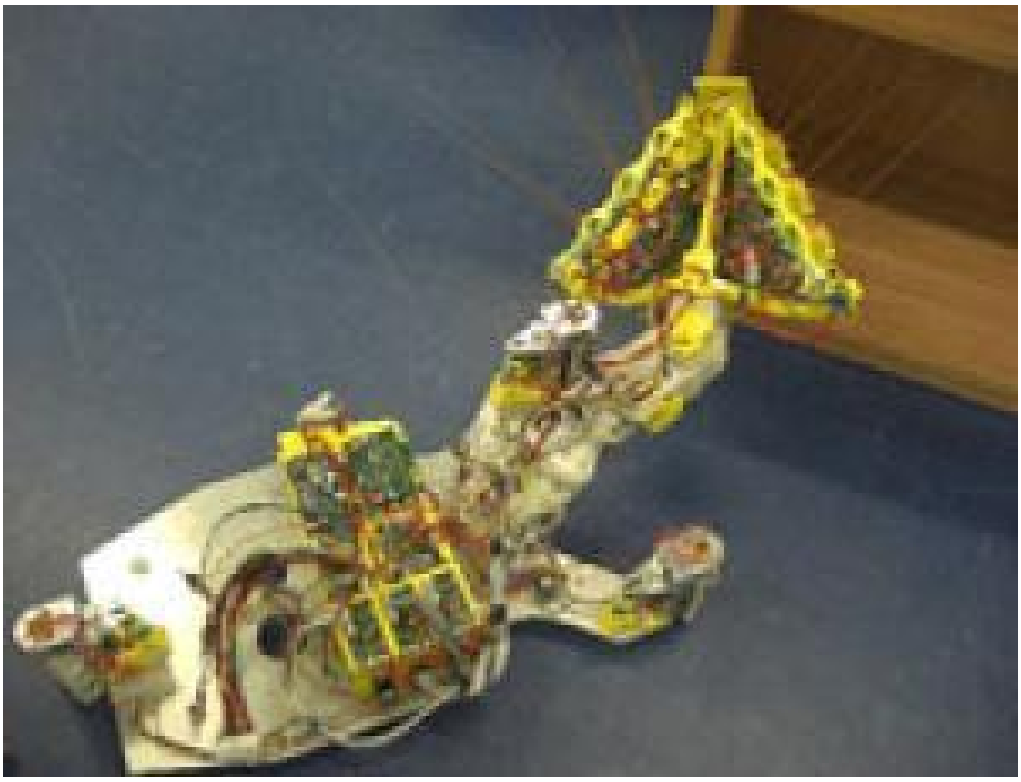
Journal reference:

1. Colagiuri et al. **Expectancy in Double-Blind Placebo-Controlled Trials: An Example from Alcohol Dependence**. *Psychotherapy and Psychosomatics*, 2009; 78 (3): 167 DOI: 10.1159/000206871

Adapted from materials provided by Journal of Psychotherapy and Psychosomatics, via AlphaGalileo

http://www.sciencedaily.com/releases/2009/06/090622064701.htm

Researchers Unveil Whiskered Robot Rat



SCRATCHbot. (Credit: Image courtesy of University of the West of England)

ScienceDaily (July 5, 2009) — A team of scientists have developed an innovative robot rat which can seek out and identify objects using its whiskers. The SCRATCHbot robot will be demonstrated this week (1 July 2009) at an international workshop looking at how robots can help us examine the workings of the brain.

Researchers from the Bristol Robotics Lab, (a partnership between the University of the West of England and the University of Bristol) and the University of Sheffield have developed the SCRATCHbot, which is a significant milestone in the pan-european "ICEA" project to develop biologically-inspired artificial intelligence systems. As part of this project Professor Tony Prescott, from the University of Sheffield's Department of Psychology, is working with the Bristol Robotics Lab to design innovative artificial touch technologies for robots that will also help us understand how the brain controls the movement of the sensory systems.

The new technology has been inspired by the use of touch in the animal kingdom. In nocturnal creatures, or those that inhabit poorly-lit places, this physical sense is widely preferred to vision as a primary means of discovering the world. Rats are especially effective at exploring their environments using their whiskers. They are able to accurately determine the position, shape and texture of objects using precise rhythmic sweeping movements of their whiskers, make rapid accurate decisions about objects, and then use the information to build environmental maps.

Robot designs often rely on vision to identify objects, but this new technology relies solely on sophisticated touch technology, enabling the robot to function in spaces such as dark or smoke-filled rooms, where vision cannot be used.

The new technology has the potential for a number of further applications from using robots underground, under the sea, or in extremely dusty conditions, where vision is often seriously compromised. The

technology could also be used for tactile inspection of surfaces, such as materials in the textile industry, or closer to home in domestic products, for example vacuum cleaners that could sense textures for optimal cleaning.

Dr Tony Pipe, (BRL, UWE), says "For a long time, vision has been the biological sensory modality most studied by scientists. But active touch sensing is a key focus for those of us looking at biological systems which have implications for robotics research. Sensory systems such as rats' whiskers have some particular advantages in this area. In humans, for example, where sensors are at the fingertips, they are more vulnerable to damage and injury than whiskers. Rats have the ability to operate with damaged whiskers and in theory broken whiskers on robots could be easily replaced, without affecting the whole robot and its expensive engineering.

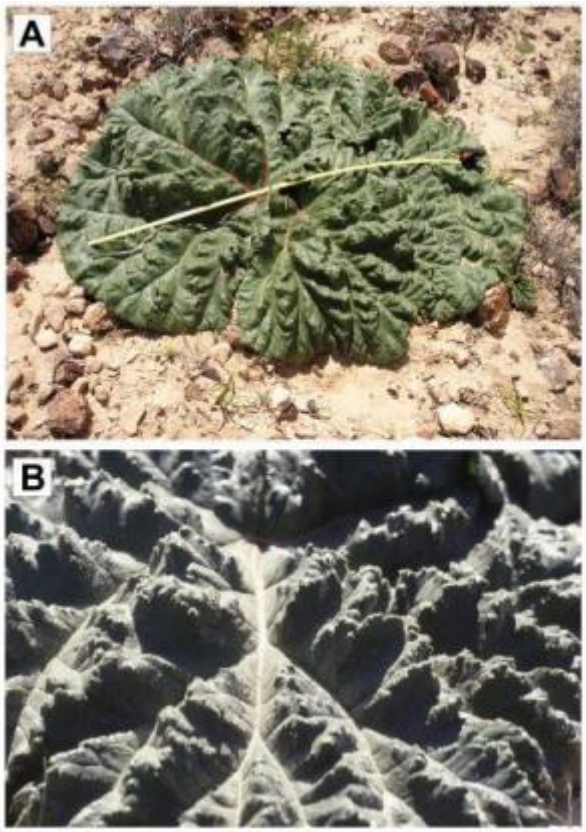
"Future applications for this technology could include using robots underground, under the sea, or in extremely dusty conditions, where vision is often a seriously compromised sensory modality. Here, whisker technology could be used to sense objects and manoeuvre in a difficult environment. In a smoke filled room for example, a robot like this could help with a rescue operation by locating survivors of a fire. This research builds on previous work we have done on whisker sensing."

Professor Prescott said: "Our project has reached a significant milestone in the development of actively-controlled, whisker-like sensors for intelligent machines. Although touch sensors are already employed in robots, the use of touch as a principal modality has been overlooked until now. By developing these biomimetic robots, we are not just designing novel touch-sensing devices, but also making a real contribution to understanding the biology of tactile sensing."

Adapted from materials provided by University of the West of England

http://www.sciencedaily.com/releases/2009/06/090630163538.htm

World's First 'Self-Watering' Desert Plant: Desert Rhubarb



Researchers from the University of Haifa-Oranim have managed to decipher the unique self-watering mechanism of this plant in the Negev desert, which harvests 16 times more water than other plants in the region (Credit: Prof. Gidi Ne'eman, University of Haifa)

ScienceDaily (July 5, 2009) — Researchers from the Department of Science Education-Biology at the University of Haifa-Oranim have managed to make out the "self-irrigating" mechanism of the desert rhubarb, which enables it to harvest 16 times the amount of water than otherwise expected for a plant in this region based on the quantities of rain in the desert. This is the first example of a self-irrigating desert plant, the scientists say.

The desert rhubarb grows in the mountains of Israel's Negev desert, where average precipitation is particularly low (75 mm per year). Unlike most of the other desert plant species, which have small leaves so as to minimize moisture loss, this plant is unique in that its leaves are particularly large; each plant's rosette of one to four leaves reaches a total diameter of up to one meter. Prof. Simcha Lev-Yadun, Prof. Gidi Ne'eman and Prof. Gadi Katzir came across this unique plant growing in the desert while studying the field area with students of the Department of Science Education-Biology of the University of Haifa-Oranim, and noticed that its leaves are unusually large and covered with a waxy cuticle. They observed an exceptionally ridged structure on each leaf, forming a leaf structure that resembles the habitat's mountainous topography.

The scientists explained that these deep and wide depressions in the leaves create a "channeling" mountain-like system by which the rain water is channeled toward the ground surrounding the plant's deep root. Other desert plants simply suffice with the rain water that penetrates the ground in its immediate surroundings.

The findings have shown that the natural selection process has resulted in the evolution of this plant's extremely large leaves, which improved its ability to survive in the arid climate of the desert.

The results of experiments and analysis of the plant's growth - in an area with an average annual rainfall of 75 mm - showed that the desert rhubarb is able to harvest quantities of water that are closer to that of Mediterranean plants, reaching up to 426 mm per year. This is 16 times the amount of water harvested by the small-leafed plants of the Negev desert region. When the research team watered the plant artificially, they observed how the water flows along the course of the leave's depressed veins to the ground surrounding the plant's single root and then penetrates the ground to a depth of 10 cm or more. Under the experimental conditions, water penetrated the ground only as deep as 1 cm.

"We know of no other plant in the deserts of the world that functions in this manner," the researchers concluded.

Adapted from materials provided by University of Haifa.

http://www.sciencedaily.com/releases/2009/07/090701102904.htm

Desert Dust Alters Ecology Of Colorado Alpine Meadows

More dust covers snow in the San Juan Mountains of Colorado than previously documented. (Credit: Center for Snow and Avalanche Studies)

ScienceDaily (July 5, 2009) — Accelerated snowmelt--precipitated by desert dust blowing into the mountains--changes how alpine plants respond to seasonal climate cues that regulate their life cycles, according to results of a new study reported this week in the journal *Proceedings of the National Academy of Sciences (PNAS)*. These results indicate that global warming may have a greater influence on plants' annual growth cycles than previously thought.

Current mountain dust levels are five times greater than they were before the mid-19th century, due in large part to increased human activity in deserts.

"Human use of desert landscapes is linked to the life cycles of mountain plants, and changes the environmental cues that determine when alpine meadows will be in bloom, possibly increasing plants' sensitivity to global warming," said Jay Fein, program director in the National Science Foundation (NSF)'s Division of Atmospheric Sciences, which funded the research in part.

This year, 12 dust storms have painted the mountain snowpack red and advanced the retreat of snow cover, likely by more than a month across Colorado.

"Desert dust is synchronizing plant growth and flowering across the alpine zone," said Heidi Steltzer, a Colorado State University scientist who led the study. "Synchronized growth was unexpected, and may have adverse effects on plants, water quality and wildlife."

"It's striking how different the landscape looks as result of this desert-and-mountain interaction," said Chris Landry, director of the Center for Snow and Avalanche Studies (CSAS) in Silverton, Colo., who, along with Tom Painter, director of the Snow Optics Laboratory at the University of Utah, contributed to the study.

"Visitors to the mountains arriving in late June will see little remaining snow," said Landry, "even though snow cover was extensive and deep in April. The snow that remains will be barely distinguishable from the surrounding soils.

Earlier snowmelt by desert dust, said Painter, "depletes the natural water reservoirs of mountain snowpacks and in turn affects the delivery of water to urban and agricultural areas."

With climate change, warming and drying of the desert southwest are likely to result in even greater dust accumulation in the mountains.

In an alpine basin in the San Juan Mountains, the researchers simulated dust effects on snowmelt in experimental plots. They measured dust's acceleration of snowmelt on the life cycles of alpine plants.

The timing of snowmelt signals to mountain plants that it's time to start growing and flowering. When dust causes early snowmelt, plant growth does not necessarily begin soon after the snow is gone.

Instead, plants delay their life cycle until air temperatures have warmed consistently above freezing.

"Climate warming could therefore have a great effect on the timing of growth and flowering," said Steltzer.

Competition for water and nutrient resources among plants should increase, leading to the loss of less competitive species. Delayed plant growth could increase nutrient losses, decreasing water quality.

Similarity in flowering times and plant growth will result in abundant resources for wildlife for a short time rather than staggered resources over the whole summer, Steltzer believes.

"With increasing dust deposition from drying and warming in the deserts," she said, "the composition of alpine meadows could change as some species increase in abundance, while others are lost, possibly forever."

Adapted from materials provided by National Science Foundation.

http://www.sciencedaily.com/releases/2009/06/090629200804.htm

Inexpensive Thin Printable Batteries Developed

Printable batteries. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (July 5, 2009) — For a long time, batteries were bulky and heavy. Now, a new cutting-edge battery is revolutionizing the field. It is thinner than a millimeter, lighter than a gram, and can be produced cost-effectively through a printing process.

In the past, it was necessary to race to the bank for every money transfer and every bank statement. Today, bank transactions can be easily carried out at home. Now where is that piece of paper again with the TAN numbers? In the future you can spare yourself the search for the number. Simply touch your EC card and a small integrated display shows the TAN number to be used. Just type in the number and off you go. This is made possible by a printable battery that can be produced cost-effectively on a large scale.

It was developed by a research team led by Prof. Dr. Reinhard Baumann of the Fraunhofer Research Institution for Electronic Nano Systems ENAS in Chemnitz together with colleagues from TU Chemnitz and Menippos GmbH. “Our goal is to be able to mass produce the batteries at a price of single digit cent range each,” states Dr. Andreas Willert, group manager at ENAS.

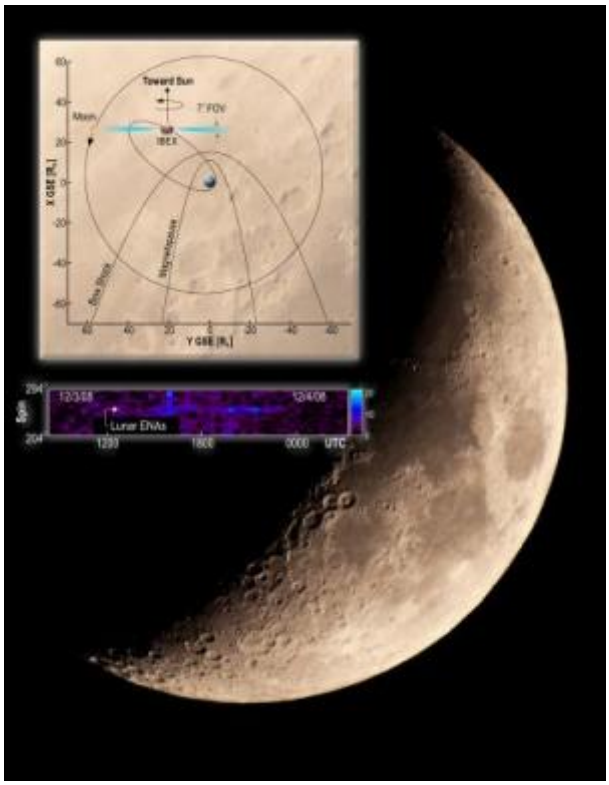
The characteristics of the battery differ significantly from those of conventional batteries. The printable version weighs less than one gram on the scales, is not even one millimeter thick and can therefore be integrated into bank cards, for example. The battery contains no mercury and is in this respect environmentally friendly. Its voltage is 1.5 V, which lies within the normal range. By placing several batteries in a row, voltages of 3 V, 4.5 V and 6 V can also be achieved. The new type of battery is composed of different layers: a zinc anode and a manganese cathode, among others. Zinc and manganese react with one another and produce electricity. However, the anode and the cathode layer dissipate gradually during this chemical process. Therefore, the battery is suitable for applications which have a limited life span or a limited power requirement, for instance greeting cards.

The batteries are printed using a silk-screen printing method similar to that used for t-shirts and signs. A kind of rubber lip presses the printing paste through a screen onto the substrate. A template covers the areas that are not to be printed on. Through this process it is possible to apply comparatively large quantities of printing paste, and the individual layers are slightly thicker than a hair. The researchers have already produced the batteries on a laboratory scale. At the end of this year, the first products could possibly be finished.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/07/090702080358.htm

Fast Neutral Hydrogen Detected Coming From The Moon



NASA's Interstellar Boundary Explorer has made the first detection of neutral atoms coming from the Moon (background image). The color-coded data toward the bottom shows the neutral particles and geometry measured at the Moon on Dec. 3, 2008. IBEX spins at four rotations per minute with its field of view sweeping over the moon each spin over about 10 hours. The neutral atoms are summed in 6 degree bins with the lunar direction indicated by the white arrow. IBEX detects particles produced by reflection and neutralization of the incident solar wind protons at toward the spacecraft. The Earth, moon and spacecraft shown toward the top are not to scale. (Credit: Image courtesy of Southwest Research Institute)

ScienceDaily (July 5, 2009) — NASA's Interstellar Boundary Explorer (IBEX) spacecraft has made the first observations of very fast hydrogen atoms coming from the moon, following decades of speculation and searching for their existence.

During spacecraft commissioning, the IBEX team turned on the IBEX-Hi instrument, built primarily by Southwest Research Institute (SwRI) and the Los Alamos National Laboratory, which measures atoms with speeds from about half a million to 2.5 million miles per hour. Its companion sensor, IBEX-Lo, built by Lockheed Martin, the University of New Hampshire, NASA Goddard Space Flight Center, and the University of Bern in Switzerland, measures atoms with speeds from about one hundred thousand to 1.5 million mph.

"Just after we got IBEX-Hi turned on, the moon happened to pass right through its field of view, and there they were," says Dr. David J. McComas, IBEX principal investigator and assistant vice president of the SwRI Space Science and Engineering Division. "The instrument lit up with a clear signal of the neutral atoms being detected as they backscattered from the moon."

The solar wind, the supersonic stream of charged particles that flows out from the sun, moves out into space in every direction at speeds of about a million mph. The Earth's strong magnetic field shields our

planet from the solar wind. The moon, with its relatively weak magnetic field, has no such protection, causing the solar wind to slam onto the moon's sunward side.

From its vantage point in space, IBEX sees about half of the moon -- one quarter of it is dark and faces the nightside (away from the sun), while the other quarter faces the dayside (toward the sun). Solar wind particles impact only the dayside, where most of them are embedded in the lunar surface, while some scatter off in different directions. The scattered ones mostly become neutral atoms in this reflection process by picking up electrons from the lunar surface.

The IBEX team estimates that only about 10 percent of the solar wind ions reflect off the sunward side of the moon as neutral atoms, while the remaining 90 percent are embedded in the lunar surface. Characteristics of the lunar surface, such as dust, craters and rocks, play a role in determining the percentage of particles that become embedded and the percentage of neutral particles, as well as their direction of travel, that scatter.

McComas says the results also shed light on the "recycling" process undertaken by particles throughout the solar system and beyond. The solar wind and other charged particles impact dust and larger objects as they travel through space, where they backscatter and are reprocessed as neutral atoms. These atoms can travel long distances before they are stripped of their electrons and become ions and the complicated process begins again.

The combined scattering and neutralization processes now observed at the moon have implications for interactions with objects across the solar system, such as asteroids, Kuiper Belt objects and other moons. The plasma-surface interactions occurring within protostellar nebula, the region of space that forms around planets and stars -- as well as exoplanets, planets around other stars -- also can be inferred.

IBEX's primary mission is to observe and map the complex interactions occurring at the edge of the solar system, where the million miles per hour solar wind runs into the interstellar material from the rest of the galaxy. The spacecraft carries the most sensitive neutral atom detectors ever flown in space, enabling researchers to not only measure particle energy, but also to make precise images of where they are coming from.

Around the end of the summer, the team will release the spacecraft's first all-sky map showing the energetic processes occurring at the edge of the solar system. The team will not comment until the image is complete, but McComas hints, "It doesn't look like any of the models."

IBEX is the latest in NASA's series of low-cost, rapidly developed Small Explorers spacecraft. The IBEX mission was developed by SwRI with a national and international team of partners. NASA's Goddard Space Flight Center manages the Explorers Program for NASA's Science Mission Directorate.

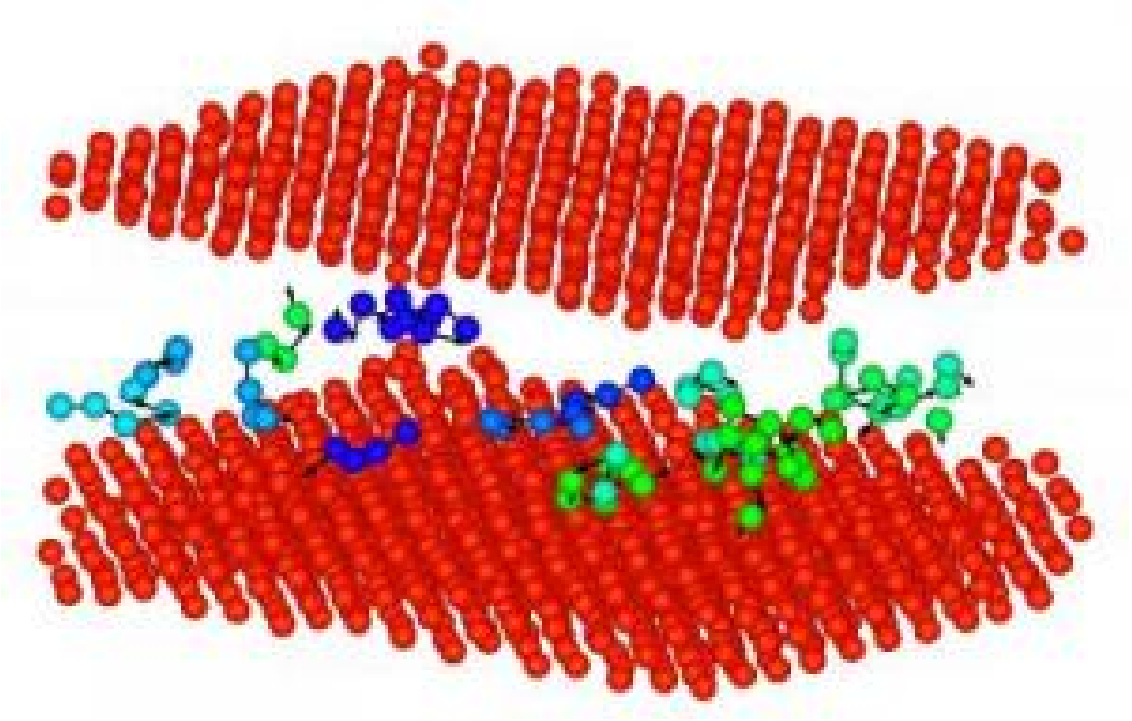
Journal reference:

1. McComas, F. Allegrini, P. Bochsler, P. Frisch, H.O. Funsten, M. Gruntman, P.H. Janzen, H. Kucharek, E. Moebius, D.B. Reisenfeld, and N.A. Schwadron. **Lunar Backscatter and Neutralization of the Solar Wind: First Observations of Neutral Atoms from the Moon**. *Geophysical Research Letters*, 2009 DOI: 10.1029/2009GL038794

Adapted from materials provided by Southwest Research Institute.

http://www.sciencedaily.com/releases/2009/06/090618124948.htm

'A Touch Of Glass' In Metal, Settles Century-old Question



Between a polycrystalline material's grains (saffron layers) exist disorderly areas called grain boundaries, the behavior of which has been difficult to understand. The green and blue objects in the boundary are string-like collections of atoms that NIST scientists have recently shown behave like glass-forming liquids, a similarity that should help scientists analyze a wide range of materials. (Credit: NIST)

ScienceDaily (July 4, 2009) — Better predictions of how many valuable materials behave under stress could be on the way from the National Institute of Standards and Technology (NIST), where scientists have recently found evidence of an important similarity between the behavior of polycrystalline materials—such as metals and ceramics—and glasses.

Most metals and ceramics used in manufacturing are polycrystals. The steel in a bridge girder is formed from innumerable tiny metal crystals that grew together in a patchwork as the molten steel cooled and solidified. Each crystal, or "grain," is highly ordered on the inside, but in the thin boundaries it shares with the grains around it, the molecules are quite disorderly. Because grain boundaries profoundly affect the mechanical and electrical properties of polycrystalline materials, engineers would like a better understanding of grain boundaries' formation and behavior. Unfortunately, grain boundary formation in most technically useful alloys has eluded efforts to observe it for a century.

"You'd like to have simple engineering rules regarding how a material's going to break," says NIST materials scientist Jack Douglas. "For example, corrosion typically travels along grain boundaries, so polycrystals usually fracture along them. But metals melt and deform at very high temperatures, so observing them under those conditions is a challenge."

While some scientists had speculated that the molecules in grain boundaries behave similarly to the way molecules do in glass-forming liquids, whose properties are well understood, none had found conclusive evidence to back up such a claim. That started to change when NIST theorist James Warren saw a conference presentation by the University of Alberta's Hao Zhang concerning some odd "strings" of atoms in his simulation of grain boundary motion using a simulation technique called molecular

dynamics. The collective atomic behavior observed in grain boundaries reminded the team of prior findings made at NIST about glass-forming liquids, whose atoms also form strings.

Subsequently, the team showed that the strings of atoms arising in grain boundaries are strikingly similar in form, distribution and temperature dependence to the string-like collective atomic motions generally found in glass-forming liquids—and that properties for both types of substances change with temperature in virtually the same way. "This work represents a paradigm shift in our understanding of grain boundaries," Douglas says. "All the important qualities relating to atomic motion in both of these types of materials—the development of these string-like atomic motions, or the amplitude at which their atoms rattle—are strikingly similar. For all intents and purposes, grain boundaries are a type of glass."

Douglas says the findings could permit substantial progress in predicting the failure of many materials important in construction and manufacturing and could improve our understanding of how crystals form boundaries with one another.

Journal reference:

1. Zhang et al. **Grain boundaries exhibit the dynamics of glass-forming liquids**. *Proceedings of the National Academy of Sciences*, 2009; 106 (19): 7735 DOI: 10.1073/pnas.0900227106

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

http://www.sciencedaily.com/releases/2009/06/090617123435.htm

First Detailed Look At Progress Of A Wildland-urban Fire

Ruins of two homes in the Trails community burned during the Witch and Guejito fires in 2007. To reduce structure loses from future Wildland Urban Interface fires, NIST has reconstructed a timeline of the fire events, including the defensive actions taken by first responders and homeowners. (Credit: Credit: Maranghides, NIST)

ScienceDaily (July 4, 2009) — A wildfire rages across southern California wildlands towards residential communities, endangering residents and firefighters and sending property up in smoke. This is an increasingly common story, occurring several times a summer. To better understand these Wildland-Urban Interface (WUI) fires and how best to prevent or fight them, researchers at the National Institute of Standards and Technology (NIST) have issued an in-depth study on fire behavior and defensive actions taken in a community during a such a fire.

WUI fires are becoming more prevalent as housing developments push into former wilderness areas. Drought is believed to also be a major contributor to larger wildfires. In addition to southern California, WUI fires also burn across the southern United States and in countries such as Australia, Greece, Italy and Spain. Little research has been conducted on understanding WUI fire behavior and on the effectiveness of current risk mitigation strategies.

The new NIST study examines in detail the events in one representative community during the Oct. 21-22, 2007 "Witch Fire" north of San Diego, Calif. The Witch Fire was the largest of the 2007 California fire storm. The fire burned 197,990 acres (80,124 hectares) and destroyed more than 1,100 homes. Fire damage was estimated at $1.8 billion and suppression costs were $18 million.

For their study, fire researchers Alex Maranghides and Ruddy Mell tracked down every fire captain who worked in the fire at The Trails housing development in Rancho Bernardo to follow the fire's evolution. The NIST researchers, with the support of The Trails Homeowners Association, also collected event timeline information from homeowners. Of the 274 homes in The Trails neighborhood, 245 were within the fire's perimeter. Of those, 74 homes were completely destroyed and 16 were partly damaged.

The data collection tracked the fire's approach from the wildlands, the effects of the fire in the community and defensive actions taken by owners and first responders. Researchers documented the construction characteristics of the destroyed homes and the wildland and residential vegetation damage immediately after the fire.

The study revealed that two-thirds of all the homes destroyed were ignited either directly or indirectly by embers. "This is an important finding because current guidelines to make structures more fire resistant

offer little guidance on how to make structures more resistant to an ember attack," fire researcher Alex Maranghides explains. Researchers also learned that one-third of all structures within the fire perimeter were defended by first responders and/or homeowners.

The NIST report is the first in a series of three publications to understand WUI fire behavior. The second publication, in progress, will examine the role of construction and landscaping on the probability of a structure's survival. A third report will describe a study that uses the data to build a computer-generated virtual community to test the fire behavior predicted by different fire models and compare the results to the observed fire behavior and structural response.

This study is part of NIST's Reduced Risk of Fire Spread in Wildland-Urban Interface Communities research within its Building and Fire Research Laboratory, a program to develop first-generation tools by 2013 for improved risk assessment and mitigation in WUI communities at risk from wildfires.

"A Case Study of a Community Affected by the Witch and Guejito Fires," report may be found at http://fire.nist.gov/wui.

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

http://www.sciencedaily.com/releases/2009/06/090617123429.htm

Sound Tunnel: Avant-Garde Park Portrait

By RANDY KENNEDY

The elegantly arched pedestrian tunnel just north of the Central Park Zoo is never a tranquil place. Every half-hour it is filled with "Georgie Porgie" and "Old King Cole" and other nursery-school war horses ringing out from the George Delacorte clock chimes nearby. Convoys of summer campers passing through on their way to the Tisch Children's Zoo shriek and shout and send the word "echo" echoing off the 140-year-old sandstone brickwork.

"I see adults who get in there and let loose," said John Morton, a composer who has been spending a lot of time around the tunnel lately. "Tunnels are weird kinds of public places that way. You lose your inhibitions inside them. Here's this place in the middle of Manhattan where you feel like you can scream."

For the last month — thanks to Mr. Morton, six high-end speakers, a computer and a generous helping of musical avant-garde smuggled into the city's populist playground — the tunnel itself has found a voice: a strange, urgent one that screams, whispers, sings, declaims poetry and recreates the multifarious sounds of the park around it, from jackhammers and horses' hooves to cracking winter ice.

Mr. Morton, whose work is in the tradition of John Cage and who is known for rebuilding old music boxes and remixing their tunes, approached Central Park officials a couple of years ago. His idea was to construct a kind of aural portrait of the park, using field recordings he would make over many months of wandering around it with a high-definition recorder.

Clare Weiss, the curator of the public art program for the New York City Parks and Recreation Department, had long wanted to commission a temporary artwork for one of Central Park's many tunnels, where a video or sound piece could be sheltered from the elements and also take advantage of a tunnel's acoustics. The one near the Delacorte Musical Clock (at East 65th Street) was chosen because of Mr. Morton's interest in mechanical music. And with the help of the New York State Council on the Arts and the nonprofit arts organization Harvestworks, he got going.

Conjuring up images of Gene Hackman as the surveillance expert in Francis Ford Coppola's film "The Conversation," Mr. Morton moved through the park surreptitiously for more than 40 days over the course of a year, capturing gospel choirs, park-bench arguments, the rattle of dead leaves and the heartbeatlike

clack of lawn-bowling balls. He recorded a child practicing a warbling version of "Eleanor Rigby" on a violin and a group singing ethereal Renaissance motets. Carefully avoiding stern-looking school officials, he managed to get a snippet of French boys from the Lycée Français playing basketball and later, at the North Meadow Recreation Center at 97th Street, a ping as clear as polished glass from a baseball caroming off an aluminum bat.

"I had a lot of sounds I knew I wanted to get, but then I just let my ear lead me," said Mr. Morton, 55, who can lovingly describe the "very specific envelope of dissolve" made by the slamming of a metal hot-dog cart lid.

After recording hundreds of hours of sound, Mr. Morton edited the files down and, using a computer he installed next to a tangle of steam pipes in a zoo building attic, customized a program that samples and mixes the sounds with a degree of randomness. The Delacorte chimes function as a kind of catalyst; when they begin playing, the computer records their music and immediately replays it in disjointed fragments inside the tunnel, before embarking on a 20-minute run of park sounds. (Mr. Morton said he was surprised to find that the chimes, which are controlled from a cabinet in the same attic space he is using, are fully electronic, their quaint old-world bell tones generated by a small, charmless chunk of electronics about the size of a clock radio.)

William Roberts, a hotel room-service worker who installs himself daily on a bench near the tunnel to drink coffee and read the newspaper, said he had at first mistaken the sounds emanating from it for some kind of bizarre enticement to visit the zoo. "But then I heard voices and jackhammers, and I couldn't figure out what was happening in there," said Mr. Roberts, who added that as a music lover with extremely catholic tastes, he has been enjoying the daily found-noise concerts (which will continue daily from 8 a.m. to 8 p.m. through Sept. 10). "I don't know what to call it," he said, "but I like it."

As he spoke, the stentorian voice of the poet Bob Holman, recordings of whom are also mixed into the piece, boomed out of the tunnel with a random salvo of verse that seemed perfectly to fit the moment and the work of art:

Could you — why don't you —
turn off the TV of the world?
and sit on this bench beside this stranger
go on and question, sigh, and fan, linger
It's a noise show slow-down
With an idiot's boom-box suddenly blossoming
into a carousel of characters.

http://www.nytimes.com/2009/07/06/arts/06sound.html?th&emc=th

Future Vision Banished to the Past

By NICOLAI OUROUSSOFF

TOKYO — How old does a building have to be before we appreciate its value? And when does its cultural importance trump practical considerations?

Those are the questions that instantly come to mind over the likely destruction of Kisho Kurokawa's historic Nakagin Capsule Tower.

A rare built example of Japanese Metabolism, a movement whose fantastic urban visions became emblems of the country's postwar cultural resurgence, the 1972 Capsule Tower is in a decrepit state. Its residents, tired of living in squalid, cramped conditions, voted two years ago to demolish it and are now searching for a developer to replace it with a bigger, more modern tower. That the building is still standing has more to do with the current financial malaise than with an understanding of its historical worth.

Yet for many of us who believe that the way we treat our cultural patrimony is a fair measure of how enlightened we are as a society, the building's demolition would be a bitter loss. The Capsule Tower is not only gorgeous architecture; like all great buildings, it is the crystallization of a far-reaching cultural ideal. Its existence also stands as a powerful reminder of paths not taken, of the possibility of worlds shaped by different sets of values.

Founded by a loose-knit group of architects at the end of the 1950s, the Metabolist movement sought to create flexible urban models for a rapidly changing society. Floating cities. Cities inspired by oil platforms. Buildings that resembled strands of DNA. Such proposals reflected Japan's transformation from a rural to a modern society. But they also reflected more universal trends, like social dislocation and the fragmentation of the traditional family, influencing generations of architects from London to Moscow.

Of the five members who made up the group, Kurokawa was the most glamorous. A photo taken in 1958 at a Moscow student conference, when he was just 24, shows him surrounded by fawning girls, signing autographs. Trim and handsome, often outfitted in elegantly tailored suits and a bow tie, he became a regular at Tokyo nightclubs. His Space Capsule Disco, opened in the 1960s, was a hot spot for young creative types.

The Nakagin Capsule Tower was completed as the movement's influence was beginning to wane. Composed of 140 concrete pods plugged into two interconnected circulation cores, the structure was meant as a kind of bachelor hotel for businessmen working in the swanky Ginza neighborhood of Tokyo. Inside, each apartment is as compact as a space capsule. A wall of appliances and cabinets is built into one side, including a kitchen stove, a refrigerator, a television and a tape deck. A bathroom unit, about the size of an airplane lavatory, is set into an opposite corner. A big porthole window dominates the far end of the room, with a bed tucked underneath.

Part of the design's appeal is voyeuristic. The portholes evoke gigantic peepholes. Their enormous size, coupled with the small scale of the rooms, exposes the entire apartment to the city outside. Many of the midlevel units look directly onto an elevated freeway, so you are almost face to face with people in passing cars. (On my first visit there, a tenant told me that during rush hour, drivers stuck in traffic often point or wave at residents.)

But the project's lasting importance has more to do with its structural innovations, and how they reflect the Metabolists' views on the evolution of cities. Each of the concrete capsules was assembled in a factory, including details like carpeting and bathroom fixtures. They were then shipped to the site and bolted, one by one, onto the concrete and steel cores that housed the building's elevators, stairs and mechanical systems.

In theory, more capsules could be plugged in or removed whenever needed. The idea was to create a completely flexible system, one that could be adapted to the needs of a fast-paced, constantly changing society. The building became a symbol of Japan's technological ambitions, as well as of the increasingly nomadic existence of the white-collar worker.

No one doubts how difficult it would be to revive that vision today. The building was never as flexible in reality as it was in theory: adding and removing the capsules was prohibitively expensive. And the capsule notion itself was obviously limited, since it didn't account for the possibility of sharing space with others. It hasn't helped, too, that the lack of regular maintenance has taken a severe toll on the structure — and on the few remaining tenants.

When I visited several weeks ago, it was pouring rain. Corridors smelled of mildew. Some tenants had taped plastic bags to their door frames to catch leaks, and many of them were bulging with gray water. At one point a tenant took me up to a bridge that connected the two towers, where I could see chunks of concrete breaking off from the corner of one of the capsules. Nothing short of a full-scale restoration would save it.

But the issue is not just the fate of this one building; it is why certain landmarks — in Japan and throughout the developed world — are preserved, and others are not. Dozens of private houses, after all, from Palladian villas to late Modernist masterpieces, have been lovingly restored over the years, some in worse condition than the tower. Government agencies and nonprofit groups have also put significant amounts of money toward the restoration of important civic works.

But when an aging Kurokawa pleaded with the apartment owners to save his masterpiece, he got nowhere. And after his death two years ago, few preservationists rallied to the building's defense. There's been no serious effort to look into what exactly it would cost to retrofit the 140 units. Nor has any institution, public or private, stepped up with a viable plan for how to save it.

Why is that so? Partly it is because all over the world, postwar architecture is still treated with a measure of suspicion by the cultural mainstream, which often associates it with brutal city housing developments or clinical office blocks. Partly, too, it has to do with the nature of housing blocks in general. They are not sexy investments; they do not feed an investor's vanity or offer the cultural prestige that owning a landmark house does.

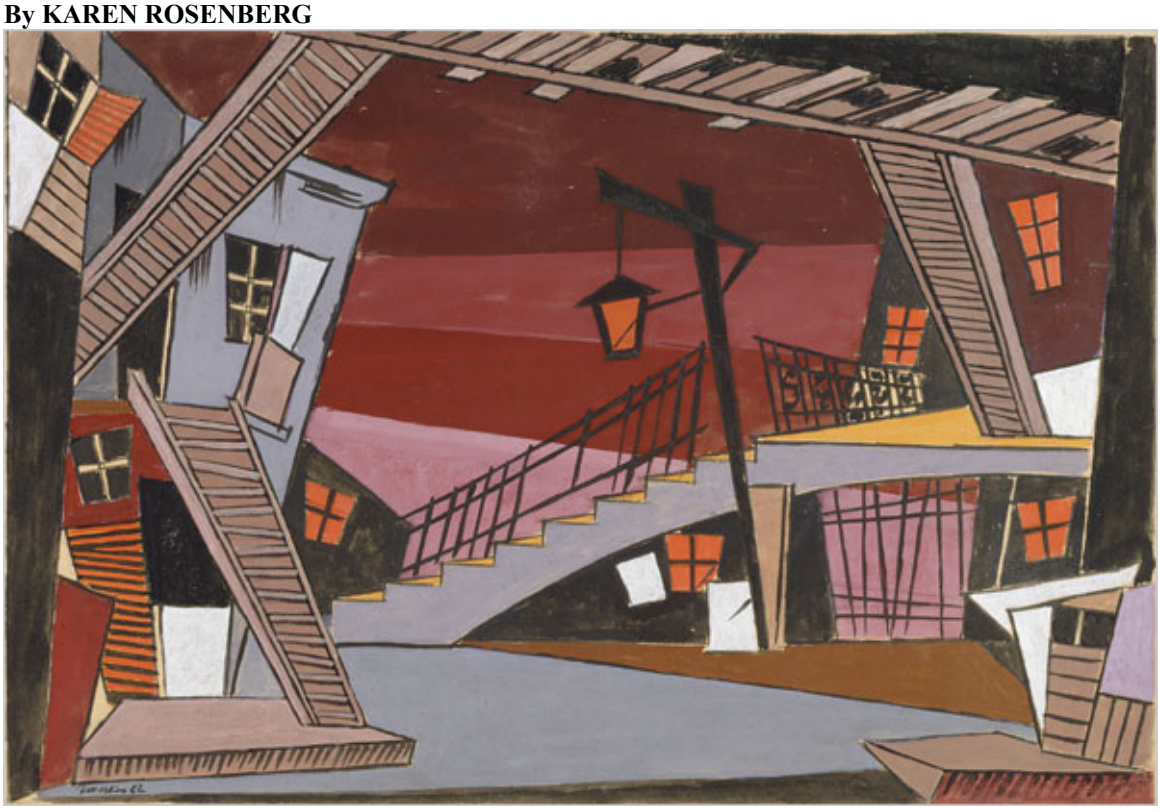
But another concern is that all too often, private developments like the Capsule Tower, no matter how historically important, are regarded in terms of property rights. They are about business first, not culture. Governments don't like to interfere; the voices of preservationists are shrugged off. "Want to save it?" the prevailing sentiment goes. "Pay for it."

Until that mentality changes, landmarks like Kurokawa's will continue to be threatened by the wrecking ball, and the cultural loss will be tremendous. This is not only an architectural tragedy, it is also a distortion of history.

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

'CREATING THE MODERN STAGE'
Where All the World's an Atmospheric Stage

By KAREN ROSENBERG



Donald Oenslager, the great American set designer and a professor at the Yale School of Drama, wrote that "a sketch for a scene is as short-lived as the life of the theater it supports."

Mr. Oenslager, who died in 1975, was being a bit disingenuous, as he was a major collector of such sketches. In 1982 his widow gave some 1,600 drawings, prints and books on set design to the Morgan Library & Museum. About 50 of these drawings, including two by Mr. Oenslager, are on view there in "Creating the Modern Stage: Designs for Theater and Opera." They present a concise summary of 20th-century stagecraft, one that appeals equally to Museum of Modern Art mavens and seasoned theatergoers. Jennifer Tonkovich, a curator of drawings and prints, organized the show with the help of Elizabeth Nogrady, the Moore curatorial fellow at the Morgan. It moves east and then west, tracing the spread of modern stagecraft from Britain to Eastern Europe, Russia and finally the United States. The geography is appropriately loose, given that wars and revolutions forced creative people to migrate from one cultural center to another.

Performance photographs show the sets being used. And viewers can hear excerpts from some of the productions, among them Wagner's "Parsifal" and Gershwin's "Porgy and Bess," at several listening kiosks. (A podcast would have been even better.)

Many of the drawings, particularly those in the early sections, are more radical than they appear. Seemingly straightforward renderings disguise innovations in lighting (alternatives to conventional footlights) or set construction (the debut of the revolving stage). Building on theories of the Swiss designer Adolphe Appia (1862-1928), who reacted against the literalism of the 19th-century stage, the British designer Edward Gordon Craig (1872-1966) envisioned sets as atmospheric washes of color. In his drawing of a scene from "Romeo and Juliet," the lovers' bench is bathed in a silvery light. The rest of the set has a warm yellow cast. The couple is at the white-hot center of a flame.

Craig, who trained as an actor at the Lyceum Theater in London, took a holistic approach to set design. He couldn't imagine a stage without actors and an audience. In one of his drawings for "Macbeth" jagged

steps extend the stage into the first rows of seats. A sleepwalking Lady Macbeth, holding a candle, appears poised to descend.

The next section of the exhibition, "Destroying Traditions," shows how Central and Eastern European designers interpreted Appia's and Craig's ideas. Movements like the Secession in Austria and Jugendstil in Germany emphasized the synthesis of the arts. Paul Hindemith's grim Expressionist opera "Murderer, Hope of Women" had a libretto by the painter Oskar Kokoschka; the set, by Ludwig Sievert, consisted of a dark portal flanked by fiery columns.

Sievert's design for a 1914 staging of "Parsifal" is also on view, set off by photographs of a 19th-century production. The contrast between the stylized bower of Sievert's set and the illusionistic landscape in the photographs reveals that modernity hit the theater with the same force it did painting.

Farther east, the Russians developed their own avant-garde stagecraft, heavily influenced by Cubism, Futurism and Constructivism. Drawings by Alexandra Exeter (1882-1949) are among the most striking in the exhibition. Her architectural "Construction for a Tragedy" pairs crisscrossing orange ramps and black vertical frames, and is reminiscent of artworks by Vladimir Tatlin and Aleksandr Rodchenko.

In other designs the avant-garde coexists happily with folk tradition. Natalia Goncharova's set for a 1915 Ballets Russes revival of "Tamara," set in the Caucasus Mountains, incorporates Asiatic scrolling clouds, Futurist-influenced mountains and textiles inspired by indigenous Russian art.

The designer Robert Edmond Jones (1887-1954) dominates the American section of the show, which is the largest and most varied. Jones was fluent in the new stagecraft, having studied in Europe, and was in demand as American theater grew increasingly sophisticated. He tailored his approach to the forms that flourished in the 1920s and '30s: musicals, comedies and socially conscious dramas.

For the 1933 opening of O'Neill's "Ah, Wilderness!," set in a Connecticut home in 1906, Jones designed a period interior. For a 1930 production of a Schoenberg opera he envisioned an abstract cluster of screens.

Sometimes a single scene inspired markedly different sets, as illustrated by two Jones drawings of the sleepwalking scene from "Macbeth." One dates from 1938 and emphasizes architecture; the other, from 1946, relies mostly on light. In the 1946 image Lady Macbeth's anxieties are cleverly multiplied by a grid of mirrors.

There are many ways to look at "Creating the Modern Stage": as a greatest hits of 20th-century theater, a list of Oenslager's influences or a group of colorful works on paper. But it's most interesting as an exchange of American, European and Russian modernisms.

One of the best examples is a vibrant drawing by the designer Juozas Jankus, from a late-1960s production of "Porgy and Bess" in Vilnius, Lithuania. Made at a time when Europeans were keeping a close eye on racial tensions in America, Jankus's drawing of Catfish Row shows a topsy-turvy urban block, with a tilted streetlamp and precarious-looking fire escapes. It refers simultaneously to Cubo-Futurism, W.P.A.-era murals and postwar urban decay.

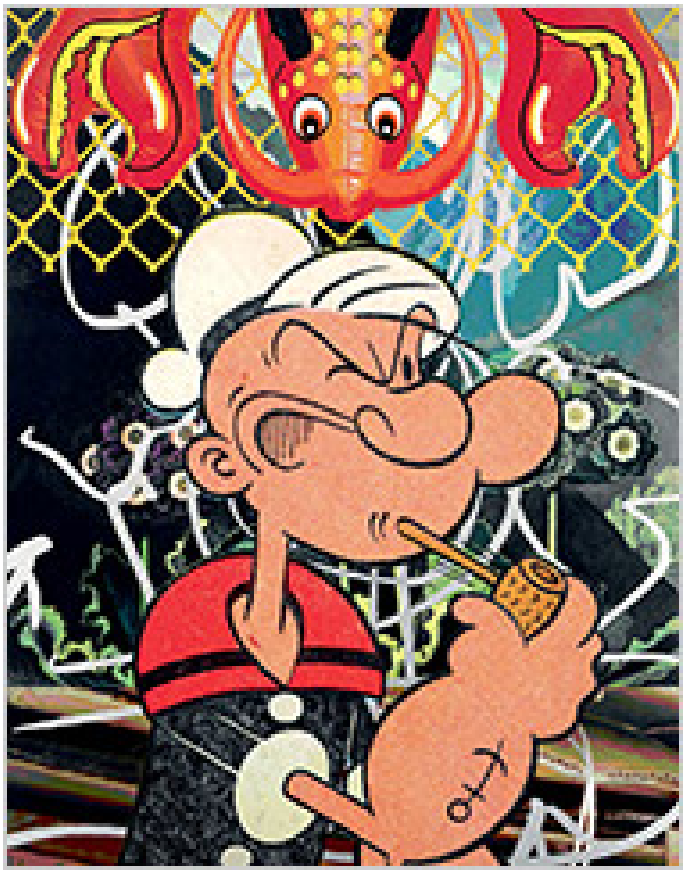
A quotation from one of Oenslager's books seems apt: "The theater is one of the most adaptable and flexible of the arts. While it may from time to time feed on the past, it has always lived in the present."

"Creating the Modern Stage: Designs for Theater and Opera" continues through Aug. 16 at the Morgan Library & Museum, 225 Madison Avenue, at 36th Street; (212) 685-0008, themorgan.org.

http://www.nytimes.com/2009/07/06/arts/design/06modern.html?ref=design

Koons and a Sailor Man in London

By CAROL VOGEL



LONDON — Although it was a sweltering 90-degree day, Jeff Koons arrived at the Serpentine Gallery here on Tuesday morning looking crisp in his gray suit, white shirt and blue tie. He was in his element, greeting a gaggle of reporters, art critics and photographers and posing in front of a blow-up plastic dolphin hanging from the ceiling. An inflatable lobster was perched precariously on a wastepaper basket and a ladder-back chair.

He may be an international star whose works have been seen all over Europe (at the Château de Versailles last year, a show of his sculptures included one of Michael Jackson with his pet chimpanzee, Bubbles), but this is his first major solo show at a public institution in London.

The Serpentine exhibition, "Jeff Koons: Popeye Series," features sculptures fashioned from children's pool toys, cast in aluminum and painted to resemble the originals. There are also dense, realist paintings of Popeye holding his can of spinach or smoking his pipe, a red lobster looming over his head.

"I watched Popeye when I was younger," Mr. Koons said by way of explaining the series, which he began in 2002. "I always see a bit of my father in Popeye. He was a self-created and very optimistic man." (His father was a furniture store owner and interior designer.)

The show — organized by Julia Peyton-Jones, director of the Serpentine; Hans Ulrich Obrist, its co-director; and Kathryn Rattee, a curator there — is on view through Sept. 13 and includes 23 works. The paintings are monumental, some more than 8 feet tall and 7 feet wide, and the sculptures of inflatable toys incorporate other familiar things: an aluminum ladder, stainless-steel pots and pans, wooden logs, even trash cans.

Although the works were conceived seven or eight years ago, some were fabricated only this year. "They take time to make," Mr. Koons said.

He first started buying the inflatable toys when he was visiting his mother in Florida. "That's where I got the lobster and the caterpillars," Mr. Koons said. "Then I went online and found the hippopotamus, the turtles and the monkeys."

He typically buys 100 to 200 of each toy because although they are machine-made, each has slight variations. "I look for form, graphics and color," he said, pointing to the tiny details on a nearby turtle.

Fanciful and childlike though these pieces may be, when he talks about his work, he constantly refers to figures from art history. On Tuesday he cited Salvador Dalí, one of his heroes, whose telephone in the shape of a lobster is a touchstone of Surrealism, as well as Marcel Duchamp and his famous mustache on the face of Mona Lisa. (One of the works in the show, "Moustache," from 2003, is a wrought-iron mustache with a pool toy on either end; it hangs from the ceiling on two bright red chains.)

Throughout his career Mr. Koons has embraced all kinds of figures, from those found in ancient art to stars of popular culture like Mr. Jackson. His 1988 sculpture of Mr. Jackson with Bubbles was decorated with gold metallic paint and brought $5.6 million when it sold at Sotheby's in New York in 2001.

Larry Gagosian, the New York dealer who represents Mr. Koons, said on Wednesday that if one from the edition (he made three along with an artist's proof) was to come up for sale now, it could make more than $20 million. "And that's conservative," he added.

Mr. Koons never met Mr. Jackson, although he tried more than once. "Every time I would make a date with him, he'd stand me up," Mr. Koons said. "Once we planned to meet at a recording studio in Los Angeles, and when I knocked on the door, someone came out and said he hadn't been seen for six months."

By the way, Mr. Koons said he had no plans to make more Jackson sculptures.

OLD CHURCH, NEW VIDEO

Every year thousands of tourists from all over the world flock to the financial district here to see St. Paul's Cathedral, Wren's majestic 17th-century house of worship with its soaring dome and regal interiors. And although it may be perhaps the last place one would expect to see contemporary art, by 2011 it will include another attraction: the American artist Bill Viola has been commissioned to create two multiscreen video installations at the end of the choir aisles, flanking the high altar of the cathedral and the American Memorial Chapel.

"The cathedral has a life of several strands: architectural, spiritual, commemorative," said Sandy Nairne, director of the National Portrait Gallery in London, who serves on a planning committee for the cathedral. "We wanted a place for pausing when people are visiting during the day."

While the cathedral has had temporary contemporary art installations by artists like Yoko Ono and Rebecca Horn, this will be the first permanent artwork it has commissioned. Rather than ask an artist to do something conventional, like a painting or stained-glass window, Mr. Nairne said, "everyone felt that video would make a vivid and compelling way of exploring meditative issues." He added, "After all, video art has been with us now for some 40 years."

The choice of Mr. Viola was an obvious one, Mr. Nairne said. Mr. Viola has made several temporary video installations for other places of worship. In 1996 he created "The Messenger" for Durham Cathedral, some 230 miles north of London. There, attached to a 12th-century door, was a video projection about the cycle and the mysteries of life. The first image viewers saw was a luminous abstract form shimmering against a deep blue background. As the shape grew, the figure of a man appeared, his body glistening with water.

Mr. Viola also created "Ocean Without a Shore," a three-screen installation in San Gallo church in Venice in 2007 that dealt with the intersection of life and death. And last year a benefactor donated "Study for the Path," a three-screen installation from 2002 depicting people of all ages walking in a procession through dense woods, to the 13th-century Basilica di San Marco in Milan.

For St. Paul's Mr. Viola plans to create two works, one about Mary, the other about martyrs. "Mary is the Christian embodiment of a universal female figure present in nearly all spiritual and religious traditions," Mr. Viola said in a statement about the project. "I see this piece as the embodiment of the feminine principle, related to ideas of creativity, procreation, inner strength, love and compassion."

About the theme of martyrs he said: "The Greek word for martyr originally meant witness. In today's world the mass media turns us all into witnesses to the suffering of others." He added, "I see this piece as representing the ideas of action, fortitude, perseverance, endurance and sacrifice."

Mr. Viola has made several trips to London recently to study the space. "He spent time at night there thinking and sketching," Mr. Nairne said. And last year the church did a full-scale test using two other works by Mr. Viola to gauge visitors' reactions, try out the lighting and better understand the technical issues.

Money for the project is coming from private sources, and some still needs to be raised, Mr. Nairne said, though he wouldn't disclose the budget. "People were intrigued," he said, referring to the visitors who saw the test. Neither of Mr. Viola's new works will have sound, he explained, but he added that they would have shutters, "so that when a service is going on, they will be neither visible nor distracting."

http://www.nytimes.com/2009/07/03/arts/design/03vogel.html

Innovative System Creates Drinking Water from Thin Air
by Jorge Chapa

There is plenty of water in the world for everyone, the problem has always been trying to convert it into a form we can drink. German Researchers at the Fraunhofer Institute recently announced that they have developed a new method to convert air humidity into drinking water using renewable energy. They are proposing large water harvesting plants to be located even in the most remote of places, such as the Sahara desert. Is this the solution to our water problems? Getting water from thin air is actually not as difficult as it seems - the problem has always been how to do so in a cheap and relatively energy efficient way. The research was led by Siegfried Egner, head of the deparment at the Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB) in Stuttgart, in conjunction with Logos Innovationen. The most intriguing part of their research is how this concept can be adapted depending upon the demand for water. It can be adapted to suit individual needs as well as large-scale installations. So far, the researchers have been able to replicate this on a laboratory scale, though they hope to have a working facility up and running soon.

The innovative process works as follows: A saline solution known as hygroscopic brine absorbs moisture as it is drawn through a tower or chimney. The moisture-rich saline solution is then sucked into an underground tank, thanks to a lower pressure prevalent in the system, and is heated up by solar collectors installed in the roof. The lower pressure is the key in this process, as water is released from the brine at a temperature that is well below its boiling point. This evaporated water is collected and run down a completely filled tube, which in turn creates the lower pressure which drags down further liquid, thus creating a continuous loop within the system. This water is collected into a tank which can then be consumed. There are still huge hurdles to cross before we see water harvesting plants like the one pictured above in cities everywhere. And indeed, there is no indication of what would be needed or how much they would cost. We have to say, though, that on principle, this seems like a worthy research project.

+ Fraunhofer ITP

http://www.inhabitat.com/2009/07/08/researchers-announce-new-way-to-creating-drinking-water-from-air/

July 7, 2009

Stylish Bamboo Taxis Hit the Streets of the Phillipines

by Jorge Chapa

In the search for a low-cost, fuel-efficient, safe, and environmentally friendly alternative to motorcycles, the mayor of a city in the Philippines recently rolled out two incredible taxis crafted from one of our favorite renewable materials - bamboo! Rustico Balderian, mayor of Tabontabon, has commissioned the construction of two taxis made from 90% bamboo that are powered by coconut biodiesel - take that steel-based cars!

Bamboo is an incredible material - it is rapidly renewable, environmentally friendly, and does not require a ton of processing for it to be incorporated into designs. But did you know that its tensile strength is just as good as that of steel? This remarkable strength makes bamboo a fitting and exceptionally sustainable material for Tabontabon's new taxis.

The two vehicles are called the Eco 1 and Eco 2. The Eco 1 seats 20 people and can run on one gallon of biodiesel for about 80 hours. Eco 2 works just as well, but seats around 8. Both vehicles are made by Tabontabon's out-of-school youth, 90% of each vehicle is made out of bamboo, and they are covered in traditional Filipino woven mats called banig. Both vehicles are operating today - now if we could only get one in blue.

+ Toti Eco

http://www.inhabitat.com/2009/07/07/transportation-tuesday-the-bamboo-taxi/

July 7, 2009

SAHİMO Hydrogen Vehicle Travels 568 Kilometers on 1 Liter of Fuel
by Jorge Chapa

Students from Turkey's Sakarya University have unveiled a remarkable attempt at creating Europe's most fuel efficient vehicle. The SAHİMO is a hydrogen powered vehicle that is capable of traveling 568 kilometers on 1 liter of fuel (about 353 miles on a quarter gallon). The students' ultimate goal is to trek SAHİMO across 3,000 kilometers of the Australian Outback on just 3 liters of fuel in the inaugural 2009 Global Green Challenge. And you thought you were getting good mileage out of your Prius!

The SAHİMO is truly a lightweight carbon fiber vehicle, weighting less than 110 kilograms. It won third most efficient vehicle at the 26th Shell Eco Marathon held in Europe. The designers hope to improve SAHİMO's performance, equipping it to reach a full 1,000 kilometers/per 1 liter of fuel, before participating in the Global Green Challenge in October.

This year marks the debut of the 2009 Global Green Challenge, an evolution of the World Solar Challenge competition in Australia, in which approximately twenty electric, hybrid, alternative fuel and low emission production and prototype vehicles will compete "in a test of durability and eco friendly performance, across an entire continent." Just like the better known World Solar Challenge competition, vehicles will have to trek across 3,000 kilometers in the Australian desert.

The cost of development for the SAHİMO wasn't cheap — amounting to $170,000. The team is looking for additional sponsorship to make the necessary improvements to achieve their goals. Not bad for a project that began as a simple homework assignment in 2003.

+ SAHİMO

http://www.inhabitat.com/2009/07/07/sahimo-hydrogen-vehicle-travels-568-kilometers-on-1-liter-of-fuel/

Tornado Tower Features Energy Generating Facade
by Bridgette Meinhold

The Tornado Tower is a spectacular modern and unique design that is characterized by a rotating facade, which generates power from high altitude winds. The exterior of the tower is outfitted with curved fins that harness the wind to generate clean energy to power the arts center and the surrounding city as well. Pairing function and aesthetic, the roof of the tower boasts an undulating sea of pearls that meld into clouds, from which unparalleled views of the city are possible.

Tornado Tower was one of many impressive entries submitted into a design competition to create a performing arts center in Taipei, Taiwan. Designed by Ulf Mejergren and Anders Berensson from Vision Division in collaboration with Markus Wagner from Svens Standard, the Tornado Tower would not only be a feat of wonder in and of itself, but it would provide a beautiful backdrop for the many performances that would take place inside. At the base of the tower, an open public space welcomes visitors by surrounding them in a sea of pearls. Inside the tower, a spiraling staircase allows visitors to reach the Grand Theater by elevator, foot or on a VIP train made up of giant pearls (non-toxic acrylic balls.)At the top of the tower sits the Grand Theater covered in pearls and backlit by soft lights that may be adjusted for the appropriate performance and mood. The interior of the theater looks like a wondrous dream — and a magical reality to transport you to another place. Unfortunately, the Tornado Tower did not win the design competition for the Tapei Performing Arts Center. Instead, OMA was selected as the winner. But we can still dream of seeing the opera in such a magnificent setting.

+ Vision Division

+ Tapei Performing Arts Center

http://www.inhabitat.com/2009/07/08/tornado-tower-features-energy-generating-facade-and-countless-pearls/

Language 'predicts dementia risk'

People with superior language skills early in life may be less likely to develop Alzheimer's disease decades later, research suggests.

A team from Johns Hopkins University studied the brains of 38 Catholic nuns after death.

They found those with good language skills early in life were less likely to have memory problems - even if their brains showed signs of dementia damage.

The study appears online in the journal Neurology.

" **One possible implication of this study is that an intellectual ability test in the early 20s may predict the likelihood of remaining cognitively normal five or six decades later** "
Rebecca Wood Alzheimer's Research Trust

Dementia is linked to the formation of protein plaques and nerve cell tangles in the brain.

But scientists remain puzzled about why these signs of damage produce dementia symptoms in some people, but not others.

The researchers focused on nuns who were part of an ongoing clinical study.

They divided the women into those with memory problems and signs of dementia damage in the brain, and those whose memory was unaffected regardless of whether or not they showed signs of dementia damage.

And they also analysed essays that 14 of the women wrote as they entered the convent in their late teens or early 20s, assessing them for complexity of language and grammar.

The study showed that language scores were 20% higher in women without memory problems than those with signs of a malfunctioning memory.

The grammar score did not show any difference between the two groups.

Lead researcher Dr Juan Troncoso said: "Despite the small number of participants in this portion of the study, the finding is a fascinating one.

"Our results show that an intellectual ability test in the early 20s may predict the likelihood of remaining cognitively normal five or six decades later, even in the presence of a large amount of Alzheimer's disease pathology."

Brain cell growth

The study also found that brain cells were largest in women who retained a normal memory despite showing signs of disease in their brains.

The researchers said this suggested that a growth in brain cells might be part of the body's early response to the onset of dementia, and this might help to prevent memory impairment.

Dr Troncoso said: "Perhaps mental abilities at age 20 are indicative of a brain that will be better able to cope with diseases later in life."

Dr Susanne Sorensen, head of research at the Alzheimer's Society, said: "It is interesting that the nuns in the study with better language skills in their youth avoided memory problems in later life.

"However, the research is in a very small, select group and it would be difficult to say at this stage if language skills could really predict dementia."

Rebecca Wood, chief executive of the Alzheimer's Research Trust, said: "One possible implication of this study is that an intellectual ability test in the early 20s may predict the likelihood of remaining cognitively normal five or six decades later.

"However, prominent exceptions exist, including authors like Terry Pratchett and Iris Murdoch, who developed dementia despite their linguistic brilliance."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8140213.stm

Published: 2009/07/08 23:01:49 GMT

Tests raise life extension hopes

A drug discovered in the soil of a South Pacific island may help to fight the ageing process, research suggests.

When US scientists treated old mice with rapamycin it extended their expected lifespan by up to 38%.

The findings, published in the journal Nature, raise the prospect of being able to slow down the ageing process in older people.

However, a UK expert warned against using the drug to try to extend lifespan, as it can suppress immunity.

" **We believe this is the first convincing evidence that the ageing process can be slowed and lifespan can be extended by a drug therapy starting at an advanced age.** "
Professor Randy Strong University of Texas

Rapamycin was first discovered on Easter Island in the 1970s.

It is already used to prevent organ rejection in transplant patients, and in stents implanted into patients to keep their coronary arteries open. It is also being tested as a possible treatment for cancer.

Researchers at three centres in Texas, Michigan and Maine gave the drug to mice at an age equivalent to 60 in humans.

The mice were bred to mimic the genetic diversity and susceptibility to disease of humans as closely as possible.

Rapamycin extended the animals' expected lifespan by between 28% and 38%.

The researchers estimated that in human terms this would be greater than the predicted increase in extra years of life, if both cancer and heart disease were prevented and cured.

Researcher Dr Arlan Richardson, of the Barshop Institute, said: "I've been in ageing research for 35 years and there have been many so-called 'anti-ageing' interventions over those years that were never successful.

"I never thought we would find an anti-ageing pill for people in my lifetime; however, rapamycin shows a great deal of promise to do just that."

Professor Randy Strong, of the University of Texas Health Science Center, said: "We believe this is the first convincing evidence that the ageing process can be slowed and lifespan can be extended by a drug therapy starting at an advanced age."

Calorie restriction

Rapamycin appears to have a similar effect to restricting food intake, which has also been shown to boost longevity.

" **In no way should anyone consider using this particular drug to try to extend their own lifespan, as rapamycin suppresses immunity** "
Dr Lynne Cox University of Oxford

It targets a protein in cells called mTOR, which controls many processes involved in metabolism and response to stress.

The researchers had to find a way to re-formulate the drug so that it was stable enough to make it to the mice's intestines before beginning to break down.

The original aim was to begin feeding the mice at four months of age, but the delay caused by developing the new formulation meant that feeding did not start until the animals were 20 months old.

The researchers thought the animals would be too old for the drug to have any effect - and were surprised when it did.

Professor Strong said: "This study has clearly identified a potential therapeutic target for the development of drugs aimed at preventing age-related diseases and extending healthy lifespan.

"If rapamycin, or drugs like rapamycin, works as envisioned, the potential reduction in health cost will be enormous."

'Don't try it now'

Dr Lynne Cox, an expert in ageing at the University of Oxford, described the study as "exciting".

She said: "It is especially interesting that the drug was effective even when given to older mice, as it would be much better to treat ageing in older people rather than using drugs long-term through life."

However, she added: "In no way should anyone consider using this particular drug to try to extend their own lifespan, as rapamycin suppresses immunity.

"While the lab mice were protected from infection, that's simply impossible in the human population.

"What the study does is to highlight an important molecular pathway that new, more specific drugs might be designed to work on.

"Whether it's a sensible thing to try to increase lifespan this way is another matter; perhaps increasing health span rather than overall lifespan might be a better goal."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8139816.stm

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Striking salamander species found
Matt Walker
Editor, Earth News

A striking new species of lungless salamander has been found living in a small stream in the Appalachian foothills of the US.

The salamander is so distinct that it's been classified within its own genus, a taxonomic grouping that usually includes a host of related species.

The creature breathes through its skin, and unusually for its kind, males and females have different colouration. Such a distinct amphibian has not been found in the US for half a century.

The researchers who discovered the salamander describe it in the Journal of Zoology. They have dubbed it the 'patch-nosed' salamander after the yellow patch on the animal's snout.

The tiny animal averages just 25 to 26mm long. They found so few of the animals that either it is highly secretive, or more likely it survives in such small, isolated numbers that it is already at risk of extinction.
The salamander fauna of the US has been intensively studied for well over a century, so the discovery of such a distinct form was completely unsuspected
Biologist Carlos Camp

"This animal is really a spectacular find," says biologist Carlos Camp of Piedmont College in Demorest, Georgia, who led the team which described the new species.

"It is the first genus of amphibian, indeed of any four-footed vertebrate, discovered in the US in nearly 50 years."

Around the world, there are approximately 500 species of salamander.

Two-thirds of these species are lungless, breathing entirely through their porous, moist skin.

The Appalachian Highlands of the southeastern US is a hot spot for lungless salamander diversity, with species occupying a variety of moist or wet environments including living in streams, underground, among the leaf litter of the forest floor, up cliffs and in trees.

"The salamander fauna of the US, particularly of the southern Appalachians, has been intensively studied for well over a century, so the discovery of such a distinct form was completely unsuspected," says Carlos. **Striking differences**

Two graduate students, Bill Peterman of the University of Missouri, Columbia and Joe Milanovich of the University of Georgia, Athens discovered the first example of the species, scientifically named *Urspelerpes brucei* . They took the animal to Camp for identification.

"When we realised that it was something novel, we contacted a geneticist, Trip Lamb, of East Carolina University, Greenville and a bone specialist, David Wake of the University of California at Berkeley. John Maerz, a professor at the University of Georgia, completed the research team," says Carlos.

The team's investigations revealed just how novel the salamander is.

"The genetic data revealed that this was far more unusual than any of us suspected, which is why we described it in its own genus," says Camp.

But the amphibian also looks strikingly different to other species.

For a start, it has the smallest body size of any salamander in the US. It is also the only lungless salamander in the US whose males have a different colour and pattern than females, a trait more characteristic of birds.

Males have a pair of distinct dark stripes running down the sides of the body and a yellow back. Females lack stripes and are more muted in colour.

Males also have 15 vertebrae, one less than females. Yet while most species of lungless salamander have male and females of differing sizes, those of *Urspelerpes brucei* are close to being equal in size.

Uniquely for such a small lungless salamander, *Urspelerpes brucei* has five toes, whereas most other small species have reduced that number to four.

The behaviour and lifestyle of the salamander remain a mystery.

The animal's jaw and teeth structure suggest that it eats small, terrestrial prey such as insects caught using a projectile tongue as some other species of lungless salamander do.

So far, Camp's team have recovered just eight adults, all from within or alongside a single stream. Four were collected hiding under rocks and four in loose leaf litter. Three were females, each carrying eggs.

The last new genus of amphibian living in the US to be described, in 1961, was also a lungless salamander, the Red Hills Salamander of southern Alabama.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8140000/8140003.stm

Published: 2009/07/08 11:01:13 GMT

Study pinpoints UK wind hotspots

By Mark Kinver
Science and environment reporter, BBC News

The most comprehensive report of its kind has identified the UK's best locations for households to install micro-wind turbines, say its authors.

The Energy Saving Trust (EST) said some households could generate in excess of £2,800 worth of electricity a year.

However, it also concluded that other locations would actually lose money if a small-scale turbine was installed.

The EST is advising homeowners to visit its website, which will show whether a turbine will help them cut their bills.

The performance of domestic turbines have come under the spotlight in recent years, with critics saying the devices failed to generate the amount of electricity outlined by manufacturers.

"Because the turbines are seen as a new, emerging technology, there has been very little proper monitoring and performance assessment," explained author Simon Green, the EST's head of business development.

"Our study was not tested in the lab, or based on computer modelling, but on real homes in order to independently assess their performance."

'Location, location, location'

The two-year study involved 57 locations, ranging from south-west England to the Orkney Islands, and tested a range of turbines that fell within two categories: building-mounted and free standing pole-mounted.

BEST PERFORMING SITE

- Location: Orkney Islands
- Turbine: 6kW pole-mounted
- Profile: Rural, flat, open space
- Average wind speed: 5.75m/s
- Annual generation: 22,000kWh
- Payback period: less than 10 yrs

"Building-mounted turbines were generally smaller ones with a 50cm diameter, which were fitted to roofs on a bracket similar to TV aerials," Mr Green told BBC News.

"The others - pole-mounted turbines - were generally larger, with bigger power outputs, and were remotely mounted in a field or at the end of a garden."

At the sites, the researchers recorded wind speed and measured the net generation of electricity every five minutes.

The team could then work out, over the course of a whole year, exactly how much electricity was produced and the overall performance of the wind turbine.

Mr Green said the study's findings revealed that there were a complex range of factors that influenced the effectiveness of a wind turbine's performance.

"The fundamental conclusion is location, location, location," he said.

"It is critically important that wind turbines are located in an area with sufficient wind resources.

"We believe that a minimum average wind speed needs to be at least five metres per second (18km/h; 11mph)."

Highs and lows

In the 57-site field study, the remote island of North Ronaldsay in the Orkneys generated the most electricity over the course of a year.

WORST PERFORMING SITE
- Location: Dagenham, Essex
- Turbine: 1kW building-mounted
- Profile: Urban, heavily developed
- Average wind speed: 2.37m/s
- Annual generation: 0kWh
- Payback period: never *(Source: Energy Saving Trust)*

The site's 6kW pole-mounted turbine generated almost 22,000 kilowatt hours (kWh), which equated to a £2,860 saving if electricity cost £0.13/kWh.

The report noted: "This location is in essence an offshore wind turbine mounted on land and represents an almost perfect site.

"There are no obstructions around the turbine, and it is mounted in very clean air."

Data showed that the island's average wind speed was 5.75m/s.

However, not all sites delivered such favourable results, Mr Green explained.

"The study's findings show that a lot of the turbines had been installed in areas that did not achieve the minimum average wind speed," he observed.

The worst performing site, a 1kW turbine attached to a house in Dagenham, Essex, actually consumed more energy than it generated.

"The recorded wind speed was 2.37m/s," the report noted.

"This site represents an example of an installation in an urban area with a poor wind resource, as well as a poorly-installed turbine."

Based on the findings, the report estimated there was potential for more than 450,000 micro-turbines to be installed on properties across the UK.

These devices, the trust calculated, would generate almost 3,500 gigawatt hours of electricity each year, enough to power about 870,000 homes.

Homeowners who are interested in finding out whether their home is located in a suitable area are being advised to visit the trust's website.

"Customers can type in their postcode, and the website will give a much more accurate estimate of the average wind speed in their area," Mr Green explained.

"But we should also stress that any customer who is thinking of installing this kit should use a Microgeneration Certification Scheme (MCS) approved equipment and installer."

The EST plans to follow up this study with similar assessments of other renewable energy technologies, including photovoltaic panels, micro-CHP and heat pumps.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8139373.stm

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Monkeys have a memory for grammar

- 00:01 08 July 2009 by **Catherine Brahic**

Primates can intuitively recognise some rules of grammar, according to a study of cotton-topped tamarin monkeys (*Saguinus oedipus*).

The findings do not mean primates can communicate using language, but they do suggest that some of the skills required to use language may be linked to very basic memory functions.

One grammatical structure that is found across many languages is affixation: the addition of syllables, either at the beginning or at the end of a word, to modify its meaning.

For instance, in English, the suffix "–ed" is added to verbs to make the past tense. In German, the same effect is achieved by adding the prefix "ge–" to the front of verb stems.

Ansgar Endress and colleagues at Harvard University thought that, because this structure is found in so many languages, it might be linked to basic memory functions that are independent of language. If they could prove this was true, it would suggest ways that children might be learning grammatical structures.

Nonsense words

To test this, Endress and colleagues studied 14 cotton-top tamarins, which, like all other non-human primates, do not use language to communicate.

They first played a sequence of nonsensical "words" to the monkeys that all had the same prefix, like "shoybi", "shoyka", and "shoyna".

The following morning, the animals were played a different set of entirely new words. This second set had completely different stems – brain, brest, and wasp instead of bi, ka, and na – but were preceded by the same prefix. Mixed in to the new batch of words were a few that violated the familiar prefix pattern by having a suffix instead of a prefix ("brainshoy" instead of "shoybrain").

The researchers hypothesised that, if the monkeys were able to recognise the prefix pattern they had heard the day before, they would be more likely to look at the loudspeakers when they heard a word that violated the grammatical pattern.

"This is exactly what they did," says Endress. The team found the same result if they familiarised the monkeys with words that had suffixes, then mixed in a few prefixes.

No food

The fact that the tamarins appeared to understand the prefix and suffix patterns, without being trained with food rewards, does not prove that they have language and grammar, says Endress. But it does suggest that their memory is able to recognise certain linguistic patterns.

Memory organisation in humans means we find it easiest to track what occurs in the first and the last position of sequences. "This is a basic and well-known fact about the organisation of memory for sequences," says Endress.

"If you try to remember the sequence NBGHQPZRXV, it is easier to remember that N was in the first position, and V in the last position," than it is to remember that the H was in the fourth position.

The results suggest that grammar may have evolved from this basic memory structure. It could also explain how rules like the English past-tense are learned.

Endress explains: "Our results suggest a fairly pedestrian mechanism: human infants, like monkeys, might be particularly prone to track what occurs in the first and the last position of words and other linguistic units. They might use these mechanisms of memory organization for learning affixation rules."

Kate Arnold of the University of St. Andrews, UK, says the finding that some primates are able to differentiate a valid sequence from an invalid one may relate to some very unusual behaviour she has seen in wild monkeys. Last year, Arnold showed that putty-nosed monkeys in Nigeria are able to combine two different calls into a sequence that causes other monkeys in the area to move to a different area. This is the closest anyone has ever come to observing animals using syntax.

Journal reference: *Biology Letters*, DOI: 10.1098/rsbl.2009.0445 (in press)

http://www.newscientist.com/article/dn17426-monkeys-have-a-memory-for-grammar.html

Winning the ultimate battle: How humans could end war

- 07 July 2009 by **John Horgan**

Magazine issue 2715.

OPTIMISTS called the first world war "the war to end all wars". Philosopher George Santayana demurred. In its aftermath he declared: "Only the dead have seen the end of war". History has proved him right, of course. What's more, today virtually nobody believes that humankind will ever transcend the violence and bloodshed of warfare. I know this because for years I have conducted numerous surveys asking people if they think war is inevitable. Whether male or female, liberal or conservative, old or young, most people believe it is. For example, when I asked students at my university "Will humans ever stop fighting wars?" more than 90 per cent answered "No". Many justified their assertion by adding that war is "part of human nature" or "in our genes". But is it really?

Such views certainly seem to chime with recent research on the roots of warfare. Just a few decades ago, many scholars believed that prior to civilisation, humans were "noble savages" living in harmony with each other and with nature. Not any more. Ethnographic studies, together with some archaeological evidence, suggest that tribal societies engaged in lethal group conflict, at least occasionally, long before the emergence of states with professional armies (see our *timeline of weapons technology*). Meanwhile, the discovery that male chimpanzees from one troop sometimes beat to death those from another has encouraged popular perceptions that warfare is part of our biological heritage.

These findings about violence among our ancestors and primate cousins (see "When apes attack") have perpetuated what anthropologist Robert Sussman from Washington University in St. Louis, Missouri, calls the "5 o'clock news" view of human nature. Just as evening news shows follow the dictum "if it bleeds, it leads", so many accounts of human behaviour emphasise conflict. However, Sussman believes the popular focus on violence and warfare is disproportionate. "Statistically, it is more common for humans to be cooperative and to attempt to get along than it is for them to be uncooperative and aggressive towards one another," he says. And he is not alone in this view. A growing number of experts are now arguing that the urge to wage war is not innate, and that humanity is already moving in a direction that could make war a thing of the past.

Among the revisionists are anthropologists Carolyn and Melvin Ember from Yale University, who argue that biology alone cannot explain documented patterns of warfare. They oversee the Human Relations Area Files, a database of information on some 360 cultures, past and present. More than nine-tenths of these societies have engaged in warfare, but some fight constantly, others rarely, and a

few have never been observed fighting. "There is variation in the frequency of warfare when you look around the world at any given time," says Melvin Ember. "That suggests to me that we are not dealing with genes or a biological propensity."

Anthropologist Douglas Fry of Åbo Akademi University in Turku, Finland, agrees. In his book, *Beyond War*, he identified 74 "non-warring cultures" that contradict the idea that war is universal. His list includes nomadic hunter-gatherers such as the !Kung of Africa, Australian Aborigines and Inuit. These examples are crucial, Fry says, because our ancestors are thought to have lived as nomadic hunter-gatherers from the emergence of the *Homo* lineage around 2 million years ago until the appearance of permanent settlements and agriculture less than 20,000 years ago. That time span constitutes more than 99 per cent of the evolutionary history of *Homo*.

Fry does not deny that lethal violence probably occurred among our nomadic hunter-gatherers' forebears, but he asserts that hunter-gatherers in the modern era show little or no genuine warfare - organised fighting between rival groups. Instead, he says, most violence consists of individual aggression, often between two men fighting over a woman. These fights might occasionally precipitate feuds between groups of friends and relatives of the antagonists, but such rivalry is costly and so rarely lasts long. Humans "have a substantial capacity for dealing with conflicts non-violently", he says. One group might simply "vote with its feet" and walk away from the other. Alternatively, a third party might mediate a resolution. Or in rare cases, a man might be so compulsively aggressive and violent that others in the band would banish or even kill him. "In band society, no one likes a bully," says Fry.

When battle begins

Brian Ferguson of Rutgers University in Newark, New Jersey, also believes that there is nothing in the fossil or archaeological record supporting the claim that our ancestors have been waging war against each other for hundreds of thousands, let alone millions, of years. The first clear-cut evidence of violence against groups as opposed to individuals appears about 14,000 years ago, he says. The evidence takes the form of mass graves of skeletons with crushed skulls, hack marks and projectile points embedded in them; rock art in Australia, Europe and elsewhere depicting battles with spears, clubs and bows and arrows; and settlements clearly fortified for protection against attacks (see "The birth of war").

War emerged when humans shifted from a nomadic existence to a settled one and was commonly tied to agriculture, Ferguson says. "With a vested interest in their lands, food stores and especially rich fishing sites, people could no longer walk away from trouble." What's more, with settlement came the production of surplus crops and the acquisition of precious and symbolic objects through trade. All of a sudden, people had far more to lose, and to fight over, than their hunter-gatherer forebears (see our *timeline of weapons technology*).

So rather than being a product of our genes, it looks as if warfare emerged in response to a changing lifestyle. Even then it was far from inevitable, as the variability in warmongering between cultures and across time attests. The Embers have found links between rates of warfare and environmental factors, notably droughts, floods and other natural disasters that impact upon resources and provoke fears of famine. Likewise, Patricia Lambert of Utah State University in Logan found a connection between drought and warfare among the Chumash, who inhabited the coast of southern California for millennia before the arrival of Europeans (*Antiquity*, vol 65, p 963).

Archaeologist Steven LeBlanc of Harvard University says that war is not a biological compulsion but a rational response to environmental conditions such as swelling populations and dwindling food supplies. He points out that some North American tribes fought savagely over land and other resources before the arrival of Europeans. But warfare also "stops on a dime", he says, as a result of ecological or cultural changes. In his book *Constant Battles: Why we fight*, LeBlanc describes how warlike Native American tribes such as the Hopi embraced peace when it was imposed on them by

outsiders. "We are definitely malleable and susceptible to cultural influence," he says. Warfare is "not so hard-wired that it can't stop".

Warfare on the wane

Indeed, perhaps the best and most surprising news to emerge from research on warfare is that humanity as a whole is much less violent than it used to be (see our *timeline of weapons technology*). People in modern societies are far less likely to die in battle than those in traditional cultures. For example, the first and second world wars and all the other horrific conflicts of the 20th century resulted in the deaths of fewer than 3 per cent of the global population. According to Lawrence Keeley of the University of Illinois in Chicago, that is an order of magnitude less than the proportion of violent death for males in typical pre-state societies, whose weapons consist only of clubs, spears and arrows rather than machine guns and bombs.

There have been relatively few international wars since the second world war, and no wars between developed nations. Most conflicts now consist of guerilla wars, insurgencies and terrorism - or what the political scientist John Mueller of Ohio State University in Columbus calls the "remnants of war". He notes that democracies rarely, if ever, vote to wage war against each other, and attributes the decline of warfare over the past 50 years, at least in part, to a surge in the number of democracies around the world - from 20 to almost 100. "A continuing decline in war seems to be an entirely reasonable prospect," he says.

Most conflicts now consist of guerilla wars, insurgencies and terrorism - the remnants of war "Violence has been in decline over long stretches of history," agrees psychologist Steven Pinker of Harvard University. Homicide rates in modern Europe, for example, are more than 10 times lower than they were in the Middle Ages. Decreases in the rate of warfare and homicide, Pinker notes, cannot be explained by changes in human nature over such a relatively short period. Cultural changes and changes in attitude must be responsible, he says.

Pinker gives several reasons for the modern decline of violence in general. First, the creation of stable nations with effective legal systems and police forces. Second, increased life expectancies that make us less willing to risk our lives through violence. Third, increasing globalisation and improvements in communications technology, which have increased our interdependence with, and empathy towards, those outside of our immediate "tribes". "The forces of modernity are making things better and better," he says.

However, while war might not be inevitable, neither is peace. Nations around the world still maintain huge arsenals, including weapons of mass destruction, and armed conflicts still ravage many regions (see our *timeline of weapons technology*). Major obstacles to peace include the lack of tolerance inherent in religious fundamentalism, which not only triggers conflicts but often contributes to the suppression of women; global warming, which will produce ecological crises that may spark social unrest and violence; overpopulation, particularly when it produces a surplus of unmarried, unemployed young men, and the proliferation of weapons of mass destruction. "Humans can easily backslide into war," Pinker warns.

Fortunately, understanding the environmental conditions that promote war also suggests ways to limit it. LeBlanc points out that the modern focus of human competition - and the warfare that can accompany it - has shifted somewhat from food, water and land to energy. Two keys to peace, he suggests, are population control and cheap, clean, reliable alternatives to fossil fuels. Promoting the spread of participatory democracy clearly wouldn't hurt, either.

Richard Wrangham of Harvard University takes another line, and makes a case for the empowerment of women. It is well known that as female education and economic opportunities rise, birth rates fall. A stabilised population decreases demands on governmental and medical services and on natural resources and, by extension, lessens the likelihood of social unrest and conflict. Since women are less

prone to violence then men, Wrangham hopes that these educational and economic trends will propel more women into government.

Is this all just idealistic pie-in-the-sky? Well, there is no doubt that any announcement of the end of warfare would be premature. At the very least, though, we can confidently reject the fatalistic belief that it is innate. That assumes "we're some kind of automata where aggressive genes force us to pick up knives and guns like zombies and attack each other without any thoughts going through our heads", says Pinker. War is not in our DNA. And if warfare is not innate then, surely, neither is it inevitable.

Read more: *Timeline of weapons technology*

When apes attack

Many people think the discovery of warlike behaviour among chimps supports the view that war among humans is inevitable. In fact, the work of some primatologists suggests ways to reduce human conflict.

"We and all the primates have a tendency to be hostile to non-group members," says Frans de Waal of Emory University in Atlanta, Georgia. But the level of aggression displayed by individuals depends on their environment. He found, for example, that rhesus monkeys, which are ordinarily incorrigibly aggressive, grow up to become kinder and gentler when raised by mild-mannered stump-tail monkeys.

De Waal has also reduced conflicts among monkeys and apes by increasing their interdependence - making them cooperate to obtain food, for example - and ensuring they had equal access to food (*PLoS Biology*, vol 5, e 190). He points to the myriad interdependencies between nations and groups of people, and believes that by fostering ever more economic cooperation through alliances such as the European Union we can promote peace.

Primate violence is not blind and compulsive but calculating and responsive to circumstance, says Richard Wrangham from Harvard University. Chimps only fight when they think they can get away with it. "That's the lesson that I draw for humans." Wrangham says that although we are much less risk-averse than chimps, human societies - from hunter-gatherers to modern nations - also behave much more aggressively toward rival groups if they are confident they can prevail. He reckons that reducing imbalances of power between nations should reduce the risk of war (*Yearbook of Physical Anthropology*, vol 42, p 1).

http://www.newscientist.com/article/mg20327151.500-winning-the-ultimate-battle-how-humans-could-end-war.html?full=true

New Home for Chinese Experience in America

By LARRY ROHTER

The newly expanded, newly relocated Museum of Chinese in America has chosen to open the doors of its new home on the edge of Chinatown quietly and gradually as it settles in over the summer. But it aims to make a big statement once it's fully moved in about the role that Chinese immigrants and their descendants have played in constructing American society.

"The long-term goal is to create a national museum that will also be a cultural anchor" for Chinatown, said S. Alice Mong, the museum's just-hired director. "There is a lot to do, we have many stories to tell, but we begin with this new building, which will allow us to have the programs to go along with what we envision."

That building, a converted industrial machine repair shop at 211-215 Centre Street, was designed by Maya Lin, who also designed the Vietnam Memorial in Washington and is a member of the museum's board. With about 12,000 square feet spread over two floors, the Centre Street building is nearly six times larger than the museum's current home, and cost $8.1 million to revamp. In the lobby Ms. Lin has created an art installation called "The Journey Wall," which consists of bronze tiles that link Chinese-American families' names and places of origin in China with the towns or cities where they settled in America.

She has created two entrances for the building, which are meant to symbolize the museum's twin missions: helping Americans to understand the Chinese world better, and vice versa.

"Sometimes Chinese history is seen as unchanging, and put into a lacquered box," said Cynthia Lee, the museum's chief curator. "There is also a notion that Chinese isolate themselves into that box and don't want to interact with the rest of society. We want to get away from that and show our history as a living, dynamic thing."

The Museum of Chinese in America began nearly 30 years ago as the Chinatown History Project, and has amassed a large collection of documents and objects that register the history and culture of Chinese immigrants in America. But before the move to the new site the museum was confined to 2,000 square feet on the second floor of a building at 70 Mulberry Street, in the heart of Chinatown, that it shared with numerous other community groups.

The Centre Street location opened without fanfare late last month, and many of the artifacts collected over the years are still in transit from one building to the other. On Sept. 22 the museum is scheduled to hold a grand opening ceremony at the new building, when its permanent "core collection" will be unveiled, along with an exhibition of art combining the work of Chinese-American artists and Chinese artists living in the United States.

Ms. Mong, who formally assumes her new duties next week, comes to the museum from the Committee of 100, a Chinese-American leadership group whose founders include I. M. Pei and Yo-Yo Ma. Born in Taiwan and raised in Virginia and Ohio, she said she envisioned the expanded version of the museum as a place that would attract not just Chinatown residents and non-Chinese New Yorkers but also "tourists from Tennessee and Qingdao."

Sam Quan Krueger, the museum's chief operating officer, said: "The Committee of 100 is known as a network of prominent Chinese-Americans, the movers and shakers. So Alice's coming here is a boon to our ability to raise individual capital while tapping into the vibrancy of the Chinese-American community."

In this initial phase, with most exhibits still being installed, the museum is open only on Thursdays, with no admission charged. After the formal inauguration ceremonies it will be open Thursday through Monday, with an admission charge of $7 for adults and $4 for students and those 65 and over.

The new museum's first public offering is the Chinatown Film Project, which began last week and will continue on Thursdays throughout the summer. Ten directors based in New York City, some of them of Chinese descent but most not, were commissioned to make short films, less than 10 minutes long, focusing on some aspect of daily life in Chinatown.

The results include impressionistic, plotless efforts like Wayne Wang and Richard Wong's "Tuesday" and Jem Cohen's "New York Night Scene" as well as story-driven shorts like Rose Troche's "Sunday at 6" and Cary Fukunaga's "Kiwi Lotion." Once the museum has opened fully, the films will be shown in rotation throughout the day until year's end.

Karin Chien, the film project's producer and curator, said she hoped the new, larger museum and the chance it offers to showcase Chinese-American or Asian-American films and performers, from spoken word artists to musicians, would "facilitate a huge renaissance for Chinatown."

"In the same way that the museum is expanding physically," she added, "it wants to expand the scope of the media and artists it works with and the audience it attracts, and this seemed a good way to start."

Two other events scheduled for this month also exemplify that approach. On Saturday the museum will be the host of Asian-American ComiCon, an event devoted to the role of Asians and Asian-Americans in comics and graphic fiction, and on July 24 through July 26, part of the 32nd annual Asian American International Film Festival, for years a staple event at the Asia Society, will be held there.

One section of the museum's permanent exhibition that is already up and running, a multi-media presentation called "core portraits," focuses on Chinese-Americans who in one way or another "exemplify a particular historical period." The 10 subjects include a celebrity, the silent film era actress Anna May Wong, but the display also incorporates a restaurateur, a laundryman and the first Chinese graduate of an American university, Yung Wing, who studied at Yale in the mid-19th century.

Each of the video portraits runs three to five minutes and is accompanied by a scripted first-person monologue, delivered in English, that is based on statements made by the subject. Those texts have been written by some of the country's most prominent Chinese-American literary figures, including David Henry Hwang, Maxine Hong Kingston, Gish Jen and Ha Jin.

"I think this museum can be a way for us to celebrate and investigate the role that Chinese people have played in building this country," said Mr. Hwang, a playwright whose work includes "M. Butterfly" and "FOB." "It is important to have an institution that can make the statement that we have always been a critical part of American history and at the same time ask what it really means to be a Chinese-American."

Until Sept. 22 the Museum of Chinese in America is open on Thursdays, at 211-215 Centre Street, between Howard and Grand Streets, Lower Manhattan, (212) 619-4785, mocanyc.org.

http://www.nytimes.com/2009/07/09/arts/design/09chinatown.html?_r=1

Computer learns sign language by watching TV

- 14:03 08 July 2009 by **Colin Barras**

It's not only humans that can learn from watching television. Software developed in the UK has worked out the basics of sign language by absorbing TV shows that are both subtitled and signed.While almost all shows are broadcast with subtitles, some are also accompanied with sign language because it is easier for many deaf people to follow. Shows with both text and signing are a bit like a Rosetta Stone – a carving that provided the breakthrough in decoding Egyptian hieroglyphics from an adjacent translation in classical Greek.

So Patrick Buehler and Andrew Zisserman at the University of Oxford, along with Mark Everingham at the University of Leeds set out to see if software that can already interpret the typed word could learn British Sign Language from video footage.

Sign of the times

They first designed an algorithm to recognise the gestures made by the signer. The software uses the arms to work out the rough location of the fast-moving hands, and identifies flesh-coloured pixels in those areas to reveal precise hand shapes. Once the team were confident the computer could identify different signs in this way, they exposed it to around 10 hours of TV footage that was both signed and subtitled. They tasked the software with learning the signs for a mixture of 210 nouns and adjectives that appeared multiple times during the footage. The program did so by analysing the signs that accompanied each of those words whenever it appeared in the subtitles. Where it was not obvious which part of a signing sequence relates to the given keyword, the system compared multiple occurrences of a word to pinpoint the correct sign.

Starting without any knowledge of the signs for those 210 words, the software correctly learnt 136 of them, or 65 per cent, says Everingham. "Some words have different signs depending on the context – for example, cutting a tree has a different sign to cutting a rose." he says, so this is a high success rate given the complexity of the task.

Signing avatars

Helen Cooper and Richard Bowden at the University of Surrey, UK, have used the same software in a different way to teach their own computer sign language."Our approach achieves higher accuracy levels with less data," Cooper says. To get such good results, she and Bowden get the software to scan all the signs in a video sequence and identify those that appear frequently and so likely represent common words. The meaning of each of those signs is then determined by referring to the subtitles.

"That approach is very scalable – it can run quickly on large amounts of data," says Everingham. But he thinks that it leaves the software less able to distinguish between terms than using his team's more word-specific method.Both approaches, though, could be more than just academic demonstrations of the power of software. They could be used to create a way to automatically animate digital avatars that could fluently sign alongside any TV programme. Previous attempts to do this resulted in avatars that appear clunky to people fluent in sign language, says Everingham.

Everingham and colleagues, and Cooper and Bowden, presented their work at the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR 2009) in Miami Beach, Florida, last week.

http://www.newscientist.com/article/dn17431-computer-learns-sign-language-by-watching-tv.html

A Salute to the Wheel

Always cited as the hallmark of man's innovation, here is the real story behind the wheel – from its origins to its reinvention

- By Megan Gambino
- Smithsonian.com, June 18, 2009

It's fair to say that when an advertisement describes a septic tank as "the best invention since the wheel," we've begun to take our round, load-bearing companion for granted.

In light of Smithsonian's special July coverage of the frontiers of innovation, we thought this would be an appropriate time to pay tribute to one of the origins of innovation by sharing some intriguing, little-known facts about the wheel.

No wheels exist in nature.

Throughout history, most inventions were inspired by the natural world. The idea for the pitchfork and table fork came from forked sticks; the airplane from gliding birds. But the wheel is one hundred percent *homo sapien* innovation. As Michael LaBarbera—a professor of biology and anatomy at the University of Chicago—wrote in a 1983 issue of *The American Naturalist*, only bacterial flagella, dung beetles and tumbleweeds come close. And even they are "wheeled organisms" in the loosest use of the term, since they use rolling as a form of locomotion.

The wheel was a relative latecomer.

We tend to think that inventing the wheel was item number two on our to-do list after learning to walk upright. But several significant inventions predated the wheel by thousands of years: sewing needles, woven cloth, rope, basket weaving, boats and even the flute.

The first wheels were not used for transportation.

Evidence indicates they were created to serve as potter's wheels around 3500 B.C. in Mesopotamia—300 years before someone figured out to use them for chariots.

The ancient Greeks invented Western philosophy&hellipand the wheelbarrow.

Researchers believe that the wheelbarrow first appeared in classical Greece, sometime between the sixth and fourth centuries B.C., then sprung up in China four centuries later and ended up in medieval Europe, perhaps by way of Byzantium or the Islamic world. Although wheelbarrows were expensive to purchase, they could pay for themselves in just 3 or 4 days in terms of labor savings.

Art historian Andrea Matthies has found comical illustrations, one from the 15th century, showing members of the upper classes being pushed to hell in a wheelbarrow—quite possibly the origin for the expression "to hell in a handbasket."

Wheel of Fortune: More than just a game show.

The Wheel of Fortune, or *Rota Fortunae*, is much older than Pat Sajak. In fact, the wheel, which the goddess Fortuna spins to determine the fate of those she looks upon, is an ancient concept of either Greek or Roman origin, depending on which academic you talk to. Roman scholar Cicero and the Greek poet Pindar both reference the Wheel of Fortune. In *The Canterbury Tales*, Geoffrey Chaucer uses the Wheel of Fortune to describe the tragic fall of several historical figures in his Monk's Tale. And William Shakespeare alludes to it in a few of his plays. "Fortune, good night, smile once more; turn thy wheel!" says a disguised Earl of Kent in *King Lear*.

Camels 1; Wheel 0

Camels supplanted the wheel as the standard mode of transportation in the Middle East and northern Africa between the second and the sixth centuries A.D. Richard Bulliet cites several possible reasons in his 1975 book, *The Camel and the Wheel*, including the decline of roads after the fall of the Roman Empire and the invention of the camel saddle between 500 and 100 B.C. Despite abandoning the wheel for hauling purposes, Middle Eastern societies continued to use wheels for tasks such as irrigation, milling and pottery.

"Breaking on the wheel" was a form of capital punishment in the Middle Ages.

This type of execution was medieval even by medieval standards. A person could be stretched across the face of a wheel and bludgeoned to death or have an iron-rimmed wheel pounded across the person's bones with a hammer. In another variation, Saint Catherine of Alexandria was wrapped around the rim of a spiked wheel and rolled across the ground in the early fourth century. Legend has it that the wheel "divinely" broke—sparing St. Catherine's life, until the Romans beheaded her. Since then, the breaking wheel has also been called the "Catherine Wheel." St. Catherine was named the patron saint of wheelwrights.

The oldest, most common design for a perpetual motion device is the overbalanced wheel.

For centuries, tinkerers, philosophers, mathematicians and crackpots have tried to design perpetual motion devices that, once set in motion, would continue forever, producing more energy than they consume. One common take on this machine is a wheel or water mill that uses changes in weight to continually rotate. The overbalanced wheel, for example, has weighted arms attached to the rim of the wheel that fold down or extend out. But no matter what the design, they all violate the first and second laws of thermodynamics, which state, respectively, that energy cannot be created or destroyed and that some energy is always lost in converting heat to work. The U.S. patent office refuses to assess claims for perpetual motion devices unless the inventors can produce working models.

Life, liberty and the pursuit of patents.

According to the U.S. Patent and Trademark Office, the first patent involving a wheel was issued to James Macomb of Princeton, New Jersey, on August 26, 1791—just one year after the U.S. Patent Law was passed. Macomb's invention was a design for a horizontal, hollow water wheel to create hydropower for mills. Although the patent office is aware of this patent being issued, the original record was destroyed along with other patents from the 18th century in an 1836 fire.

The earliest wheels in North America were used for toys.

In the 1940s, archaeologists unearthed wheeled toys—ceramic dogs and other animals with wheels as legs—in pre-Colombian layers of sediment in Vera Cruz, Mexico. The indigenous peoples of North America, however, would not use wheels for transportation until the arrival of European settlers.

Roulette means "small wheel" in French.

The origin of the gambling game roulette is a bit hazy. Some sources say Blaise Pascal, a 17th-century French mathematician, invented it in his attempts to create a perpetual motion device. But what's more commonly accepted is that roulette is an 18th century French creation that combined several existing games.

The term "fifth wheel" comes from a part that was often used in carriages.

By definition, a fifth wheel is a wheel or a portion of a wheel with two parts rotating on each other that sits on the front axle of a carriage and adds extra support so it doesn't tip. But it's superfluous, really—which is why calling someone a "fifth wheel" is a way of calling them unnecessary, basically a tagalong.

How the bicycle ruined enlightened conversation.

As reported in the *New York Times*, an 1896 column in the *London Spectator* mourned the impact of the bicycle on British society: "The phase of the wheel's influence that strike &hellipmost forcibly is, to put it briefly, the abolition of dinner and the advent of lunch&hellip.If people can pedal away ten miles or so in the middle of the day to a lunch for which they need no dress, where the talk is haphazard, varied, light, and only too easy; and then glide back in the cool of the afternoon to dine quietly and get early to bed&hellipconversation of the more serious type will tend to go out."

The first Ferris Wheel was built to rival the Eiffel Tower.

Norman Anderson, author of *Ferris Wheels: An Illustrated History*, surmises that the first pleasure wheels, or early Ferris Wheels, were probably just wheels with buckets, used to raise water from a stream, that children would playfully grab hold of for a ride. But it was the "revolving wheel, 250 feet in diameter and capable of carrying 2,160 persons per trip," invented by George Washington Gale Ferris, Jr. and unveiled at Chicago's World Columbian Fair in 1893, that really brought the Ferris Wheel to the carnival scene. The fair celebrated the 400th anniversary of Columbus's discovery of the New World, and organizers wanted a centerpiece like the 984-foot Eiffel Tower that was created for the Paris Exposition of 1889. Ferris answered that call. He apparently told the press that he sketched every detail of his Ferris wheel over a dinner at a Chicago chophouse, and no detail needed changing in its execution.

In movies and on TV, wheels appear to rotate in reverse.

Movie cameras typically operate at a speed of about 24 frames per second. So basically, if a spoke of a wheel is in a 12 o'clock position in one frame and then in the next frame, the spoke previously in the 9 o'clock position has moved to 12 o'clock, then the wheel appears stationary. But if in that frame another

spoke is in the 11:30 position, then it appears to be revolving backwards. This optical illusion, called the wagon wheel effect, also can occur in the presence of a strobe light.

One man actually succeeded in reinventing the wheel.

John Keogh, a freelance patent lawyer in Australia, submitted a patent application for a "circular transportation facilitation device" in May 2001, shortly after a new patent system was introduced in Australia. He wanted to prove that the cheap, streamlined system, which allows inventors to draft a patent online without the help of a lawyer, was flawed. His "wheel" was issued a patent.

Find this article at:
http://www.smithsonianmag.com/science-nature/A-Salute-to-the-Wheel.html

Aquatic deer and ancient whales

Matt Walker
Editor, Earth News

If you startled a deer, you might not expect it to jump into the nearest pond and submerge itself for minutes.

But that is exactly what two species of mouse-deer in Asia do when confronted by predators, scientists have found.

One other African mouse-deer species is known to do the same thing, but the new discovery suggests all ruminants may once have had an affinity with water. It also lends support to the idea that whales evolved from water-loving creatures that looked like small deer.

There are around 10 species of mouse-deer, which are also called 'chevrotains'. All belong to the ancient ruminant family Tragulidae, which split some 50 million years ago from other ruminants, the group that went on to evolve into cattle, goats, sheep, deer and antelope.

Deer are supposed to walk on land and graze not swim underwater
Zoologist Erik Meijaard

Each is a small, deer-like creature that unusually does not have antlers or horns. Instead they have large upper canine teeth, which in the males project down either side of the lower jaw. The largest species, which stands no more than 80cm tall, lives in Africa and is thought to be the most primitive of all mouse-deer. Known as the water-chevrotain, this animal likes to live in swampy habitats. When alarmed, it dashes for the nearest river where it submerges and swims underwater to safety.

All of the other species of mouse-deer, which live in southeast Asia and India and Sri Lanka were thought to be dry-land animals.

Diving deer

That was until researchers witnessed some remarkable behaviour during two separate incidents.

The first occurred in June 2008 during a biodiversity survey in northern Central Kalimantan Province in Borneo, Indonesia. During the survey, observers saw a mouse-deer swimming in a forest stream. When the animal noticed the observers it submerged. Over the next hour, they saw it come to the surface four or five times, and maybe more unseen. But it often remained submerged for more than five minutes at a time.

Eventually the observers caught the animal, which they identified as a pregnant female, then released it unharmed. Among the survey team was the wife of Erik Meijaard, a senior ecologist working with the Nature Conservancy in Balikpapan, Indonesia.

Meijaard knew of anecdotal reports by local people who described deer hiding in creeks and rivers when chased by their dogs. When he saw photos of the deer he identified it as a greater mouse-deer (*Tragulus napu*). The same year, Meijaard also heard reports of a mouse-deer in Sri Lanka that had also been seen swimming underwater.

Three observers saw a mountain mouse-deer (*Moschiola* spp) run into a pond and start to swim, hotly pursued by a brown mongoose. The mouse-deer submerged itself, and eventually the mongoose retreated. The deer left the water only to be chased straight back into it by the mongoose.

"It came running again and dived into the water and swam underwater. I photographed this clearly and it became clear to me at this stage that swimming was an established part of its escape repertoire," says Gehan de Silva Wijeyeratne, who saw the incident. "Seeing it swim underwater was a shock. Many mammals can swim in water. But other than those which are adapted for an aquatic existence, swimming is clumsy. The mouse-deer seemed comfortable, it seemed adapted," he says.

Origins of whales

Meijaard, Wijeyeratne and Umilaela, who saw the submerged Bornean mouse-deer, describe both incidents in the journal *Mammalian Biology* . "This is the first time that this behaviour has been described for Asian mouse-deer species," says Meijaard. "I was very excited when I heard the mouse-deer stories because it resolved one of those mysteries that local people had told me about but that had remained hidden to science." "The behaviour is interesting because it is unexpected. Deer are supposed to walk on land and graze not swim underwater. But more interestingly for the zoologist are the evolutionary implications," he says.

The behaviour bolsters one leading theory regarding the origin of whales. In 2007, scientists led by Hans Thewissen of the Northeastern Ohio Universities College of Medicine in Ohio published details of a remarkable fossil called *Indohyus* . This fossil was of a ruminant animal that looked like a small deer, but also had morphological features that showed it could be an ancestor of early whales.

Although speculative, that suggests that all early ruminants may also have led a partially aquatic lifestyle. The discovery that two Asian species of mouse-deer are comfortable underwater shows that at least three species of modern tragulid share an aquatic escape behaviour. Because these species diverged at least 35 million years ago, their ancestor also likely behaved in the same way, again bolstering the the idea that a deer-like ruminant may have evolved to produce the modern cetacean group of whales and dolphins.

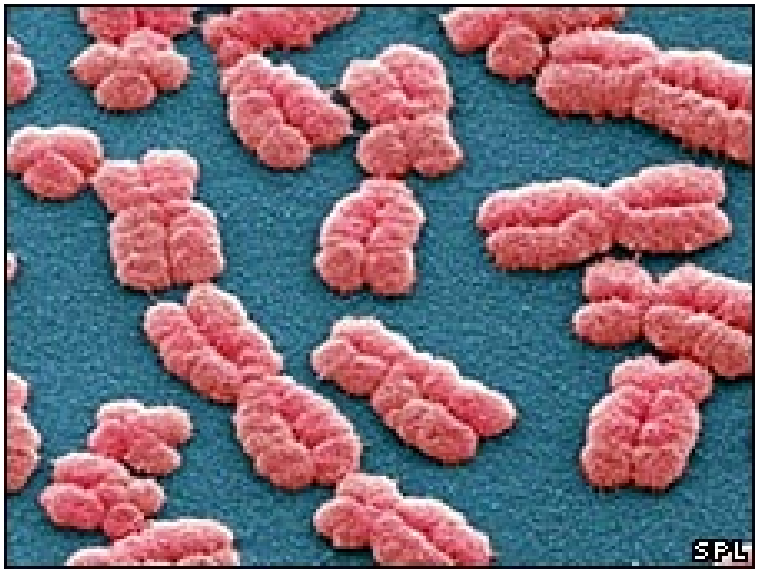
Hippos, the closest modern relative of whales, also dive for water when threatened, a behaviour that may have been lost over time by other modern species such as sheep and antelope.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8137000/8137922.stm

Published: 2009/07/07 11:00:56 GMT

Call for tougher gene test rules

The private gene testing industry must be more tightly regulated, peers say.



The House of Lords Science and Technology Committee said a code of conduct was needed to stop bogus claims being made.

The report also said the tests, which predict the risk of disease later in life, needed to be more thoroughly reviewed before being marketed.

But the unequal provision of services in the NHS was criticised as well. Experts welcomed the report.

The completion of the human genome map in 2000 has led to a boom in genetic research and services.

Until then, much of the focus was on single-gene disorders, such as Huntingdon's and cystic fibrosis.

But the breakthrough led to the possibility of new and better screening and treatment for a range of more complex disorders.

" **We must act now to prepare the health service and the public to gain maximum benefits from genomic medicine** "
Sir Mark Walport Wellcome Trust

Health firms have already started to exploit the issue by offering genetic testing, which can give people an idea of the risk they face of getting a range of diseases from heart disease to Alzheimer's.

The committee said it was concerned that unproven claims were being made and that individuals were not being offered the proper support and counselling to understand and cope with the results.

It said a voluntary code should be introduced to improve standards - official regulators are powerless to act as many of the companies offering such tests are based outside the UK and sell their services over the internet.

The peers said the EU could also re-classify genetic testing from low to medium risk to reflect the psychological impact the results can have.

This would mean they would be subject to more through pre-market reviews.

It also said mainstream NHS staff outside specialist genetic departments needed more training to help them deal with the "increasing demands" being placed on them by people worried about test results.

But the committee also said there was unequal access to genetic services provided by the NHS.

Genetic testing and subsequent treatment is already available for a range of disorders, such as breast cancer, as well as to work out which drugs an individual responds best to.

The report said individual trusts needed more help to develop and set up specialist genetic services as the issue was only going to become more pressing in the future.

'Blueprint'

Lord Patel, chairman of the report, said it was essential for the government to produce a new policy paper on the issue as the last was six years ago and was now out-of-date.

He added: "It is an ever-developing technology that presents both challenges and exciting opportunities."

Sir Mark Walport, director of the Wellcome Trust, said the report offered a "much-needed blueprint" for the future.

"We must act now to prepare the health service and the public to gain maximum benefits from genomic medicine."

The call for better regulation of the private testing market was even welcomed by firms working in the industry.

Brian Whitley, founder of GeneticHealth, a UK company which offers genetic testing but does not sell over the internet, said he was "very much" in support of better regulation.

"It is completely wrong to give people results without offering counselling."

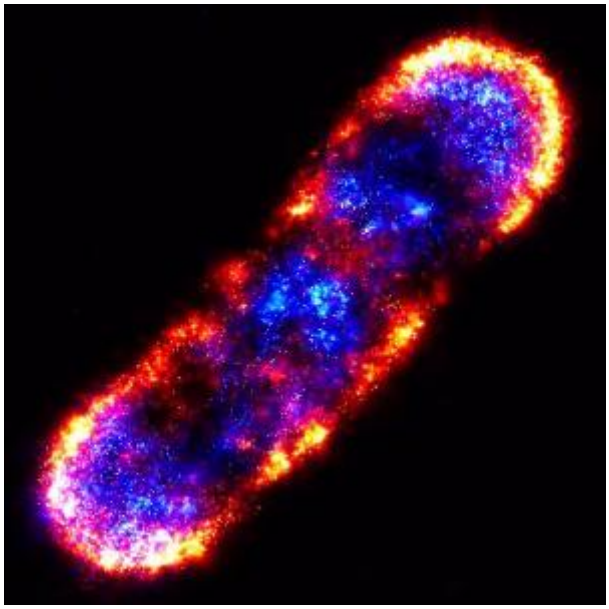
A spokeswoman for the Department of Health said the government was fully-committed to "harnessing the potential" of genetic testing and research.

"We will carefully consider the recommendations before formally responding."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8136776.stm

Published: 2009/07/06 23:39:40 GMT

Spontaneous Assembly: A New Look At How Proteins Assemble And Organize Themselves Into Complex Patterns



PALM is an an ultrahigh-precision visible light microscopy technique that enables scientists to photo-actively fluoresce and image individual proteins. This PALM composite of an E.coli bacterial cell shows the organization of proteins in the chemotaxis signaling network. (Credit: Image courtesy of DOE/Lawrence Berkeley National Laboratory)

ScienceDaily (July 9, 2009) — Self-assembling and self-organizing systems are the Holy Grails of nanotechnology, but nature has been producing such systems for millions of years. A team of scientists has taken a unique look at how thousands of bacterial membrane proteins are able to assemble into clusters that direct cell movement to select chemicals in their environment. Their results provide valuable insight into how complex periodic patterns in biological systems can be generated and repaired.

Researchers with Berkeley Lab, the University of California (UC) Berkeley, the Howard Hughes Medical Institute, and Princeton University, used an ultrahigh-precision visible light microscopy technique called PALM - for Photo-Activated Localization Microscopy - to show that the chemotaxis network of signaling proteins in E.coli bacteria is able to spontaneously form from clusters of proteins without being actively distributed or attached to specific locations in cells. This simple organizational mechanism - dubbed "stochastic self-assembly" - is related to the self-organizing patterns first described in 1952 by the British computer scientist Alan Turing.

"It is not widely appreciated that complex periodic patterns can spontaneously emerge from simple mechanisms, but that is probably what is happening here," said Jan Liphardt, the biophysicist who led this research.

Liphardt holds a joint appointment with Berkeley Lab's Physical Biosciences Division and UC Berkeley's Physics Department. He is the principal author of a paper now available *PLoS Biology*. Co-authoring the paper with Liphardt were Derek Greenfield, Ann McEvoy, Hari Shroff, Gavin Crooks, Ned Wingreen and Eric Betzig.

Key to a cell's survival is the manner in which its critical components - proteins, lipids, nucleic acids, etc. - are arranged. For cells to thrive, the organization of these components must be optimized for their respective activities and also reproducible for succeeding generations of cells. Eukaryotic cells feature distinct subcellular structures, such as membrane-bound organelles and protein transport systems, whose

complex organization is readily apparent. However, there is also complex spatial organization to be found within prokaryotic cells, such as rod-shaped bacteria like E. coli.

"It has remained somewhat mysterious how bacteria are able to organize and spatially segregate their interiors and membranes," said Liphardt. "Two cells which are biochemically identical can have very different behaviors, depending upon their spatial organization. With new technologies such as PALM, we are able to see exactly how cells are organized and relate spatial organization with biological function."

PALM and the Chemotaxis Network

In the PALM technique, target proteins are labeled with tags that fluoresce when activated by weak ultraviolet light. By keeping the intensity of this light sufficiently low, researchers can photoactivate individual proteins.

"Since individual proteins are imaged one at a time, we can localize and count them, and then computationally assemble the locations of all proteins into a composite, high-precision image," said Liphardt. "With other technologies, we have to choose between observing large clusters or observing single proteins. With PALM, we can examine a cell and see single proteins, protein dimers, and so forth, all the way up to large clusters containing thousands of proteins. This enables us to see the relative organization of individual proteins within clusters and at the same time see how clusters are arranged with respect to one-another."

Liphardt and his colleagues applied the PALM technique to the E.coli chemotaxis network of signaling proteins, which direct the movement of the bacteria towards or away from sugars, amino acids, and many other soluble molecules in response to environmental cues. The E.coli chemotaxis network is one of the best-understood of all biological signaling systems and is a model for studying bacterial spatial organization because its components display a nonrandom, periodic distribution in the cell membrane.

"Chemotaxis proteins cluster into large sensory complexes that localize to the poles of the bacterial cell," Liphardt said. "We wanted to understand how these clusters form, what controls their size and density, and how the cellular location of clusters is robustly maintained in growing and dividing cells."

Using PALM, Liphardt and his colleagues mapped the cellular locations of three proteins central to the chemotaxis signaling network - Tar, CheY and CheW - with a mean precision of 15 nanometers. They found that cluster sizes were distributed with no one size being "characteristic." For example, a third of the Tar proteins were part of smaller lateral clusters and not of the large polar clusters. Analysis of the relative cellular locations of more than one million individual proteins from 326 cells determined that they are not actively distributed or attached to specific locations in cells, as had been hypothesized.

"Instead," said Liphardt, "random lateral protein diffusion and protein-protein interactions are probably sufficient to generate the observed complex, ordered patterns. This simple stochastic self-assembly mechanism, which can create and maintain periodic structures in biological membranes without direct cytoskeletal involvement or active transport, may prove to be widespread in both prokaryotic and eukaryotic cells."

Liphardt and his research group are now applying PALM to signaling complexes in eukaryotic membranes to see how widespread is stochastic self-assembly in nature. Given that biological systems are nature's version of nanotechnology, the demonstration that stochastic self-assembly is capable of organizing thousands of proteins into complex and reproducible patterns holds promise for a wide range of applications in nanotechnology, including the fabrication of nanodevices and the development of nanoelectronic circuits.

This work was funded by the U.S. Department of Energy's Office of Science, Energy Biosciences Program, the Sloan and Searle Foundations, and National Institutes of Health grants.

Journal reference:

1. Derek Greenfield, Ann L. McEvoy, Hari Shroff, Gavin E. Crooks, Ned S. Wingreen, Eric Betzig, and Jan Liphardt. **Self-Organization of the Escherichia coli Chemotaxis Network Imaged with Super-Resolution Light Microscopy**. *PLoS Biology*, 2009; 7 (6): e1000137 DOI: 10.1371/journal.pbio.1000137

Adapted from materials provided by DOE/Lawrence Berkeley National Laboratory.

http://www.sciencedaily.com/releases/2009/07/090708132820.htm

Saharan Dust Storms Linked To Enigmatic Fertilizer Plankton In Ocean

Satellite picture of Saharan sand storm above the Cape Verde Islands. (Credit: NASA)

ScienceDaily (July 9, 2009) — The tropical Atlantic waters around Cape Verde are very low in plant nutrients. Nitrogen is in especially short supply and limits the growth of the phytoplankton, the tiny plants that are at the basis of the food chain in the ocean. In this area, the nutrients fall out from the sky: Trade winds carry Saharan dust rich in iron and phosphorus which can fertilize the surface of the ocean.

This was one of the reasons for the IFM-GEOMAR and other German and UK institutions to establish an observatory on the Cape Verde island Sao Vicente. The Tenatso Observatory now supports long-term measurements of dust and greenhouse gases as well as an oceanographic mooring and regular sampling expeditions by the small Cape Verdean research vessel Islandia.

“We’re testing whether Saharan dust can promote the growth of a particular type of microbe, a cyanobacteria. These cyanobacteria can fertilize the surface of the ocean by fixing the abundant nitrogen gas that is dissolved in seawater”, says Prof. Julie LaRoche from IFM-GEOMAR, co-leader of the expedition.

There is plenty of nitrogen gas in the atmosphere but it needs to be "fixed" so that it turns into a fertilizer which is available to phytoplankton. The enigmatic cyanobacteria UCYN-A seems to be a very special nitrogen fixer. In contrast to other cyanobacteria, it is probably incapable of producing oxygen. This in turns enables it to fix nitrogen during the day while others cannot.

The Trade Winds and frequent dust storms that make this area so important for ocean research also complicate the scientists’ work. Dust samples are collected with filters on top of the atmospheric observatory. The collection of the water samples, however, requires sailing on the Islandia for several hours to the ocean observatory located 130 kilometres offshore in a surrounding water depth of 3600 metres. The samples are returned to laboratories that have been established at Cape Verde’s “National Institute for Fishery Development” where the dust experiments are conducted.

"The working conditions are difficult and some trips on the Islandia are like a roller coaster. But overall it's a very positive work experience, thanks to our supportive Cape Verdean colleagues, the crew of the Islandia, and the general ambience on the islands ", says Stefanie Sudhaus , Ph.D. student at IFM-GEOMAR and member of the last expedition. Loaded with plenty of data from their experiments and confident that the experiments will deliver new discoveries, the scientists have returned to Kiel. During the expedition they were accompanied by scientists from the Max Planck Institute for Marine Microbiology, the Alfred Wegener Institute for Polar and Marine Research, Leibniz Institute for Baltic Sea Research and the Leibniz Institute for Tropospheric Research.

Research Project at the Cape Verde

Scientists from German and Cape Verdean institutes have started collecting data at Cape Verde Observatory Tenatso in 2008, measurements that they hope to continue in order to follow the effect of global change in the tropical Atlantic Ocean. Their research is part of the SOPRAN project (Surface Ocean Processes in the Anthropocene) that is largely supported by the German Federal Ministry of Education and Research (BMBF).

Nitrogen fixers and UCYN-A

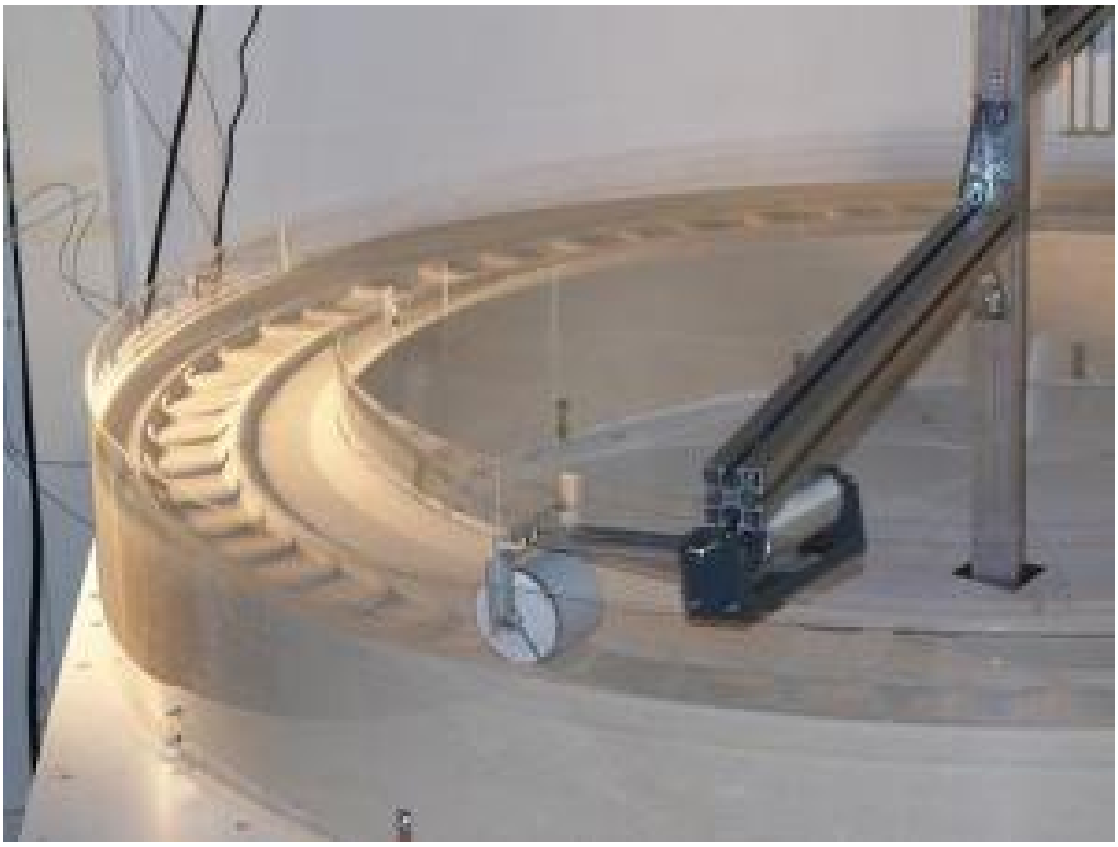
There is plenty of nitrogen gas (N2) in the atmosphere but only few organisms are able to "fix" it so that it turns into a fertilizer with biologically useful molecules. Cyanobacteria or blue-green algae are amongst the most important nitrogen-fixers. Until recently scientists thought that single-cell organisms could only fix the nitrogen during the night because during the day, oxygen is released through photosynthesis and inhibits nitrogen fixation by poisoning the enzyme responsible for it.

The cyanobacterium UCYN-A doesn't seem to work like that. It lacks the genes for photosystem II that are needed for the oxygen release and apparently cannot fix carbon dioxide into sugars. Thus, it may utilize light energy in other ways and forgoes photosynthesis, as is normally carried out by land plants and other algae. Although this organism has never been isolated in pure culture, an initial characterization of its genome was published in 2008 by the group of Jonathan Zehr at University of Santa Cruz (Zehr et al. 2008, *Science* Vol. 322 no. 5904, pp. 1110-1112).

Adapted from materials provided by Leibniz Institute of Marine Sciences (IFM-GEOMAR).

http://www.sciencedaily.com/releases/2009/06/090619125903.htm

Physics Of Bumpy Roads: What Makes Roads Ripple Like A Washboard?



Lyon washboard road experiment, featuring a wheel rolling over a bed of sand, creating ripples. (Credit: Stephen Morris)

ScienceDaily (July 9, 2009) — Just about any road with a loose surface — sand or gravel or snow — develops ripples that make driving a very shaky experience. A team of physicists from Canada, France and the United Kingdom have recreated this "washboard" phenomenon in the lab with surprising results: ripples appear even when the springy suspension of the car and the rolling shape of the wheel are eliminated. The discovery may smooth the way to designing improved suspension systems that eliminate the bumpy ride.

"The hopping of the wheel over the ripples turns out to be mathematically similar to skipping a stone over water," says University of Toronto physicist, Stephen Morris, a member of the research team.

"To understand the washboard road effect, we tried to find the simplest instance of it, he explains. We built lab experiments in which we replaced the wheel with a suspension rolling over a road with a simple inclined plow blade, without any spring or suspension, dragging over a bed of dry sand. Ripples appear when the plow moves above a certain threshold speed."

"We analyzed this threshold speed theoretically and found a connection to the physics of stone skipping. A skipping stone needs to go above a specific speed in order to develop enough force to be thrown off the surface of the water. A washboarding plow is quite similar; the main difference is that the sandy surface "remembers" its shape on later passes of the blade, amplifying the effect."

Washboard road is familiar to drivers of back country roads the world over but also appears in some other surprising places in nature and technology. Just about any time a malleable surface is acted upon by a sideways force, you will get ripples. Washboard road is analogous to the little ripples that form on wind-

or water-driven sand at the beach, and to the moguls which develop on ski hills. Motocross bikes and snowmobiles also make ripples. Washboard can also cause tiny bumps on steel railway tracks and even the read head in a hard disk can sometimes hop along the surface of the disk to make a washboard pattern.

In addition to Morris, the research collaboration includes lead author Anne-Florence Bitbol and Nicolas Taberlet of Ecole Normale Superieure in Lyon and Jim McElwaine of the University of Cambridge. Experiments were done in Cambridge and Lyon and results published in *Physical Review E* on June 26, 2009.

Adapted from materials provided by University of Toronto.

http://www.sciencedaily.com/releases/2009/07/090707131834.htm

Virus-resistant Grapevines

Virus-resistant grapevines. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (July 8, 2009) — Viruses can cost winegrowers an entire harvest. If they infest the grapevines, even pesticides are often no use. What's more, these chemicals are harmful to the environment. Researchers are growing plants that produce antibodies against the viruses and are thus immune.A good wine needs to ripen. But it's a long way to the barrel. Even before the harvest, the grapevines have to overcome all kinds of obstacles. Extremely hot or rainy periods can destroy entire crops, not to mention the wide variety of pests that can appear on the scene. Bugs such as the vine louse or the rust mite, fungi such as mildew, or viruses such as the "Grapevine fanleaf virus" (GFLV for short) can give the vines a hard time. The GFLV infects the grapevine and causes fanleaf disease, resulting in deformed and very yellowed leaves, smaller grapes and crop loss. However, there will soon be a cure for GFLV infections: Researchers at the Fraunhofer Institute for Molecular Biology and Applied Ecology IME in Aachen are making certain plants resistant to the GFLV by genetic engineering. "Our modified plants produce antibodies," explains Dr. Stefan Schillberg, head of department at the IME. "These antibodies 'recognize' the viruses and prevent them from spreading in the plant and causing damage." To enable the plant to produce the antibodies, the scientists have to modify its genotype and channel genetic information for the antibodies into it. This task is performed by tiny helpers called agrobacteria, which genetic engineers have been using for over twenty years. These are soil bacteria that inherently transfer parts of their own genome to that of the plant. Using simple routine processes, the researchers introduce the antibody gene into the bacteria, which then act as a transport vehicle and carry it over to the vine.The researchers are still testing this process on model plants, and the first results show that their modified versions are up to 100 percent resistant to the virus. "The antibody is produced very effectively inside the plants," says Schillberg. "The next step on the agenda is to test the method on actual grapevines and then to carry out field tests." The scientists' long-term goal is to curb the use of pesticides. "Certain pesticides are necessary to fight GFLV infections," Schillberg explains. But they often only have a limited effect. They are also harmful to the environment and therefore banned in many regions. Countries like Chile, for example, which depend strongly on their winegrowing business, could benefit enormously from the pathogen-resistant grapevines and improve their crop yields.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/07/090702080525.htm

New Portrait Of Omega Nebula's Glistening Watercolors

Three-colour composite image of the Omega Nebula (Messier 17), based on images obtained with the EMMI instrument on the ESO 3.58-metre New Technology Telescope at the La Silla Observatory. North is down and East is to the right in the image. It spans an angle equal to about one third the diameter of the Full Moon, corresponding to about 15 light-years at the distance of the Omega Nebula. (Credit: ESO)

ScienceDaily (July 8, 2009) — The Omega Nebula, sometimes called the Swan Nebula, is a dazzling stellar nursery located about 5500 light-years away towards the constellation of Sagittarius (the Archer). An active star-forming region of gas and dust about 15 light-years across, the nebula has recently spawned a cluster of massive, hot stars. The intense light and strong winds from these hulking infants have carved remarkable filigree structures in the gas and dust.

When seen through a small telescope the nebula has a shape that reminds some observers of the final letter of the Greek alphabet, omega, while others see a swan with its distinctive long, curved neck. Yet other nicknames for this evocative cosmic landmark include the Horseshoe and the Lobster Nebula.

Swiss astronomer Jean-Philippe Loys de Chéseaux discovered the nebula around 1745. The French comet hunter Charles Messier independently rediscovered it about twenty years later and included it as number 17 in his famous catalogue. In a small telescope, the Omega Nebula appears as an enigmatic ghostly bar of light set against the star fields of the Milky Way. Early observers were unsure whether this curiosity was really a cloud of gas or a remote cluster of stars too faint to be resolved. In 1866, William Huggins settled the debate when he confirmed the Omega Nebula to be a cloud of glowing gas, through the use of a new instrument, the astronomical spectrograph. In recent years, astronomers have discovered that the

Omega Nebula is one of the youngest and most massive star-forming regions in the Milky Way. Active star-birth started a few million years ago and continues through today. The brightly shining gas shown in this picture is just a blister erupting from the side of a much larger dark cloud of molecular gas. The dust that is so prominent in this picture comes from the remains of massive hot stars that have ended their brief lives and ejected material back into space, as well as the cosmic detritus from which future suns form.

The newly released image, obtained with the EMMI instrument attached to the ESO 3.58-metre New Technology Telescope (NTT) at La Silla, Chile, shows the central region of the Omega Nebula in exquisite detail. In 2000, another instrument on the NTT, called SOFI, captured another striking image of the nebula (ESO Press Photo 24a/00) in the near-infrared, giving astronomers a penetrating view through the obscuring dust, and clearly showing many previously hidden stars. The NASA/ESA Hubble Space Telescope has also imaged small parts of this nebula (heic0305a and heic0206d) in fine detail.

At the left of the image a huge and strangely box-shaped cloud of dust covers the glowing gas. The fascinating palette of subtle colour shades across the image comes from the presence of different gases (mostly hydrogen, but also oxygen, nitrogen and sulphur) that are glowing under the fierce ultraviolet light radiated by the hot young stars.

Adapted from materials provided by European Southern Observatory - ESO.

http://www.sciencedaily.com/releases/2009/07/090707094909.htm

Finding Fear: Neuroscientists Locate Where It Is Stored In The Brain

For the first time, neuroscientists have located the neurons responsible for fear conditioning in the mammalian brain. (Credit: iStockphoto/Kurt Paris)

ScienceDaily (July 8, 2009) — Fear is a powerful emotion, and neuroscientists have for the first time located the neurons responsible for fear conditioning in the mammalian brain. Fear conditioning is a form of Pavlovian, or associative, learning and is considered to be a model system for understanding human phobias, post-traumatic stress disorder and other anxiety disorders.

Using an imaging technique that enabled them to trace the process of neural activation in the brains of rats, University of Washington researchers have pinpointed the basolateral nucleus in the region of the brain called the of amygdala as the place where fear conditioning is encoded.

Neuroscientists previously suspected that both the amygdala and another brain region, the dorsal hippocampus, were where cues get associated when fear memories are formed. But the new work indicates that the role of the hippocampus is to process and transmit information about conditioned stimuli to the amygdala, said Ilene Bernstein, corresponding author of the new study and a UW professor of psychology.

The study is being published on July 6, in *PLoS One*, a journal of the Public Library of Science.

Associative conditioning is a basic form of learning across the animal kingdom and is regularly used in studying how brain circuits can change as a result of experience. In earlier research, UW neuroscientists looked at taste aversion, another associative learning behavior, and found that neurons critical to how people and animals learn from experience are located in the amygdala.

The new work was designed to look for where information about conditioned and unconditioned stimuli converges in the brain as fear memories are formed. The researchers used four groups of rats and placed

individual rodents inside of a chamber for 30 minutes. Three of the groups had never seen the chamber before.

When control rats were placed in the chamber, they explored it, became less active and some fell asleep. A delayed shock group also explored the chamber, became less active and after 26 minutes received an electric shock through the floor of the chamber. The third group was acclimated to the chamber by a series of 10 prior visits and then went through the same procedure as the delayed shock rats. The final group was shocked immediately upon being introduced inside the chamber.

The following day the rats were individually returned to the chamber and the researchers observed them for freezing behavior. Freezing, or not moving, is the most common behavioral measure of fear in rodents. The only rats that exhibited robust freezing were those that received the delayed shock in a chamber which was unfamiliar to them."We didn't know if we could delay the shock for 26 minutes and get a fear reaction after just one trial. I thought it would be impossible to do this with fear conditioning," said Bernstein. "This allowed us to ask where information converged in the brain."

To do this, the researchers repeated the procedure, but then killed the rats. They then took slices of the brains and used Arc catfish, an imaging technique, which allowed them to follow the pattern of neural activation in the animals.Only the delayed shock group displayed evidence of converging activation from the conditioned stimulus (the chamber) and the unconditioned stimulus (the shock). The experiment showed that animals can acquire a long-term fear when a novel context is paired with a shock 26 minutes later, but not when a familiar context is matched with a shock.

"Fear learning and taste aversion learning are both examples of associative learning in which two experiences occur together. Often they are learned very rapidly because they are critical to survival, such as avoiding dangerous places or toxic foods," said Bernstein."People have phobias that often are set off by cues from something bad that happened to them, such as being scared by a snake or being in a dark alley. So they develop an anxiety disorder," she said.

"By understanding the process of fear conditioning we might learn how to treat anxiety by making the conditioning weaker or to go away. It is also a tool for learning about these brain cells and the underlying mechanism of fear conditioning."

Co-authors of the study, all at the UW, are Sabiha Barot, who just completed her doctoral studies; Ain Chung, a doctoral student; and Jeansok Kim, an associate professor of psychology.

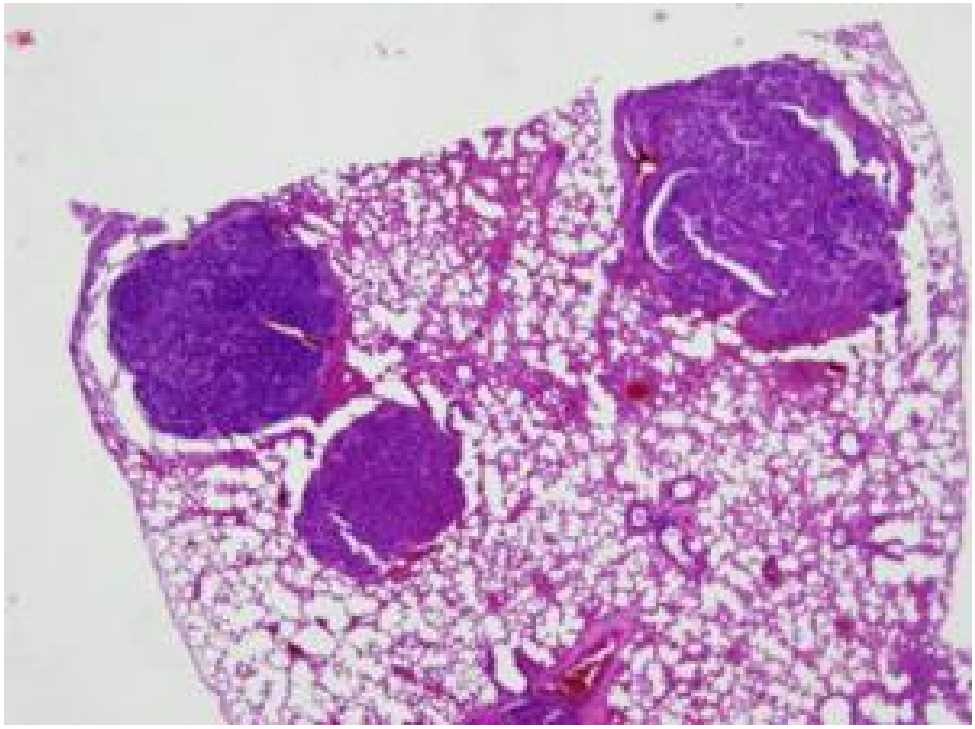
Journal reference:

1. Sabiha K. Barot, Ain Chung, Jeansok J. Kim, Ilene L. Bernstein. **Functional Imaging of Stimulus Convergence in Amygdalar Neurons during Pavlovian Fear Conditioning**. *PLoS ONE*, 2009; 4 (7): e6156 DOI: 10.1371/journal.pone.0006156

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2009/07/090707093753.htm

Genetically Engineered Mice Yield Clues To 'Knocking Out' Cancer



This is a section of lung tissue from a double knockout mouse, stained to show lung tumors. Mice lacking both the neil1 and nth1 genes were particularly prone to pulmonary and liver tumors during their second year. (Credit: Teebor, NYU)

ScienceDaily (July 8, 2009) — Deleting two genes in mice responsible for repairing DNA strands damaged by oxidation leads to several types of tumors, providing additional evidence that such stress contributes to the development of cancer. That's the conclusion of a recent study in DNA Repair by researchers at the National Institute of Standards and Technology (NIST), Oregon Health and Science University (OHSU) and the New York University School of Medicine (NYUSM).

Although all cells need oxygen to survive, the element also can be stressful to cells and their components—particularly DNA—as part of "reactive species" in the environment, such as free radicals and peroxides. The damage levied on DNA by these compounds can include lesions, breaks, cross-links and deletions—errors in our normal genetic codes that, if left unchecked, may accelerate the aging process and increase susceptibility to several disease states. In humans, DNA repair genes produce enzymes called DNA glycosylases that excise sections of DNA strands already modified by oxidative stress, and thus protect the genetic material.

One of these repair genes, neil1, was identified and characterized in 2002 by Sankar Mitra and his team at the University of Texas Medical Branch in collaboration with NIST researchers Miral Dizdaroglu and Pawel Jaruga. The gene produces a DNA repair protein, NEIL1 that is nearly identical in humans and mice. Therefore, a mouse serves a perfect model for studying the biological function of the neil1 gene in both species.

To do this, OHSU researchers under R. Stephen Lloyd genetically engineered mice without the neil1 gene (known as neil1 knockout mice). During their first 6-10 months of life, the majority of male mice developed severe obesity, dyslipidemia (abnormal levels of lipids in the blood), fatty liver disease and hyperinsulinemia (excess levels of circulating insulin in the blood). In humans, these disorders are collectively known as metabolic syndrome, a condition that affects more than 40 million persons in the United States.

In collaboration with Dr. Lloyd's group, a second research team under George W. Teebor at NYUSM engineered mice that were missing either the neil1 or the nth1 gene (nth1 encodes for another DNA glycosylase, the NTH1 protein) or both these genes. These latter are known as neil1/nth1 double knockouts. NIST's Dizdaroglu and guest researchers Pawel Jaruga and Güldal Kirkali found that both types of knockout mice exhibited significant accumulation of two lesions called formamidopyrimidines in the DNA of the liver, kidney and brain. This indicates that there was a lack of DNA repair in these organs.

During the second year of life, both types of mice also developed pulmonary and hepatocellular (liver cell) tumors. Double knockout mice had a higher incidence of tumors than the single knockouts.

The researchers state that their results emphasize the role of DNA repair in preventing carcinogenesis. The work may lead to the development of new measurement methods and reference materials for accurate and reproducible assessments of DNA damage and repair and contribute to understanding the role of oxidatively induced DNA damage and its repair in carcinogenesis. Future studies will focus on the role of NEIL1 in disease processes.

Journal reference:

1. Chan et al. **Targeted deletion of the genes encoding NTH1 and NEIL1 DNA N-glycosylases reveals the existence of novel carcinogenic oxidative damage to DNA□**. *DNA Repair*, 2009; 8 (7): 786 DOI: 10.1016/j.dnarep.2009.03.001

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

http://www.sciencedaily.com/releases/2009/07/090701102956.htm

Immobilized Microbes Can Break Down Potentially Harmful Phthalates

Plastic bottles and other pollution on the shore of Bicaz Lake, Romania. Phthalic Acid Esters (PAEs), commonly known as phthalates, are widely used as additives in polymer manufacture as plasticizers. (Credit: iStockphoto/Stéphane Bidouze)

ScienceDaily (July 8, 2009) — Immobilized microbes can break down potentially harmful phthalates, according to researchers in China, writing in the *International Journal of Environment and Pollution*. The microbes might be used to treat industrial waste water and so prevent these materials from entering the environment.

Phthalic Acid Esters (PAEs), commonly known as phthalates, are widely used as additives in polymer manufacture as plasticizers. They do not readily degrade in the environment and so have become widely distributed in natural water, wastewater, soils, and sediment.

Concerns about their suspected ability to cause genetic mutations and cancer have led to their listing as priority pollutants by the US Environmental Protection Agency, the European Union, the China National Environmental Monitoring Centre, and other regulatory authorities.

Weizhong Wu of the College of Environmental Sciences and Engineering, at Peking University, in Beijing, and Xianlin Meng of Harbin Institute of Technology, in Nangang District, have identified and isolated a microbe that can digest one of the most common PAEs, d-n-butyl phthalate. This compound is widely used and is one of the most frequently found in diverse environmental samples including groundwater, river water, drinking water, open ocean water, soil humates, lake sediments and marine sediments, the researchers say.

They have now used acclimation and enrichment techniques to ferment adequate quantities of the active microbe, which was obtained from the activated sludge from a wastewater treatment plant. It was enriched and acclimated by incubating activated sludge. This involves cultivating the microbes in a solution containing phthalate as the only source of carbon for the microbes. Successive divisions of

microbial cells quickly leads to the evolution of a strain that can quickly metabolize the phthalate and convert it into the raw materials for microbial growth and reproduction.

The researchers then tested this phthalate-digesting microbe by immobilizing cells on a new type of ceramic honeycomb support. They then measured the before and after concentration of phthalate in a simulated wastewater sample. Initial concentration was 100 milligrams per liter which fell to less than 1.0 milligram per liter within two days of treatment with the microbial honeycomb.

The team points out that the rate of degradation was two and a half times faster with immobilized microbes than with microbes floating free in the sample.

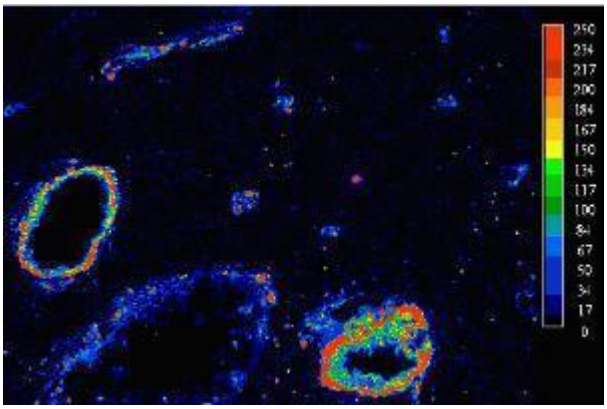
Journal reference:

1. . **Biodegradation of plasticiser di-n-butyl phthalate by immobilised microbial cells**. *Int. J. Environment and Pollution*, 2009, 38, 203-211

Adapted from materials provided by Inderscience Publishers, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090619112325.htm

Mummified Dinosaur Skin Yields Up New Secrets



Microprobe image of silicon distribution in a tendon from Dakota. (Credit: Image courtesy of University of Manchester)

ScienceDaily (July 8, 2009) — Scientists from The University of Manchester have identified preserved organic molecules in the skin of a dinosaur that died around 66-million years ago.

The well-preserved fossil of the plant-eating hadrosaur – known as 'Dakota' – has been analysed by researchers writing in the journal *Proceedings of the Royal Society B.*

The team report how the fossil's soft tissues were spared from decay by fine sediments that formed a mineral cast.

A wide range of tests have shown that the fossil still holds cell-like structures, although the constituent proteins have decayed.Advanced imaging and chemical techniques have revealed that the mummified duckbilled dinosaur had two layers of skin – just like the skin of modern birds and reptiles, which scientists believe are closely related to duckbilled dinosaurs.

They believe the hippo-sized Dakota fell into a watery grave, with little oxygen present to speed along the decay process. Meanwhile, very fine sediments reacted with the soft tissues of the animal, forming a kind of cement.

As a result, the 66 million-year-old fossil still retains some of the organic matter of the original dinosaur, mixed in with the minerals.

"You're looking at cell-like structures; you slice through this and you're looking at the cell structure of dinosaur skin," said Dr Phil Manning, Senior Lecturer in Palaeontology & Research Fellow School of Earth, Atmospheric & Environmental Sciences (SEAES). "That is absolutely gobsmacking."

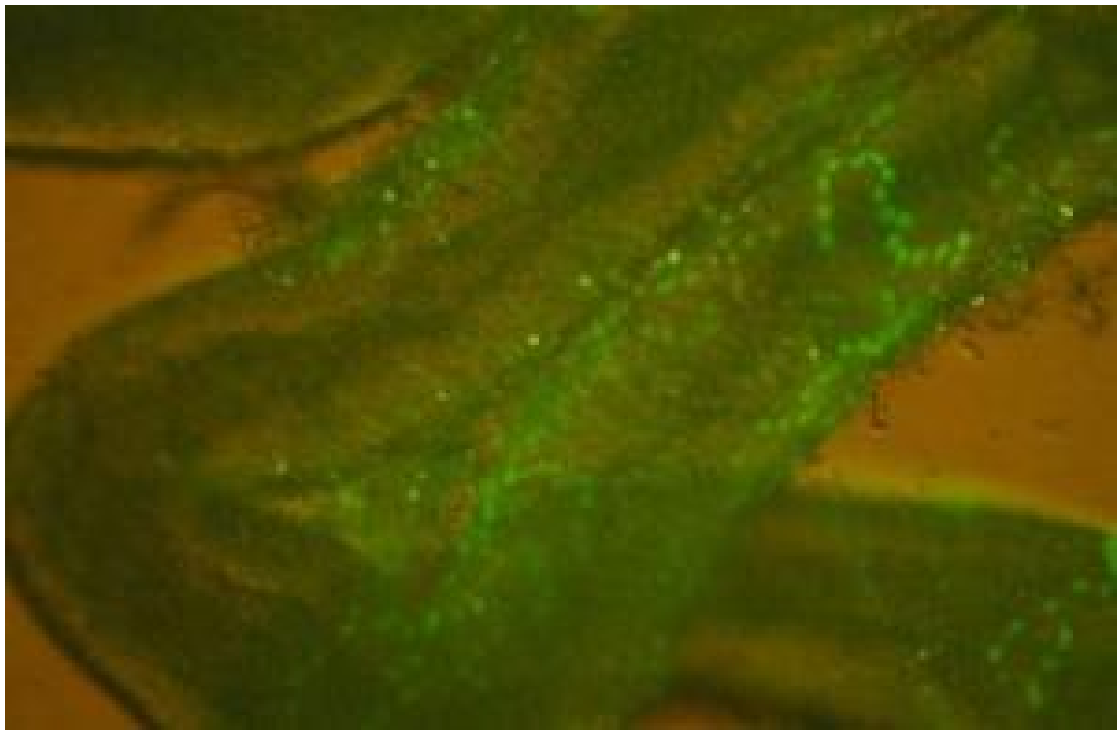
The Manchester research team comprised Dr Phil Manning (SEAES and Manchester Museum), Peter Morris (SEAES and the Williamson Research Centre for Molecular Environmental Science), Adam McMahon and Emrys Jones (Wolfson Molecular Imaging Centre), Andy Gize and Joe Macquaker (SEAES), Prof Simon Gaskell and Onrapak Reamtong (Manchester Interdisciplinary Biocentre), Dr Bill Sellers (Faculty of Life Science), Bart van Dongen (SEAES and Williamson Research Centre for Molecular Environmental Science), Mike Buckley and Dr Roy Wogelius (SEAES and Williamson Research Centre for Molecular Environmental Science)

Scientists at The University of Liverpool, Manchester Metropolitain University, Yale University and The University of York also took part in the study.

Adapted from materials provided by University of Manchester.

http://www.sciencedaily.com/releases/2009/07/090707203728.htm

Scientists Reprogram Clearly Defined Adult Cells Into Pluripotent Stem Cells -- Directly And Without Viruses



These are unipotent germline stem cells (fluorescent green) in the sperm duct of a mouse testis. (Credit: Image: MPI Münster / Kinarm Ko)

ScienceDaily (July 8, 2009) — Kinarm Ko and Hans Schöler's team at the Max Planck Institute for Molecular Biomedicine in Münster have succeeded for the first time in culturing a clearly defined cell type from the testis of adult mice and converting these cells into pluripotent stem cells without introduced genes, viruses or reprogramming proteins. These stem cells have the capacity to generate all types of body tissue. The culture conditions alone were the crucial factor behind the success of the reprogramming process.

The testis is a sensitive organ and an astonishing one at that. Even at the age of 70, 80 or 85, men have cells that constantly produce new sperm. Therefore, they can conceive embryos and become fathers at almost any age - assuming they can find a sufficiently young female partner. Based on this, researchers have long assumed that cells from the testis have a similar potential as in embryonic stem cells: that is, a pluripotency that enables them to form over 200 of the body's cell types.

In fact, a number of researchers have recently stumbled on the multiple talents in the male gonads of humans and mice. It all began with the work of Takashi Shinohara's team in 2004. The Japanese scientists discovered that, like embryonic stem cells, certain cells in the testis of newborn mice are able to develop into different kinds of tissue. In 2006, scientists working with Gerd Hasenfuß and Wolfgang Engel in Göttigen reported that such adaptable cells can also be found in adult male mice. Additionally, Thomas Skutella and his colleagues at the University of Tübingen recently made headlines when they cultured comparable cells from human testis tissue.

A bewildering variety of cells

"At first glance, it would appear that it has long been established that pluripotent cells exist in the testis of adult humans and mice," says Schöler. "However, it is often unclear as to exactly which cells are being referred to in the literature and what these cells can actually do." (See *Background Information)

This is not only due to the fact that the testis contains a multitude of different cells. Scientists who dismantle tissue in the laboratory must carefully separate and analyse the cells to establish which cell type they have under the microscope. The question of potency is a controversial one among stem cell researchers, as binding benchmarks have yet to be defined. What some scientists would define as "pluripotent" is just about deemed "multi-potent", that is, as having a limited capacity for differentiation, by others. Greater certainty can be provided by carrying out the relevant tests. These include, among other things, a test to establish whether, after injection into early embryos, the cells are able to contribute to the development of the new organism and gamete formation, and to pass on their genes to further generations. However, not every team carries out all of these tests and important questions are left unanswered, even in articles published in renowned journals.

Stable original cell line

With their work, Ko and his colleagues wanted to establish clarity from the outset. To this end, they started by culturing a precisely defined type of cell, so-called germline stem cells (GSCs), from the testis of adult mice. In their natural environment, these cells can only do one thing: constantly generate new sperm. Moreover, their own reproduction is an extremely rare occurrence. Only two or three of them will be found among the 10,000 cells in the testis tissue of a mouse. However, they can be isolated individually and reproduced as cell lines with stable characteristics. Under the usual cell culturing conditions, they retain their unipotency for weeks and years. Consequently, all they can do is reproduce or form sperm. What nobody had guessed until now, however, was that a simple trick is enough to incite these cells to reprogramme. If the cells are distributed on new petri dishes, some of them revert to an embryonic state once they are given sufficient space and time. "Each time we filled around 8000 cells into the individual wells of the cell culture plates, some of the cells reprogrammed themselves after two weeks," reports Ko. And when the switch in these germline-derived pluripotent stem cells (gPS) has been reversed, they start to reproduce rapidly.

The researchers have proven that the "reignition" of the cells has actually taken place with the aid of numerous tests. Not only can the reprogrammed cells be used to generate heart, nerve or endothelial cells, as is the case with embryonic stem cells, the scientists can also use them to produce mice with mixed genotypes, known as chimeras, from the new gPs, and thus demonstrate that cells obtained from the testis can pass their genes on to the next generation Whether this process can also be applied to humans remains an open question. There is much to suggest, however, that gPS cells exceed all previously artificially reprogrammed cells in terms of the simplicity of their production and their safety.

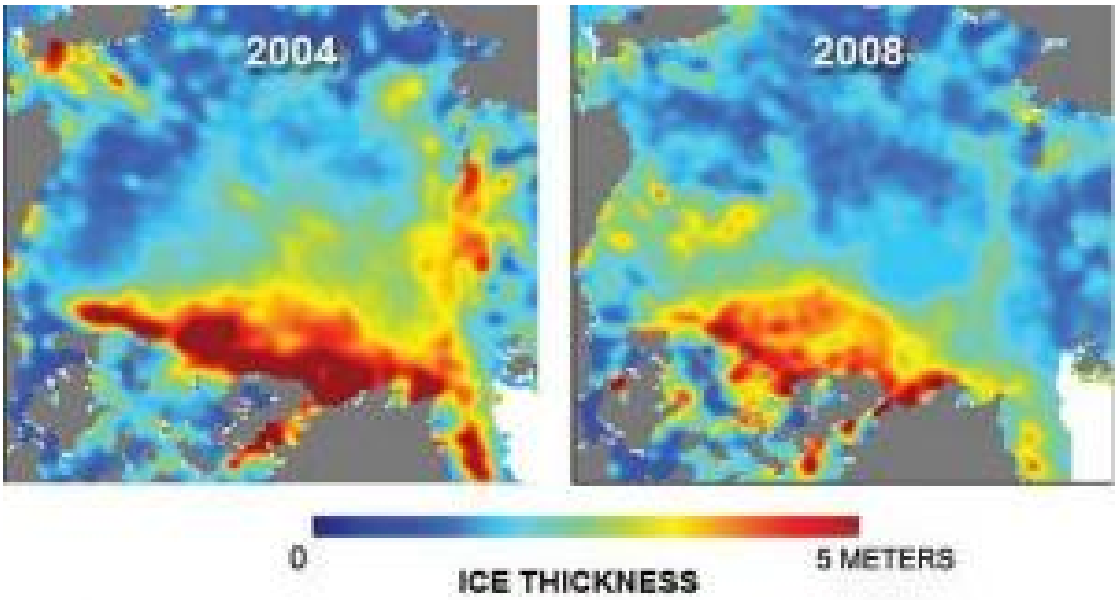
Journal reference:

1. Ko et al. **Induction of Pluripotency in Adult Unipotent Germline Stem Cells**. *Cell Stem Cell*, 2009; 5 (1): 87 DOI: 10.1016/j.stem.2009.05.025

Adapted from materials provided by Max-Planck-Gesellschaft.

http://www.sciencedaily.com/releases/2009/07/090707131824.htm

New NASA Satellite Survey Reveals Dramatic Arctic Sea Ice Thinning



ICESat measurements of the distribution of winter sea ice thickness over the Arctic Ocean in 2004 and 2008. Click link for measurements between 2004 and 2008, along with the corresponding trends in overall, multi-year and first-year winter ice thickness. (Credit: Ron Kwok, NASA/JPL)

ScienceDaily (July 8, 2009) — Arctic sea ice thinned dramatically between the winters of 2004 and 2008, with thin seasonal ice replacing thick older ice as the dominant type for the first time on record. The new results, based on data from a NASA Earth-orbiting spacecraft, provide further evidence for the rapid, ongoing transformation of the Arctic's ice cover.

Scientists from NASA and the University of Washington in Seattle conducted the most comprehensive survey to date using observations from NASA's Ice, Cloud and land Elevation Satellite, known as ICESat, to make the first basin-wide estimate of the thickness and volume of the Arctic Ocean's ice cover. Ron Kwok of NASA's Jet Propulsion Laboratory in Pasadena, Calif., led the research team, which published its findings July 7 in the *Journal of Geophysical Research-Oceans*.

The Arctic ice cap grows each winter as the sun sets for several months and intense cold ensues. In the summer, wind and ocean currents cause some of the ice naturally to flow out of the Arctic, while much of it melts in place. But not all of the Arctic ice melts each summer; the thicker, older ice is more likely to survive. Seasonal sea ice usually reaches about 2 meters (6 feet) in thickness, while multi-year ice averages 3 meters (9 feet).

Using ICESat measurements, scientists found that overall Arctic sea ice thinned about 0.17 meters (7 inches) a year, for a total of 0.68 meters (2.2 feet) over four winters. The total area covered by the thicker, older "multi-year" ice that has survived one or more summers shrank by 42 percent.

Previously, scientists relied only on measurements of area to determine how much of the Arctic Ocean is covered in ice, but ICESat makes it possible to monitor ice thickness and volume changes over the entire Arctic Ocean for the first time. The results give scientists a better understanding of the regional distribution of ice and provide better insight into what is happening in the Arctic.

"Ice volume allows us to calculate annual ice production and gives us an inventory of the freshwater and total ice mass stored in Arctic sea ice," said Kwok. "Even in years when the overall extent of sea ice remains stable or grows slightly, the thickness and volume of the ice cover is continuing to decline,

making the ice more vulnerable to continued shrinkage. Our data will help scientists better understand how fast the volume of Arctic ice is decreasing and how soon we might see a nearly ice-free Arctic in the summer."

In recent years, the amount of ice replaced in the winter has not been sufficient to offset summer ice losses. The result is more open water in summer, which then absorbs more heat, warming the ocean and further melting the ice. Between 2004 and 2008, multi-year ice cover shrank 1.54 million square kilometers (595,000 square miles) -- nearly the size of Alaska's land area.

During the study period, the relative contributions of the two ice types to the total volume of the Arctic's ice cover were reversed. In 2003, 62 percent of the Arctic's total ice volume was stored in multi-year ice, with 38 percent stored in first-year seasonal ice. By 2008, 68 percent of the total ice volume was first-year ice, with 32 percent multi-year ice.

"One of the main things that has been missing from information about what is happening with sea ice is comprehensive data about ice thickness," said Jay Zwally, study co-author and ICESat project scientist at NASA's Goddard Space Flight Center in Greenbelt, Md. "U.S. Navy submarines provide a long-term, high-resolution record of ice thickness over only parts of the Arctic. The submarine data agree with the ICESat measurements, giving us great confidence in satellites as a way of monitoring thickness across the whole Arctic Basin."

The research team attributes the changes in the overall thickness and volume of Arctic Ocean sea ice to the recent warming and anomalies in patterns of sea ice circulation.

"The near-zero replenishment of the multi-year ice cover, combined with unusual exports of ice out of the Arctic after the summers of 2005 and 2007, have both played significant roles in the loss of Arctic sea ice volume over the ICESat record," said Kwok.

For images of the Arctic sea ice decline, visit: http://www.nasa.gov/topics/earth/features/icesat-20090707.html .

For more information about ICESat, visit: http://icesat.gsfc.nasa.gov .

Journal reference:

1. Kwok, R., G. F. Cunningham, M. Wensnahan, I. Rigor, H. J. Zwally, and D. Yi. **Thinning and volume loss of the Arctic Ocean sea ice cover: 2003–2008**. *Journal of Geophysical Research*, 2009; 114 (c7): C07005 DOI: 10.1029/2009JC005312

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2009/07/090708103212.htm

Fathers Spend More Time With Children Who Resemble Them, Study Suggests

A father and daughter. (Credit: Copyright Charlotte Faurie, ISEM)

ScienceDaily (July 8, 2009) — Darwin's theory of evolution predicts that men will take more care of children that look like them. A team at the Institut des sciences de l'évolution (CNRS / Université de Montpellier 2) verified this prediction in a study published online in the pre-print issue of the journal *Animal Behaviour.*

The investment of a father in the care and education of a child is a decisive factor for the child's development, growth and even survival, particularly in countries with high infant mortality. As this behavior is transmitted from generation to generation, it can evolve by natural selection. Evolutionary theory predicts that men should have developed the capacity to recognise their biological children. This recognition of paternity can be made on the basis of physical resemblance.

The study by the ISEM[(1)] team has shown for the first time that paternal investment is partly influenced by genetically based similarities. The study was conducted in several villages in Senegal, where the researchers used a method that simultaneously quantified investment made by fathers and their resemblance to their children. A total of thirty families, each with two children, took part in the study. To quantify paternal investment, mothers answered a questionnaire in which they had to estimate the time that the father spent looking after the child, his attention, affection and even the money he provided.

According to their answers, each father was assigned an investment index. A separate group of people, who did not know these families, were chosen as relatedness 'raters' to evaluate facial and olfactory resemblance between children and fathers. For the faces, a photograph of each child was shown to the raters, together with those of three men including the father. For odor, the evaluator had to compare the odors of a tee-shirt worn by the child with those of two men. Each time that the father was recognized, a point was attributed and these results were collated to build a resemblance index.

A correlation was found between these resemblance indices and the paternal investment as calculated from the questionnaire results. The study also clearly confirmed the positive impact of a father's presence on the nutrition and growth of the child. In this region, children who benefit from the presence of their father clearly have better living conditions. From the point of view of Darwinian theory, very few studies have been made on the link between paternal investment and genetically based resemblance, and none have been done with real families. Today, these results represent an important step in the study of the evolution of paternal investment. The ISEM team has also conducted a study on paternal investment in France from which results will be published in the coming months.

1) Institut des sciences de l'évolution de Montpellier (CNRS / Université de Montpellier)

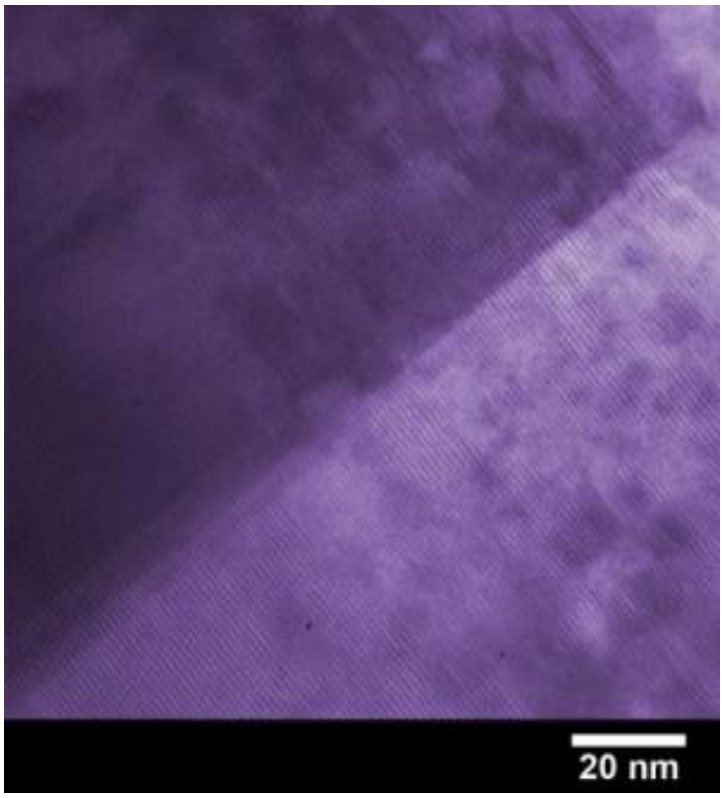
Journal reference:

1. Alvergne et al. **Father-offspring resemblance predicts paternal investment in humans**. *Animal Behaviour*, May 28, 2009; DOI: 10.1016/j.anbehav.2009.03.019

Adapted from materials provided by CNRS.

http://www.sciencedaily.com/releases/2009/06/090618180334.htm

How Strain At Grain Boundaries Suppresses High-temperature Superconductivity



Electron microscope image of two superconducting thin films that meet at a six degree tilt boundary (the dark line running through the image). The numerous smaller lines that intersect the grain boundary at 90 degrees are the individual crystalline layers. The connection between the two films shows distortions in the superconducting layers, which severely limits current flow in these materials. (Credit: F.J. Baca, US Air Force Research Lab)

ScienceDaily (July 8, 2009) — Researchers at the National Institute of Standards and Technology (NIST) have discovered that a reduction in mechanical strain at the boundaries of crystal grains can significantly improve the performance of high-temperature superconductors (HTS). Their results could lead to lower cost and significantly improved performance of superconductors in a wide variety of applications, such as power transmission, power grid reliability and advanced physics research.

One of the main challenges in developing long-length, high-quality HTS wires is to mitigate the effect of granularity on wire performance because grain boundaries are prone to block current flow. Dislocations—defects in the crystalline structure—that grow in number with increasing grain-boundary angle strongly reduce the superconducting crosssection of the grain boundary.

Switching to thin-film designs has led to great improvements in grain alignment and significantly improved performance in, for instance, yttrium-barium-copper-oxide (YBCO) coated conductors. But even in these highly aligned superconductor films grain boundaries still limit their performance. The effect of dislocations can further be mitigated by chemical doping of the grain boundaries—for instance by replacing some of the yttrium atoms with calcium—but it has been difficult to apply this technique to long wire lengths.

Although it is well known that dislocations cause part of the grain boundary crosssection to become non-superconducting, the effect of strain—which extends from the dislocations into the remaining superconducting bridges over the grain boundary—was previously unknown. NIST's Danko van der Laan and his collaborators have found that this strain plays a key role in reducing current flow over grain

boundaries in YBCO. Furthermore, when the strain was removed by applying compression to the grain boundaries, the superconducting properties improved dramatically.

The new understanding of the effects of strain on current flow in thin-film superconductors could significantly advance the development of these materials for practical applications and could lower their cost. Some of the most promising uses are in more efficient electrical transmission lines, which already have been successfully demonstrated by U.S. power companies, and increased electric power grid reliability. NIST has research programs in both these areas. Improved HTS thin-film conductors could also enable more powerful high-field particle accelerators and advanced cancer treatment facilities.

Journal reference:

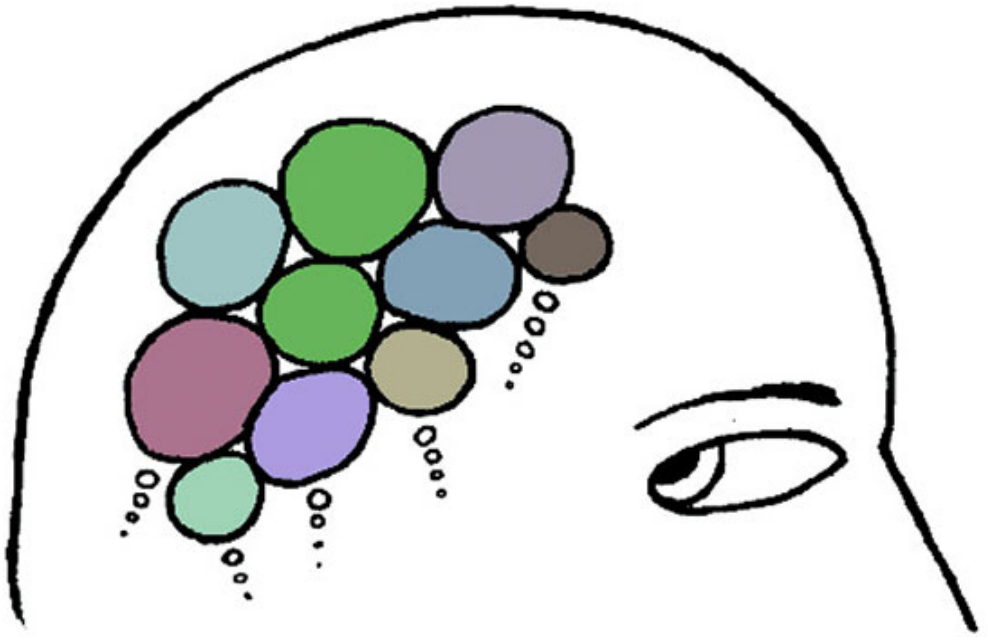
1. D.C. van der Laan, T.J. Haugen and P.N. Barnes. **Effect of compressive uni-axial strain on grain boundary critical current density in YBa2Cu3O7-d superconducting films**. *Physical Review Letters*, June 9, 2009

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

http://www.sciencedaily.com/releases/2009/06/090617123439.htm

Why the Imp in Your Brain Gets Out

By BENEDICT CAREY



The visions seem to swirl up from the brain's sewage system at the worst possible times — during a job interview, a meeting with the boss, an apprehensive first date, an important dinner party. What if I started a food fight with these hors d'oeuvres? Mocked the host's stammer? Cut loose with a racial slur?

"That single thought is enough," wrote Edgar Allan Poe in "The Imp of the Perverse," an essay on unwanted impulses. "The impulse increases to a wish, the wish to a desire, the desire to an uncontrollable longing."He added, "There is no passion in nature so demoniacally impatient, as that of him who, shuddering upon the edge of a precipice, thus meditates a plunge."

Or meditates on the question: Am I sick?

In a few cases, the answer may be yes. But a vast majority of people rarely, if ever, act on such urges, and their susceptibility to rude fantasies in fact reflects the workings of a normally sensitive, social brain, argues a paper published last week in the journal Science.

"There are all kinds of pitfalls in social life, everywhere we look; not just errors but worst possible errors come to mind, and they come to mind easily," said the paper's author, Daniel M. Wegner, a psychologist at Harvard. "And having the worst thing come to mind, in some circumstances, might increase the likelihood that it will happen."

The exploration of perverse urges has a rich history (how could it not?), running through the stories of Poe and the Marquis de Sade to Freud's repressed desires and Darwin's observation that many actions are performed "in direct opposition to our conscious will." In the past decade, social psychologists have documented how common such contrary urges are — and when they are most likely to alter people's behavior.

At a fundamental level, functioning socially means mastering one's impulses. The adult brain expends at least as much energy on inhibition as on action, some studies suggest, and mental health relies on abiding strategies to ignore or suppress deeply disturbing thoughts — of one's own inevitable death, for example.

These strategies are general, subconscious or semiconscious psychological programs that usually run on automatic pilot.

Perverse impulses seem to arise when people focus intensely on avoiding specific errors or taboos. The theory is straightforward: to avoid blurting out that a colleague is a raging hypocrite, the brain must first imagine just that; the very presence of that catastrophic insult, in turn, increases the odds that the brain will spit it out."We know that what's accessible in our minds can exert an influence on judgment and behavior simply because it's there, it's floating on the surface of consciousness," said Jamie Arndt, a psychologist at the University of Missouri.

The empirical evidence of this influence has been piling up in recent years, as Dr. Wegner documents in the new paper. In the lab, psychologists have people try to banish a thought from their minds — of a white bear, for example — and find that the thought keeps returning, about once a minute. Likewise, people trying not to think of a specific word continually blurt it out during rapid-fire word-association tests.

The same "ironic errors," as Dr. Wegner calls them, are just easy to evoke in the real world. Golfers instructed to avoid a specific mistake, like overshooting, do it more often when under pressure, studies find. Soccer players told to shoot a penalty kick anywhere but at a certain spot of the net, like the lower right corner, look at that spot more often than any other.

Efforts to be politically correct can be particularly treacherous. In one study, researchers at Northwestern and Lehigh Universities had 73 students read a vignette about a fictional peer, Donald, a black male. The students saw a picture of him and read a narrative about his visit to a mall with a friend.In the crowded parking lot, Donald would not park in a handicap space, even though he was driving his grandmother's car, which had a pass, but he did butt in front of another driver to snag a nonhandicap space. He snubbed a person collecting money for a heart fund, while his friend contributed some change. And so on. The story purposely portrayed the protagonist in an ambiguous way.

The researchers had about half the students try to suppress bad stereotypes of black males as they read and, later, judged Donald's character on measures like honesty, hostility and laziness. These students rated Donald as significantly more hostile — but also more honest — than did students who were not trying to suppress stereotypes.

In short, the attempt to banish biased thoughts worked, to some extent. But the study also provided "a strong demonstration that stereotype suppression leads stereotypes to become hyperaccessible," the authors concluded. Smokers, heavy drinkers and other habitual substance users know this confusion too well: the effort to squelch a longing for a smoke or a drink can bring to mind all the reasons to break the habit; at the same time, the desire seemingly gets stronger.

The risk that people will slip or "lose it" depends in part on the level of stress they are undergoing, Dr. Wegner argues. Concentrating intensely on not staring at a prominent mole on a new acquaintance's face, while also texting and trying to follow a conversation, heightens the risk of saying: "We went to the mole — I mean, mall. Mall!"

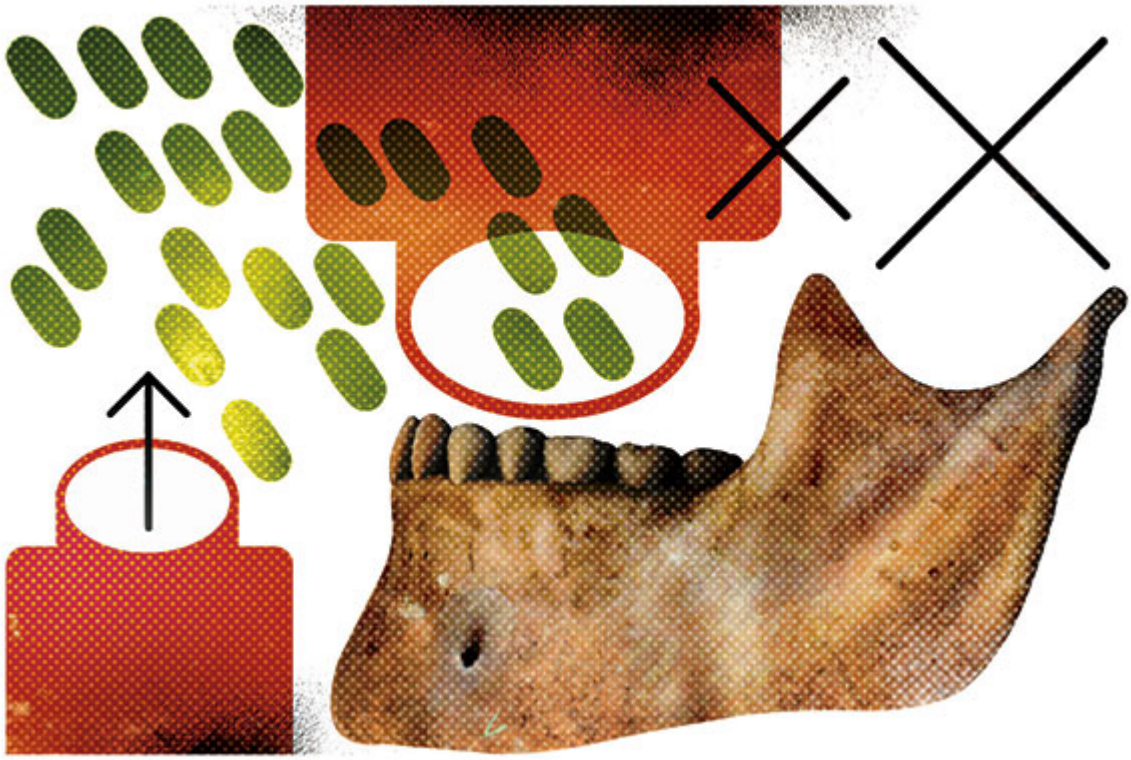
"A certain relief can come from just getting it over with, having that worst thing happen, so you don't have to worry about monitoring in anymore," Dr. Wegner said.

All of which might be hard to explain, of course, if you've just mooned the dinner party.

http://www.nytimes.com/2009/07/07/health/07mind.html?nl=health&emc=a1

Reasons Not to Panic Over a Painkiller

By TARA PARKER-POPE



Few drugs are more ubiquitous than acetaminophen, the pain reliever found in numerous over-the-counter cold remedies and the headache drug Tylenol.

But last week, a federal advisory committee raised concerns about liver damage that can occur with overuse of acetaminophen, and the panel even recommended that the Food and Drug Administration ban two popular prescription drugs, Vicodin and Percocet, because they contain it.

The news left many consumers confused and alarmed. Could regular use of acetaminophen for pain relief put them at risk for long-term liver damage?

To help resolve the confusion, here are some questions and answers about acetaminophen.

What prompted the committee to look at acetaminophen in the first place?

Every year about 400 people die and 42,000 are hospitalized as a result of acetaminophen poisoning. When used as directed, the drug is not hazardous. But acetaminophen is now in so many products that it is relatively easy to take more than the recommended daily limit, now four grams.

“People often don’t know what products acetaminophen is in,” said Dr. Lewis S. Nelson, a medical toxicologist from New York University who was the panel’s acting chairman. “It isn’t that hard to go above the four-gram dose. If you took a couple acetaminophen for a headache until you got to the maximum dose, and then maybe later you take Tylenol PM and some Nyquil for a cold. And your back hurts, so you take Vicodin — by now you’ve probably gotten to a seven-gram dose.”

What did the panel recommend?

Besides a ban on Percocet and Vicodin, it called on the F.D.A. to lower the total recommended daily dose of acetaminophen from the current level of four grams, which is about 12 tablets of regular strength Tylenol. The new maximum dose is likely to be 2.6 to 3.25 grams, equal to 8 to 10 regular pills.

The panel also recommended that "extra strength" doses — equal to two 500-milligram pills — be switched to prescription only, and that the largest dose available over the counter be limited to two 325-milligram pills. It also recommended that infants' and children's doses be standardized to prevent errors.

As a precaution, should consumers switch to other types of over-the-counter pain relief?

Emphatically, no. Every drug has risks and side effects, but over all the risk of acetaminophen to any individual is low. Far more people are harmed by regular use of aspirin and ibuprofen, which belong to a class of medicines called nonsteroidal anti-inflammatory drugs, or Nsaids. By most estimates, more than 100,000 Americans are hospitalized each year with complications associated with Nsaids. And 15,000 to 20,000 die from ulcers and internal bleeding linked to their use. By comparison, there are only about 2,000 cases of acute liver failure, and about half of them are related to drug toxicity. Of the drug-induced cases, 40 percent are due to acetaminophen, and half of those are a result of intentional overdose.

"Nearly everybody on the panel recognizes that from a public-health perspective, ibuprofen is much more concerning than acetaminophen," Dr. Nelson said.

For users of Percocet and Vicodin, the picture is cloudier. Hydrocodone, the narcotic in Vicodin, is not available as a single drug. Oxycodone, the narcotic in Percocet, will remain available. But these ingredients are tightly controlled, and prescriptions may require extra time and paperwork.

If I've been using a drug like Vicodin, should I be worried about long-term liver damage?

The risks associated with acetaminophen overdose are acute or immediate liver failure, not chronic liver disease. Even if you've been taking Tylenol or other drugs with acetaminophen for years, there is no reason to worry about long-term liver damage as long as you are using them as directed. (By comparison, regular use of Nsaids like aspirin and ibuprofen can lead to chronic gastrointestinal problems over time.) An overdose of acetaminophen does not typically produce immediate symptoms. Instead, drug-induced hepatitis is likely to develop within a week, leading to loss of appetite, nausea, vomiting, fever and abdominal pain. Dark urine and jaundice (yellowing of the skin and eyes) suggest a more serious case. Usually the liver will recover once the drug is stopped or with medical treatment, but many patients in acute liver failure will die without a transplant.

About 15 percent of liver transplants result from drug poisoning. In one study, 40 percent of drug-related liver transplants were due to acetaminophen, 8 percent to tuberculosis drugs, 7 percent to epilepsy treatment and 6 percent to antibiotics.

What's the main lesson from the panel review of acetaminophen?

Because acetaminophen is in so many products, consumers need to be vigilant about reading labels, and they need to keep track of how much of the drug they are ingesting daily.

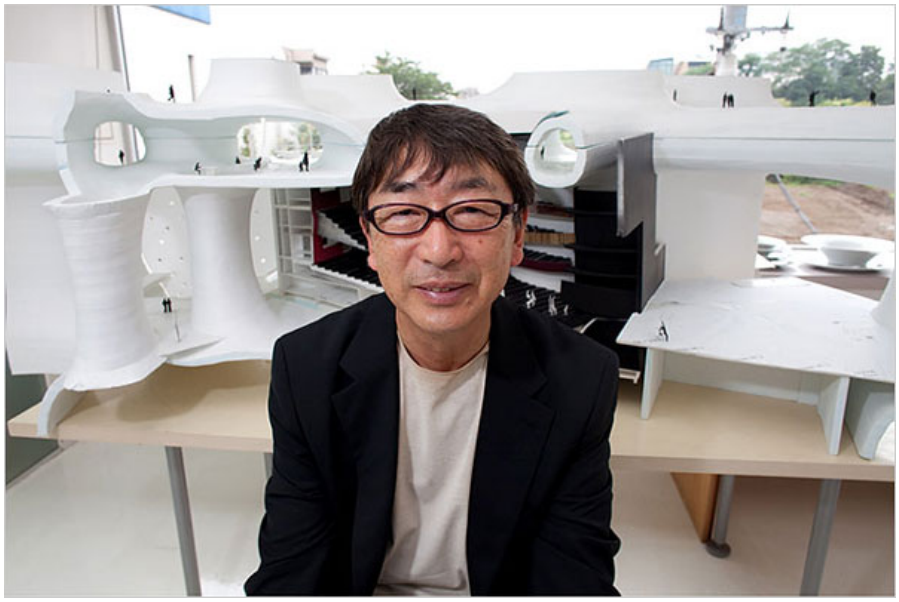
"It would be a real shame if people in reading these stories got the idea that acetaminophen is not safe," said Dr. Paul Watkins, director of the Institute for Drug Safety Sciences at the Hamner Institutes and the University of North Carolina. "It's totally safe when taken as directed. The problem is that people end up unknowingly taking much more than recommended."

http://www.nytimes.com/2009/07/07/health/07well.html?nl=health&emc=a1

Inside His Exteriors

By NICOLAI OUROUSSOFF

Tokyo



AFTER nearly four decades of work Toyo Ito has earned a cult following among architects around the world, although he is little known outside his home country, Japan. Through his strange and ethereal buildings, which range from modest houses for the urban recluse to a library whose arched forms have the delicacy of paper cutouts, he has created a body of work almost unmatched in its diverse originality. Over the past decade, as the popularity of architecture has boomed and many of his contemporaries have jetted around the globe piling up one commission after another, Mr. Ito has largely remained on the sidelines. He is rarely mentioned in conversations about semicelebrities like Rem Koolhaas, Zaha Hadid or Jacques Herzog. He has repeatedly been passed over for the Pritzker Prize, architecture's highest honor, in favor of designers with much thinner résumés. Even in his native country he is overshadowed by Tadao Ando, whose brooding concrete structures have become a cliché of contemporary Japanese architecture.

Mr. Ito's status may finally be about to change. On Thursday a stadium he designed for the World Games will be unveiled to a global audience in Kaohsiung, Taiwan. Its pythonlike form should produce as much a stir, at least within architectural circles, as did the Bird's Nest stadium by Mr. Herzog and Pierre de Meuron when it was unveiled a year ago at the Beijing Olympics.

Even more ambitious are his plans for the Taichung opera house, which is scheduled to go into construction sometime next year. A work of striking inventiveness, it has already been touted as a masterpiece. Its porous exterior, which resembles a gigantic sponge, is as wildly imaginative in its way as Frank Gehry's Guggenheim museum in Bilbao, Spain. Its design was a large reason Mr. Ito was recently awarded his first American commission, the Berkeley Art Museum in California.

But even if Mr. Ito begins to land the big, lucrative commissions that he so obviously deserves, he may never be completely accepted by a broad popular audience. He does not have the intimidating, larger-than-life persona of a Koolhaas. Nor is he a flamboyant presence like Ms. Hadid, who is often compared to an opera diva because of her striking looks and imperial air.

Mr. Ito, by comparison, can be unassuming. A small, compact man with a round face framed by rectangular glasses and dark bangs, he is easygoing and rarely flustered. And he has the rare ability to consider his projects with a critical eye, even going so far as to point out flaws that a visitor might have overlooked.

What's more, his work can be maddeningly difficult to categorize. No two Ito buildings look exactly alike. There is no unifying aesthetic style, no manifesto to advance. You can never be sure what Mr. Ito will do next, which can be thrilling for architects but nerve-racking for clients (another reason, perhaps, that his work isn't better known).

What his buildings do share is a distrust of simplistic formulas. His career can be read as a lifelong quest to find the precise balance between seemingly opposing values — individual and community, machine and nature, male and female, utopian fantasies and hard realities.

His ability to find such balances consistently has made him one of our great urban poets, someone who has been able to crystallize, through architecture, the tensions that lie buried in the heart of contemporary society. It makes his work especially resonant today, when much of the world is drawn to one form of extremism or another.

Mr. Ito, who was born in 1941, began his career at a pivotal time in Japanese architecture. As a student in the 1960s he followed Modernists like Kenzo Tange as they rebuilt the country's cultural confidence after the devastation of World War II. His first job was in the office of Kiyonori Kikutake, a founder of the Metabolist movement, which envisioned gigantic flexible structures that could adapt to a society in constant flux. It established Mr. Kikutake and his cohorts as prominent figures of the international avant-garde.

But that decade of cultural optimism was short lived. By the 1970 Osaka Expo, which served as a showcase for the country's top architectural talents, Metabolism had been practically reduced to a fad, its social agenda stripped of its original meaning.

"All the big concepts were drained of idealism," Mr. Ito told me as we rode a bullet train through the Japanese countryside on the way to visit one of his buildings. "It was very disappointing for the young generation. It became very hard to have any outward hope about the future."

This crisis of faith — the sudden awareness of the powerlessness of architects, if not of architecture — was soon followed by a prolonged economic recession, which meant that the kinds of large-scale public commissions available to many postwar architects were gone.

Looking for a way forward Mr. Ito was drawn to the work of Kazuo Shinohara, a vocal critic of the Metabolists who believed that if architecture could change the world at all, it would do so not by promoting radical social visions but by creating small, modest spaces to nurture and protect the individual spirit. His houses, mostly build it in the 1960s and 1970s, were conceived as private utopias, with delicate interiors supported by muscular concrete pillars that seemed designed to resist the outside pressures of a corrupting society.

Mr. Ito took this idea to its extreme in 1976 with the White U house, which was organized around a central court and completely shut off from the outside world. Designed for his younger sister, whose husband had died of cancer, its seamless white interiors were meant to create an intensely private, therapeutic environment, a place where she could recover from her grief. Only the tops of a few surrounding buildings and utility poles were visible from inside, a gentle reminder that life continued beyond its walls.

But eventually this vision seemed as limiting as the Metabolist's vision seemed naïve, and Mr. Ito would locate his architecture in the space between two extremes: the social idealism of late Modernism and the inwardness of Shinohara's work.

His breakthrough came with the Sendai Mediatheque, a library and exhibition space completed in 2001. Seen from a distance the structure looks like a conventional Modernist glass box rising from one of Sendai's busy, tree-lined boulevards. The first hint of something out of the ordinary is a series of enormous white latticework tubes that pierce the top of the structure, capped by a delicate steel frame. The tubes seem to be arranged in a loose, almost random pattern, and as you get closer, you realize they extend down through the entire structure, connecting the floors. They not only hold up the building, they house elevators, staircases and mechanical systems. Sunlight, reflected from gigantic, computer-controlled mirrors, spills through them during the day, giving the building an ethereal glow.

"The tubes are often compared to trees in a forest," Mr. Ito told me through a translator as we toured the building. "But they are also like objects in a Japanese garden, where space is created by movement around carefully arranged points, like ponds or stones."

The idea was to free us, both physically and psychologically, from the rigidity of the grid and what it implies — the Cartesian logic, the erasure of individual identity. But the building is not just an isolated experiment. By echoing the forms of the conventional slab buildings around it and aggressively distorting them, the design suggests how the city too could be made more free and more human.
This vision takes on even greater complexity in the Tama Art University Library, completed just over two years ago, west of Tokyo. Set at the edge of a dreary hillside campus, the structure was conceived as an irregular grid of delicate concrete arches.

When I first saw it, it brought to mind the work of Louis Kahn, who — in an effort to root modern architecture in an ancient past — used classical references to imbue glass, concrete and steel with an aura of historical monumentality. But Mr. Ito's design turns this idea on its head. The arches that line the library's exterior vary in width from 6 feet to nearly 50 feet, giving them an offhand, whimsical quality. Windows are set flush to the arches' concrete surfaces so that the facades have a taut appearance, as if the building had been sealed in shrink wrap.

Inside, the arches are arranged at odd angles to one another. Other structures seem casually placed inside the space — a large concrete drum that houses mechanical systems at one end, a sculptural staircase at another. The floor of an informal exhibition space follows the slope of the surrounding landscape so that from inside, the relationship of the two seems fluid.

The result is a kind of antimonument. The image we hold of a heavy, traditional arch becomes something fragile and ethereal. The classical sense of order dissolves. The design's aim is to liberate us from the oppressive weight of history and, in the process, open up imaginative possibilities.
Since the library's completion his ambitions have led to a startling range of new designs. The concave roof segments of his recently opened Za-Koenji Public Theater in Tokyo, for instance, are vaguely reminiscent of Shinohara's House Under High-Voltage Lines (1981). But Mr. Ito's structure is more animated, reflecting the energy of its bustling working-class site.

Seen from an elevated rail line that passes directly in front of it, the theater's uneven tentlike form seems to be a result of the forces colliding around it, like speeding trains and arcane zoning requirements. Inside, a wide elliptical staircase at the back corner of the lobby draws people up through the building. Big porthole windows are carved into its roof and walls. It is a simple, inexpensive building, yet its enigmatic form lingers in the imagination and transforms your perception of the neighborhood around it.
The design for the 44,000-seat Kaohsiung stadium, by contrast, seems to be as much about the anxieties of a mass event as about a shared emotional experience. While traditional stadiums are designed to shut out the outside world, Mr. Ito's stadium seeks to maximize our awareness of it while still creating a sense of enclosure.

From the main entry the stadium looks like a gigantic snake that is just beginning to coil around its prey. Its tail extends to one side, framing a large entry plaza. At times when the stadium is less full, people will be able to stroll through the gates from the plaza and sit on a patch of grass at the edge of the field, eroding the boundary between inside and out.

Inside, the intertwining pipes of the canopy curl down and around the stands, enveloping the audience. And while the immediate surroundings are shut out, most seats have a distant view of downtown. The result is remarkable: a space that manages to maintain the intensity and focus of a grand stadium without that intensity becoming oppressive.

Yet it is in his design for the Taichung opera house, scheduled to go into construction sometime next year, that Mr. Ito comes closest to an ideal he has been chasing for decades: a building that seems to have been frozen in a state of metamorphosis. Set in a landscaped park, the opera house is conceived as a flexible network of interconnected vessels that has been sliced off on four sides to form a rectangular box. The amorphous forms are not random; their seemingly elastic surfaces grow and shrink according to the functions they house, which include restaurants, foyers, a roof garden and three concert halls that will seat from 200 and 2,000 people. Visitors will find themselves slipping between some of these forms and entering others. The sense of inside and out, of stillness and motion, becomes a complex, carefully composed dance.

It is a striking vision, as beautiful as anything built in the past decade. And it sums up Mr. Ito's philosophy about both architecture and life, about the need to accommodate the many contradictions that make us human.

It also suggests a way architecture can move forward.

At the beginning of this century the field seemed to have entered a new age of freedom and experimentation. But like everything else, that spirit was quickly subsumed by the competitive greed of the global economy: the money, the real estate speculation, the frantic rush for consumer attention. Designs that were born of joy and exuberance, like Mr. Gehry's Guggenheim, were treated as marketable commodities, which became a kind of trap.

Seen in that light, the inaccessibility of Mr. Ito's architecture is a virtue. Hard to pin down, it is also difficult to brand. By embracing ambiguity, his work forces us to look at the world through a wider lens. It asks us to choose the slowly unfolding narrative over the instant fix.

"I sometimes feel that we are losing an intuitive sense of our own bodies," Mr. Ito lamented at one point during my visit. "Children don't run around outside as much as they did. They sit in front of computer games. Some architects have been trying to find a language for this new generation, with very minimalist spaces. I am looking for something more primitive, a kind of abstraction that still has a sense of the body."

"The in between," he added, "is more interesting to me."

http://www.nytimes.com/2009/07/12/arts/design/12ouro.html?ref=design

All Around London, an Invitation to Make Music

By SARAH LYALL

LONDON — The piano was standing innocently near the Millennium Bridge, minding its own business except for a cheeky come-on — "Play Me, I'm Yours" — printed on its side. For a 24-year-old Australian tourist named Lauren Bradley, it was as alluring as a sign saying "Free Chocolate."

"I live away from home and don't have my own piano, so any chance I get to tinker, I take it," Ms. Bradley said, spotting the piano after crossing the bridge. Without even sitting down, she pounded out the beginning of "Ain't Misbehavin' " as passers-by recorded her brief performance on their cellphones.
Ms. Bradley then walked on, but the piano remained, ready for its next customer and its next song. (Rachmaninoff? "Chopsticks"?) All around London its fellow pianos were waiting, too — 30 of them in all — part of an interactive art project meant to challenge people to come out of their urban insularity and also to provide some summertime music.
"They're out there to get people talking to one another and to claim ownership and activate the public space," said the creator of the project, Luke Jerram, an artist who lives in Bristol. He previously brought incarnations of it to Birmingham, England; São Paolo, Brazil; and Sydney, Australia. "It's a blank canvas for everyone's creativity."
The London project is scheduled to last until Monday and has cost about £14,000 (or a bit more than $22,000), Mr. Jerram said. The biggest obstacle was the city's tangled, multilayered bureaucracy, which required him to obtain a separate music license for each location. He used old, unwanted pianos that people had "chucked out," he said — in contrast to São Paolo, where pianos are scarce and so precious that they cost a year's salary. There, some people traveled for hours just to have the chance to play.
The pianos, which are secured to the ground with metal cables and have plastic covers in case of rain, have proved a huge hit. All of them are still there — outside the Natural History Museum, on Portobello Road, in Leicester Square and in the churchyard of St. Paul's Cathedral, among other spots. None has been vandalized. People have tended to relinquish their places courteously after a while to allow others to perform.
A piano tuner who travels around on a bicycle, providing on-the-spot help, has had to bring in reinforcements to deal with all the wear and tear.
Best of all, Londoners have resoundingly disproved the stereotype that they are genetically incapable of spontaneous acts of public exuberance. Professionals and beginners; exhibitionists and their impromptu

groupies; players of every aptitude from highly gifted to virtually talentless — all have tried their hand at the pianos. (Highlights, including a pianist dressed as Mozart, a 9-year-old boy playing Chopin and the musical comedy duo Katzenjammer playing on 24 of the pianos in eight hours, are available at streetpianos.com/london2009.)

"It's quite good at showing everyone some — I don't know what word to use — culture," said Connor McElhinney, 15, who was hanging around the Millennium Bridge piano, just listening.

The piano is in a prime location to attract people walking on and off the bridge, which traverses the Thames between the Financial District and Bankside, near the Tate Modern gallery. It was rarely available that afternoon.

A music student named Hannah Watson, 19, stopped to knock out the first movement of the Ravel Sonatine. Wearing a T-shirt saying "Let Me Drop Everything and Work on Your Problem," a 13-year-old visitor from Israel named Amotz Oppenheim played his entire self-taught repertory: the beginning of "Eine Kleine Nachtmusik."

Then came Martin Roig, 39, a wedding planner from Argentina, who attracted a circle of amateur paparazzi and had people sending videos to their friends with his impassioned renditions of several Scarlatti sonatas.

"He's not doing it for money?" asked Ilya Fisher, 45, who stopped to listen en route to the dentist. She came back a moment later with a bottle of water for the performer.

Mr. Roig said he had not played in public since he was a child. "I felt like I was a little boy again," he said. "I think it's a beautiful idea, and it makes people nearer to the music."

A young woman taking part in an improvisation project for a Canadian Web site that requires her to interact with props around London sat down and began to play. It wasn't a real composition, in keeping with the improvisation theme, but it still sounded good.

Suddenly musicians were coming out of the woodwork. Glenn Comiskey, a member of a traditional Irish band called Eist (the word means listen), stopped to play Van Halen's "Jump" and then a sing-along encore: Abba's "Dancing Queen."

Mr. Comiskey said he does not really know how to play the piano, although he does play the guitar, the mandolin and the low whistle. By coincidence, he said, he had just passed the street piano at Smithfield Market, where a man in a fedora was "trying to impress his girlfriend" by playing virtuoso jazz.

"They're like buses," he said of the pianos. "You don't see one for ages, and then suddenly they're everywhere."

http://www.nytimes.com/2009/07/11/arts/design/11pianos.html?ref=design

'AN ANTIQUITY OF IMAGINATION'
Mysterious Moods, Elusive in Marble

By HOLLAND COTTER

WASHINGTON — As if their Ambien were kicking in, the saints, gods and lovers in a show of Venetian Renaissance sculpture at the National Gallery of Art here seem barely awake. A man and woman lean drowsily together; a soft-faced youth throws his head back in a doze. Shoulders droop; mouths fall slack. In another minute they'll be out cold.

Already dreams have begun, some good, some not. The leaning-together lovers look happy enough; the soft-faced youth zoned out beyond emotion. But a woman with an antique gem in her hair is in tears. A wild-looking man with blank eyes is shouting. He's clearly in pain, dreamed or not.

All these figures are part of a tight, tiny, luxuriant show called "An Antiquity of Imagination: Tullio Lombardo and Venetian High Renaissance Sculpture." And if their meanings and moods feel elusive, well, they are. We don't know whom most of the dozen sculptures in the show depict, or what they were meant to express, or whom they were made for. As often as not, we have to guess at the artists' names.

What we do know is that these works emerged during a golden phase of Venetian painting at the end of the 15th and beginning of the 16th centuries. The sculptors who produced them were contemporaries and influential colleagues of Giovanni Bellini, Giorgione and Titian and that perturbed antiquarian Andrea Mantegna of Padua. And these artists were just as celebrated in their day, though their names are only vaguely recognized now.

Why? Fashions changed. In the years just before and after 1500, Venice experienced that painting boom. Easel painting — relatively cheap, quickly produced and easy to transport — became the art medium of choice. The market for stone carving declined, and the names of even leading sculptors fell into obscurity. There they largely remain, not helped by the fact that the finest surviving examples of their work, in the form of monumental altars and tombs, cannot be moved without causing damage. To experience them you must go where they are. But because their creators' names are unfamiliar, few people make the effort. So the obscurity continues.

Scholars, of course, make the effort. That's their job. They not only go where the art is; they also gather fragments of it to map out histories we might not otherwise know. This show does that. Organized by Alison Luchs, curator of early European sculpture at the National Gallery, the exhibition puzzles together pieces that don't neatly mesh, are hard to interpret and may leave us perplexed. But it also turns us on to fabulous artists we may have been only dimly aware of.

The main one is Tullio Lombardo, who was born around 1455, died in 1532 and lived mostly in Venice. He's the star of the exhibition and was, in that dynastic Renaissance way, the star of a family of stars. His father, Pietro, came from Lombardy and was a sculptor and an architect. In the late 15th century, when Venice was, sculpturally speaking, a Gothic backwater, Pietro helped introduce neo-Classical styles from Florence and bring Venice up to speed.

His son Tullio, who worked as his assistant, took that classical impulse and really went with it, immersing himself, retrospectively and romantically, in the ancient world. He collected and copied antique

sculptures, read Greek history and poetry and closely followed the archaeological news coming out of Rome, where excavations were bringing staggering objects to light.
The effect of this immersion is evident in Tullio's grand funerary projects, like the tomb he designed for Doge Andrea Vendramin, with its imperious vault and legionnaire angels. But it takes more intimate and innovative shape in his bust-length sculptures of couples, two of which are the glory of this Washington show.
Both are relief images, with the marble so deeply cut as to make the heads appear to stand free of the backing stone. Both are modeled on ancient Roman funerary carvings memorializing marriages. But the reliefs point to an interaction with contemporary sources, namely new, psychologically complex styles of painted portraiture. (Here's where Giorgione comes in.) Tullio's work was probably influenced by all of this, and contributed to it. For certain he brought this novel approach to sculpture; it is the very essence of his marble portraits of couples in the show.
In the earlier of these two pieces, which dates from around 1490 and comes from the Galleria Giorgio Franchetti at the Ca' d'Oro in Venice, the approach is naturalistic. The faces are differently fleshy, hers full and round, his squared off. Their personalities are alike, but not; spacey in different ways. With her plush, open lips and heavy eyes, she looks perpetually set for a nap. He does too, except that slight frown lines on his brow indicate that he worries too much and doesn't sleep so well.
But any impression of harmony-in-difference, so appropriate to a marriage portrait, is undermined by one element: their glances, which go in completely opposite directions. The effect of severance is startling. One minute these people are lovers prepared to face eternity together; the next they're strangers on a crowded subway, bodies touching, minds off in separate spheres.
The second sculpture, "Bacchus and Ariadne," carved about a decade later, looks psychologically more direct, but turns out to be just as tricky to read. Here the signs of intimacy are unambiguously piled up. Not only do the young man and woman strike a pose of somnolent eroticism, but they are also mirror images, sharing facial features, hairstyles, even look-alike torsos.
The work's title, a modern one based on the vine-leaf garland on the man's head, suits the vision of Parnassian flawlessness. Surely these figures are not meant as portraits but as poetic ideals embodying a longed-for past. But if so, why do they have such modish hairdos, and why does the woman have her hair caught up in an embroidered 16th-century snood? Like Giorgione, Tullio is trying to bridge an ancient-modern divide, to dress a classical dream in Rialto styles.
Many other artists tried to do this too — it was a Renaissance obsession — through styles of dress or psychological realism, or both. And the other sculptures in the show also send complicated emotional signals.
A single Garboesque figure in a bust-length relief by Tullio has been taken to be both a man and a woman. And although it has Bacchus' languid, nodding-out air, he is a saint, or so he's labeled. Spiritual somnambulist may be a better designation.
And what can we make of the little free-standing bust of a sobbing woman, carved by Tullio's contemporary Antonio di Giovanni Minello? The antique medallion she wears in her hair has led to some speculation that she is the abandoned Dido, grieving for Aeneas, though to a modern eye she looks like an allergy-sufferer caught between sneezes. So much for art transcending cultures and time.
And then there's the shouter. He appears on a panel carved in low relief by a follower of Tullio or of his younger brother Antonio, as a skinny male of uncertain age standing in front of a tree. And he is identified as St. Sebastian, the young Roman soldier-martyr who was tied to a tree and shot with arrows. Sebastian is often depicted as a buff and stalwart sufferer. But this figure, perhaps influenced by Mantegna, doesn't fit this model. With his stretched mouth, sightless eyes and scowl, he looks wired, anguished and crazed. He's the dark side of "an antiquity of imagination," the way Mantegna's painting of St. Sebastian is, or Giorgione's "Tempest" is. He's Gothic, extreme and postmodern: the voice of the unclassical. Many of the show's tensions unite in him. What's he shouting? "Sleepers, awake!" It's good that he's here.
"An Antiquity of Imagination: Tullio Lombardo and Venetian High Renaissance Sculpture" runs through Nov. 1 at the National Gallery of Art, Fourth Street and Constitution Avenue NW, Washington; (202) 737-4215, nga.gov.

http://www.nytimes.com/2009/07/10/arts/design/10cotter.html?ref=design

'THE SWEENEY DECADE'
The Shock of the New, 50 Years On

By ROBERTA SMITH

What did they get and when did they get it? This is a good if possibly superficial yardstick for measuring museums' alertness to new art. After auction prices, it may be the closest the art world gets to baseball stats. If a work of art in a public collection withstands the so-called tests of time, the gap between when it was made and when it was acquired becomes a telling and sometimes thrilling bit of data, like a high batting average. The shorter the interval, the greater the sense of institutional nerve and prescience.In "The Sweeney Decade: The 1959 Inaugural," at the Guggenheim Museum, the interval is always short. Of the 24 paintings and sculptures on view, all were made in the 1950s and acquired during that decade, usually within a year or two of their creation. Some are still interesting, others not; but they reveal a museum trying to sniff out the new and unafraid to put its money where its curatorial instincts pointed, albeit at 1950s prices. The exhibition also demonstrates that these instincts are never infallible, a point that is nicely expanded on by a coincidental but oddly complementary show of the same size at the Michael Rosenfeld Gallery. Many of its 25 paintings from the 1950s and '60s are by artists who were not on museums' radar at the time."The Sweeney Decade" is part of the Guggenheim's celebration of the 50th anniversary of its Frank Lloyd Wright building. It honors James Johnson Sweeney, who was the museum's second director, from 1952 until 1960 (an eight-year decade actually). Sweeney oversaw the construction of the Wright building and broadened the Guggenheim's acquisitions beyond the mostly European, mostly nonobjective art favored by Hilla Rebay, his predecessor.

Sweeney acquired work by European modernists who had fallen outside Rebay's nonobjective parameters — Brancusi being one. He also set his sights on younger postwar artists from Asia and the United States, often buying directly from the studio. And he organized the inaugural exhibition in Wright's new building, which consisted of 133 works, according to its ancient typed checklist.
A hundred and one were by well-known European modernists, with special emphasis on Wassily Kandinsky (23 paintings), whom Rebay considered the lodestar of nonobjective art. The remaining 32 were Sweeney acquisitions; 15 of them are in the current show.
It's too bad there wasn't room for more, but "The Sweeney Decade" still constitutes a fascinating time capsule in its combined distillation of a curator's taste, a museum's optimism and a historical moment. It is also a snapshot of the way postwar artists strove to be innovative, or at least up to date, in their emphasis on the materials and processes of painting.

I can't say the canon is overturned: the strongest works here are by two of its stalwarts. One is Jackson Pollock's 1953 "Ocean Greyness," whose nodes of color embedded in thrashing strokes of black and gray create a field of oculuslike openings that presage Lee Bontecou's canvas reliefs. The other is Willem de Kooning's "Composition," from 1955, an equally dense expanse of clashing brushstrokes, with red dominant. In contrast, many noncanonical painters look as misguided as they ever have, among them Hans Hartung, Jean-Pierre Riopelle and Antonio Saura.

But some unfamiliar artworks command attention. With its garish color and emphatic brushwork, Karel Appel's totemic 1953 "Two Heads" (acquired in 1954) points to the work of Jean-Michel Basquiat and may also have been grist for Picasso's relentless mill. Takeo Yamaguchi's boldly scaled 1958 "Work — Yellow" is dominated by a lopsided double square of deep yellow. Applied with palette knife in a thick, smooth slab — a method that Brice Marden would soon adopt — it occupies a subtly rhythmic field of thinner brown brushwork, evoking both the calligraphy and the sword hilts of Japan.

The British sculptor Eduardo Paolozzi's "St. Sebastian, No. 2," from 1958, teeters between postwar existentialism and Pop appropriation, and between traditional bronze and assemblage. It seems nearly every part of the figure is cast from a different made or found element. It becomes dizzying to try to figure out which is which and how it was all put together.

In her selections for this show Tracey Bashkoff, the Guggenheim's associate curator for collections and exhibitions, has stressed the international sweep of Sweeney's vision and the unfamiliar parts of the collection. That may explain why Franz Kline and Stuart Davis are not here, although both were represented in the inaugural show with canvases that outclass quite a bit that is. But I was happy to become acquainted with the paintings of Luis Feito and Alfred Manessier and the sculptures of Eduardo Chillida, David Hayes and Etienne Hajdu.

In the corner of one gallery the desire to get beyond painting's conventional gestures and materials is evident in the efforts of Antoni Tapies (lots of sand), Alberto Burri (burnt wood) and Conrad Marca-Relli (canvas shapes on canvas). They call attention to like-minded artists whose work Sweeney did not acquire: Lucio Fontana, Yves Klein, Ms. Bontecou and John Chamberlain, as well as Jasper Johns.

At the Rosenfeld gallery "Abstract Expressionism: Further Evidence (Part 1: Painting)" includes a slightly different cast of characters. Although there are two artists from the Guggenheim show (James Brooks and Marca-Relli), and a few others who were highly visible players in the '50s (Hans Hofmann, Joan Mitchell and Milton Resnick), many of the artists here were not being snapped up by museums. Painters like Norman Lewis, Jay DeFeo, Charles Seliger, Charles Alston and Alma Thomas report from an Abstract Expressionist road less traveled.

It is instructive to cherry-pick from this ensemble, with an eye to what might both shake up and enhance the Sweeney show. My choices from the pre-1960 works include the 1951 Brooks painting (it's better than the Guggenheim's 1958 canvas); Alfred Leslie's monstrous "Hoboken Collage" (1953-54); Mr. Resnick's somber but beautifully painted "A," from 1957; and two Alfonso Ossorio paintings, but especially the oozing relieflike "Mirror Point" (1958), which describes a tree trunk with thin sheets of knotty wood stuck in the thick paint.

But the work that should go to the Guggenheim or some other public collection before all others is Beauford Delaney's "Composition 16," from 1954-56, a shimmering field of dark, green-tinged yellow laid over a field of finely minced primaries and finished with a series of flat ribbonlike brushstrokes — also yellow — whose meandering lines seem vaguely floral.

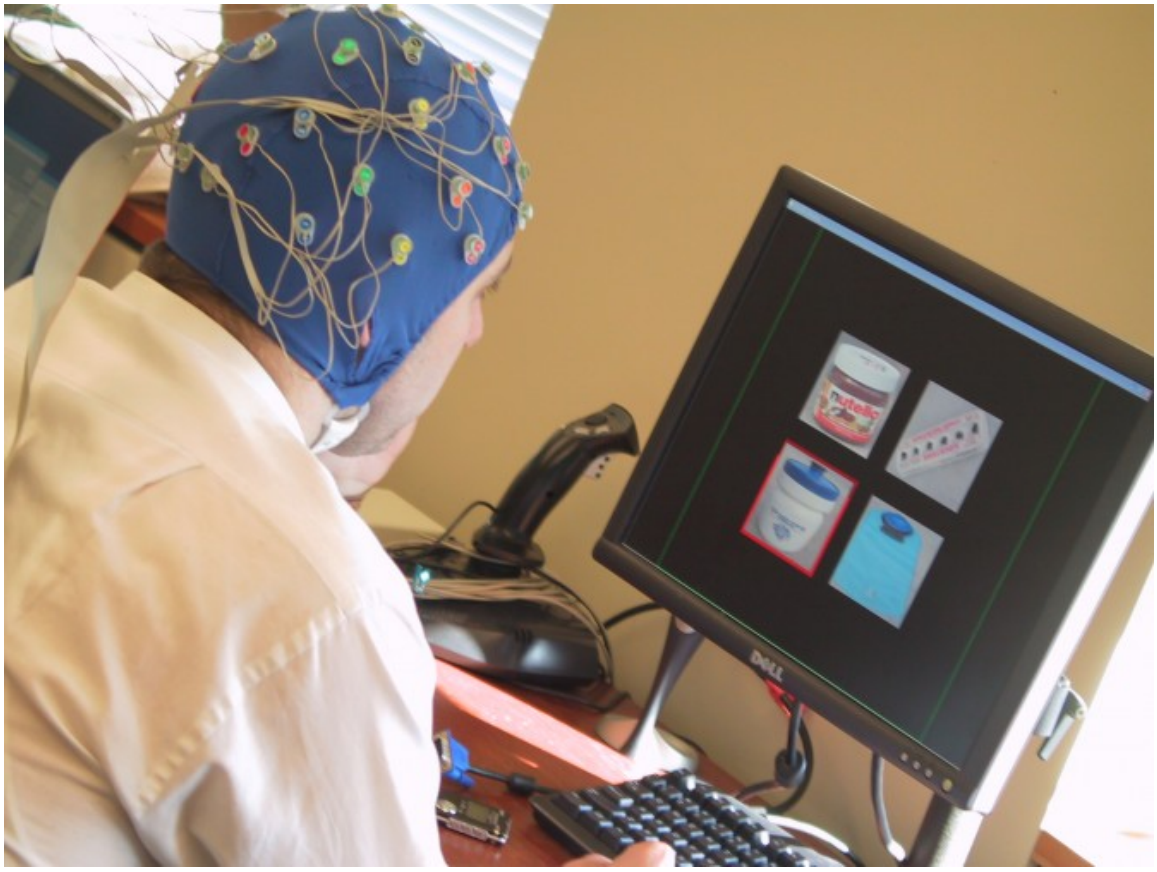
Reflecting Delaney's admiration for Monet and possibly an awareness of Pollock, this marvelous painting is a must-have for any museum that wants to expand its definition of Abstract Expressionism beyond the white men who still dominate it.

"The Sweeney Decade: Acquisitions of the 1959 Inaugural" continues through Sept. 2 at the Guggenheim Museum, 1071 Fifth Avenue, at 89th Street; (212) 423-3500. "Abstract Expressionism: Further Evidence (Part 1: Painting)" continues through July 31 at the Michael Rosenfeld Gallery, 24 West 57th Street, Manhattan; (212) 247-0082.

http://www.nytimes.com/2009/07/10/arts/design/10sweeney.html?ref=design

The Next Hacking Frontier: Your Brain?

By Hadley Leggett



Hackers who commandeer your computer are bad enough. Now scientists worry that someday, they'll try to take over your brain.

In the past year, researchers have developed technology that makes it possible to use thoughts to operate a computer, maneuver a wheelchair or even use Twitter — all without lifting a finger. But as neural devices become more complicated — and go wireless — some scientists say the risks of "brain hacking" should be taken seriously.

"Neural devices are innovating at an extremely rapid rate and hold tremendous promise for the future," said computer security expert Tadayoshi Kohno of the University of Washington. "But if we don't start paying attention to security, we're worried that we might find ourselves in five or 10 years saying we've made a big mistake."

Hackers tap into personal computers all the time — but what would happen if they focused their nefarious energy on neural devices, such as the deep-brain stimulators currently used to treat Parkinson's and depression, or electrode systems for controlling prosthetic limbs? According to Kohno and his colleagues, who published their concerns July 1 in *Neurosurgical Focus*, most current devices carry few security risks. But as neural engineering becomes more complex and more widespread, the potential for security breaches will mushroom.

For example, the next generation of implantable devices to control prosthetic limbs will likely include wireless controls that allow physicians to remotely adjust settings on the machine. If neural engineers

don't build in security features such as encryption and access control, an attacker could hijack the device and take over the robotic limb.

"It's very hard to design complex systems that don't have bugs," Kohno said. "As these medical devices start to become more and more complicated, it gets easier and easier for people to overlook a bug that could become a very serious risk. It might border on science fiction today, but so did going to the moon 50 years ago."

Some might question why anyone would want to hack into someone else's brain, but the researchers say there's a precedent for using computers to cause neurological harm. In November 2007 and March 2008, malicious programmers vandalized epilepsy support websites by putting up flashing animations, which caused seizures in some photo-sensitive patients.

"It happened on two separate occasions," said computer science graduate student Tamara Denning, a co-author on the paper. "It's evidence that people will be malicious and try to compromise peoples' health using computers, especially if neural devices become more widespread."

In some cases, patients might even want to hack into their own neural device. Unlike devices to control prosthetic limbs, which still use wires, many deep brain stimulators already rely on wireless signals. Hacking into these devices could enable patients to "self-prescribe" elevated moods or pain relief by increasing the activity of the brain's reward centers.

Despite the risks, Kohno said, most new devices aren't created with security in mind. Neural engineers carefully consider the safety and reliability of new equipment, and neuroethicists focus on whether a new device fits ethical guidelines. But until now, few groups have considered how neural devices might be hijacked to perform unintended actions. This is the first time an academic paper has addressed the topic of "neurosecurity," a term the group coined to describe their field.

"The security and privacy issues somehow seem to slip by," Kohno said. "I would not be surprised if most people working in this space have never thought about security."Kevin Otto, a bioengineer who studies brain-machine interfaces at Purdue Universty, said he was initially skeptical of the research. "When I first picked up the paper, I don't know if I agreed that it was an issue. But the paper gives a very compelling argument that this is important, and that this is the time to have neural engineers collaborate with security developers."

It's never too early to start thinking about security issues, said neural engineer Justin Williams of the University of Wisconsin, who was not involved in the research. But he stressed that the kinds of devices available today are not susceptible to attack, and that fear of future risks shouldn't impede progress in the field. "These kinds of security issues have to proceed in lockstep with the technology," Williams said.

History provides plenty of examples of why it's important to think about security before it becomes a problem, Kohno said. Perhaps the best example is the internet, which was originally conceived as a research project and didn't take security into account. "Because the internet was not originally designed with security in mind," the researchers wrote, "it is incredibly challenging — if not impossible — to retrofit the existing internet infrastructure to meet all of today's security goals." Kohno and his colleagues hope to avoid such problems in the neural device world, by getting the community to discuss potential security problems before they become a reality.

"The first thing is to ask ourselves is, 'Could there be a security and privacy problem?'" Kohno said. "Asking 'Is there a problem?' gets you 90 percent there, and that's the most important thing."

http://www.wired.com/wiredscience/2009/07/neurosecurity/

20,000 Nations Above the Sea

Is floating the last, best hope for liberty?

Brian Doherty | July 2009 Print Edition

Ideas evolve quickly along the Friedman family tree. The late Milton Friedman, an economist at the University of Chicago, was one of the 20th century's most respected and influential advocates for classical liberalism. In scholarly books and popular articles he argued that if we want the greatest possible wealth and freedom, government should be restricted pretty much to cops and courts. It shouldn't be in the business of manipulating or dictating our choices, whether they involve education, the economy, or joining the military.

Milton's son David took this attitude a step farther in several books on political philosophy and economics. Given the manifest inefficiencies of government, David argued, the healthiest and most efficient social and economic system requires no state at all.

Now David's son Patri has taken the family tradition one step beyond. Inspired by his dad's classic 1973 book *The Machinery of Freedom*, Patri Friedman has concluded that society's design flaw goes deeper than just government itself. Think of the state as a business—but one with enormously high barriers to entry and enormously high exit costs. As it would in the business world, this set-up breeds sclerosis, inefficiency, and the tendency to treat customers like dirt.

From Patri's point of view, Milton's path of steady, sober education about the advantages of liberty wasn't changing the basic negatives very much. And although David might be right that government isn't even necessary, the fact remains that governments, however inefficient, control virtually every chunk of planet Earth. Winning control of a piece of land almost necessarily involves bloodshed, with very little likelihood of success. High barriers to entry, indeed. So while the libertarian movement maintained its traditional orientation toward scholarship, journalism, and political activism, governments were busy perpetrating mass murder on a scale no other institution could manage, mucking up market transactions that could improve everyone's lives, and ruining millions of lives over private but illegal choices, such as consuming disapproved drugs.

Patri Friedman was doing all right himself, living with his wife and child in a mini-commune of sort—the kind people today call an "intentional community"—in Mountain View, California, a bit south of San Francisco. He had a great and challenging job with a great company, Google. But his preoccupation, his passion, lay elsewhere. He thought he had figured out the real underlying problem bedeviling society, and it went deeper than just governments themselves. The real solution, he came to think, would involve the lure of the bounding main, the unbounded horizon, our vast and empty oceans.

Remember those high exit costs? Friedman wondered: What if you could just *move*—not just you, but everything you own, including your home, and, if your neighbors agreed with you, your whole community? What if you could move all of it where no government would bother you at all, and you could make a new, better society?

Friedman called his theory "dynamic geography." He remembered a line from his dad's book *The Machinery of Freedom* about how differently terrestrial government would behave if everyone lived in trailers and could easily flee state oppression. If land itself could get up and go, the incentive structure of government would change even more, moving it in a libertarian direction.

In the past, such thoughts led many libertarians to dream of space colonization. But you don't need to leave the planet, Friedman reasoned; just make "land" that can float on the ocean.

And so Friedman is no longer with Google. He is president of something called the Seasteading Institute. He thinks he has a feasible plan to accomplish something neither his father nor his grandfather managed, for all their inspiration to him and hundreds of thousands of others: actually creating a libertarian society. Even if it's a small, floating one. "I would be sad if it doesn't happen in my lifetime," Friedman says. "But even looking at optimistic scenarios, I can see it will take several decades before I can say I really changed the world."

A Sunken History of Floating Nations

Wayne Gramlich is a voluble, white-bearded tech geek and science fiction fan—the kind of guy who thinks about how things work, and *could* work, a bit deeper than most people do. A former Sun Microsystems engineer, he became interested in creating free lands on the ocean after stumbling across the website of the Atlantis Project, a.k.a. Oceania, a failed scheme to do just that from the early 1990s. Gramlich took an idle notion about liberated ocean living and turned it into an experimental social and physical engineering project. He set his ideas afloat on the sea of the World Wide Web in the late 1990s under the name "Seasteading: Homesteading the High Seas."

Gramlich's solution to building new land on the ocean was cheap and inventive: achieve flotation by lashing together empty two-liter soda bottles; convert the bottle-raft into usable land by covering it with five-mil-thick (roughly fivethousandths of an inch) black plastic sheeting and dirt. (He later realized he had underestimated the power of waves in the open ocean, and he now dismisses his plastic bottle idea as "just a glorified form of suicide." But in calm waters, it could work.)

Friedman stumbled upon Gramlich's seasteading manuscript in the early 21st century. The two men began chatting online, realized they lived near each other, and forged a partnership that in April 2008 was formally chartered as the Seasteading Institute. The organization now has two part-time paid employees in addition to Friedman (who is salaried) and Gramlich (who is not, as he spends far less time on the project). It is dedicated to pursuing and proselytizing for ideas and techniques that could allow human beings to live on stateless floating "land" on the ocean. The institute is throwing conferences, patenting aquatic platform designs, sending Friedman to spread the word at far-flung gatherings of tech world bigwigs and libertarian visionaries, and receiving friendly coverage on CNN and in *Wired*.

To longtime libertarian hands, though, seasteading seems like an old idea, one weighed down by the corpses of many ill-fated plans. Most of these efforts are legend, barely documented by history. Their tales are recounted in moldering tiny-circulation newsletters seen only by enthusiasts (and in 1970s issues of **reason**). One of the most influential of the small magazines pushing libertarianism in the 1960s was *Innovator*, and in its latter days the journal's editors had come to think along the same lines as Friedman, though with far less rigor.

*Innovato*r's leading theorist of taking to the seas for liberty was an anarchist writer named Kerry Thornley. Thornley's essays on oceangoing freedom inspired the science fiction writers Robert Shea and Robert Anton Wilson to create an anarchist yellow submarine that was central to the plot of their influential 1975 novel *Illuminatus!* But when it came to real-world endeavors, Thornley wasn't the ideal pioneer. Among other things, he was confident that he had been groomed to be a patsy of sorts in the John F. Kennedy assassination, given his previous acquaintance with, and supposed resemblance to, Lee Harvey Oswald. (Before that fateful day in Dallas, Thornley had *already* written a *roman à clef* about Oswald, whom he knew from the U.S. Marines.)

Other libertarians, largely in the 1970s, actually attempted to create free nations on the open ocean, sometimes using existing islands and reefs, sometimes using boats or artificial islands. The history of these attempts is equally comic and terrible. The one that most resembles the Seasteading Institute's efforts was Operation Atlantis, in which Werner Stiefel, an upstate New York pharmaceutical manufacturer, convinced a small gang of eager young libertarians to help him build a ferro-cement boat called "Atlantis II" in 1969. This vessel was supposed to sail down to the Caribbean, where the crew

might grab some land in disputed territories such as Anguilla or the Silver Shoals near Haiti, or just use the ship as a staging ground to build some artificial concrete land.

The schemers had their own silver coin, dubbed the "deca"; they got some press in *Esquire*; and they had their own homemade boat. But the ship sank in a hurricane, attention from the Haitian government forced the project into quiet mode (canceling the highly entertaining newsletter *Atlantis News*), and no new libertarian Atlantis ever arose in the Caribbean.

The king of the "take over existing land" plan was Mike Oliver, a Nevada-based real estate developer and coin dealer who had published a book called *A New Constitution for a New Country* in 1968. Oliver had a winning never-say-die approach to his dream. In 1972 he attempted to claim space for a Republic of Minerva on a series of reefs in the southwest Pacific, 260 miles from the tiny kingdom of Tonga. Perhaps *create* is a better verb than *claim*: Oliver had to pay dredging boats to build up usable land between a couple of sturdy reefs. Shortly afterward, the king of Tonga conquered the colony with one boat. The land Oliver paid to build eventually was reclaimed by the ocean.

For the rest of the 1970s, Oliver concentrated instead on islands that had the advantage of already existing but the disadvantage of already being governed. He made common cause with separatist groups on the Bahamian island of Abaco and the New Hebrides island of Espiritu Santo. Such conspiring failed to instigate any independent libertarian nations; it just resulted in the arrests of some rebellious natives.

I called Oliver to ask for an interview while researching my 2007 book *Radicals for Capitalism*. A weight of angry regret and failure seemed to block his throat as he testily informed me he had nothing to say about any past attempts to start a new libertarian nation.

So Why Expect Seasteading to Work?

Patri Friedman, who has been sailing around some of the very reefs on which earlier utopias capsized, is well aware of these past failures and says he has learned from them. The Seasteading Institute's website is as thorough and thoughtful a guide as you'll find to the foibles and follies of previous attempts to create new and/or floating nations. And there are some important points of departure that Friedman says will make the difference this time around.

First, seasteading does not require anyone to take over existing terrain. That was hopeless; the land's all claimed by some government or another, even the parts barely above water. And an open rebellion against an existing regime is unlikely to succeed. Seasteaders therefore will make their own "land."

Second, seasteading is modular. Unlike various floating nations that never got off the drawing board—the "Freedom Ship," the "Aquarius Project," and other pipe dreams—the institute's plan doesn't require an upfront multimillion-dollar buy-in. Seasteading can start small, and in fact Friedman is sure it *will* start small, with tiny family-sized platforms called "coaststeads" near the mainland serving both as proof of concept and a laboratory for working out the kinks before community-sized seasteads are ready to sprout in international waters. Friedman figures the cost of such starter sea homes won't be too out of line with housing costs on land, especially if people are buying in a communal or time-share fashion. In fact, most recent cost estimates for a particular hotel/resort seasteading design came out to roughly $258 per square foot (without factoring in some assembly and deployment costs), which is quite a bit cheaper than the current price of many single family homes in the San Francisco Bay area.

Third, seasteading isn't just based in libertarian theorizing and hopes. Friedman knows that seasteads will need to have some business hook, and he's busy working those angles. There's SurgiCruise, a nascent floating medical tourism company that is seeking venture funding. If Americans will fly to Mexico, India, or Thailand for cheaper medical care free of U.S. regulatory costs, the idea goes, why wouldn't they sail 12 miles for it? Among the other first-tier business ideas being bruited about with varying levels of

intensity are vacation resorts, sin industries, aquaculture, deep-sea marina services, and universal data libraries free of national copyright laws.

Fourth, because the open ocean plus "dynamic geography" allows for experimentation with governance in *any* form, seasteading shouldn't appeal only to libertarians. Sure, any seastead that Friedman would want to live in would get as close to anarchism as can be managed. But he thinks a variety of ideologues should be willing to leap on board, from sustainability-oriented environmentalists to members of various intentional communities, religious or philosophical or whatever, that want to shape their own lives in peace without government interference. Such communities might not be individualist in their internal policies, but they fit within the libertarian framework of seasteading itself, which allows for a wide variety of freely chosen social structures.

In April 2008, Friedman's vision received a tangible and encouraging business reward: a half-million-dollar stake from Peter Thiel, the libertarian co-founder of PayPal. Friedman's high profile on the Internet, particularly on his always engaging and interesting LiveJournal blog, coupled with his personal history in the Silicon Valley, had won his project the attention of local programmers and money people. A job interview with Thiel's venture capital management firm Clarium soon morphed into a meeting with Thiel himself.

Thiel supports many endeavors to create a future filled with wonderful science-fictional ideas, including the Methuselah Mouse Prize for life extension research and the Singularity Institute, which focuses on wild futuristic accomplishments of all sorts. He was a natural audience for Friedman's vision, and he was sold. As Thiel's colleague Joe Lonsdale tells me, "To Thiel and others involved in lots ofdifferent innovations in Silicon Valley, this seems like the coolest new thing you could create: a new government. That sounds really neat."

Seasteading, Friedman insists, should be of interest to any philanthropist who wants to preserve and protect a wider and more secure human future. As he writes in his book-in-progress on seasteading, "The ability to experiment with a new system will produce both internal benefits to the pioneering seasteaders and external benefits to the world. Seasteaders will be able to choose a society which is in harmony with their values. And each society will serve as an experiment, to see how its system works in practice."

A Seasteaders' Convention

The First Annual Seasteading Conference, held in October 2008, draws about 50 people to an Embassy Suites meeting room in Burlingame, California. Most but not all of the attendees are male libertarian Americans in the computer industry. Friedman and Gramlich do a lot of the talking, selling the reasons why you should, and the ways that you could, seastead. Representatives of Marine Innovation and Technology, a reputable ocean engineering firm, give detailed discussions of designs for small, relatively affordable, modular and movable seasteads. (The firm later supplied the Seasteading Institute with a design for a floating seven-story hotel-casino resort, patent pending.)

The conference attracts solid, serious people with lucrative occupations and (in at least a few cases) cash to invest. Friedman says he is "pleasantly surprised by the low wacko factor." He detects hardly any "people who were not competent, not practical, who have a crazy vision and don't think about how to make [it] a reality." This already puts the project ahead of most past new-country schemes.

I am struck by how few would-be seasteaders have actual nautical experience, as opposed to lots of clever ideas about flotation, breakwaters (to protect floating domiciles from waves, including the dreaded, superpowerful "rogue waves"), and transportation of seastead-sized objects. One attendee—Mikolaj Habryn, who works for Google—tells me he took a sailing course out of his interest in the topic, but for the most part these are not people with saltwater in their veins. They are computer types, social and physical engineers, and visionaries who for various reasons think experimenting with new social forms is an exciting challenge. Many of them tell me they are not likely to be early adapters living on small-scale

experimental seasteads; instead they plan to wait until the business environment offshore has room for their careers, or until the comfort level for landlubbers rises a bit.

This lack of high-seas experience might be just fine. While ocean living creates unique challenges and costs—Friedman refers to these as the "ocean tax," recognizing that seasteaders must eventually make the cost lower than the "government tax" you suffer on land—most prospective seasteaders think the obstacles can be largely overcome through money and thought. Human beings already know how to generate power on isolated locations off the grid. Wind, solar, and diesel strike Friedman as the most obviously feasible, and the ocean will probably provide a particularly suitable environment for wind power. Although seasteads probably will try to grow their own food, it can be shipped in if needed; the ocean is all about moving big things cheaply.

What about that most time-tested vessel for living on the sea: the boat? Modularly connecting the vehicles into larger communities seems tricky. Friedman's ideal seasteading community can start small, grow marginally as the idea or the techniques improve enough to attract more people, and be able to both expand and contract as social experiments succeed or fizzle in the judgment of each individual seasteader. He fears boats don't provide much room for self-sufficiency in food and power, let alone comfortable long-term living, given their space limitations. Finally, he's leery of the "Just use boats!" line of thinking because ships are simply too old-fashioned to capture the visionary imagination in the way he thinks seasteading must if the movement is to thrive. Still, Friedman has been moved enough by the obvious immediate advantages in cost and proven legal status to think that living on retrofitted old ships might be a reasonable starting point for experimenting with his ideas.

Oil platforms, another existing model of ocean living and working, are cost-effective because they extract a valuable commodity. But seasteaders cannot, and don't expect to, begin with resource extraction. That would certainly run afoul of both the Law of the Sea Treaty and any number of existing government and corporate interests that claim to have a say over how ocean-based resources should be used and allocated. For the same reason that taking over existing land is a bad idea for nascent seasteaders, anything that suggests a challenge to existing wealth and authority could hobble the movement while it's still trying to find its sea legs.

Indeed, this aspirationally lawless bunch muses throughout the conference in Burlingame over the extent to which the world would view all seasteaders as a part of the same team, and thus whether seasteads would have to, gulp, *police* each other to prevent one bad apple from spoiling the bunch. They do not reach a conclusion.

Seasteaders do have a legal adviser: Jorge Schmidt, an attorney who has experience with the Law of the Sea Treaty. Schmidt is careful to tell me there are plenty of unknowns awaiting future floaters, although he approves of Friedman's basic framework: get your seastead out of the 12-mile range that countries claim full sovereignty over, don't mess with resources in the 200-mile exclusive economic zone that most nations also assert, and emulate existing ships in international waters by arranging with some nation to obtain a "flag of convenience" marking seasteads as under its protection. In open waters, only nations have rights. Individuals without a stable flag are considered pirates and outlaws.

The seasteading project benefits from the fact that many poorer countries are willing to sell their sovereignty to the highest bidder in a flag-of-convenience process that works to the buyer's advantage. "I definitely think at the start those countries will want a cut [of whatever economic benefit a seastead produces], but keep in mind we're in a good negotiating position," Friedman says. "We can talk to every country in the world and only need one to give us the deal we want, and we can have them bid against each other for how low the cut can be."

Schmidt speculates that full sovereignty might never happen for seasteads, but that it might not matter. "Maybe we'll get 95 percent of what we want just paying Tuvalo," he tells me. "If that's the case, why go the extra step?" Reality is nine-tenths of the law: "What's most important is to get things running, to have

something concrete that works. Once we have that, the actual dynamics fuel themselves, rather than expectations and theory."

Getting lost in these worlds of expectation and theory while talking to seasteading enthusiasts and reading their message boards is delightfully bracing, even if it's difficult in sober moments to imagine their dreams materializing. Surely before it gets to the point of modular anarchy, *some* nation is going to say, "Screw existing international law; we're not letting this happen."

Friedman says something during our first interview in Palo Alto, something that sounds puckish at first but on second and third thought seems more and more true. Libertarians, he says, expend precious time and energy on truly and self-evidently impossible paths toward political change. "Like the Ron Paul movement," he says. "Lots of libertarians' effort and millions and millions directed in a way that's hopeless! For real change [electoral politics is] totally hopeless. Think how much more likely to succeed [libertarians would be] if that amount of resources were put into something that could actually work." By which he means seasteading. And you have to admit: When you compare it to the likelihood of creating a libertarian world through American politics, seasteading starts to look more and more sensible.

'We Can't Build Libertopia'

I have talked to a lot of people about the seasteading concept, normal human beings not particularly familiar with libertarianism or new-country schemes. Everyone offers at least some objections. Friedman and his team have heard them all, and they've got answers—or at least suggestive approximations that indicate the various critiques ought not to be deal killers.

Pirates, for example, are far more likely to attack wealthy ships than humble residential platforms. Seasteaders are very likely to have arms and can raise the cost of attacks higher than most pirates will be willing to pay. Storms? You can keep seasteads safe through breakwaters and a spar-and-buoy design in which most of the wave energy hits just a pillar or two while the city sits cozily on a top platform. And yes, tight communal living can be stressful, but residents of places such as Antarctica stations already find a way to muddle through.

Unlike most new-country dreamers, Friedman and his team are winningly scientific, as opposed to scientistic. They are scrupulous about avoiding claims that such-and-such technical solution *must* work. They are wary of oceandreamer concepts such as "seament" or "ocean thermal energy conversion," which are based on the premise that both building materials and energy are easily gleanable from the open seas themselves.

And although he remains a happy anarchovisionary, Friedman knows that he and his confederates must take baby steps. He just wants to see marginal improvements in governance, and he is sure "dynamic geography" is the key. Thus, while the goal is to be totally free-floating, he is willing to let seasteads be encased in breakwaters if that's the cheapest way to keep them safe from the ocean's ravages.

"We can't build libertopia," he says. "Whatever we build will have to have security forces who will bust in your door if they think you're designing nuclear weapons or funding terrorism."

This concession is based not on principle but on the pragmatic concern that nukes and terrorism would make seasteads sitting ducks for nation-states. "It will be a bummer," Friedman adds, "and not what I want ultimately, but with that constraint we can get a lot of freedom, a lot more than we have now."

Friedman comes across as a consistently calm and reasonable man. So reasonable, in fact, that dealing with the rest of the world's passions and irrationalities have come to bore and annoy him.
That's why he embraced seasteading to begin with.

As Milton's grandson says at the conference, the best thing about seasteading is that it doesn't require any proselytizing to the masses. "Niche social and political movements [try to] argue with everyone they run across and convince the whole country," he notes, but that's "stressful and hopeless." Why not just *do* it: build a version of the world you want to live in. Then you get to *live in it*, regardless of whether anyone else is convinced it's proper or makes sense.

'We Just Want to Create a Laboratory'

In his introductory talk at the seasteading conference, Friedman calmly tells a series of maddening stories: of men dying of cancer in prison because of stupid immigration restrictions, of tens of millions murdered by states in the 20th century, of people imprisoned and impoverished because of their choice of recreation. The context and political intent are clear: We have to figure out a way to escape governments.

As of this writing, seasteading is still mostly talk and dreams. Raising more money is in abeyance, as the Seasteading Institute doesn't even have official nonprofit status yet. (The Internal Revenue Service is processing the paperwork.) The patent on the first hotel-casino design is still pending. The publicity generated by the article in *Wired*, seasteading's first extensive major print media hit, more than doubled Friedman's volunteer base within a few weeks.

The current economic crisis, everyone involved notes, makes the institute's prospects both better and worse in the short term. It's easier to sell the notion that the world desperately needs some new political and economic systems, but it's harder to convince people to be charitable, especially toward experimental long shots.

The first real, physical thing the seasteaders plan is a fall 2009 event in the San Francisco Bay called Ephemerisle, a sort of aquatic Burning Man (the annual desert art festival in which Friedman is an enthusiastic participant). They plan to experiment with some flotation designs and begin to feel what a free life at sea might be like.

"You can read all the books you want that say freedom is a better system, but if people in their daily lives are surrounded by cops with guns, where government supplies emergency services, where every product has been regulated and tested by government, it's hard to wrap your head around the crazy idea that all these things can be provided by a free market," Friedman tells me. "So let's do it. Let's live it. It could be a disaster. People might die. But living it makes it so much more powerful than talking about it." Through Burning Man, he adds, he's "seen the power of experience to shape people's perceptions about what's possible."

What will the experience of living on a seastead be like? What social structures will arise on a liberated ocean? Friedman recognizes that it is neither possible nor necessary for him to know. In his words, it's "an enormous relief to realize that we can just throw up our hands and safely leave some of the questions philosophers have been discussing for millennia unresolved. We just want to create a laboratory for experimenting with social contracts, and a world in which people are free to create societies with groups of like-minded compatriots. The details of those societies are up to you."

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http://www.reason.com/news/show/133865.html

Exploring New Ideas for Arts Journalism

By: Tom Jacobs

With cultural coverage rapidly disappearing from the nation's shrinking newspapers, new forums for arts journalism need to be found. Otherwise, as Miller-McCune.com reported in an in-depth piece in March, the arts risk becoming an evermore marginal facet of American society.

So those who cover the creative scene are being forced to think creatively themselves, as they experiment with new, economically viable ways of getting information, criticism and analysis to the public. Now, the University of Southern California is collecting intriguing new approaches to cultural coverage, the best of which will be explored at an on-campus summit this fall.

The National Summit on Arts Journalism will be webcast live from Los Angeles beginning at 9 a.m. Pacific Time on Oct. 2. It is sponsored by the USC Annenberg School for Communication and the National Arts Journalism Program. "If arts journalism is increasingly not viable in traditional media, we are committed to helping to find or create new and better models," states the summit's Web site. "There are many ideas currently buzzing for attention. Our intention here is to try to identify some of the most promising and give them wider circulation.""We're looking for sustainable new models that have the potential to support arts journalism," the site adds. "These can be established projects or startups, but must already be launched or on a clear trajectory to launching. Size of the project is not necessarily a factor, but impact is."

Projects are to be submitted online. They will be accessible to the public through Aug. 17, at which point they will be evaluated by a panel of veteran arts journalists. Five winners will be announced Sept. 1. Representatives of all five will receive travel expenses to come to Los Angeles and give a live multimedia presentation at the Oct. 2 summit. Roundtable discussions of the ideas will follow, including input from the online audience.Bloggers are welcome to submit an application, but the site notes: "We're not looking for blogs unless there's something that makes your blog both sustainable as a business model and replicable."In the two weeks following the event, members of the National Arts Journalism Program and alumni of the National Endowment for the Arts' Arts Journalism Institutes will vote on their favorite projects. Prizes will be $7,500 for first place, $5,000 for second place and $2,500 for third.

So forget the notion of arts & entertainment. The new paradigm is arts & entrepreneurship.

http://www.miller-mccune.com/mediator/new-ideas-for-arts-journalism-1341

Solar System

By: Matt Jenkins

Francisco DeVries was familiar with all the grand plans and high-flown talk about solarizing the world's power mix to fight global warming. Then he found himself staring at a problem that seems, somehow, to have repeatedly escaped the climate evangelists' attention.

DeVries is a confessed save-the-climate junkie, and his professional credentials include a stint as an appointee in the U.S. Department of Energy under President Clinton. More recently, though, he earned his paycheck as the chief of staff for Berkeley, Calif., Mayor Tom Bates. About two years ago, DeVries was charged with implementing an ambitious new measure to cut the city's greenhouse gas emissions 80 percent by 2050.

Despite California's reputation for all things green, less than 0.5 percent of homes in the state have photovoltaic systems. Berkeley's greenhouse gas-reduction program is, in large part, aimed at encouraging the city's homeowners to put solar panels on their roofs. Because DeVries was in charge of spearheading the initiative, he says, "I thought I should walk the walk: I thought I should get solar on my own house."

But when he knuckled down to the task, DeVries came face-to-face with the high cost of going green. "The bids came in, and I couldn't pull the trigger for all the same reasons that people everywhere aren't pulling the trigger," he says. "Which is, 'Oh my lord, that's a *big* check.'"

The average cost of a residential solar installation in California is around $30,000. That's not exactly the kind of money everyone has just lying around, and it confronts homeowners with the prospect of having to refinance their mortgage or open a home-equity line of credit to pay for an upgrade that, to a large extent, will serve the collective good. And, DeVries points out, if you install solar panels and then move — as the average California homeowner does every five to seven years — "that means you've just bought your next owner all this free electricity."

DeVries was hardly the first homeowner whose virtuous intentions were frustrated by the cold realities of credit. Many a person might have thrown their hands up in frustration, bought a couple of compact fluorescent light bulbs and salved the shreds of his public-spiritedness with a bottle of Chablis. But DeVries recognized his conundrum as a symptom of a bigger problem.

He was struck, in particular, that the money people spend on their monthly electric bill could instead be channeled into retrofitting their homes with solar. "The money's there. The money's *there*. People are paying it hand over fist, every month. But we as consumers aren't (doing solar installations)," he says. "At its root, there is a financing market failure for renewables and energy efficiency in people's homes. Everybody's talking about all the technology, but we have to solve the financing problem."

It is not, on its face, a particularly glamorous problem to take on. But two years later, DeVries seems to have devised a solution — one that, in spite of its decided wonkiness, Mayor Bates has taken to referring to as "Berkeley's most important contribution to fighting global warming."

DeVries has the slightly manic air you'd expect of a political chief of staff. He is a tall, rail-thin and slightly bookish person, with a to-do list that seems like it might benefit from a couple of extra hours in each day. By his own admission, DeVries' intellectual preoccupations tend to run "a mile wide and an inch deep."

At the time he was given responsibility for implementing Berkeley's greenhouse gas-reduction program, DeVries was actually trying to get out of public service. Bates had recently been elected to a second term as mayor, and DeVries had a 2-year-old son at home. "I had a really stressful job," he says. "I loved it, but I was a little burned out at that point."

For some reason, though, the clean-energy financing problem focused DeVries' energy. The problem wasn't actually money: If your monthly power bill is $130, as DeVries' is, you would make a total of $31,200 in payments over 20 years — about what it would cost to install a photovoltaic unit on your home. Put in those terms, going solar seems like a smart move. But, as DeVries discovered, plunking down cash on the barrelhead for a new solar system is a daunting proposition.

Mayor Bates recognized that if the city could provide financial assistance to homeowners, it would go a long way toward turning the city's carbon-emission goal into reality. But the financing, he says, was a sticky point: "It's hard to take your general fund money and put it into an untested idea."

As it happened, though, DeVries found himself involved in another matter of civic procedure that, he realized, offered a model for the problem that had come to preoccupy him. A Berkeley neighborhood had decided to put its utility poles and power lines underground. To pay for the project, the city created an underground utility district, a type of land-secured financing district that is a standard element of municipal bond finance.

The utility district would sell bonds to cover the upfront costs of the project. Homeowners in the project would then pay back the money through a tax assessment levied on their property — essentially an installment plan that would spread the repayment over 20 years, much like a recurring utility bill. The bonds would be made secure through a tax lien put on each participating property.

"We've been using (land-secured financing districts) for everything from parks to open space to streets to sewers to underground utility districts for 100 years," DeVries says. "And I thought, 'Well, geez: That mechanism might help solve my problem.'"

The utility-district kind of financing arrangement is especially attractive because a municipal bond carries relatively low interest, opening up a lower-cost option than would otherwise be available to homeowners. (Also, because the home itself serves as collateral, even homeowners with less-than-stellar credit are

eligible.) But when it came to solar installation on people's houses, DeVries says, "nobody had ever tried to give individual property owners access to the municipal bond market before."

To open up access to that market, DeVries proposed creating a Sustainable Energy Financing District, into which property owners who wanted to install solar systems could annex themselves. That district could then issue bonds whose proceeds could finance the upfront costs of photovoltaic systems; participating homeowners could use the money they save on their utility bills to pay the tax assessment. That assessment stays with the property, so if a homeowner moves, the next resident picks up the repayment — and gets the solar power.

Under the program, a $30,000 system would carry a $245 per-month property tax. But, when offset with rebates from the local energy utility and state and federal tax credits (the federal credit alone, for 30 percent of the cost of the system, knocks the effective tax down to $172 per month), the price of going solar ends up being close to what it would cost to continue buying power from the grid.

The Berkeley City Council approved the Sustainable Energy Financing District in November 2007, and the idea immediately attracted interest from points far beyond Berkeley. In fact, two weeks before the city council greenlighted the program, the *San Francisco Chronicle* ran a front-page story about it. DeVries had the day off and was at home when the paper hit the streets, but within hours, "my cell phone went crazy. We received hundreds of calls — from property owners that wanted to do it, solar companies that wanted to be involved, other cities that wanted to learn how we were doing it."

Still, it wasn't clear who, exactly, would buy the bonds.

Last spring, DeVries finally left his job at the Berkeley mayor's office. He spent several months as a stay-at-home dad and moonlighted as a consultant for various clients on energy-related issues. But he found that once he'd started thinking about how to reduce the climate impact of the average home, he couldn't stop.

"I'm constantly cognizant of all the ways in which our homes are wasting energy," he says. DeVries is a confessed hot-tub aficionado, but "this whole thing has ruined hot tubs for me." Even spending time in homes and offices that still use incandescent light bulbs, rather than compact fluorescent lights, is, as he puts it, "like hearing nails on a chalkboard."

Berkeley, meanwhile, was struggling to get a bank to back its bonds. Several banks did express interest but, because they weren't sure how to incorporate the new type of bond into their portfolios, indicated that it could be awhile before they were ready to take the plunge. And worsening economic conditions didn't help.

"Banks have been traditionally very conservative, and of course they've gone through a horrible meltdown," Bates says. "It was the worst possible time to be talking to them about a new idea."

In the meantime, though, a financier named Stephen Portis had started working with the city to find funding for the program. Portis recognized the broader need for a company that could act as a financing partner for municipal clean-energy programs, and, last summer, started a company called Renewable Funding, with its offices in downtown Oakland.

And he roped DeVries back into the game, asking him to work as a consultant to the company to figure out how, exactly, to bridge the gap between individual home owners and the bond market. DeVries purposefully stayed clear of any work on the contractual nuts and bolts of the Berkeley program. But he created a "turnkey" model that cities could adopt to access on-demand financing for energy projects, a model that Renewable Funding now calls CityFIRST. That model, in effect, bundles scores of bonds for individual solar-installation projects into a package big enough that it won't be laughed out of the market.

The first incarnation was a bond purchase agreement with the city of Berkeley. "Securing the funding was a big problem," Bates says. "The banks were interested, but when push came to shove, they weren't ready to go. So we were lucky that Renewable Funding came along."

Under its agreement with Berkeley, Renewable Funding pledges to buy all of the bonds for the city's $1.5 million pilot program. The company will buy the individual bonds in small increments as they're needed at an interest rate of 3.25 percent over the 10-year Treasury rate or 6.75 percent, whichever is greater.

"We're sort of micro-financing these things within the municipal bond world," DeVries says. "We have one master bond indenture, but every bond that gets purchased is, in fact, a tiny micro bond. They sell us a little itty-bitty bond as part of this bond indenture, and we wire them the money."

When DeVries left the city of Berkeley, he hadn't been intending to dig much deeper into the ugly details of financing solar-retrofit programs. But his work to figure out the financing angle made him think again. "Pretty quickly," he says, "I realized this is what I want to do."

Last fall, once Renewable Funding finalized its deal with the city of Berkeley, Portis hired DeVries as the president of the new company. "There were a lot of questions about whether or not you could end up bringing the money to make the program work," DeVries says. "That's what we do, and I think that's probably what was needed to make this work."

Now, Renewable Funding is working to sell the bonds it had issued, largely in an effort to prove the market for them. Originally, the company had hoped to turn to the public bond market, but the market's implosion last year sent interest rates soaring from 6 1/2 to 7, and then 7 1/2 to 8, 8 1/2 to 9, and 9 1/2 to 10 percent. "People got scared," DeVries says. "Everybody was looking at it and having a heart attack."

Rates in the bond market have been settling down again. But Renewable Funding has begun pitching the bonds as boutique investments to the growing class of socially responsible investors who are trying to use their money to leverage environmental change and who might like the bonds for, as DeVries puts it, "some other reasons besides just a 6 or 6 and a half percent return on their money."

"If somebody's sitting there saying, 'Do I want these sewer bonds from Fresno or these Berkeley clean-energy bonds? I'm kind of indifferent; I'll go with the cheaper deal,' maybe we're talking to the wrong group of people," DeVries says.

"The greenness of them doesn't necessarily get you a discount, but it buys you the opportunity" to pitch it to socially enlightened investors, he says. "They're willing to take a long-term view, as opposed to a big bond-investment company making a quick decision that day about how to maximize returns."

Renewable Funding has already secured firm commitments from private buyers for the Berkeley bonds. Now, the company is in discussions with a major infrastructure-development bank about a $50 million facility for long-term debt, which will give Renewable Funding the money to purchase bonds issued by programs elsewhere, too.

The entire concept is still just getting off the ground. In Berkeley, 38 homeowners enrolled in the city's pilot program, and the first solar installations there were completed this spring. The city will soon expand its program to include energy efficiency projects such as weatherproofing and heating, venting and air conditioning upgrades — which actually offer better returns per dollar in terms of greenhouse gas-emissions reduction.

The model is beginning to take off. Last fall, the city of Palm Desert, in Southern California, began its own program. That program focuses on improving energy efficiency as well as installing solar panels, and has already made $7.5 million in loans to 208 homeowners. Last year, the California Legislature also created a statewide Clean Energy Finance Program that allows governments throughout the state to issue

bonds like Berkeley's. Sonoma County, in Northern California, and Boulder County in Colorado, are now starting their own versions of the program; San Diego will start a program this year, and San Francisco hopes to make at least $20 million in loans this year.

Local governments are now turning to a wide variety of sources, not just Renewable Funding, to launch their programs. And, DeVries says, that's fine by him. "Over time, it'll probably be a very big market, and it'll be more than just us," he says. "And that's as it should be."

Palm Desert, for instance, began its program last August with $2.5 million from the city's general fund, although the financial downturn has made city finance managers much more skittish about such commitments now. "I would be barbecued if I were to try that today," says Patrick Conlon, who runs the city of Palm Desert's Office of Energy Management. The city funded the second phase of its program by selling a bond to the local redevelopment agency and has recently issued a request for proposals for the third phase of its program.

Renewable Funding is helping to administer Boulder County's program, but the county will try to sell its bonds directly on the bond market rather than going through an intermediary. When San Francisco recently issued a request for proposals from funding partners, Renewable Funding threw its hat in the ring — as did several banks, including Wells Fargo, which are now apparently feeling more confident in the concept.

"We cast a pretty wide net," says Johanna Partin, who manages San Francisco's renewable energy program. "We've learned a lot from places like Berkeley and Palm Desert, but there's still a lot left to be learned."

Conlon, the Palm Desert program manager, acknowledges that the financial realities are not exactly sunshiny right now: "I cannot think of a worse time to go out and try to sell bonds. I've never seen the climate as bad as it is." But the demand is staggering. "I've got a waiting list of over 200 people. We could do a $40 (million) or $60 million loan program, and it would get snapped up in a heartbeat," he says. "We've created a monster."

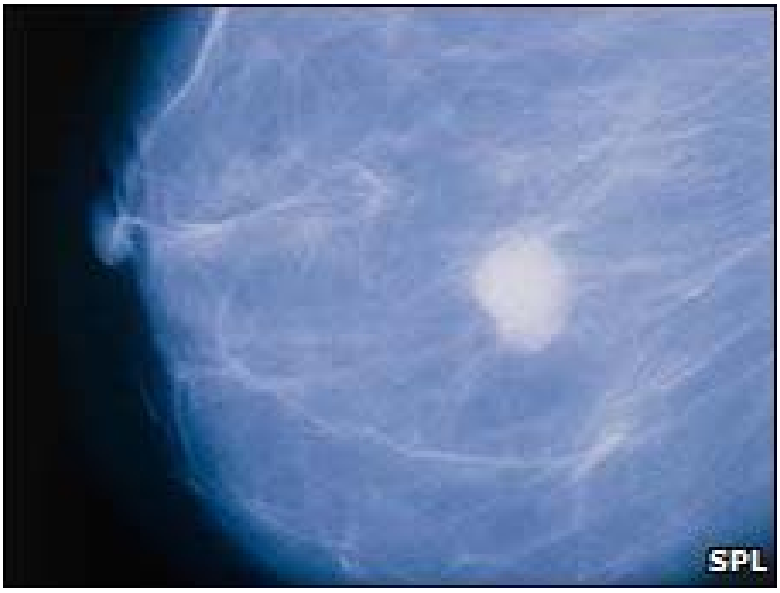
For DeVries' part, he's happy to have cooked up a better way to help the masses take a hand in the fight to save the climate. "Our goal is not to take over the market for financing solar and energy efficiency," he says. "It's to provide a financing mechanism for people who otherwise could not or would not get solar and energy efficiency.

"And that swath (of people) is a lot bigger now than it was a year ago."

http://www.miller-mccune.com/science_environment/solar-system-1270

Third of breast cancer 'harmless'

One in three breast cancers detected by mammogram screening may actually be harmless, a study has suggested.



Data from five countries, including the UK, suggest some women may have had unnecessary treatment for cancers that were unlikely to kill them or spread. As it is not possible to distinguish between lethal and harmless cancers, all are treated. But advocates of screening insist it is a vital tool for early detection of cancerous cells.

" **It means that screening for cancer, in this case breast cancer, is a much closer call than has been previously advertised** "
Professor Gilbert Welch
Dartmouth Institute for Health Policy

Researchers from the Nordic Cochrane Centre in Denmark said their results showed cancer screening programmes could lead to "overdiagnosis". Writing in the British Medical Journal (BMJ), they said: "Screening for cancer may lead to earlier detection of lethal cancers but also detects harmless ones that will not cause death or symptoms.

"The detection of such cancers, which would not have been identified clinically in someone's remaining lifetime, is called over-diagnosis and can only be harmful to those who experience it."

Closer call

Professor Gilbert Welch, of the Dartmouth Institute for Health Policy, wrote an editorial on the finding in the BMJ. He said: "It means that screening for cancer, in this case breast cancer, is a much closer call than has been previously advertised. "It has the opportunity to help some women but it also has the consequence of leading others to be treated needlessly for cancer and that's not a trivial thing."

But Professor Julietta Patnick, director of NHS Cancer Screening Programmes, said one in eight women diagnosed with breast cancer through the NHS programme would have been missed without screening.

She said screening was estimated to save 1,400 lives a year in England alone.

Professor Patnick said: "Thanks to screening, one extra woman's life will be saved for every eight women diagnosed with breast cancer.

"By bringing forward the date of diagnosis (through early detection), we find those cancers that would otherwise not be caught until later in life by which time they could be fatal."

She also criticised the research, suggesting it made highly selective use of statistics, and ignored lifestyle changes which had increased breast cancer incidence, such as women waiting longer before having their first child.

The researchers looked at a range of statistics from five countries which had implemented screening programmes, including data for England and Wales from between 1971 and 1999.

" **Based on all the current evidence, we believe the benefits of detecting breast cancer early still outweigh the risks** "
Dr Sarah Cant

The findings seem to confirm research published by the same team earlier this year.

Other recently compiled figures also show that UK death rates from breast, bowel, and male lung cancer are at their lowest since 1971.

The figures showing the fall in deaths from three of the most common cancers were compiled by Cancer Research UK, and are being put down to improved screening and better care.

'Don't be put off'

Dr Sarah Cant, from Breakthrough Breast Cancer, said she hoped the research on the incidence of harmless breast cancers would not discourage women from attending screening.

"Unfortunately, it is currently not possible to predict which cancers found through screening will develop aggressively and which will grow very slowly," she said.

"Based on all the current evidence, we believe the benefits of detecting breast cancer early still outweigh the risks."

She added that women needed to be given clear information about breast screening and it was important to remember that "while survival rates have increased greatly in recent years, just under 12,000 women still die from this disease each year in the UK."

Her view was echoed by Emma Pennery, of the charity Breast Cancer Care, who said: "Until it is possible to accurately determine the progression of cancers found through mammograms, screening remains an effective option for detecting breast cancers as soon as possible.

"As this review acknowledges this could lead to overtreatment in a percentage of cases.

"However, without screening women would face the prospect of having to wait for a visible symptom of cancer, such as a lump, to become apparent before treatment could start."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8143564.stm

Published: 2009/07/10 06:38:28 GMT

A glimpse of ancient dying stars

By Victoria Gill
Science reporter, BBC News

Astronomers have revealed faint images of the two oldest and most distant supernovae to be discovered to date.

When a massive star effectively runs out of nuclear fuel, it explodes in a supernova - hurling much of its material into space.

The scientists described in the journal Nature how they gathered images of the exploding stars by monitoring the same galaxies over five years.

They used multiple images to pick out supernovae in the distant Universe.

The furthest two supernovae the team found occurred about 11 billion years ago.

Mark Sullivan, an astronomer from the University of Oxford in the UK, was one of the authors of the study. He explained that these stars exploded about 2.5 billion years after the Big Bang.

"As a point of reference, the universe is currently about 13.5 billion years old," said Dr Sullivan.

The team gathered their data using the Canada-France-Hawaii telescope on Mauna Kea in Hawaii.

" **This method will allow us... to witness some of the very first stars ever** "
Jeff Cooke University of California, Irvine

"We took all of the data in and combined it together," said Dr Sullivan. "So instead of just using data taken in a single night, which would typically be a single hour we had several hours worth of (images)."

The faint light from the aftermath of the huge stellar explosions was visible for several months, so the scientists were able to isolate it from the blur of the galaxies in which they occurred.

"What we're looking for are things that were there one year, but which weren't there the next," explained Dr Sullivan.

"You see an image of the galaxy in which a supernovae exploded. When you subtract the two years' data, the galaxy disappears, because it hasn't changed. So you're just left with things that have changed - in this case that's the supernovae."

Dr Sullivan said that this new technique opened up exciting possibilities for future experiments.

"We have shown that this is the way in which we can find the most distant cosmic explosions," he told BBC News.

Seeing stars

Ancient supernovae can reveal important clues about the birth of the Universe.

"Elements such as iron, calcium and nickel are manufactured by these massive stars," explained Jeff Cooke, from the University of California, Irvine, who was also involved in the study.

"Upon their explosive death, they eject this material into space and 'pollute' their environments. This material then cools and can form recycled stars with disks of material around them that can then form planets."

By "looking back 11 billion years into the past", Dr Cooke said that these new discoveries will help astronomers to understand exactly how this process works.

"Moreover, the new method that we use here will allow us to observe as far back as 12 and a half billion years to witness some of the very first stars ever."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8141395.stm

Published: 2009/07/09 11:47:26 GMT

Academics denounce maths A-level

Dozens of university academics have put their names to calls for a new maths A-level in England to be scrapped.

Educators for Reform, a think tank offshoot, say "use of mathematics" is not of A-level standard.

They argue it will mislead students from poor backgrounds and will not prepare people for university study.

The Qualifications and Curriculum Authority said a consultation on the new course was just ending but it was meant to supplement existing A-levels.

The new qualification is intended to be taught from September 2011.

The academics - at least 62 of them as of Thursday afternoon - say that in particular the compulsory algebra and calculus units are "considerably less demanding and cover less content than A-level".

Dilution

The maths professors and lecturers are basing their opinions on the AS-level in use of mathematics and pilot papers for the A2, the second part of an A-level. They say curriculum time is taken up with practical activities rather than developing advanced mathematical understanding.

Another plank of their objections, being presented in response to a QCA consultation, is that there is already a shortage of specialist maths teachers in secondary schools.

These will be spread even more thinly if they are having to teach another course as well as A-level mathematics, they say.

And they argue fewer students might take the main maths A-level if use of mathematics presents an easier option.

Most universities will continue to demand A-level mathematics for those wishing to study physics, economics, chemistry, computer science and engineering, according to their report.

"Students attending schools - usually in the poorest areas - that do not have a detailed knowledge of university admission policies will be unaware of this," it says.

"Some university admissions tutors have already had to turn away bright students whose teachers (wrongly) believed that a Grade A in AS-level use of mathematics was appropriate preparation for subjects requiring a high degree of mathematical literacy."

Professor Nick Shepherd-Barron at Cambridge University said: "As far as A-level is concerned creativity has been not just hidden, but lost.

"Instead mathematics is presented as a mindless exercise in the execution of routines."

'Skills for progression'

For the A2 exam, students must take a compulsory paper in calculus, and choose two other papers.

These include options such as data analysis, decision mathematics, dynamics, hypothesis testing, mathematical comprehension and mathematical principles for personal finance.

Educators for Reform say there are already free-standing qualifications suitable for those who do not need a full-blown maths A-level.

They say GCSE-level study should be made more rigorous - and A-level less dull.

A QCA spokesman said A-level use of mathematics was intended to be an addition to AS and A-levels, not a replacement.

"It is designed to be accessible to a wide range of students and to improve the mathematical knowledge and skills needed for progression to employment and higher education (but not for mathematics or mathematics-related degrees)," he said.

"It will help develop a workforce with appropriate skills to meet the needs of business and industry."

He added it was too early to comment on the final specifications of the new qualifications, as the public consultation on the draft criteria ended on 10 July and a full analysis of the responses would then be carried out. "Once proposals are approved, awarding bodies will develop new specifications for accreditation by [regulator] Ofqual."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8143060.stm

Published: 2009/07/09 23:02:16 GMT

Liquefied Manure's Thomas Paine May Be German

By: Michael Scott Moore

A village in northern Germany called Jühnde has become famous in green-energy circles as one of the world's most successful "bio-villages." That means it heats the houses of some 75 percent of its citizens with both wood chips and methane gas produced from byproducts of local farms — fermented silage (sunflowers, maize, wheat and rye) or liquefied manure.

"Seventy-five percent" of Jühnde is, admittedly, only about 200 people. But that hasn't kept the village from an unexpected level of international fame.

Eckhard Fangmeier, the project manager in Jühnde, has traveled twice to upstate New York to explain the German initiative to Americans, most recently at the end of last month. A fact-finding mission from BioTown USA (formerly known as Reynolds, Ind.) flew to Germany in 2007, and the Midwesterners openly treat Jühnde as a role model.

Bio-villages are something of a fashion in the German countryside. Less well known are wood- and methane-warmed towns like Mauenheim, Renquishausen and Oberrosphe. In Börnsen, locals have built such a successful village heating system that the giant European energy provider for the region, E.on, is no longer welcome. The mayor, Walter Heisch, identifies with Majestix, the village elder from the *Asterix* comic books about ancient Gauls who liked to beat up Romans. He's a rebellious villager dedicated to breaking the monopolistic power of Big Energy. "We can be insufferable when we work together," he likes to say.

So why, with its tradition of independence — and a popular aversion to "foreign oil," made painful since 2001 — doesn't America have a similar smattering of self-sufficient bio-energy towns? Where are the patriots of American energy, the Tom Paines and Patrick Henrys of the heartland, looking to convert hog manure into heat?

Right now BioTown USA is the best-developed American experiment, and it's more ambitious than Börnsen or Jühnde. The state of Indiana itself has guided the project, and the goal is not just to heat the town with farm byproducts but to run local vehicles on biofuels. This effort hit a stumbling block in 2007 when the town's main ethanol producer, VeraSun — which was planning to build a local refinery — fell victim to an ethanol glut and a spike in the price of corn. VeraSun, like ethanol producers across the United States, went bankrupt.

"Energy prices in the U.S. are very competitive," said Brandon Seitz, who directs the state's Office of Energy Development, "and Indiana has some of the lowest rates, which makes certain renewable projects harder to make profitable ... I [also] think business structure is different between Germany and the U.S., and the cooperative model is more accepted in German economic circles than within the U.S."

Eckhard Fangmeier sees American technology for these towns lagging about 15 years behind German know-how, which is the reason he flies to Syracuse to sit in on panel discussions. "It's refreshingly new for Americans," he told me. "That one can create something communally [to benefit every individual] — that's something very new. But I think it's just a matter of time. Americans are very practical."

Perhaps. But German towns also have the benefit of federal support. An ambitious policy to phase out nuclear power plants by 2021 led to the Renewable Energy Sources Act of 2000, which jacked up "feed-in tariffs" — fixed prices for small-time energy producers who want to sell their power into the national grid. An amendment to the law in 2004 strengthened the policy requiring big energy companies like E.on to buy from small, renewable producers. These price-fixing measures have helped some German bio-village projects, including Jühnde, pay the bills.

BioTown USA would rather do without government subsidies. Ryan West, from the Indiana Department of Agriculture, doesn't want to see a model bio-energy village; he wants a viable, reproducible business model. "We could do BioTown with state and federal funds, but that's not our goal," he told a local Indiana paper in 2006. "This isn't about creating a showplace and walking away."

But it's worth mentioning that feed-in tariffs aren't the same as state and federal funds. Germany has created a viable business model, without throwing taxpayer euros at the problem.

The argument against feed-in tariffs for renewable energy is that price-fixing will muck up the market and raise energy prices for everyone. Germans are, in fact, used to paying a bit more for electricity and heat, but the extra costs are negligible — an average of €1.50 ($2.10) per household after the Renewable Energy Sources Act came into effect, as estimated by the World Future Council. Some big energy companies (like mine in Berlin) also offer "green blends" of electricity at a premium, to help cover costs without raising their basic rates. It works. Germans as a people still find plenty of things to moan about, but the price of energy isn't one of them.

http://www.miller-mccune.com/europe/liquefied-manure-1334

A Primer on Media in the 21st Century

By: Tom Price

Traditional news media — newspapers, magazines and television news organizations — are testing novel responses to stem the steady losses of their subscribers, viewers and advertisers.

Beyond cost-cutting measures like reducing staff, pulling back coverage and shrinking the size of their printed products, news organizations are sharing work with longtime rivals, using amateurs as volunteer reporters and moving heavily or totally online. They're also turning to new and untested methods for raising income.

The efforts are catalogued in the Project for Excellence in Journalism's sixth annual report on "The State of the News Media."

With the recession exacerbating downward trends at many news organizations, the media's state now is "the bleakest" since PEJ published its first report in 2004, the authors conclude. Not only has the well-chronicled decline of newspapers continued apace, but magazines and television also are in trouble.

One counterpoint: Cable news audiences and income soared because of interest in the stations' extensive 2008 campaign coverage. Ratings "plummeted" after the election, the report said, then picked up in early 2009, indicating that the cable channels "might retain some, but not most," of their 2008 viewership.

Most newspapers remain profitable, and the report's authors "do not subscribe to the theory that the death of the industry is imminent." But profit margins *are* declining, however, and if that is not reversed, more papers will go out of business, the report warns. Staff cuts create "significant erosion" of the comprehensive reporting newspapers do more than any other news medium. The authors worry that diminished content will cause further readership drops.

For magazines, "2008 may be seen as the year when the traditional mass audience model finally collapsed," the report says. U.S. News moved almost entirely on line, and *Time* and *Newsweek* aimed

their reporting at smaller, elite audiences.

Local television revenues fell 7 percent, something unheard of in an election year when candidates spend heavily on advertising. Revenues fell even for network news programs whose ratings rose.

To cut costs and increase reporting resources, a growing number of newspapers are sharing their reporters' work. In Florida, for example, the *St. Petersburg Times* and *The Miami Herald* have merged their state capital bureaus. The eight largest newspapers in Ohio share stories. Even the prestigious *Washington Post* has begun sharing some reporting with *The Baltimore Sun*.

"We expect the content-sharing movement to gain momentum quickly through 2009," the report's authors wrote. "Some edge of competition is being lost, but so is a lot of duplicated effort."

Some newspapers are turning to their readers for help in so-called "citizen-journalism" projects. *The Oregonian* in Portland enlisted citizen volunteers to help cover the state's 2008 presidential caucuses, for instance. The *News-Press* in Fort Meyers, Fla., recruited local experts in various fields to lend their knowledge to reporting projects.

Still, the report says, other attempts to employ volunteers have failed. A majority of editors interviewed for a survey last year gave a "cautious assessment" of the value of amateur reporting, the report reveals. The newspapers' professionals had to spend significant time working with the amateurs in order to obtain publishable stories, several editors said.

Some papers are outsourcing noneditorial functions, such as payroll operations and customer-service phone centers. Advertising production has been moved as far away as India. Dean Singleton, owner of the 54-paper MediaNews Group chain, has talked of shifting some editorial functions abroad.

Despite continuing circulation declines, newspaper readership may be growing because of visits to the papers' Internet sites. Unique visitors to the Web sites increased about 16 percent during 2008, outnumbering the papers' daily circulation. Web visitors add an average 8.4 percent to papers' print readership, the report said.

News organizations have not figured out how to make money online, however. Few news organizations charge for access to their Web sites. Newspapers generate just 10 percent of their revenues on the Internet.

That leaves the media looking for new income sources.

One proposal is to develop a system of micropayments that would allow Web sites to charge visitors a few cents for reading a story, listening to an audio file or viewing a video or photograph. The report's authors discount micropayments' potential, however.

Instead, they suggest exploring:

• Requiring Internet service providers to pay news organizations for content, just as cable systems pay television stations and cable channels.

• Demanding payment from aggregators, such as Google News, that provide public access to content produced by newsgathering organizations. The publisher of *The Wall Street Journal*, one of the few big papers seeing even anemic circulation gains, has called Google a "vampire ... sucking the blood" from newspapers.

• Enabling advertisers to sell their wares through news media Web sites.

• Expanding the number of niche Web sites that charge for access.

Most traditional media are continually expanding their Internet presence. They're also looking to push their content beyond computers to various portable devices.

Nearly 40 U.S. and foreign newspapers — From *The New York Times* and *Las Vegas Review-Journal* to *The Times* of London and *Shanghai Daily* — can be read on the Kindle wireless device for monthly subscription prices ranging from $6 to $15. Kindle screens — 6-inch or 9.7-inch — make for easier reading than cell phones.

Network and cable television programming can be viewed on some cell phones now. Using new mobile digital television (DTV) technology, local stations plan to start telecasting directly to phones and other portable devices this year. The broadcasts will be accessible on DTV-capable devices. Receiver chips to upgrade other devices could become available by the end of the year.

The chips will make broadcasts available on cell phones, laptop computers, personal digital assistants, portable media players, gaming devices, in-vehicle entertainment systems and global positioning system devices.

Television networks also are moving to increase the revenues they receive from local affiliates, the report says.

Traditionally, networks have paid affiliates to carry network programming. Ten years ago, Fox required affiliates to pay for the right to broadcast network programs. NBC did the same last year, although that won't take affect until most network-affiliate contracts expire in 2012 and 2013.

CBS is seeking a share of the income its affiliates receive from cable systems. It's also looking at supplying its programs directly to cable and satellite systems, bypassing affiliates completely.

http://www.miller-mccune.com/media/media-in-the-21st-century-1323#

Climate Models Get Biological Makeover

By: Nicholas Jachowski

It's springtime in Silicon Valley and a timeless tale is being retold. Kevin Arrigo, an oceanography professor at Stanford University, stands in the front of a classroom of students explaining how life works. He's not talking about any old life though, but life in the ocean — where life began. And it's not the fishes and the whales, either; as Arrigo puts it, "If it's big enough to see, it's probably not important."

Arrigo is talking about the tiny plants that make up the base of the oceanic food pyramid — the phytoplankton. Like all plants, microscopic phytoplankton take light from the sun and carbon dioxide from the atmosphere to make food and oxygen in the process known as photosynthesis. But in much the same way that Arrigo dismisses the ecological primacy of the oceans' larger denizens, climate scientists have for the most part dismissed the role of marine life in their climate models.

No longer.

For the first time, researchers at the premier climate-modeling institute in the United States are explicitly incorporating the complexities of marine life into their computer simulations. The first of these next-generation models was initiated last month, and while final data won't be available until next year, their approach is already promising the most accurate climate simulations ever. More accurate climate models will help to inform and guide world leaders, policy makers and everyday people who seek to avoid potentially irreversible harm to the planet due to climate change caused by mankind. Understanding why — and why it took so long - to incorporate biology into climate models means taking a closer look not just at the computers but at the microscopic life of the oceans.

Phytoplankton grow quickly as long as they get sunlight from above and nutrient-rich water upwelling from the depths. The tiny plants are in turn eaten by zooplankton such as krill and copepods, which in turn are eaten by fish, which are eaten by bigger fish, and on upwards to seals and dolphins, and those other "unimportant" things we can see.

It was the evolution of these tiny plants in the ocean that allowed more complex organisms like humans to evolve. If man were around 3 billion years ago during the advent of the first phytoplankton, he would suffocate from lack of oxygen. By the process of photosynthesis, phytoplankton drastically changed the Earth's atmosphere from having almost no oxygen to the 20 percent oxygen levels of today.

Changes are occurring in the atmosphere again, but not because of phytoplankton. This time humans are the cause. As scientists try to predict the changes man's atmospheric tampering will have on the Earth, they are beginning to look to phytoplankton to see what role they might play in keeping Earth's atmosphere in balance.

Last month, scientists working on the next Intergovernmental Panel on Climate Change report began experiments on the newest climate model, which, for the first time, includes phytoplankton.

According to IPCC, a scientific body charged with evaluating the risk of climate change associated with human activity, the Earth's temperature could rise between 2.0 degrees Fahrenheit and 11.5 degrees during the 21st century. The main contributor to the warming is the increase of heat-trapping greenhouse gases in the atmosphere due to human activities such as deforestation and the burning of fossil fuel. One of the most significant greenhouse gases is carbon dioxide, a naturally occurring gas that is pumped out in unnatural quantities as a byproduct of burning those fossil fuels. Carbon dioxide levels in the atmosphere have increased 38 percent since the mid-1700s. Every five to seven years since 1990, the IPCC has put out assessment reports that both summarize the scientific literature on climate change published since the last report and make projections. Key to making projections about the future climate are "global climate models," or GCMs, which are computer codes used for simulating a dynamic Earth. The Fifth Assessment Report is due in 2014, and computer programmers and scientists are already hard at work on the next generation of GCMs.

According to Arrigo, biology — or to be specific, biogeochemistry, the chemical cycles caused by biology — was not thought to be important enough to include in GCMs until now. "There was no ocean biogeochemistry in the old IPCC models," said Ron Stouffer, a meteorologist and climate modeler at Princeton University's Geophysical Fluid Dynamics Laboratory, an arm of the National Oceanographic and Atmospheric Administration. "Now everyone is trying to include terrestrial and ocean biogeochemistry."

Arrigo says biogeochemical processes were not modeled because scientists thought that the physical and chemical processes relating to increasing greenhouse gases, such as carbon dioxide trapping heat in the atmosphere, ocean circulation transporting heat poleward, clouds reflecting sunlight and sea-ice melting, were more important. Such processes might be more important, but nobody knows for sure because no one has extensively modeled biogeochemistry in GCMs before. Another reason for not including biogeochemical cycles in GCMs is the extra layer of complexity they add "in a model you didn't trust very much to begin with," said professor Stephen Schneider, referring to the uncertainty inherent in modeling future climates. Schneider, a Stanford climatologist who has been involved with the IPCC since 1988, thinks the biggest thing holding back climate modeling is the lack of computer time.

According to Stouffer, it can take up to six months to run just one GCM experiment, and that's on "one of the bigger (computers) on the planet," he said. Stouffer noted that with biology in the models, run times could be twice as long — up to a year.

As computers become faster and more computing time is available, Schneider offered three strategies for modelers: Add more processes such as biogeochemistry, add more predictions of future greenhouse gas levels or increase the resolution of the model. Each option has its merits, and "none of it's wrong," he said. The decision likely will come down to scientists' individual preferences.

Oceanographer Anand Gnanadesikan, also at the Geophysical Fluid Dynamics Laboratory, is one scientist who has decided to add biogeochemistry to the models. Gnanadesikan, who headed the ocean model

development team for the IPCC's Fourth Assessment Report, said, "I'm interested in how ocean circulation determines plant growth and how plant growth potentially influences ocean circulation." The ocean model is coupled with an atmosphere model to make a global climate model.

Oceans are important for GCMs because water circulation is responsible for much of the heat distribution around the world, and the oceans remove carbon dioxide from the atmosphere. The "ocean is more important than the land" when it comes to the climate, Arrigo said — it's four times more potent than the land at pulling carbon dioxide out of the atmosphere.

But as carbon dioxide in the atmosphere increases, it also increases in the oceans — with sometimes unexpected results. Carbon dioxide combines with seawater to make carbonic acid, which is acidifying the oceans and making it harder for marine organisms, including some phytoplankton, to make shells. The continued addition of carbon dioxide to the atmosphere and its subsequent absorption into the ocean threaten the future of these species.

Ocean biogeochemistry is nothing if not complex. It's no wonder the first generations of climate models left it out. But following the details is potentially crucial for predicting climate changes. In the case of shelled animals in an acidified ocean, the chemical process that creates shells actually releases a molecule of carbon dioxide. So, decreasing the amount of shell means less carbon dioxide will be in the oceans — which means more carbon dioxide could leave the atmosphere and be absorbed into the water. This "negative feedback," could decrease the amount of carbon dioxide in the atmosphere — cooling the climate — if it happens on a broad enough scale. The question is: Will it be strong enough to counteract global warming? Modeling may be the only way to find out.

According to Arrigo, most of the potential biogeochemical feedback loops caused by increasing carbon dioxide and global warming are negative feedbacks. Most physical feedbacks tend to be positive, for example, increasing temperatures will put more water vapor in the atmosphere via evaporation, further increasing the Earth's temperature. What's unclear, Arrigo said, is whether first-order effects, like greenhouse warming, or feedback loops, like the demise of shells, are more important in climate modeling. Fortunately, we may know the answer to that question very soon. "We started running the model a couple days ago," Stouffer said by phone last month, referring to the model he, Gnanadesikan, and about 80 other scientists at Geophysical Fluid Dynamics Laboratory have been working on for the past three years.

John Dunne, another climate modeler at Geophysical Fluid Dynamics Laboratory, says this latest model contains 30 biogeochemical variables used to model the impacts of biology on the climate, which he describes as "fairly sophisticated." The model even contains three phytoplankton groups. This is light-years ahead of the biogeochemistry in the old IPCC models, in which the biology consisted of assuming the ocean to be "off-green everywhere" to account for phytoplankton absorption of light, says Gnanadesikan.

The GFDL climate modelers are taking their time to produce the best global climate model they can with the limited computational power and knowledge of oceanic biogechemical cycles available. The time has come for biology in the models, but it'll take years to work out the kinks. The data from models they're running now will be publicly available in a year and a quarter, said Stouffer. But he added, "There's too much uncertainty, there's not enough observation, and there's not enough understanding." The best we can hope for by the next IPCC report in 2014 "is to start to get a handle on the uncertainties."

That means focusing, for the first time, on Arrigo's favorite marine creatures, the phytoplankton. The needs of global climate science might mean that these tiniest of plants -and the people who study them — will finally get their turn in the big time.

http://www.miller-mccune.com/science_environment/next-generation-climate-models-1317.print

Paging Dr. Fido. Dr. Fido to the Recovery Room, Please

By: Frank Nelson

Kate, 14, has been having a tough time coping with Lyme disease and pneumonia, but as she scrunches over to make room on her hospital bed for Jinx, a super-friendly, black-and-white border collie, she brightens visibly.

Jinx is a welcome reminder of home and happier times ahead. As she ruffles the thick, glossy coat, Kate talks about her own dog — a golden retriever/collie mix — and other pets waiting for her after she goes home from the hospital.

On a recent Friday evening, Jinx and her owner, Mary Arango, began their rounds in intensive care, moved through pediatric and surgical wards and finally made their way up six floors to oncology, where they brought a smile to the face of Christine Laird.

"I'm so glad to see you," said Laird, who also talked lovingly about her own little dog at home. "This is wonderful; you've made my evening."

Among recent studies, researchers have measured the effectiveness of animal-assisted therapy for:

Pain relief in children

Patients with heart failure

Adult substance abusers

Early dementia patients

Psychiatric disorders

Arango, who gets this sort of reaction all the time, is also smiling. For 15 years, she has been making volunteer visits with her therapy dogs, first to a veterans' nursing home in Alabama, and for the past decade, she's been delighting patients — and staff — at Cottage Hospital in Santa Barbara, Calif.

While combining careers as a math teacher and photographer, she also trains and certifies therapy dogs, is an evaluator for Therapy Dogs International and is writing a book about these extraordinary animals.

Though Kate, Laird and others Jinx meets all seem to agree these canine visits make them feel much better, their enthusiastic responses might be dismissed as at best anecdotal and at worst sentimental flights of fancy. But researchers have weighed in, and hundreds of closely controlled medical and academic studies into animal-assisted therapy, or AAT, tend to confirm the benefits. (There are also "animal-assisted activities," which lack the documentation, specific goals and professional direction of AAT.)

Such are the therapeutic benefits of dogs, and to an extent cats, rabbits, guinea pigs, birds, fish — even horses and farm animals — that pets are an increasingly common sight around hospitals, rehabilitation centers, hospices, assisted living facilities and retirement homes.

Green Chimneys, headquartered in Brewster, N.Y., has been a pioneer in AAT. For 60 years the organization has been using interaction with animals to provide a caring learning environment for emotionally vulnerable and academically challenged at-risk kids.

Today, around 200 children and others with developmental difficulties share a few hundred acres of farmland where their education very much embraces all nature has to offer, including an assortment of animals, birds and plants.

And the Animal-assisted & Creative Therapies Center in Bradenton, Fla., has taken things a step further, using dolphins — and now an animatronic dolphin — to help special-needs adults and children.

Animals are helping resolve physical and mental health issues for a wide variety of patients and residents, from children to the elderly — and they're carrying quite a caseload, from drug abuse, strokes, diabetes, autism and grief counseling to accident victims, Alzheimer's patients, wounded service personnel and the sexually abused.

Measureable benefits, say researchers, include lower heart rate, respiratory rate and blood pressure, reduced stress, anxiety and depression, improved self-esteem and social skills, and an increase in key neurochemicals such as serotonin and dopamine.

Separate studies have also shown positive outcomes not just for patients but for their families, associated medical staff, the animal owners and even for the animals themselves.

"There's something unique about the human-animal bond," says Debra Sellers, assistant professor in adult development and aging at Kansas State University's School of Family Studies and Human Services.

She first tapped into what she describes as a "powerful tool" when she began taking her own dog along to therapy sessions at a long-term care facility. Later she conducted a highly focused academic study showing that AAT could help modify the behavior of elders with dementia, improving their quality of life.

While Sellers sees a need for more quality research in this field, including studies involving animals other than dogs, she's convinced that AAT has a role to play in the future of health care.

The Delta Society, a national organization aiming to improve health and well-being through positive interactions with animals, references about 90 studies of animal therapy on its Web site, www.deltasociety.org.

The society's marketing director, JoAnn Turnbull, mentions others:

• Adults struggling with eating disorders are benefitting from horseback riding, learning that controlling a horse gives them the confidence to control other things in their lives.

• Children with autism, who find trouble sitting still and focusing, are learning just that by petting or grooming a small dog.

• Other youngsters, anxious or embarrassed about reading aloud in class, are happily honing those skills, and their self-confidence, by reading to dogs.

• Stroke victims may be encouraged toward physical therapy by helping take a dog on short walks.

And as the growing body of research continues to affirm the bold claims being made for this type of therapy, so too researchers are starting to discover why — why it is that damaged bodies and minds react so beneficially to the touch, sight or even just the presence of an animal.

The origins of AAT can be traced back at least to late 18th-century England when, according to Aubrey Fine's *Handbook on Animal-Assisted Therapy*, animal companionship was first used in treatment of the mentally ill.

The practice continued in the 19th century and was expanded to the treatment of physical ailments. Fine records Florence Nightingale writing in 1880 that a small pet "is often an excellent companion for the sick, for long chronic cases especially."

This echoes modern research into the benefits of pet ownership, which confirms how the unconditional love and comfort provided by a dog, cat or other small animal can pay huge physical, emotional, mental and social dividends.

Many of those findings have been documented by agencies such as the Centers for Disease Control and the National Institutes of Health.

Animal-assisted activities take those outcomes one step further, having animals, most often dogs, visit and interact with patients and residents at various institutions in a casual meet-and-greet atmosphere.

Therapy Dogs International, based in Flanders, N.J., was founded 1976. Last year more than 19,000 dogs and their handlers were registered with the organization, which operates in all 50 states and Canada. Similarly, Love on a Leash, started in 1984 and incorporated as the Foundation for Pet-Provided Therapy in 1995, has more than 900 members in 28 states.

However, AAT takes therapy to another level by seeking to extract the same benefits from casual animal-patient interactions but in a clinical setting where progress toward clearly defined goals is monitored and measured.

The Delta Society, based in Bellevue, Wash., has around 10,000 registered therapy animals, mostly dogs, and a serious commitment to AAT: The organization helps health care professionals and facilities set up AAT programs. "We have the tools and resources to guide them," said Turnbull. However, the society does not track the number of institutions running such programs, and Turnbull is unaware of any such central registry charting the rise of AAT.

Nowhere are those tools being applied to greater effect than at the Inova Fairfax Hospital campus, in Virginia, where registered nurse Leslie Horton works almost full time as the animal-assisted care coordinator.

The program, started in late 2001, has enjoyed remarkable results. About 20 dogs have become an integral part of critical care, providing comfort to trauma and stroke victims, heart, lung and bone marrow transplant patients, those dying of cancer and others.

After 26 years working in intensive care, Horton knows all about the different levels of comas and patient responses. "The animal does stimulate something within them that helps them wake up," she said.

This doesn't happen in every case, but Horton says each month about five or six patients respond with increased levels of consciousness. "It's amazing to see the change in them."

The AAT program is carefully measured, and the results are being compiled in a report due out later this year. Horton hopes it will demonstrate both improved patient outcomes and financial benefits for the hospital.

There is some resistance from the medical profession, she said, based primarily on fears of infection, especially the spread of antibiotic-resistant organisms that could put patients and the wider public at risk.

She calls this an "appropriate concern" but says such risks can be minimized by following guidelines from the federal Centers for Disease Control, Delta and the Association for Professionals in Infection Control and Epidemiology, Inc. Horton says after "at least 12,000 visits," Inova's program has no known cases of crossover infection.

Some resistance is also founded on fears of dogs biting or otherwise injuring patients, and the belief that the use of animals in therapy may not always be culturally or otherwise appropriate for certain patients.

Horton says these fears can be allayed by using well-trained animals that are good-tempered and enjoy working with people, educating the handlers and screening patients to make sure they want this type of contact.

She hopes the public — and doctors — will become more aware of what AAT has to offer and make more use of the service. "AAT is one of the tools we have, just like medicines, X-rays and physical therapy."

http://www.miller-mccune.com/health/paging-dr-fido-1325

Physician, Heel Thyself

By: David Rosenfeld

In attempting to reform the U.S. health care system, President Barack Obama and congressional leaders have repeatedly said that controlling costs is as important, if not more, than extending coverage to all Americans.

To do so will mean turning around a decade of political will — under both Democratic and Republican control — to the contrary.

Over the past decade, Congress did little to close exceptions in physician self-referral laws and anti-kickback statutes, laws originally intended to completely bar doctors from referring patients for services in which they had a financial interest.

"Critics of self-referral arrangements state that they pose a conflict-of-interest since the physician is in a position to benefit financially from the referral," social legislation specialist Jennifer O'Sullivan explained in a Congressional Research Service report in 2004. "They suggest that such arrangements may encourage overutilization of services, which in turn drives up health care costs. They also contend that such arrangements create a captive referral system, which limits competition among health care providers.

"Others respond to these concerns by stating that while problems may exist, they are not widespread. Further, these observers contend that in many cases physician investors are responding to a demonstrated need which would not otherwise be met, particularly in a medically underserved area."

Health care researchers continually say that exceptions in the law are driving excessive and often unnecessary spending.

While the Obama administration has visibly pursued outright medical fraud and abuse enforcement this year, it really falls to Congress to sew up these loopholes. Most observers say legislators are unlikely to close many of the exceptions they created in 2001 through legislation known as Stark II, named after Rep.

Pete Stark, a California Democrat who led the charge for prohibitions on self-referral in legislation — Stark I — that took effect in 1992.

Similar "safe harbors" came in 1987 and additionally throughout the 1990s to protect those in the health care industry from anti-kickback laws Congress first passed in 1972.

Rather than eliminating self-referrals, the exceptions have allowed a system to flourish in which physicians in some states now own almost everything, said Jean Mitchell, economist and professor at Georgetown University Public Policy Institute, who's written extensively on the effects of self-referral loopholes.

Mitchell singled out Texas, California and Florida as the most problematic states. "Texas just passed a law mandating coverage for cardiac CT scans," she said. "There's no proof it does anything to improve health or diagnosis. It's just another way for cardiologists to make money."

Seeing Imaging Clearly

One exception to the Stark law is called the In-Office Ancillary Exception, which encouraged doctors in group practices to buy imaging equipment and perform scans on patients in their own office. (See the appendix here for a fuller list of exceptions.) Physician-owned imaging had already started to flourish, but this new exception, billed as an improvement in patient care, increased the trend. Medical device companies, such as GE Healthcare and Siemens Healthcare, capitalized amid rampant growth.

"This in-office loophole was meant to address the Mayo Clinics of the world, not the orthopedic surgeon with five physicians practicing together who put an MRI machine in their office," Mitchell said. "I can't even tell you how easy the money is. If somebody told you that you could make another half a million dollars a year by putting a CT scanner in your office, of course you would do it."

Doctors say owning the imaging equipment offers convenience to patients and prompt diagnosis that results in better care. And procedures in a doctor's office are typically less expensive per case.

According to a June report by the Medicare Payment Advisory Commission, or MedPAC, the volume of diagnostic imaging services paid under Medicare's physician fee schedule between 2002 and 2007 grew by 44 percent, above the 23 percent growth per beneficiary for all other physician services.

From 2000 through 2006, Medicare spending for physician imaging services doubled from about $7 billion to about $14 billion, the General Accounting Office reported last year. Ironically, just below this report on the GAO Web site is a 1994 report identifying the same problem, saying physician-owned imaging warrants scrutiny.

Mitchell and colleagues attempted to analyze the problem among commercial insurers in a 2007 paper published in Health Affairs. They reviewed claims data submitted in 2004 to a large insurer in California and found that 33 percent of providers who submitted bills for magnetic resonance imaging scans were classified as self-referral.

In addition, the study determined, "61 percent of those who billed for MRI and 64 percent of those who billed for CT did not own the imaging equipment. Rather, they were involved in lease or payment-per-scan referral arrangements that might violate federal and state laws."

"Imaging is probably the worst because it's just so easy to send a patient for another test," Mitchell said.

Doctor Entrepreneur

Another problematic loophole is called the Whole Hospital Exception. Under the original Stark law, physicians could not refer patients to any facility in which they had a financial interest. But exceptions under Stark II allowed doctors to refer patients to outpatient-oriented "ambulatory surgery centers" they

owned or physician-owned hospitals in which they were part owners of the entire hospital. A similar "safe harbor" exists under the anti-kickback statute.

Throughout the past decade, several moratoriums on referrals to specialty hospitals of more than a year each, took place, which has slowed the growth in physician-owned hospitals.

By and large, these exceptions have led to a surge in physician-owned specialty hospitals (roughly 150 nationwide) and surgery centers (more than 5,000) along with the market for medical devices. These specialty facilities focus on procedures that tend to make the most money — such as imaging, cancer treatment or minor surgery — and often do not include emergency services or general medicine.

According to an article in the journal *Health Services Research*, urologists who owned ambulatory surgery centers in Florida performed twice as many kidney stone surgeries as non-owners. They also performed a greater proportion of their surgeries (39.6 percent) in ASCs, than non-owners (8 percent). The study analyzed patients undergoing outpatient surgery for urinary stone disease in Florida from 1998 to 2002.

The procedure to remove a kidney stone — called lithotripsy — is largely elective, generally covered by insurers and can be lucrative, said lead author Dr. John Hollingsworth, a clinical lecturer in urology at University of Michigan Health System. "By virtue of it being an elective procedure the timing of it is up to physicians to decide," he said.

Surgery centers, he says, are major drivers of the health care dollar. And there are some important advantages. Doctors have obvious reasons for using them: For patients, they are more convenient and often easier, and for payers, the cost per case at surgery centers is less expensive than hospitals. The question is: Are the procedures needed?

Attempts to close the whole-hospital exception often get muddled by lobbying between physician groups and hospitals. Surgery centers present a major financial threat to hospitals; a ban on physician self-referral was again part of the American Hospital Association's latest proposed health reforms this year.

"It's mostly a political issue right now. It's who has the stronger lobby, and that's all it's about," said Dr. Bhagwan Satiani, a professor at the Department of Surgery, Division of Vascular Disease and Surgery at Ohio State University School of Medicine, who has analyzed the political dynamic.

"If you look at the evidence, it's kind of mixed. Both sides are not telling the entire truth. I have arguments against and for specialty hospitals. Congress responds to money and who has more influence."

Chris Meyers, an attorney for Holland & Knight, which represents healthcare providers, pharmaceutical companies and device makers, believes the exceptions are useful and proper. "Without the exceptions, every marketing activity would be a violation of anti-kickback and self-referral," Meyers said.

From Meyers' perspective, multiple federal laws combined with various state laws can make for a confusing web of possible legal trouble. More than half of all states have laws that cover alleged kickbacks through private insurance. Federal laws cover Medicare and other federal programs.

"I expect to see significant increase in attention paid to conflict of interest, kickback and self-referral," Meyers said. "I think the tendency is to go a little bit overboard. The pendulum has swung a little too far (on the side of too much regulation). It makes it difficult for companies to understand what the rules are and what they are supposed to do."

Mitchell, at Georgetown University, has an easy solution. "The only way to get rid of the whole problem is to just tell physicians you can't own anything," she said. "You cannot. That's it. Bottom line. It's a conflict of interest." The AMA, which wrestled with the issue in the early 1990s, disagrees: As long as

patients are informed of the referring physician's financial interest and about alternative facilities, it sees self-referrals as ethical.

Barring complete prohibition, Mitchell suggests reducing and bundling the payment rate for such things that fall within one of the exceptions or safe harbors. In addition, Medicare and commercial insurers should stop paying for procedures and start focusing payments on overall care.

"What that would do is take the incentive out of running the scanner for everybody who walks through the door," she said.

It's something most politicians and insurers understand in theory, she said, but maybe not as much in practicality because insurance companies and government health plans are scared to death of the doctors. "The provider might drop out of the network, limit choice, and then the patients will be screaming," Mitchell said. "Therefore they've done relatively nothing."

http://www.miller-mccune.com/health/physician-heel-thyself-1333

July 13, 2009

Plantagon: Geodesic Dome Farm of the Future

by Ariel Schwartz

Lots of cities have farmers markets, but most — if not all — of the produce comes from rural farmers that use oil-intensive methods of transportation to cart around their food. With **80%** of all people on the planet projected to live in cities by **2050**, food production will have to move into cities if it is to remain cost-efficient. A Swedish-American company called Plantagon has conceived of an incredible solution: a massive urban greenhouse contained within a geodesic dome. The vertical farm, which consists of a spiral ramp inside a spherical dome, is currently in the development stages.

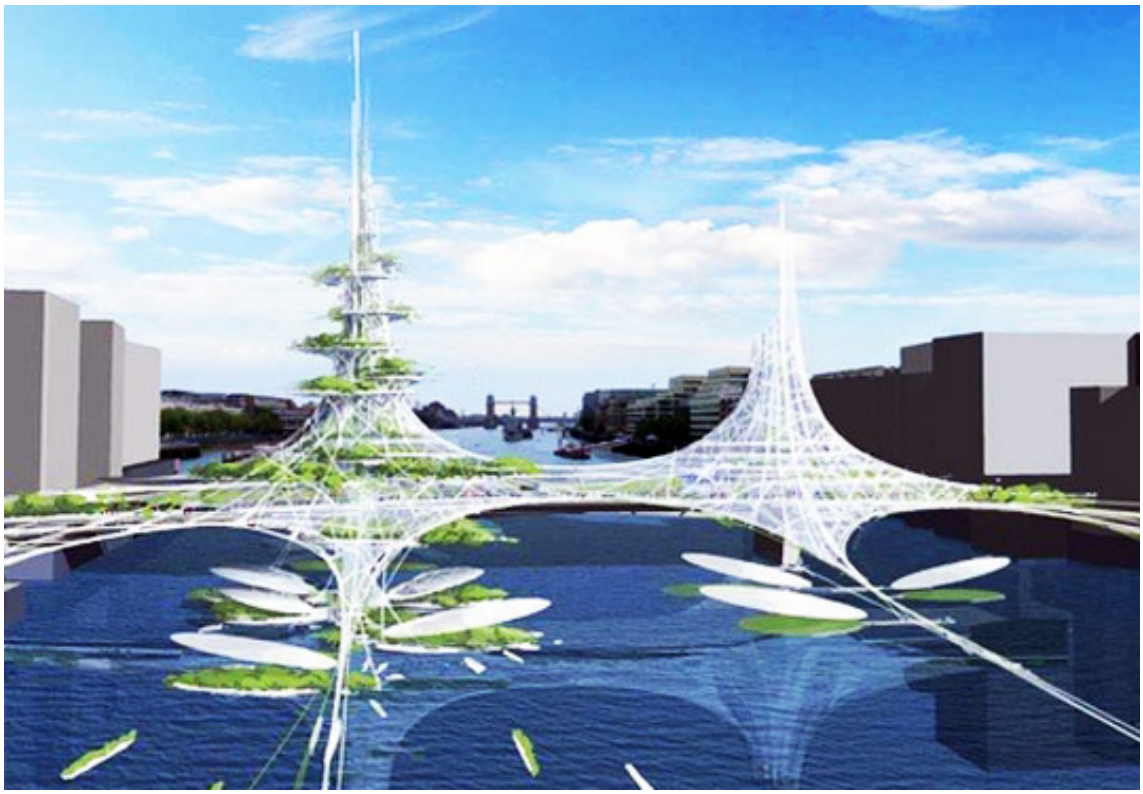
According to Plantagon, the farm "will dramatically change the way we produce organic and functional food. It allows us to produce ecological [resources] with clean air and water inside urban environments, even major cities, cutting costs and environmental damage by eliminating transportation and deliver directly to consumers. This is due to the efficiency and productivity of the Plantagon® greenhouse which makes it economically possible to finance each greenhouse from its own sales."

No word on how exactly the Plantagon system works, but the company says that consulting engineering firm Sweco has helped untangle the technical kinks of the project. Plantagon hopes to have its first vertical farm up and running within three years.

http://www.inhabitat.com/2009/07/13/plantagon/

Futuristic London Bridge Sprouts Solar Powered Vertical Farm

by Bridgette Meinhold



Recently **Chetwood Architects** unveiled a stunning proposal for a futuristic London Bridge that sprouts a towering vertical farm in the midst of the Thames river. The bridge's solar-powered spires are crowned with wind turbines and house a self-sufficent organic farm and commercial center that takes advantage of renewable energy generation, efficient use of water, solar heating, and natural ventilation.

In Medieval times, the London Bridge was an active place covered with buildings and merchants on both sides, and a major thoroughfare for people and carts to travel from one side of London to the other. That bridge is long since gone, with many bridges having replaced it since. One of those bridges was even sold to a wealthy American and reconstructed in Lake Havasu City, Arizona.

Recently, the Worshipful Company of Chartered Architects (WCCA) along with the Royal Institute for British Architects (RIBA) held a design competition for a new inhabitated version of the London Bridge. The winner of that design competition was Laurie Chetwood with her vertical farm and public market.

Taking cues from the old bridge, Chetwood designed a concept that not only made the London Bridge a central meeting spot and place to gather, but also a place of commerce. The updated bridge, which crosses the Thames, would not only sell food, but would also produce it via a **vertical farm**. The bridge is centered around 2 main elements - a vertical farm and a commercial center for fresh food markets, cafes, restaurants, and residential accommodations. A pier connected to the bridge allow goods to be delivered and bought at the water level and even more produce to be grown via hydroponics. Two produce markets will be placed on either side of the bridge, one a wholesale market and the other a public organic market.

Beyond its organic farm the new bridge will also take advantage of renewable energy generation, efficient use of water and efficient heating and cooling technologies. First the vertical farm acts as a cooling tower, drawing cool air in at the bridge level and, while hot air is pushed out through the top. This natural ventilation also powers a vertical axiswind turbine placed at the top of the tower. Solar heating for hot water occurs in convection coils, while EFTE over the core of the farm provides a lightweight solar PV skin for electricity generation. Any excess heat not needed for the farm will be provided to the retailers. Rainwater collection will go to support restrooms and the hydroponic farm, and greywater will be treated and recycled.

The judges declared Chetwood's design to be "A beautifully presented scheme, wildly imaginative yet very thoroughly considered, both in terms of its construction but also how it could sit within the wider context. The design refers to the surrounding buildings, using them as reference points and inspiration behind the form. It is also full of interesting ecological ideas and on all levels seems to work well. This was a unanimous first choice amongst the panel."

http://www.inhabitat.com/2009/07/15/vertical-farm-for-futuristic-london-bridge/

Tidal Docks Use Waves to Power NYC's Streetlamps

by Sarah Parsons

The Big Apple's known for its bright lights, but the city's iconic luminescence also sucks up huge amounts of power every year. Luckily, a team of designers came up with a plan to keep the city's lights burning bright by harnessing the power of its massive rivers. One of the most exciting entries into Metropolis magazine's 2009 Next Generation Design Competition, Richard Garber and Brian Novello's design provides a way to power street lamps using tidal power. The ambitious scheme would involve creating "Docking Systems" that would essentially extend New York's existing piers by adding a network of floating, modular docks. The docks' undersides come equipped with three vertical turbines that harness energy from moving river currents and create electricity. The power produced would then be used to light a network of LED street lamps. The designers claim that each module could produce up to 24 kilowatts of power from a 4 mph current moving in any direction. Additionally, the docks would feature green spaces and tidal pools that support wildlife, making them both efficient and aesthetically pleasing.

The Docking Stations plan was created as part of Metropolis magazine's 2009 Next Generation Design Competition, which focused this year on the question of how to fix America's energy addiction. Though Garber's and Novello's design didn't earn the grand prize, it was still featured on the magazine's Web site as one of the most innovative entries.

As of now, NYC has no plans to actually implement Docking Stations, although the city is already testing out their own tidal power stations. The Roosevelt Island Tidal Energy Project (RITE) began in 2002 and has just finished up its demonstration phase. The project, run by Verdant Power, places Free Flow Kinetic Hydropower Systems in the East River. The horizontal turbines then harness energy from a moving current to create clean electricity. However, designers of the Docking Stations say that their design offers an advantage over the RITE system because its vertical turbines spin regardless of the water current's direction—RITE only works in a certain type of current. And while Docking Stations may be just a concept for now, we're guessing that tidal power will only become a larger part of New York City's green energy plans. After all, the metropolis boasts 578 miles of waterfront—prime real estate for more underwater, silent power generators.

http://www.inhabitat.com/2009/07/14/new-design-uses-waves-to-power-nyc%E2%80%99s-streetlamps/

When Eating Disorders Strike in Midlife

By RANDI HUTTER EPSTEIN

Jeremy M. Lange for The New York Times

Margie Hodgin, a nurse in Kernersville, N.C., had struggled to lose weight since she was a teenager. But it wasn't until she turned 40 that she finally took off the extra pounds, and then some.

Margie Hodgin, a nurse in Kernersville, N.C., had struggled to lose weight since she was a teenager. But it wasn't until she turned 40 that she finally took off the extra pounds, and then some.

"It was a real sense of empowerment, that I can do this all on my own and no one is helping me, and I'm achieving what I want and fitting into my clothes better," she said of her initial delight in shedding the excess weight.

But what started as discipline transformed into disorder. Ms. Hodgin would not eat more than 200 calories a meal, and if she did, she made herself vomit. She surfed pro-ANA, or pro-anorexia, Web sites for advice. She knew that what she was doing was wrong — more like adolescent, she said — but she figured she was only hurting herself.

Meanwhile, her chronic state of starvation was triggering wild mood swings. It was only after she and her husband had several therapy sessions that she came to realize that her eating disorder was wreaking havoc on him, as well as their three boys.

"At a certain point," she said, "you cross that line and you can't help what you are doing, and the eating disorder owns you. I lost my bearings on reality and maturity."

No one has precise statistics on who is affected by eating disorders like anorexia nervosa and bulimia, often marked by severe weight loss, or binge eating, which can lead to obesity. But experts say that in the past 10 years they are treating an increasing number of women over 30 who are starving themselves, abusing laxatives, exercising to dangerous extremes and engaging in all of the self-destructive activities that had, for so long, been considered teenage behaviors.

The recent surge in older women at eating disorder clinics is not a reflection of failed treatment, experts say, but rather a signal that these disorders may crop up at any age. But while some diagnoses, like Ms. Hodgin's, are not made until these women are in their 40s, they may have battled food issues for years.

The Renfrew Center, one of the largest eating disorder clinics, with centers throughout the United States, started a treatment track geared to the 30-and-older set in 2005. The Laureate Psychiatric Hospital in Tulsa, Okla., is about to start a program, too.

Cynthia M. Bulik, director of the Eating Disorders Program at the University of North Carolina at Chapel Hill, said her clinic used to have about one older patient at a time. Now, she said, about half the inpatients are midlife women. And the executive director of the Remuda Ranch Treatment Programs in Wickenburg, Ariz., Edward J. Cumella, said that clinic had had a 400 percent increase in admissions of patients 40 and older since the late 1990s.

"I think the degree of despair we are seeing among adult women about their bodies is unrivaled," said Margo Maine, co-author of "The Body Myth: Adult Women and the Pressure to Be Perfect" (Wiley, 2005). "Eating disorders creep up during periods of developmental transitions, so the peak had been 13 to 15 and 17 to 19 — moving into adolescence and moving into college. Now, we are seeing them again during or after pregnancy and as women hit other life phases, such as empty nesting."

No one knows what triggers eating disorders. Emerging studies point to altered brain signals, but it is tricky to decipher whether the defective biochemistry is a cause or a result of poor eating. The reigning theory is the same as it is for so many syndromes with no known cause: some people are born with genes that make them highly vulnerable to environmental stimuli. "Genetics loads the gun, and environment pulls the trigger," is what the experts always say at the eating disorder conferences, said Caitlin Scafati, a recovered anorexic. And yet no one has identified the genes.

Gail Schoenbach, a 48-year-old mother of three from Warren, N.J., said she had been bulimic since she was 18 but did not get treatment until her 40s, when her friends alerted her husband and he started calling treatment centers. "I was very embarrassed and scared and humiliated and ashamed that I had lied about it," she said.

Sharon Pikus, a 64-year-old grandmother from Manhasset, N.Y., had struggled since childhood with bulimia. But it wasn't until her 40s, when her children were grown, that she finally got help. Of being bulimic, she said, "I just couldn't be it anymore — I don't know how else to put it." She was better for a time, then had a setback 10 years later and was treated again. She considers herself recovered today, but says it is a constant battle.

Extreme dieting fads like weeklong fasts are supported by our thin-obsessed culture, said Lynn Grefe, the chief executive of the National Eating Disorders Association. She added that women who fall into the diet trap of overexercising and avoiding family meals are setting dangerous examples for their children.

"A problem is that friends, and even doctors, get used to seeing someone in their overly skinny state and may not recognize their habits and physique as dangerously unhealthy," said Dr. David Herzog, the director of the Harris Center for Education and Advocacy in Eating Disorders at Massachusetts General Hospital. He is also the endowed professor in the field of eating disorders at Harvard Medical School.

Unlike teenagers, who often must be coerced into treatment, many older women come on their own accord. One of the greatest motivators is having a teenage daughter, because many parents start to worry that their child may mimic their behavior, said Craig Johnson, director of the Eating Disorders Program at Laureate Psychiatric Hospital in Tulsa.

Another reason that older women may be more likely to enter treatment is that after years of anorexia or bulimia, they finally realize that their coping strategies backfired. What they thought would bring happiness never did.

Yet making that first difficult step to admit to the problem does not make recuperation easy. In fact, for some older patients, the path can be even more difficult than it is for teenagers. Therapy involves

unraveling years of entrenched habits and jettisoning an eating-disorder identity that had been with them for decades. And the first step in getting better — healthy eating — often seems an insurmountable task to those who are terrified of food and gaining weight.

"This is asking these patients a great deal," said G. Terence Wilson, professor of psychology at Rutgers University in New Jersey. "Being intelligent and successful doesn't immunize against eating disorders."

Ms. Hodgin, who is now 45, credits her recovery in part to a trial at the University of North Carolina, where researchers are studying whether family therapy works as well for adults as it does for teenagers with the disorder. Bringing her husband to therapy sessions, she said, "made me realize how much I was breaking him down, and the resentment I had of people trying to make me better."

Every day remains a battle, Ms. Hodgin said, and she still feels strong urges to weigh less.

"But I've been able to see the damage I left in the wake of it, and I can't bear to see what I've put my kids through," she said. "You can't have an eating disorder and think it doesn't affect your family."

http://health.nytimes.com/ref/health/healthguide/esn-eating-disorders-ess.html?nl=health&emc=healthupdateema1

Antibiotic Delayed Aging in Experiments With Mice

By NICHOLAS WADE

A new star has appeared in the field of drugs that delay aging in laboratory animals, and are therefore candidates for doing the same in people.

The drug is an antibiotic, rapamycin, already in use for suppressing the immune system in transplant patients and for treating certain cancers.

Rapamycin treatment had the remarkable effect of extending life even though it was not started in the right dose until the mice had lived 600 days — equivalent to a person at age 60. Most interventions that prolong life in mice, including a very low-calorie diet, need to be started early in life to show any effect.

Experts warn that this should not be tried at home. No one knows yet if rapamycin slows aging in people or at what dose it might be effective. And any drug that suppresses the immune system is not to be trifled with.

The finding was reported online Wednesday in Nature by researchers at three institutions working in parallel. The teams were led by David E. Harrison of the Jackson Laboratory, a mouse-breeding powerhouse in Bar Harbor, Me.; Richard A. Miller of the University of Michigan; and Randy Strong of the University of Texas Health Science Center.

The researchers do not know how rapamycin secures its anti-aging effect. It could be just halting tumors rather than delaying the aging process in general.

The three teams were sponsored by the National Institute on Aging as part of a program to test possible anti-aging drugs much more rigorously.

“One of the nasty secrets of the field is that most mouse longevity experiments are done only once in one lab on one genetic background,” said Steven Austad, an expert on aging at the University of Texas Health Science Center, who was not involved in the research.

The National Institute on Aging program includes a test of two doses of resveratrol, the ingredient of red wine that is thought to mimic the effects of caloric restriction on longevity. The results have not been published, but Christoph Westphal, chief executive of Sirtris, a company exploring the health effects of resveratrol and similar chemicals, said the tests “are seeing quite modest effects of resveratrol.”

The effectiveness of rapamycin in extending the life of elderly mice was discovered by accident. The researchers found that the mice fed rapamycin were not getting the proper dose in their bloodstream. They reformulated the drug in the form of capsules that fed slow doses to the intestine, but by that time the mice were elderly. Nonetheless, life span increased by 14 percent in the females and 9 percent in the males.

“It’s no longer irresponsible to say that following these up could lead to medicines that increase human life span by 10, 20 or 30 percent,” Dr. Miller said.

It will be at least 10 years before matters are sorted out, he said, but, as of right now, “I don’t think there’s any evidence for people that there’s any drug that can slow aging down.”

http://www.nytimes.com/2009/07/09/health/research/09aging.html?_r=1&nl=health&emc=healthupdateema3

Swine flu 'hits airways harder'

H1N1 swine flu attacks the respiratory system in a more sustained way than the standard seasonal virus, research in animals shows.

Tests showed swine flu multiplies in greater numbers across the respiratory system, and causes more damage.

And instead of staying in the head like seasonal flu, it penetrates deeper into the respiratory tissues - making it more likely to cause pneumonia.

The University of Wisconsin study appears in the journal Nature.

It also suggests that swine flu may mimic the flu virus which caused the great pandemic of 1918, in which millions died.

The 1918 virus also had a greater ability than standard flu to cause damage to the respiratory system.

The researchers carried out their work on ferrets, monkeys and mice.

They also analysed samples taken from people who survived the 1918 pandemic and found that they seem to have extra immune protection against the current virus - again suggesting similarities.

However, the Wisconsin team stressed that swine flu produced, in the vast majority of cases, only mild symptoms, and is still sensitive to anti-viral drugs.

Complete analysis

Professor Ian Jones, a flu expert at the University of Reading, said the latest study provided the complete analysis of the swine flu that researchers had been waiting for.

He said: "For a number of measures it shows that the new virus is more serious than seasonal H1N1 but that, nonetheless, the major outcome to infection is recovery.

"For the few cases of severe infection the data should help in the clinical management of hospitalised patients.

Professor Wendy Barclay, an expert in virology at Imperial College London, said: "It must be borne in mind that typical circulating human strains of H1N1 have been associated with rather mild illness in recent years, and that the swine origin H1N1 may be behaving in these animal models more alike the type of H3N2 viruses that caused a pandemic in 1968."

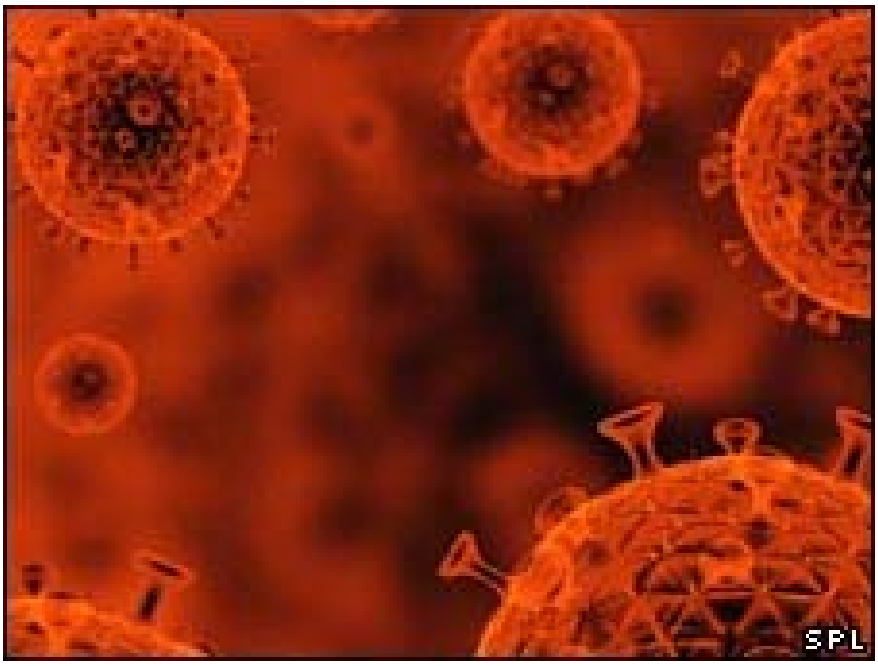
The World Health Organization has recorded nearly 100,00 cases of swine flu worldwide, although the true figure is likely to be much higher. The virus is known to have killed at least 420 people.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8148709.stm

Published: 2009/07/13 17:34:19 GMT

Women 'naturally weaker' to HIV

Experts believe women are naturally programmed to be the weaker sex when it comes to fighting off HIV.



It is well known that HIV progresses faster in women than in men with similar levels of HIV in the blood.

Now a US research team has found that a receptor molecule involved in the first-line recognition of HIV responds differently in women.

The findings in Nature Medicine might provide new ways to treat HIV and slow or stop the progression to Aids.

The Massachusetts General Hospital team explored whether known gender differences in the immune system might explain why HIV progresses faster in women.

They focused on immune cells called plasmacytoid dendritic cells or pDCs which are among the first cells to recognise and fight HIV.

Lab studies showed that a higher percentage of these cells from healthy, uninfected women became activated when presented with HIV-1 as compared with pDCs from healthy men.

Next they studied whether a woman's hormone levels might be involved.

Hormonal link

They found that pDCs from older women who had gone through the menopause had similar activity to that observed in men.

But premenopausal women with higher levels of the hormone progesterone had increased activation of pDCs in response to HIV-1.

Armed with this knowledge they then tested whether this increased activation of pDCs, in turn, led to activation of other immune cells called T cells.

" **Whilst there are some genetic differences based on sex, access to treatment remains the single most important factor in preventing HIV from progressing to Aids** "
Jo Robinson from Terrence Higgins Trust

When they tested the blood of men and women with HIV-1 they found the women did have higher levels of activated CD8-positive T cells than men with identical blood levels of HIV-1.

Lead researcher Dr Marcus Altfeld said: "While stronger activation of the immune system might be beneficial in the early stages of infection, resulting in lower levels of HIV-1 replication, persistent viral replication and stronger chronic immune activation can lead to the faster progression of Aids that has been seen in women."

Ultimately, drugs that work to modify this pathway might help patients with HIV, he said.

His team is beginning preliminary laboratory studies into this.

Jo Robinson from Terrence Higgins Trust said: "This is an interesting piece of research exploring whether HIV progresses faster in women than in men.

"Whilst there are some genetic differences based on sex, access to treatment remains the single most important factor in preventing HIV from progressing to Aids.

"Unfortunately women are most likely to be affected by the virus in places like sub-Saharan Africa, where they are also least likely to be able to access HIV treatment."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8147256.stm

Published: 2009/07/14 11:04:17 GMT

Lower IQ 'a heart disease risk'

Having a lower than average IQ is in itself a risk factor for heart disease, say UK researchers.

Given the findings, public health messages on things like exercise and diet could be simplified, the authors say in the European Heart Journal.

In the study of over 4,000 people, IQ alone explained more than 20% of the difference in mortality between high and low socioeconomic groups.

This applied even when known heart disease risk factors were considered.

Dr David Batty, who led the research for the Wellcome Trust and the Medical Research Council, said: "We already know that socio-economically disadvantaged people have worse health and tend to die earlier from conditions such as heart disease, cancer and accidents.

" **I think the public health messages on things like diet, exercise and smoking could be simplified** "
Lead researcher Dr David Batty

"Environmental exposures and health-related behaviours, such as smoking, diet and physical activity, can explain some of this difference, but not all of it."

He said this raises the possibility that as yet unmeasured psychological factors need to be considered and that one of these is intelligence or cognitive function, commonly referred to as IQ.

His team at the University of Glasgow and the University of Edinburgh studied a group of 4,289 former US soldiers from all walks of life.

As expected from past trends, those on low incomes and with less education had a higher risk of dying from cardiovascular disease.

Health promotion

But when the researchers took into account IQ and controlled for nine other known heart disease risk factors, IQ alone explained 23% of the differences in mortality between the highest and lowest socioeconomic groups in the study.

They offer several possible explanations for this - low IQ scores might simply be a marker of underlying poor health or intelligence might lead to greater knowledge about how to keep healthy.

Dr Batty said, whatever the explanation, the findings imply the IQ of the public should be considered more carefully when preparing health promotion campaigns.

"I think the public health messages on things like diet, exercise and smoking could be simplified.

"For instance, we often read about how some types of alcohol are good for you while others, or even the same ones, are not. The messages can be difficult to interpret, even by knowledgeable people."

Professor Peter Weissberg, medical director at the British Heart Foundation, said: "If we are to make real progress on tackling health inequalities we need health campaigns designed to reach everyone in the community and an environment that makes healthy choices easy choices for the whole population.

"One way to achieve this would be through clear and consistent front of pack food labelling to replace the confusing hotchpotch of schemes we currently have."

He urged the government to implement a single traffic light food labelling scheme as soon as possible.

Professor Alan Maryon-Davis, president of the UK Faculty of Public Health, said: "People with lower IQ also tend to miss out on preventive healthcare.

"They are less likely to have check-ups, follow lifestyle advice, take preventive medication and be referred for preventive hospital treatment. We must find ways to break down these barriers."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8149298.stm

Published: 2009/07/14 23:04:38 GMT

Longest insect migration revealed

Matt Walker
Editor, Earth News

Every year, millions of dragonflies fly thousands of kilometres across the sea from southern India to Africa.

So says a biologist in the Maldives, who claims to have discovered the longest migration of any insect.

If confirmed, the mass exodus would be the first known insect migration across open ocean water.

It would also dwarf the famous trip taken each year by Monarch butterflies, which fly just half the distance across the Americas.

Biologist Charles Anderson has published details of the mass migration in the Journal of Tropical Ecology.

Each year, millions of dragonflies arrive on the Maldive Islands, an event which is well known to people living there.

"But no-one I have spoken to knew where they came from," says Anderson, an independent biologist who usually works with organisations such as the Maldivian Marine Research Centre to survey marine life around the islands.

This just illustrates how little we still know about the natural world
Biologist Charles Anderson

Their appearance is especially peculiar because the 1200 islands that make up the Maldives lie 500 to 1000km from the mainland of southern India, and all are coral cays with almost no surface freshwater, which dragonflies need to complete their lifecycle.

Anderson noticed the dragonflies after he first arrived in the Maldives in 1983. He started keeping detailed records each year from 1996 and now collates data collected by local observers at other localities in the Maldives, in India and on vessels at sea.

When Anderson compared these observations with those made of dragonflies appearing in southern India, he found a clear progression of arrival dates from north to south, with dragonflies arriving first in southern India, then in the Republic of Maldives' capital Male, and then on more southern atolls.

Each year, dragonflies first appear in Male between 4 and 23 October, with a mean arrival date of 21 October. Dragonfly numbers peak in November and December, before the insects then disappear once more. The insects arrive in waves, with each staying for no more than a few days.

Over 98% of the dragonflies recorded on the islands are Globe skimmers (*Pantala flavescens*), but Pale-spotted emperors (*Anax guttatus*), Vagrant emperors (*A. ephippiger*), Twisters (*Tholymis tillarga*) and Blue perchers (*Diplacodes trivialis*) also appear in some numbers.

The dragonflies then reappear between April and June.

Longest journey

The dragonflies are clearly migrating from India across the open sea to the Maldives, says Anderson.

"That by itself is fairly amazing, as it involves a journey of 600 to 800km across the ocean," he says.

Quite how they do it was a bit of a mystery, as in October at least they appear to be flying against the prevailing winds.

However, in October, and continuing into November and December, a weather system called the Inter-tropical Convergence Zone moves southwards over the Maldives.

Ahead of the ITCZ the wind blows towards India, but above and behind it the winds blow from India. So it seems that the dragonflies are able to reach Maldives by flying on these winds at altitude above 1000m.

HARDCORE FLYING
- Globe skimmers are renowned for their ability to fly long-distances
- They can fly up to 6300m high, the highest of any dragonfly species
- With a tailwind of 10m per second, a dragonfly could cross from India to Male in 24 hours
- Maldivians consider the dragonflies' arrival to be a harbinger of the north-east monsoon

But that is not the end of the animals' epic adventure.

"As there is no freshwater in Maldives for dragonflies, what are they doing here?" asks Anderson.

"I have also deduced that they are flying all the way across the western Indian Ocean to East Africa."

Anderson has gathered a wealth of circumstantial evidence to back his claim.

Large numbers of dragonflies also start appearing in the northern Seychelles, some 2700km from India, in November, and then in Aldabra in the Seychelles, 3800km from India, in December.

That matches the slow southerly movement of the Inter-tropical Convergence Zone weather system, behind which winds blow steadily from India to East Africa.

It is also known that Globe skimmers appear in large numbers through eastern and southern Africa.

In Uganda, they appear twice each year in March or April and again in September, while further south in Tanzania and Mozambique they appear in December and January.

Record breakers

That strongly suggest that the dragonflies take advantage of the moving weather systems and monsoon rains to complete an epic migration from southern India to east and southern Africa, and then likely back again, a round trip of 14,000 to 18,000km.

"The species involved breeds in temporary rainwater pools. So it is following the rains, taking sequential advantage of the monsoon rains of India, the short rains of East Africa, the summer rains of southern Africa, the long rains of East Africa, and then back to India for the next monsoon," says Anderson.

"It may seem remarkable that such a massive migration has gone unnoticed until now. But this just illustrates how little we still know about the natural world."

The monarch butterfly is often cited as having the longest migration of any insect, covering around 7000km in an annual round trip from Mexico to southern Canada.

On average, it takes four generations of butterflies to complete the journey.

Anderson believes that the dragonflies survive the ocean flights by gliding on the winds, feeding on other small insects.

They too, take four generations to make the full round trip each year.

He says the migratory paths of a number of insect-eating bird species, including cuckoos, nightjars, falcons and bee-eaters, follow that of the dragonfly migration, from southern India to their wintering grounds in Africa. That suggests the birds feed on the dragonflies as they travel.

"They [fly] at the same time and altitudes as the dragonflies. And what has not been realised before is that all are medium-sized birds that eat insects, insects the size of dragonflies," he says.

Extraordinary ability

"There are earlier records of swarms of Globe skimmers flying out to sea, and at sea," Anderson continues.

"But it was always assumed that those dragonflies were doomed. Which says rather more about our earth-bound lack of imagination than it does about the globe skimmers' extraordinary flying abilities."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8149000/8149714.stm

Published: 2009/07/14 12:59:22 GMT

Science and the Sublime

By CHRISTOPHER BENFEY
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THE AGE OF WONDER

How the Romantic Generation Discovered the Beauty and Terror of Science

By Richard Holmes

Illustrated. 552 pp. Pantheon Books. $40

In this big two-hearted river of a book, the twin energies of scientific curiosity and poetic invention pulsate on every page. Richard Holmes, the pre-eminent biographer of the Romantic generation and the author of intensely intimate lives of Shelley and Coleridge, now turns his attention to what Coleridge called the "second scientific revolution," when British scientists circa 1800 made electrifying discoveries to rival those of Newton and Galileo. In Holmes's view, "wonder"-driven figures like the astronomer William Herschel, the chemist Humphry Davy and the explorer Joseph Banks brought "a new imaginative intensity and excitement to scientific work" and "produced a new vision which has rightly been called Romantic science."

A major theme of Holmes's intricately plotted "relay race of scientific stories" is the double-edged promise of science, the sublime "beauty and terror" of his subtitle. Both played a role in the great balloon craze that swept across Europe after 1783, when the Montgolfier brothers sent a sheep, a duck and a rooster over the rooftops of Versailles, held aloft by nothing more substantial than "a cloud in a paper bag." "What's the use of a balloon?" someone asked Benjamin Franklin, who witnessed the launching from the window of his carriage. "What's the use of a newborn baby?" he replied. The Gothic novelist Horace Walpole was less enthusiastic, fearing that balloons would be "converted into new engines of destruction to the human race — as is so often the case of refinements or discoveries in Science."

The British, more advanced in astronomy, could afford to scoff at lowly French ballooning. William Herschel, a self-taught German immigrant with "the courage, the wonder and the imagination of a refugee," supported himself and his hard-working assistant, his sister Caroline, by teaching music in Bath. The two spent endless hours at the enormous telescopes that Herschel constructed, rubbing raw onions to warm their hands and scanning the night sky for unfamiliar stars as musicians might "sight-read" a score. The reward for such perseverance was spectacular: Herschel discovered the first new planet to be identified in more than a thousand years. Holmes describes how the myth of this "Eureka moment," so central to the Romantic notion of scientific discovery, doesn't quite match the prolonged discussion concerning the precise nature of the tail-less "comet" that Herschel had discerned. It was Keats, in a famous sonnet, who compared the sudden sense of expanded horizons he felt in reading Chapman's Elizabethan translation of Homer to Herschel's presumed elation at the sight of Uranus: "Then felt I like some watcher of the skies / When a new planet swims into his ken." Holmes notes the "brilliantly evocative" choice of the verb "swims," as though the planet is "some unknown, luminous creature being born out of a mysterious ocean of stars." As a medical student conversant with scientific discourse, Keats may also have known that telescopes can give the impression of objects viewed "through a rippling water

surface." Though Romanticism, as Holmes says, is often presumed to be "hostile to science," the Romantic poets seem to have been positively giddy — sometimes literally so — with scientific enthusiasm. Coleridge claimed he wasn't much affected by Herschel's discoveries, since as a child he had been "habituated to the Vast" by fairy tales. It was the second great Romantic field of science that lighted a fire in Coleridge's mind. "I shall attack Chemistry, like a Shark," Coleridge announced, and invited the celebrated scientist Humphry Davy, who also wrote poetry, to set up a laboratory in the Lake District.

Coleridge wrote that he attended Davy's famous lectures on the mysteries of electricity and other chemical processes "to enlarge my stock of metaphors." But he was also, predictably, drawn to Davy's notorious experiments with nitrous oxide, or laughing gas. "The objects around me," Davy reported after inhaling deeply, "became dazzling, and my hearing more acute." Coleridge, an opium addict who coined the word "psychosomatic," compared the pleasurable effects of inhalation to the sensation of "returning from a walk in the snow into a warm room." Davy passed out frequently while under the influence, but strangely, as Holmes notes, failed to pursue possible applications in anesthesia.

In assessing the quality of mind that poets and scientists of the Romantic generation had in common, Holmes stresses moral hope for human betterment. Coleridge was convinced that science was imbued with "the passion of Hope," and was thus "poetical." Holmes finds in Davy's rapid and systematic invention of a safety lamp for English miners, one that would not ignite methane, a perfect example of such Romantic hope enacted. Byron celebrated "Davy's lantern, by which coals / Are safely mined for," but his Venetian mistress wondered whether Davy, who was visiting, might "give me something to dye my eyebrows black."

Yet it is in his vivid and visceral accounts of the Romantic explorers Joseph Banks and Mungo Park, whose voyages were both exterior and interior, that Holmes is best able to unite scientific and poetic "wonder." Wordsworth had imagined Newton "voyaging through strange seas of Thought, alone." When Banks accompanied Captain Cook to Tahiti and witnessed exotic practices like surfing and tattooing and various erotic rites, he returned to England a changed man; as president of the Royal Society, he steadily encouraged others, like Park, to venture into the unknown.

"His heart," Holmes writes of Park, "was a terra incognita quite as mysterious as the interior of Africa." At one low point in his African travels in search of Timbuktu, alone and naked and 500 miles from the nearest European settlement, Park noticed a piece of moss "not larger than the top of one of my fingers" pushing up through the hard dirt. "At this moment, painful as my reflections were, the extraordinary beauty of a small moss in fructification irresistibly caught my eye," he wrote, sounding a great deal like the Ancient Mariner. "I could not contemplate the delicate conformation of its roots, leaves and capsula, without admiration."

For Holmes, the "age of wonder" draws to a close with Darwin's voyage aboard the Beagle in 1831, partly inspired by those earlier Romantic voyages. "With any luck," Holmes writes wistfully, "we have not yet quite outgrown it." Still, it's hard to read his luminous and horizon-expanding "Age of Wonder" without feeling some sense of diminution in our own imaginatively circumscribed times. "To us, their less tried successors, they appear magnified," as Joseph Conrad, one of Park's admirers, wrote in "Lord Jim," "pushing out into the unknown in obedience to an inward voice, to an impulse beating in the blood, to a dream of the future. They were wonderful; and it must be owned they were ready for the wonderful."

Christopher Benfey is the Mellon professor of English at Mount Holyoke College. His books include "A Summer of Hummingbirds" and an edition of Lafcadio Hearn's "American Writings" for the Library of America.

http://www.nytimes.com/2009/07/19/books/review/Benfey-t.html?8bu&emc=bua1

What History Is Good For

By DAVID M. KENNEDY

DANGEROUS GAMES

The Uses and Abuses of History

By Margaret MacMillan

188 pp. A Modern Library Chronicles Book/The Modern Library. $22

We all live in history. Some of us make it, others are made — or broken — by it. Many of us read it. A few of us write it. Most of us try, at least fitfully, to make use of it, usually by ransacking the past for analogies to explain the present and to predict the future. And more than a few of us, in Margaret MacMillan's amply documented opinion, routinely botch it.

MacMillan, the Canadian-reared warden of St. Antony's College, Oxford, is an accomplished historian who has written about the British Raj, the Paris peace settlement of 1919 and Richard Nixon's relations with China. "Dangerous Games" is a frequently mordant and consistently provocative indictment of the myriad ways in which history as a way of understanding the world is too often distorted, politicized and badly mishandled.

MacMillan lays about with rhetorical broadsword and with fearless abandon. She inveighs against the eclipse of "professional historians" by "amateurs." She blasts the fall from fashion of political history in favor of sociology and cultural studies. She denounces identity studies of all sorts, particularly when they descend into what she calls the "unseemly competition for victimhood." (She singles out certain Afrocentric histories for special scorn, as having "the same relationship to the past as "The Da Vinci Code" does to Christian theology.") But she directs her most cogent criticism at the particular kind of historically constructed identity that is nationalism.

MacMillan reminds us that history itself has a history — a subject known in the academy as historiography. Paradoxically, those professional historians whom she so admires grew up with the modern nation-state of which she is so wary. The formal, university-based study of the past, governed by its own scholarly protocols and supported by an impressive apparatus of state-supported institutions like Britain's Public Record Office, the Archives de France and the United States National Archives and Records Administration (not to mention required courses in national history and officially sanctioned textbooks) emerged only in the 19th century. So did the mass societies fostered by newly robust central governments ruling over dispersed, disparate populations whose members had somehow to be convinced that they owed their principal loyalty not to parish, village or province, but to what the scholar Benedict Anderson has called the "imagined community" of a distinct and coherent people: the nation. Meiji Japan, Bismarck's Germany, Cavour's Italy and Lincoln's re-United States were all products of the nation-building surge that swept much of the Western world in the mid-19th century and spawned models for the rest of the world in the 20th century, usually under the banner of "self-determination." But "for all the talk about eternal nations," MacMillan notes, "they are created not by fate or God but by the activities of human beings, and not least by historians."

In our secular age, MacMillan adds, history has also displaced religion as a means of "setting moral standards and transmitting values." So we now expect the "judgment of history" to be not merely objective and fair — the professional historian's usual criteria — but identity-affirming, nation-making, virtue-inculcating and generation-binding as well. Small wonder that history has become such a hotly contested battleground, or that otherwise unbellicose professors are so often pressed into front-line service in the culture wars.

It is among the many virtues of MacMillan's succinct yet substantial book that she demonstrates how every country struggles with history in its own way. The peoples of the Balkans, Winston Churchill once observed, "produce more history than they can consume," and the weight of their past lies oppressively on their present. Something similar might be said of post-World War II Germany, which continues to be haunted by the shameful memories of Nazism and the Holocaust. The opposite has been alleged about Japan — that it remembers too little of its own offensive behavior in the World War II era, to the chronic discomfort of its neighbors, especially China. Australia wrestles with what an exasperated former prime minister, John Howard, once called the "black armband" view of his countrymen's treatment of the Aborigines. France and Germany are experimenting with a "joint history" textbook to soothe past animosities and foster attachment to the new supranational project of the European Union. A similar effort to devise a "continental narrative" integrating the histories of the three Nafta partners, Canada, Mexico and the United States, has been stalled for more than a decade, and looks most likely never to come to pass.

Of Americans it might be said that they have too little history to be able to shed any of it — or to stop arguing about it. MacMillan revisits the tempest set off by the release of the National History Standards in 1994. Designed to bring elementary and secondary school teaching into line with a generation's worth of innovative historical scholarship, including rich work on slavery, immigration, women and Native Americans, the standards were denounced by Rush Limbaugh as an attempt to teach that "our country is inherently evil." Senator Bob Dole called them "worse than external enemies."

MacMillan also offers a refreshingly frank discussion of the flap over the Smithsonian Institution's attempt to use an exhibit of the Enola Gay— the plane that dropped the first atomic bomb on Aug. 6, 1945 — to raise questions about weapons of mass destruction and the nature of modern warfare. Veterans' organizations erupted in wrath. They believed, MacMillan writes, "that the National Air and Space Museum existed not to encourage public debate, but to commemorate the glories of flight and of airpower and to reinforce Americans' patriotism." She suggests that the veterans' opinion was but a special case of a more general phenomenon: the belief that "those who actually took part in great events or lived through particular times have a superior understanding to those who come later." All to the contrary, she says elsewhere, quoting the British writer John Carey, "one of history's most useful tasks is to bring home to us how keenly, honestly and painfully, past generations pursued aims that now seem to us wrong or disgraceful." And what, we might well ask, will be the judgment of history on our own time?

MacMillan ends by asking whether we would be worse off not knowing any history at all. After pages of unsparing commentary on the misdeeds of so many historians, professional and amateur alike, it comes as a surprise to read her rather meek opinion that "I think the answer would probably be yes," a sentence that is unlikely to serve as the historians' manifesto. But that sentiment is consistent with another of MacMillan's conclusions: that history's ultimate utility does not lie in its predictive or even its explanatory value, but in its ability to teach humility, to nurture an appreciation of the limits on our capacity to see the past clearly or to know fully the historical determinants of our own brief passage in time. "If the study of history does nothing more than teach us humility, skepticism and awareness of ourselves, then it has done something useful," she writes. A knowledge of history, as the great historian of the Renaissance Jacob Burckhardt once wrote, will not make us clever for the next time, but wise forever.

David M. Kennedy, a historian at Stanford University, is working on a book about the historical determinants of the American national character.

http://www.nytimes.com/2009/07/19/books/review/Kennedy-t.html?8bu&emc=bua2

Dearborn-on-Amazon

By BEN MACINTYRE
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FORDLANDIA

The Rise and Fall of Henry Ford's Forgotten Jungle City

By Greg Grandin

Illustrated. 416 pp. Metropolitan Books/Henry Holt & Company. $27.50

The Amazon has always proved fertile soil for extravagant utopian fantasy. Victorian explorers, American industrialists, ideologues and missionaries all projected their dreams and ideas onto this terra incognita, this untamed wilderness of exotic possibility.

For Europe and North America, the vastness of South America was a focus for romance, discovery and potential profit, and also a canvas on which to paint a new world according to individual belief. Elisabeth Nietzsche, the sister of the philosopher, plunged into the jungles of Paraguay in 1886 intent on creating her own vegetarian Aryan republic, spurred on by the anti-Semitic effusions of Richard Wagner. Theodore Roosevelt predicted the great river system could be harnessed to create "populous manufacturing communities." Nelson Rockefeller thought the 4,000 miles of the Amazon might be cut into canals.

The British explorer Col. Percy Fawcett plunged into the jungle in 1925, convinced he would find an ancient city that had once flourished there, and was never seen again. Scores of would-be rescuers followed his trail and vanished too. The Amazon had a way of swallowing up dreams.

Elisabeth Nietzsche left her flyblown, half-starved New Germany to rot, and scurried home to distort her brother's philosophical legacy. Roosevelt returned from his Amazon expedition of 1914 declaring the jungle to be "sinister and evil," a place inimical to man. Alongside the myth of the Amazon's boundless opportunities grew another: the jungle as impenetrable nature, immune to modernity, a world savage and primeval where each successive conquistador arrives puffed with pride, and is conquered.

With "Fordlandia," Greg Grandin, a professor of history at New York University, tells a haunting story that falls squarely into this tradition: Henry Ford's failed endeavor to export Main Street America to the jungles of Brazil. Fordlandia was a commercial enterprise, intended to extract raw material for the

production of motor cars, but it was framed as a civilizing mission, an attempt to build the ideal American society within the Amazon. As described in this fascinating account, it was also the reflection of one man's personality — arrogant, brilliant and very odd.

In 1927, Ford, the richest man in the world, needed rubber to make tires, hoses and other parts for his cars. Rubber does not grow in Michigan, and European producers enjoyed a virtual monopoly on the rubber trade because of their Asian colonies. So, typically, the car magnate decided to grow his own.

The site chosen for Ford's new rubber plantation was an area of some 2.5 million acres on the banks of the Tapajós River, a tributary of the Amazon about 600 miles from the Atlantic. It took Ford's agents approximately 18 hours to reach the place by riverboat from the nearest town.

Ford's vision was a replica Midwestern town, with modern plumbing, hospitals, schools, sidewalks, tennis courts and even a golf course. There would be no drink or other forms of immorality, but gardening for all and chaste dances every week.

Fordlandia would not just make car production more efficient. By applying the principles of rational organization to turn out goods at an ever faster pace, Ford would also be improving the lives of those who worked in the new town, bringing health and wealth to American managers and Brazilian laborers alike. In Grandin's words, this outpost of modern capitalism was to be "an example of his particular American dream, of how Ford-style capitalism — high wages, humane benefits and moral improvement — could bring prosperity to a benighted land."

That blueprint may have worked in Ford's River Rouge plant in Dearborn, Mich. It most emphatically did not work in the jungle. Instead of a miniature but improved North American city, what Ford created was a broiling, pestilential hellhole of disease, vice and violence, closer to Dodge City than peaceable Dearborn.

The American overseers found it hard to retain employees, who tended to wander off after earning enough to satisfy their immediate wants. Those who stayed died in large numbers, from viper bites, malaria, yellow fever and numerous other tropical afflictions.

Prohibition was supposed to be rigorously upheld, but after a day spent hacking at the encircling jungle, the workers headed to the bars and bordellos that sprang up around the site. Knife fights erupted; venereal disease was rife. Along with prohibition, Ford's other rules were also resented, particularly the imposed diet of brown rice, whole-wheat bread and tinned peaches. When a new cafeteria was introduced in place of waiter service, the men rioted, destroying the mess hall and wrecking every vehicle on the property.

Meanwhile, some of the Americans brought in to run the project went mad. One man hurled himself from a boat into a nest of crocodiles. The wife of one official recalled the flying bugs with "claws just like lobsters."

Grandin paints a Conradian portrait of Einar Oxholm, the Norwegian ship's captain appointed manager of Fordlandia. We see him sipping rum (in defiance of company policy) as the fledgling community disintegrated. Oxholm was honest, but otherwise entirely unsuited to his task, knowing nothing whatever about cultivating rubber or managing men on land. He would finally return to the United States, leaving behind the graves of four of his children.

Indeed, Joseph Conrad's "Heart of Darkness" resonates through every page of this book, as the white men struggle and succumb to the jungle. In 1929, two Ford employees, Johansen, a Scot, and Tolksdorf, a German, headed upriver with orders to collect rubber seeds. Instead, they went on an alcoholic bender, marooned their cook on a deserted island and ended up in the tiny town of Barra. There Johansen, the self-proclaimed "rubber seed king of the upper rivers," bought some perfume from a trading post and was seen chasing goats, cows and chickens, attempting to anoint the animals with perfume and shouting: "Mr.

Ford has lots of money; you might as well smell good too." A drunken man spraying perfume into the jungle is an oddly fitting image for the entire enterprise.

The great carmaker himself witnessed none of this. He never set foot in the town that bore his name, yet his powerful, contradictory personality influenced every aspect of the project. The story of Fordlandia is a biography of Ford in relief, the man who championed small-town America but did more to destroy it than any other, the pioneer who aimed to lift workers from drudgery but pioneered a method of soul-destroying mass production that rendered them mere cogs.

Ford was obsessed, among other things, by Thomas Edison, soybeans, antiques and order. He hated unions, cows, Wall Street, Franklin Roosevelt and Jews. He also, fatally, despised experts. Ford's Amazon team had plenty of able men, but as Grandin observes, "what it didn't have was a horticulturalist, agronomist, botanist, microbiologist, entomologist or any other person who might know something about jungle rubber and its enemies" — the lace bugs and leaf blight that laid siege to the rubber trees, the swarms of caterpillars that left areas of the plantation "as bare as bean poles."

Given the obstacles, it is astonishing how much the creators of Fordlandia did achieve. During its brief heyday, Fordlandia boasted red fire hydrants on neat streets, running water, a sawmill, a water tower and weekly square dancing. But the intransigence of the jungle, changes in the world economy and war ensured its ignominious demise. The Ford Motor Company invested $20 million in Fordlandia. In 1945 it was sold to the Brazilian government for $244,200.

Ben Macintyre's latest book is "Agent Zigzag: A True Story of Nazi Espionage, Love, and Betrayal."

http://www.nytimes.com/2009/07/19/books/review/Macintyre-t.html?8bu&emc=bua2

Get Smarter

Pandemics. Global warming. Food shortages. No more fossil fuels. What are humans to do? The same thing the species has done before: evolve to meet the challenge. But this time we don't have to rely on natural evolution to make us smart enough to survive. We can do it ourselves, right now, by harnessing technology and pharmacology to boost our intelligence. Is Google actually making us smarter?

by Jamais Cascio

SEVENTY-FOUR THOUSAND YEARS ago, humanity nearly went extinct. A super-volcano at what's now Lake Toba, in Sumatra, erupted with a strength more than a thousand times that of Mount St. Helens in 1980. Some 800 cubic kilometers of ash filled the skies of the Northern Hemisphere, lowering global temperatures and pushing a climate already on the verge of an ice age over the edge. Some scientists speculate that as the Earth went into a deep freeze, the population of *Homo sapiens* may have dropped to as low as a few thousand families.

The Mount Toba incident, although unprecedented in magnitude, was part of a broad pattern. For a period of 2 million years, ending with the last ice age around 10,000 B.C., the Earth experienced a series of convulsive glacial events. This rapid-fire climate change meant that humans couldn't rely on consistent patterns to know which animals to hunt, which plants to gather, or even which predators might be waiting around the corner.

How did we cope? By getting smarter. The neurophysiologist William Calvin argues persuasively that modern human cognition—including sophisticated language and the capacity to plan ahead—evolved in response to the demands of this long age of turbulence. According to Calvin, the reason we survived is that our brains changed to meet the challenge: we transformed the ability to target a moving animal with a thrown rock into a capability for foresight and long-term planning. In the process, we may have developed syntax and formal structure from our simple language.

Our present century may not be quite as perilous for the human race as an ice age in the aftermath of a super-volcano eruption, but the next few decades will pose enormous hurdles that go beyond the climate crisis. The end of the fossil-fuel era, the fragility of the global food web, growing population density, and the spread of pandemics, as well as the emergence of radically transformative bio- and nano-

technologies—each of these threatens us with broad disruption or even devastation. And as good as our brains have become at planning ahead, we're still biased toward looking for near-term, simple threats. Subtle, long-term risks, particularly those involving complex, global processes, remain devilishly hard for us to manage.

But here's an optimistic scenario for you: if the next several decades are as bad as some of us fear they could be, we can respond, and survive, the way our species has done time and again: by getting smarter. But this time, we don't have to rely solely on natural evolutionary processes to boost our intelligence. We can do it ourselves.

Most people don't realize that this process is already under way. In fact, it's happening all around us, across the full spectrum of how we understand intelligence. It's visible in the hive mind of the Internet, in the powerful tools for simulation and visualization that are jump-starting new scientific disciplines, and in the development of drugs that some people (myself included) have discovered let them study harder, focus better, and stay awake longer with full clarity. So far, these augmentations have largely been outside of our bodies, but they're very much part of who we are today: they're physically separate from us, but we and they are becoming cognitively inseparable. And advances over the next few decades, driven by breakthroughs in genetic engineering and artificial intelligence, will make today's technologies seem primitive. The nascent jargon of the field describes this as " intelligence augmentation." I prefer to think of it as "You+."

Scientists refer to the 12,000 years or so since the last ice age as the Holocene epoch. It encompasses the rise of human civilization and our co-evolution with tools and technologies that allow us to grapple with our physical environment. But if intelligence augmentation has the kind of impact I expect, we may soon have to start thinking of ourselves as living in an entirely new era. The focus of our technological evolution would be less on how we manage and adapt to our physical world, and more on how we manage and adapt to the immense amount of knowledge we've created. We can call it the Nöocene epoch, from Pierre Teilhard de Chardin's concept of the Nöosphere, a collective consciousness created by the deepening interaction of human minds. As that epoch draws closer, the world is becoming a very different place.

OF COURSE, WE'VE been augmenting our ability to think for millennia. When we developed written language, we significantly increased our functional memory and our ability to share insights and knowledge across time and space. The same thing happened with the invention of the printing press, the telegraph, and the radio. The rise of urbanization allowed a fraction of the populace to focus on more-cerebral tasks—a fraction that grew inexorably as more-complex economic and social practices demanded more knowledge work, and industrial technology reduced the demand for manual labor. And caffeine and nicotine, of course, are both classic cognitive-enhancement drugs, primitive though they may be.

With every technological step forward, though, has come anxiety about the possibility that technology harms our natural ability to think. These anxieties were given eloquent expression in these pages by Nicholas Carr, whose essay "Is Google Making Us Stupid?" (July/August 2008 *Atlantic*) argued that the information-dense, hyperlink-rich, spastically churning Internet medium is effectively rewiring our brains, making it harder for us to engage in deep, relaxed contemplation.

Carr's fears about the impact of wall-to-wall connectivity on the human intellect echo cyber-theorist Linda Stone's description of "continuous partial attention," the modern phenomenon of having multiple activities and connections under way simultaneously. We're becoming so accustomed to interruption that we're starting to find focusing difficult, even when we've achieved a bit of quiet. It's an induced form of ADD—a "continuous partial attention-deficit disorder," if you will.

There's also just more information out there—because unlike with previous information media, with the Internet, creating material is nearly as easy as consuming it. And it's easy to mistake more voices for more noise. In reality, though, the proliferation of diverse voices may actually improve our overall ability

to think. In *Everything Bad Is Good for You*, Steven Johnson argues that the increasing complexity and range of media we engage with have, over the past century, made us smarter, rather than dumber, by providing a form of cognitive calisthenics. Even pulp-television shows and video games have become extraordinarily dense with detail, filled with subtle references to broader subjects, and more open to interactive engagement. They reward the capacity to make connections and to see patterns—precisely the kinds of skills we need for managing an information glut.

Scientists describe these skills as our "fluid intelligence"—the ability to find meaning in confusion and to solve new problems, independent of acquired knowledge. Fluid intelligence doesn't look much like the capacity to memorize and recite facts, the skills that people have traditionally associated with brainpower. But building it up may improve the capacity to think deeply that Carr and others fear we're losing for good. And we shouldn't let the stresses associated with a transition to a new era blind us to that era's astonishing potential. We swim in an ocean of data, accessible from nearly anywhere, generated by billions of devices. We're only beginning to explore what we can do with this knowledge-at-a-touch.

Moreover, the technology-induced ADD that's associated with this new world may be a short-term problem. The trouble isn't that we have too much information at our fingertips, but that our tools for managing it are still in their infancy. Worries about "information overload" predate the rise of the Web (Alvin Toffler coined the phrase in 1970), and many of the technologies that Carr worries about were developed precisely to help us get some control over a flood of data and ideas. Google isn't the problem; it's the beginning of a solution.

In any case, there's no going back. The information sea isn't going to dry up, and relying on cognitive habits evolved and perfected in an era of limited information flow—and limited information access—is futile. Strengthening our fluid intelligence is the only viable approach to navigating the age of constant connectivity.

WHEN PEOPLE HEAR the phrase *intelligence augmentation*, they tend to envision people with computer chips plugged into their brains, or a genetically engineered race of post-human super-geniuses. Neither of these visions is likely to be realized, for reasons familiar to any Best Buy shopper. In a world of ongoing technological acceleration, today's cutting-edge brain implant would be tomorrow's obsolete junk—and good luck if the protocols change or you're on the wrong side of a "format war" (anyone want a Betamax implant?). And then there's the question of stability: Would you want a chip in your head made by the same folks that made your cell phone, or your PC?

Likewise, the safe modification of human genetics is still years away. And even after genetic modification of adult neurobiology becomes possible, the science will remain in flux; our understanding of how augmentation works, and what kinds of genetic modifications are possible, would still change rapidly. As with digital implants, the brain modification you might undergo one week could become obsolete the next. Who would want a 2025-vintage brain when you're competing against hotshots with Model 2026?

Yet in one sense, the age of the cyborg and the super-genius has already arrived. It just involves external information and communication devices instead of implants and genetic modification. The bioethicist James Hughes of Trinity College refers to all of this as "exocortical technology," but you can just think of it as "stuff you already own." Increasingly, we buttress our cognitive functions with our computing systems, no matter that the connections are mediated by simple typing and pointing. These tools enable our brains to do things that would once have been almost unimaginable:

• powerful simulations and massive data sets allow physicists to visualize, understand, and debate models of an 11-dimension universe;

• real-time data from satellites, global environmental databases, and high-resolution models allow geophysicists to recognize the subtle signs of long-term changes to the planet;

• cross-connected scheduling systems allow anyone to assemble, with a few clicks, a complex, multimodal travel itinerary that would have taken a human travel agent days to create.

If that last example sounds prosaic, it simply reflects how embedded these kinds of augmentation have become. Not much more than a decade ago, such a tool was outrageously impressive—and it destroyed the travel-agent industry.

That industry won't be the last one to go. Any occupation requiring pattern-matching and the ability to find obscure connections will quickly morph from the domain of experts to that of ordinary people whose intelligence has been augmented by cheap digital tools. Humans won't be taken out of the loop—in fact, many, many *more* humans will have the capacity to do something that was once limited to a hermetic priesthood. Intelligence augmentation decreases the need for specialization and increases participatory complexity.

As the digital systems we rely upon become faster, more sophisticated, and (with the usual hiccups) more capable, we're becoming more sophisticated and capable too. It's a form of co-evolution: we learn to adapt our thinking and expectations to these digital systems, even as the system designs become more complex and powerful to meet more of our needs—and eventually come to adapt to *us*.

Consider the Twitter phenomenon, which went from nearly invisible to nearly ubiquitous (at least among the online crowd) in early 2007. During busy periods, the user can easily be overwhelmed by the volume of incoming messages, most of which are of only passing interest. But there is a tiny minority of truly valuable posts. (Sometimes they have extreme value, as they did during the October 2007 wildfires in California and the November 2008 terrorist attacks in Mumbai.) At present, however, finding the most-useful bits requires wading through messages like "My kitty sneezed!" and "I hate this taco!"

But imagine if social tools like Twitter had a way to learn what kinds of messages you pay attention to, and which ones you discard. Over time, the messages that you don't really care about might start to fade in the display, while the ones that you do want to see could get brighter. Such attention filters—or focus assistants—are likely to become important parts of how we handle our daily lives. We'll move from a world of "continuous partial attention" to one we might call "continuous augmented awareness."

As processor power increases, tools like Twitter may be able to draw on the complex simulations and massive data sets that have unleashed a revolution in science. They could become individualized systems that augment our capacity for planning and foresight, letting us play "what-if" with our life choices: where to live, what to study, maybe even where to go for dinner. Initially crude and clumsy, such a system would get better with more data and more experience; just as important, we'd get better at asking questions. These systems, perhaps linked to the cameras and microphones in our mobile devices, would eventually be able to pay attention to what we're doing, and to our habits and language quirks, and learn to interpret our sometimes ambiguous desires. With enough time and complexity, they would be able to make useful suggestions without explicit prompting.

And such systems won't be working for us alone. Intelligence has a strong social component; for example, we already provide crude cooperative information-filtering for each other. In time, our interactions through the use of such intimate technologies could dovetail with our use of collaborative knowledge systems (such as Wikipedia), to help us not just to build better data sets, but to filter them with greater precision. As our capacity to provide that filter gets faster and richer, it increasingly becomes something akin to collaborative intuition—in which everyone is effectively augmenting everyone else.

IN PHARMACOLOGY, TOO, the future is already here. One of the most prominent examples is a drug called modafinil. Developed in the 1970s, modafinil—sold in the U.S. under the brand name Provigil—appeared on the cultural radar in the late 1990s, when the American military began to test it for long-haul pilots. Extended use of modafinil can keep a person awake and alert for well over 32 hours on end, with only a full night's sleep required to get back to a normal schedule.

While it is FDA-approved only for a few sleep disorders, like narcolepsy and sleep apnea, doctors increasingly prescribe it to those suffering from depression, to "shift workers" fighting fatigue, and to frequent business travelers dealing with time-zone shifts. I'm part of the latter group: like more and more professionals, I have a prescription for modafinil in order to help me overcome jet lag when I travel internationally. When I started taking the drug, I expected it to keep me awake; I didn't expect it to make me feel smarter, but that's exactly what happened. The change was subtle but clear, once I recognized it: within an hour of taking a standard 200-mg tablet, I was much more alert, and thinking with considerably more clarity and focus than usual. This isn't just a subjective conclusion. A University of Cambridge study, published in 2003, concluded that modafinil confers a measurable cognitive-enhancement effect across a variety of mental tasks, including pattern recognition and spatial planning, and sharpens focus and alertness.

I'm not the only one who has taken advantage of this effect. The Silicon Valley insider webzine *Tech Crunch* reported in July 2008 that some entrepreneurs now see modafinil as an important competitive tool. The tone of the piece was judgmental, but the implication was clear: everybody's doing it, and if you're not, you're probably falling behind.

This is one way a world of intelligence augmentation emerges. Little by little, people who don't know about drugs like modafinil or don't want to use them will face stiffer competition from the people who do. From the perspective of a culture immersed in athletic doping wars, the use of such drugs may seem like cheating. From the perspective of those who find that they're much more productive using this form of enhancement, it's no more cheating than getting a faster computer or a better education.

Modafinil isn't the only example; on college campuses, the use of ADD drugs (such as Ritalin and Adderall) as study aids has become almost ubiquitous. But these enhancements are primitive. As the science improves, we could see other kinds of cognitive-modification drugs that boost recall, brain plasticity, even empathy and emotional intelligence. They would start as therapeutic treatments, but end up being used to make us "better than normal." Eventually, some of these may become over-the-counter products at your local pharmacy, or in the juice and snack aisles at the supermarket. Spam e-mail would be full of offers to make your brain bigger, and your idea production more powerful.

Such a future would bear little resemblance to *Brave New World* or similar narcomantic nightmares; we may fear the idea of a population kept doped and placated, but we're more likely to see a populace stuck in overdrive, searching out the last bits of competitive advantage, business insight, and radical innovation. No small amount of that innovation would be directed toward inventing the next, more powerful cognitive-enhancement technology.

This would be a different kind of nightmare, perhaps, and cause waves of moral panic and legislative restriction. Safety would be a huge issue. But as we've found with athletic doping, if there's a technique for beating out rivals (no matter how risky), shutting it down is nearly impossible. This would be yet another pharmacological arms race—and in this case, the competitors on one side would just keep getting smarter.

THE MOST RADICAL form of superhuman intelligence, of course, wouldn't be a mind augmented by drugs or exocortical technology; it would be a mind that isn't human at all. Here we move from the realm of extrapolation to the realm of speculation, since solid predictions about artificial intelligence are notoriously hard: our understanding of how the brain creates the mind remains far from good enough to tell us how to construct a mind in a machine.

But while the concept remains controversial, I see no good argument for why a mind running on a machine platform instead of a biological platform will forever be impossible; whether one might appear in five years or 50 or 500, however, is uncertain. I lean toward 50, myself. That's enough time to develop computing hardware able to run a high-speed neural network as sophisticated as that of a human brain, and enough time for the kids who will have grown up surrounded by virtual-world software and

household robots—that is, the people who see this stuff not as "Technology," but as everyday tools—to come to dominate the field.

Many proponents of developing an artificial mind are sure that such a breakthrough will be the biggest change in human history. They believe that a machine mind would soon modify itself to get smarter—and with its new intelligence, then figure out how to make itself smarter still. They refer to this intelligence explosion as "the Singularity," a term applied by the computer scientist and science-fiction author Vernor Vinge. "Within thirty years, we will have the technological means to create superhuman intelligence," Vinge wrote in 1993. "Shortly after, the human era will be ended." The Singularity concept is a secular echo of Teilhard de Chardin's "Omega Point," the culmination of the Nöosphere at the end of history. Many believers in Singularity—which one wag has dubbed "the Rapture for nerds"—think that building the first real AI will be the last thing humans do. Some imagine this moment with terror, others with a bit of glee.

My own suspicion is that a stand-alone artificial mind will be more a tool of narrow utility than something especially apocalyptic. I don't think the theory of an explosively self-improving AI is convincing—it's based on too many assumptions about behavior and the nature of the mind. Moreover, AI researchers, after years of talking about this prospect, are already ultra-conscious of the risk of runaway systems.

More important, though, is that the same advances in processor and process that would produce a machine mind would also increase the power of our own cognitive-enhancement technologies. As intelligence augmentation allows us to make *ourselves* smarter, and then smarter still, AI may turn out to be just a sideshow: we could always be a step ahead.

SO WHAT'S LIFE like in a world of brain doping, intuition networks, and the occasional artificial mind?

Banal.

Not from our present perspective, of course. For us, now, looking a generation ahead might seem surreal and dizzying. But remember: people living in, say, 2030 will have lived every moment from now until then—we won't jump into the future. For someone going from 2009 to 2030 day by day, most of these changes wouldn't be jarring; instead, they'd be incremental, almost overdetermined, and the occasional surprises would quickly blend into the flow of inevitability.

By 2030, then, we'll likely have grown accustomed to (and perhaps even complacent about) a world where sophisticated foresight, detailed analysis and insight, and augmented awareness are commonplace. We'll have developed a better capacity to manage both partial attention and laser-like focus, and be able to slip between the two with ease—perhaps by popping the right pill, or eating the right snack. Sometimes, our augmentation assistants will handle basic interactions on our behalf; that's okay, though, because we'll increasingly see those assistants as extensions of ourselves.

The amount of data we'll have at our fingertips will be staggering, but we'll finally have gotten over the notion that accumulated information alone is a hallmark of intelligence. The power of all of this knowledge will come from its ability to inform difficult decisions, and to support complex analysis. Most professions will likely use simulation and modeling in their day-to-day work, from political decisions to hairstyle options. In a world of augmented intelligence, we will have a far greater appreciation of the consequences of our actions.

This doesn't mean we'll all come to the same conclusions. We'll still clash with each other's emotions, desires, and beliefs. If anything, our arguments will be more intense, buttressed not just by strongly held opinions but by intricate reasoning. People in 2030 will look back aghast at how ridiculously unsubtle the political and cultural disputes of our present were, just as we might today snicker at simplistic advertising from a generation ago.

Conversely, the debates of the 2030s would be remarkable for us to behold. Nuance and multiple layers will characterize even casual disputes; our digital assistants will be there to catch any references we might miss. And all of this will be everyday, banal reality. Today, it sounds mind-boggling; by then, it won't even merit comment.

What happens if such a complex system collapses? Disaster, of course. But don't forget that we already depend upon enormously complex systems that we no longer even think of as technological. Urbanization, agriculture, and trade were at one time huge innovations. Their collapse (and all of them are now at risk, in different ways, as we have seen in recent months) would be an even greater catastrophe than the collapse of our growing webs of interconnected intelligence.

A less apocalyptic but more likely danger derives from the observation made by the science-fiction author William Gibson: "The future is already here, it's just unevenly distributed." The rich, whether nations or individuals, will inevitably gain access to many augmentations before anyone else. We know from history, though, that a world of limited access wouldn't last forever, even as the technology improved: those who sought to impose limits would eventually face angry opponents with newer, better systems.

Even as competition provides access to these kinds of technologies, though, development paths won't be identical. Some societies may be especially welcoming to biotech boosts; others may prefer to use digital tools. Some may readily adopt collaborative approaches; others may focus on individual enhancement. And around the world, many societies will reject the use of intelligence-enhancement technology entirely, or adopt a cautious wait-and-see posture.

The bad news is that these divergent paths may exacerbate cultural divides created by already divergent languages and beliefs. National rivalries often emphasize cultural differences, but for now we're all still standard human beings. What happens when different groups quite literally think in very, very different ways?

The good news, though, is that this diversity of thought can also be a strength. Coping with the various world-historical dangers we face will require the greatest possible insight, creativity, and innovation. Our ability to build the future that we want—not just a future we can survive—depends on our capacity to understand the complex relationships of the world's systems, to take advantage of the diversity of knowledge and experience our civilization embodies, and to fully appreciate the implications of our choices. Such an ability is increasingly within our grasp. The Nöocene awaits.

The URL for this page is http://www.theatlantic.com/doc/200907/intelligence

Can Your Brain Fight Fatigue?

By Gretchen Reynolds

Maisie Paterson/Getty Images

Recently, researchers in England discovered that simply rinsing your mouth with a sports drink may fight fatigue. In the experiment, which was published online in February in the Journal of Physiology, eight well-trained cyclists completed a strenuous, all-out time trial on stationary bicycles in a lab. The riders were hooked up to machines that measured their heart rate and power output. Throughout the ride, the cyclists swished various liquids in their mouths but did not swallow. Some of the drinks contained carbohydrates, the primary fuel used during exercise. The other drinks were just flavored, sugar-free water.

By the end of the time trials, the cyclists who had rinsed with the carbohydrate drinks — and spit them out — finished significantly faster than the water group. Their heart rates and power output were also higher. But when rating the difficulty of the ride, on a numerical scale, their feelings about the effort involved matched those for the water group.

In a separate portion of the experiment, the scientists, using a functional M.R.I., found that areas within the brain that are associated with reward, motivation and emotion were activated when subjects swished a carbohydrate drink. It seems that the brains of the riders getting the carbohydrate-containing drinks sensed that the riders were about to get more fuel (in the form of calories), which appears to have allowed their muscles to work harder even though they never swallowed the liquid.

The role of the brain in determining how far and hard we can exercise — its role, in other words, in fatigue — is contentious. Until recently, most researchers would have said that the brain played little role in determining how hard we can exercise. Muscles failed, physiologists thought, because of biochemical reactions within the muscles themselves. They began getting too little oxygen or were doused with too much lactic acid or calcium. They stiffened and seized.

But there are problems with the idea that fatigue involves only the muscles. “We know that people speed up at the end of exercise,” says Ross Tucker, a researcher with the Sports Science Institute of South Africa, who has extensively studied fatigue in athletes. “If calcium” or other biochemical changes in the

muscles "caused muscle failure, this would be impossible at the end, when these changes are at their greatest levels."

Instead, he and many (but not all) physiologists now believe that exhaustion isn't just in the muscles but also involves the brain. "What we now think is that the muscle isn't acting on its own," he says. "There's an interplay of central processing and muscular exertion." From the outset of exercise, "the brain asks for and gets constant feedback from the muscles and other systems especially about body temperature" and checks on "how are things going," says Carl Foster, a professor in the department of exercise and sports science at the University of Wisconsin in La Crosse. Through mechanisms that aren't fully understood, the brain tracks and calibrates the amount of fuel that is in the muscles, as well as the body's core temperature. As the amount of fuel drops and the temperature rises, the brain decides that some danger zone is being approached. It starts reducing "the firing frequency of motor neurons to the exercising muscle, leading to a loss of force production," says Ed Chambers, a researcher at the School of Sport and Exercise Sciences at the University of Birmingham in England and an author of the carbohydrate-drinks study. In other words, the mind, recognizing that the body may be going too hard, starts sending fewer of the messages that tell the muscles to contract. The muscles contract less frequently and more feebly. In a sensation familiar to anyone who exercises, your legs die beneath you.

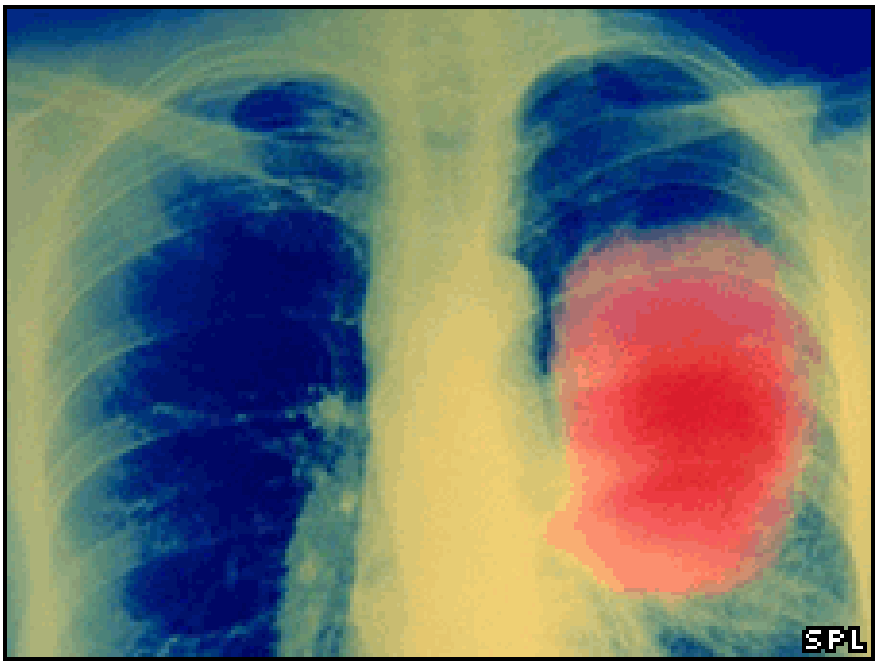
The mental choreography of fatigue is intricate, involving messages sent not only from the brain to the straining muscles but also to various areas within the mind as well. Data from some recent brainwave studies of athletes showed that during long, hard exercise, there's often a moment when portions of the brain become "de-aroused," Foster says. "It's similar to depression," he adds, and plays out in motivation. You begin to wonder why in the world you're running, swimming or pedaling so hard. You slow down.

"I think the training effect of this theory is potentially very profound," Tucker says. "Training is no longer simply an act of getting the muscles used to lactate or teaching the lungs how to breathe harder." It's also about getting your brain to accept new limits by pushing yourself, safely. "Once your brain recognizes that you're not going to damage yourself," Foster says, "it'll be happy to let you go."

http://well.blogs.nytimes.com/2009/07/15/going-all-out/?partner=rss&emc=rss

Thalidomide lung cancer 'failure'

Controversial drug thalidomide does not improve survival for lung cancer patients, UK scientists say.



The drug, banned after its use 50 years ago for morning sickness led to major birth defects, is being investigated as a cancer treatment.

But the Journal of the National Cancer Institute reported this is not the case for small cell lung cancers and that it increases the risk of blood clots.

However, experts said the drug is showing promise on other cancers.

Thalidomide is an anti-angiogenic drug. This means it targets and suppresses the formation of new blood vessels, which tumours need to survive and grow.

Small cell lung cancers account for 15-20% of all lung cancers. Survival rates have barely changed in 25 years, with just 2% of those with extensive disease alive five years after diagnosis.

'Closes the door'

In the research by doctors at London's University College and Middlesex Hospitals, 724 patients with small cell lung cancer were studied.

The work is thought to be the first fully randomised advanced study into using thalidomide to treat this kind of cancer.

Half the patients were given chemotherapy plus a daily dose of 100-200 milligrams of thalidomide, while the rest had chemotherapy plus a dummy pill.

Patients were studied for up to two years.

But at the end of the study, researchers found no evidence of any difference in survival times between the two groups.

The average survival time for patients who received the dummy pill was 10.5 months, while for those who took thalidomide capsules, it was 10.1 months.

" **While it's disappointing that thalidomide doesn't seem to help lung cancer patients, this trial still represents a step forward in understanding how to treat the disease** "
Kate Law, of Cancer Research UK

However those who took thalidomide had double the risk of developing blood clots.

Writing in the journal, the researchers led by Dr Siow Ming Lee said: "Despite preliminary promising evidence and biological plausibility, thalidomide was not associated with any survival benefit."

In the same journal, Dr Curzio Rüegg and Dr Solange Peters of the University of Lausanne in Switzerland says this study, along with other negative findings from previous research, should lead scientists to carry out more studies into both small cell lung cancer and the use of thalidomide to prevent blood vessel development.

But they said it "definitely closes the door to using thalidomide in small cell lung cancer."

Kate Law, Cancer Research UK's director of clinical research, said: "While it's disappointing that thalidomide doesn't seem to help lung cancer patients, this trial still represents a step forward in understanding how to treat the disease.

"We need to know which drugs can help but we also need to be clear about which drugs don't help. And the only way to do this is to conduct large patient studies like this one."

She added: "Thalidomide continues to show promise in treating a cancer of the bone marrow called myeloma and it is being studied in a number of other cancers including mesothelioma [asbestos-related cancer] and prostate cancer."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8154021.stm

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Ain't That the Truth

Webster's Third: *The Most Controversial Dictionary in the English Language*
Humanities, July/August 2009
Volume 30, Number 4

BY DAVID SKINNER

In 1961 a new edition of an old and esteemed dictionary was released. The publisher courted publicity, noting the great expense ($3.5 million) and amount of work (757 editor years) that went into its making. But the book was ill-received. It was judged "subversive" and denounced in the *New York Times*, the *Chicago Tribune*, the *Atlantic*, the *New Yorker*, *Life*, and dozens of other newspapers, magazines, and professional journals. Not every publication condemned the volume, but the various exceptions did little to change the widespread impression of a well-known reference work being cast out from the better precincts of American culture.

The dictionary was called "permissive" and details of its perfidy were aired, mocked, and distorted until the publisher was put on notice that it might be bought out to prevent further circulation of this insidious thirteen-and-a-half–pound, four-inch–thick doorstop of a book. *Webster's Third New International* (Unabridged) wasn't just any dictionary, of course, but the most up-to-date and complete offering from America's oldest and most respected name in lexicography. (So respected, in fact, that for more than a hundred years other publishers have adopted the Webster's name as their own. *Webster's Third*, published by G. & C. Merriam & Co., today called Merriam-Webster, is the most direct descendant,

however, of Noah Webster's pioneering *American Dictionary of the English Language*, first published in 1828.)

The dictionary's previous edition, *Webster's New International* Second Edition (Unabridged), was the great American dictionary with 600,000 entries and numerous competitors but no rivals. With a six-inch-wide binding, it weighed four pounds more than *Webster's Third* and possessed an almost unanswerable air of authority. If you wanted to know how to pronounce *chaise longue*, it told you, shāz long, end of discussion. It did not stoop to correct or even mention the vulgarization that sounds like "Che's lounge." When to use *less* and when to use *fewer*? It indicated what strict usage prescribed. It defined *celebrant* as "one who celebrates a public religious rite; esp. the officiating priest," not just any old party guest.

The third edition took a more empirical approach, listing variations in pronunciation and spelling until the reader looking for the one correct answer became the recipient of numerous competing answers: shāz long and Che's lounge (with *lounge* labeled a folk etymology). Shades of meaning were differentiated with scads of quotations from the heights of literature and the lows of yesterday's news section. The new unabridged dictionary was more rigorous but harder to use. And all this made some people quite irate, which *Webster's Third* defines as "feeling and showing a high degree of anger : WRATHFUL, INCENSED."

At first glance, the controversy over *Webster's Third* seems to symbolize a lurch in American culture from a late fifties' respect for standards to a sixties' rebellion against establishment values. The ensuing debate over the dictionary's methodology did owe much to the anxiety of midcentury intellectuals about the rise of a national popular culture, as attested to by the involvement of Dwight Macdonald, who became the definitive critic of *Webster's Third*. But the dictionary-bashing that began in 1961 has continued well beyond America's shift from square to hip. In 2001, *Harper's* magazine published a cover story by David Foster Wallace that contained a fresh assault on *Webster's Third* and its editor, Philip Gove. Like many earlier critiques, it showed little understanding of the thinking that went into *Webster's Third*. It was unique, however, in its brazen misrepresentation of the book itself.

"I am not a linguist and have no claim to being a lexicographer but have done considerable research on 17th and 18th century dictionaries," wrote Philip Gove in a job inquiry to the G. & C. Merriam Company in 1946. Gove was a lieutenant commander in the Navy on leave from a teaching position at New York University and, with the end of the war, about to be discharged. A literature PhD who had published articles on Samuel Johnson's pioneering dictionary, he soon became an assistant editor at Merriam. Five years later, after a long search for a prominent editor to oversee the editing and production of *Webster' Third* (W3), the company promoted the painstaking Gove, then in his late forties, to the position.

Herbert C. Morton, an economist, editor, and NEH research fellow, studied Gove's personal papers and company files at Merriam-Webster to reconstruct the making of W3 in his 1994 book *The Story of Webster's Third*. As Morton showed, Gove's first managerial decisions concerned how to make room for a vast number of new words, many of a technical nature, entering the lexicon leading up to and as a result of World War II. The number of new words was over 100,000 and included *astronaut, beatnik, drip-dry, mccarthyism, radiocarbon, schlemiel, solar house,* and *zip gun*.

All the material from the *Webster's Second* (W2) could not be reprinted without making W3 a two-volume work, and much of the second edition's material cried out for revision, such as the supplement "Names of Noteworthy Persons," which dated to the 1860s. W3, like W2, would be called unabridged, but words not used since 1755 were deleted (W2 had used 1500 as a cutoff date). In all, 250,000 entries were retired to free up space for new material.

Gove, in Morton's telling, comes off as an impatient and technocratic editor. He did not shrink from drawing hard lines. A dictionary should give primacy to generic terms, he asserted, not proper names, not geographical appendixes, not biographical information, not famous sayings, nor names from the Bible and the plays of William Shakespeare. This way of cutting encyclopedic material and proper nouns is also the approach of the *Oxford English Dictionary*, but it was completely novel to American dictionaries,

which tended to be one-stop, all-purpose reference works, as W2 had been. Gove's decision quickly cleared a lot of dead wood, but deprived users of helpful material and resulted in some general peculiarity. Charles Dickens, for example, no longer warranted an entry but *dickensian* (with a lowercase d) did. Words almost always capitalized in print were shown in lower case but followed by the notation *usu. cap* (usually capitalized)—a policy Morton wrote was "universally deplored."

An entry's main function, by Gove's lights, was to report the existence of a word and define its meanings according to common usage. As the nineteenth-century philologist Richard Chenevix Trench said in 1860, the "true idea of what a Dictionary is . . . is an inventory of the language" including "all the words, whether good or bad." This description, of course, clearly departs from the popular understanding of a dictionary as a book that tells you how to spell words, even proper names if they happen to be well known, and write them down correctly.

But how a word should appear in writing was not uppermost in the minds responsible for W3. The only actual word given a capital letter in the first printing was God. Others given a capital letter in later printings were copyrighted names such as Kleenex, which appeared as kleenex in the first printing (the reason it was in the dictionary, of course, was that it had changed in usage from denoting a brand of tissue to being a synonym for tissue), but was thereafter capitalized under threat of lawsuit.

Another innovation Gove introduced was in the style of definition-writing. "He insisted," explained Morton "that essential information be logically organized in a single coherent and clearly expressed phrase." In some cases, this led to a more direct expression of a word's meaning, but it also led to infelicities. The prose was made even more curious by Gove's hostility to commas, which he banned from definition-writing except to separate items in a series. He even claimed to have saved the equivalent of eighty pages of text by reducing comma use.

The circuitous entry for *door*, quoted in a caustic *Washington Post* article, became well known: "a movable piece of a firm material or a structure supported usu. along one side and swinging on pivots or hinges, sliding along a groove, rolling up and down, revolving as one of four leaves, or folding like an accordion by means of which an opening may be closed or kept open . . ." and so on.

This definition, said Gove, was for someone who had never seen a door. It is difficult to describe something as commonplace as a door, but Gove's defense undercut another important argument, that an unabridged dictionary is a sophisticated intellectual tool engineered to provide uncommon knowledge. While it was sometimes unclear whether W3 was written for lexicographers or for people who didn't know what a door was, it was certainly a quirky dictionary.

Its coverage of color terms seems hokey and pseudoscientific in retrospect: The entries were most up-to-date in 1961, redefined and illustrated with a glossy glued-in page with an elaborate modeling diagram, but hard to comprehend. Definitions for every number between one and one hundred were included, as Dwight Macdonald uncharitably noted, but failed to pass the laugh test: forty-eight is defined as "being one more than 47 in number" and so on. One sympathetic lexicographer, after using the dictionary routinely for years, complained that in listing spelling variants (*momento for memento*, for instance) the editors came "close to denying the possibility of error in spelling."

W3 infamously included an almost full set of entries for curse words (excluded from W2), opening Merriam to the charge of permissiveness, with the single exception of the F-word, opening the publisher to the charge of prudery. Some quirks offended, such as the fourth definition of the noun *jew* as "a person believed to drive a hard bargain," which is not labeled as even potentially offensive, unlike the definition of the verb form, "to cheat by sharp business practice," which is labeled with a relativist spin, "usu. taken to be offensive." And yet, W3 marked a big improvement in the treatment of sensitive ethnic, religious, and professional terms over W2, which, for example, had treated the N-word, in part, as merely a colloquialism.

Merriam's greatest resource was in its bulging files of quotations or citations. In 1934, the publisher held 1,665,000 citations; by 1961, it claimed over ten million. A word might enter the files long before it was defined and printed. In January 1917, Morton notes, a slip was filed for the term *atomic bomb*, defined as "chem. explosion of an atom" and marked "fanciful." In 1961, a written definition for a—bomb was printed in W3. Such work required a large staff of readers and definers, but a remarkable amount of work was handled by over two hundred outside consultants. One chemist mentioned by Morton needed over six years to review and comment on his assignment of 12,790 terms, which included an estimated quarter-million slips of paper.

Citations showed a word and sense in action, and those in W3 became notorious for their democratic flavor. Although the Bible and Shakespeare remained the most oft-quoted text and author, numerous contemporary language-users were cited, from literary critic Edmund Wilson to television host Art Linkletter and best-selling author and madam Polly Adler (but she, only once). In specialized areas, though, the dictionary earned exuberant praise. Its coverage and handling of sports terms was celebrated, and affectionately gibed by sports columnist Charles McCabe who wanted to know why *slud* (as in "he *slud* into third") wasn't in the dictionary. The use of International Scientific Vocabulary in the etymologies was also an inside-baseball triumph, but it drew praise from fellow lexicographers if little notice from anyone else.

What did attract notice was Gove's policy on labeling. "When in doubt dictionary editors typically attached a label to a questionable word," wrote Morton, explaining that Gove broke with tradition but tried to ensure that citations would provide context and thus speak to a word's appropriateness—a decision Gove did not explain or defend in the dictionary's introductory essay. W2 had made expansive use of a range of labels including *correct* and *incorrect, proper* and *improper, erroneous, humorous, jocular, ludicrous, gallicism*, and *poetic*. A strong argument, one imagines, could have been made to rationalize and eliminate overlapping terms (*incorrect* and *erroneous*? *humorous* and *jocular*?), but Gove reduced possible labels to five: *slang, nonstandard, substandard, obsolete,* and *archaic*. And these disapproving terms Gove used sparingly, far too sparingly for his critics. Another label he dropped was *colloquial* (meaning conversational), which was misunderstood by readers as meaning either local or plain old wrong.

Labeling a word plain old wrong did not fit the Gove approach. As he wrote in a letter to the *St. Louis Post-Dispatch*, "The basic responsibility of a dictionary is to record language, not set its style." He did believe it was possible to mishandle a word and noted that the result could be significant. "The social and professional consequences of using a wrong word in wrong circumstances remain as serious as ever." So he was not quite the relativist described in his press clippings, but nor was he secretly a schoolmarm. A former composition teacher, Gove, like Noah Webster before him, viewed the nineteenth-century fixation with grammar and many of its rules with great suspicion.

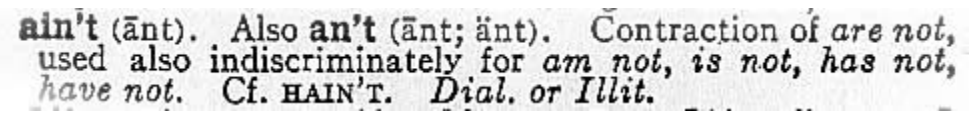
In a 1961 article he penned for *Word Study*, a marketing newsletter that Merriam circulated to educators, Gove discussed how the young science of linguistics was altering the teaching of grammar. Linguistics, he pointed out, had so far exercised little influence on lexicography except in the area of pronunciation, where the effect was "profound and exciting." The findings of linguistics allowed lexicographers to move beyond their earlier search for an elusive "formal platform speech" as a model for standard pronunciation, to acknowledge how words were actually spoken and to record legitimate variations.

The major point of Gove's article was to note that many precepts of linguistics, some of which had long been commonplace in lexicography, increasingly underlay the teaching of grammar. The National Council of Teachers of English had even endorsed five of them, and Gove quoted the list, which originally came from the 1952 volume English Language Arts:

1—Language changes constantly.
2—Change is normal.
3—Spoken language is the language.

4—Correctness rests upon usage.
5—All usage is relative.
These precepts were not new, he added, "but they still come up against the attitude of several generations of American educators who have labored devotedly to teach that there is only one standard which is correct."

While these precepts may seem quite radical, they are in reality a defense of convention. All usage is relative (5), Gove made plain elsewhere, but only to the standards of a relevant linguistic community. Formal platform speech with precise use of *who* and *whom* will not get you far in prison; prison slang meanwhile will not get you far up the corporate ladder. That change is constant and normal (1 and 2) is not to say that at any moment *night* can mean day and *day* can mean chocolate, but that, among other phenomena, some words fade from usage while others accrete new meanings. Even the head-scratching idea that "spoken language is the language" is an oblique way of saying speech is the primary form of language, writing (historically, developmentally, and quantitatively), secondary.


ain't (ānt). Also **an't** (ānt; änt). Contraction of *are not*, used also indiscriminately for *am not, is not, has not, have not.* Cf. HAIN'T. *Dial. or Illit.*

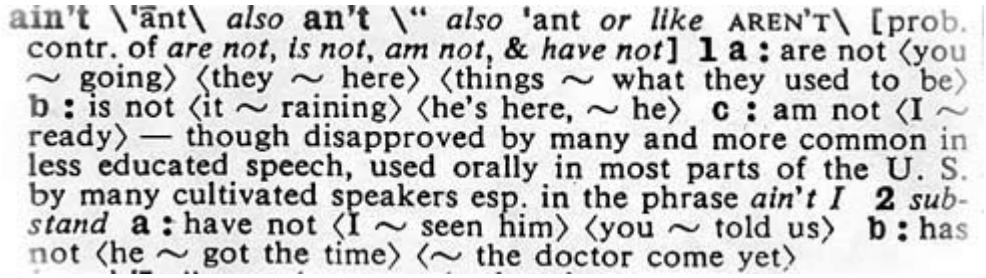
—*From* Webster's New International Dictionary *Second Edition (Unabridged)*

The most infamous entry in *Webster's Third*, by far, was for *ain't*. The word was featured in publicity material issued by Merriam's own public relations firm but misquoted to make its slightly modified treatment in W3 wrongly suggest a licentious break with the dictionary's more formal past. Numerous ain't-happy headlines and scores of one-liners—"Ain't Nothing Wrong with Use of 'Ain't,'" "Say it Ain't So"—resulted; the *New Yorker* ran a cartoon showing a receptionist at Merriam telling a visitor that "Dr. Gove ain't in."

The dictionary (as opposed to the press release) said in its first definition that *ain't* was a contraction for *are not, is not*, and *am not* and gave as a usage note, "though disapproved by many and more common in less educated speech, used orally in most parts of the U.S. by many cultivated speakers esp. in the phrase *ain't I*." This way of putting things was hardly permissive. And it happened to mirror the preference of the august rhetorician H. W. Fowler but, like the correction Merriam belatedly issued, this amusing fact did little to neutralize the story at large that, as a *New York Times* editor put it, America's great dictionary "has methodically removed all guideposts to usage."

Right or wrong, Gove never won a round on *ain't*. Later pressed to supply whatever evidence he had for the exact wording of the entry, which he himself had written, Gove was reduced to saying, "There is no large file of evidence being withheld." It is worth noting, however, that the more conservative *American Heritage Dictionary*, fourth edition, supports W3's entry in a usage note: "Despite all the attempts to ban it, *ain't* continues to enjoy extensive use in speech. Even educated and upper-class speakers see no substitute in folksy expressions such as *Say it ain't so* and *You ain't seen nothing yet*."

Several reports of hilarious usages W3 was said to have authorized proved totally unfounded. The jocular and semiliterate *irregardless* was said to have been given the okay for regular use, though the entry in W3 was labeled disapprovingly nonstandard and it was not new to Webster's (the word had appeared in W2, labeled erroneous and humorous). Life magazine editorialized against the new dictionary's handling of *irregardless*, *finalize, concretize*, and the use of *enormity* as a "synonym for enormousness." It also singled out the ending *-wise* for condemnation (as in the famous line from *The Apartment*, starring Jack Lemmon, "That's the way it crumbles, cookie-wise.").



ain't \'ānt\ *also* an't \" *also* 'ant *or like* AREN'T\ [prob. contr. of *are not, is not, am not,* & *have not*] **1 a :** are not ⟨you ~ going⟩ ⟨they ~ here⟩ ⟨things ~ what they used to be⟩ **b :** is not ⟨it ~ raining⟩ ⟨he's here, ~ he⟩ **c :** am not ⟨I ~ ready⟩ — though disapproved by many and more common in less educated speech, used orally in most parts of the U. S. by many cultivated speakers esp. in the phrase *ain't I* **2** *substand* **a :** have not ⟨I ~ seen him⟩ ⟨you ~ told us⟩ **b :** has not ⟨he ~ got the time⟩ ⟨~ the doctor come yet⟩

—*From* Webster's Third New International Dictionary *(Unabridged)*

Assuring readers it was not opposed to progress, *Life's* editorial closed by saying it would continue relying on the guidance of W2 for "matters of style, good English, winning at Scrabble and suchwise." Little did the editors understand that they had misrepresented W3's handling of *irregardless* and *enormity*(the definitions for *enormity* and *enormousness* actually drew attention to their different meanings). As for *finalize*, concretize, and the ending—wise, these were all established enough to have appeared without warning labels in W2, the very dictionary *Life's* editors claimed to know and trust so well.

Reading the press coverage—much of it collected in *Dictionaries and THAT Dictionary*, coedited by one of W3's chief defenders, James Sledd—it is hard to avoid the conclusion that much of the hubbub was attributable to journalistic culture. Professional writers, though their copy may throb with the neon glow of fashionable catchphrases, love to imagine themselves staunch traditionalists on words and punctuation. But the fight was also joined by a number of literary intellectuals.

In the spring of 1962, Wilson Follett, whose *Modern American Usage* was published posthumously a few years later, wrote in the *Atlantic* that W3's editors were "saboteurs" and the book's publication was "a very great calamity." But most faults he identified were so minute they could not live up to their billing: the well-founded if awkward phrase *center around* (Follett would only brook *center on* or *center in*); the much-scorned but much-recorded use of like as a conjunction (in place of *as* or *as if*); trifles like the facts that *cornball* was labeled slang while *corny* was not and that the third definition of *cohort* acknowledged its use in the singular as a synonym for companion. Follett was particularly exercised by W3's handling of *due*, "to extenuate such abominations as 'the event was canceled *due* to inclement weather.'"

A more lethal assault was carried out in the *New Yorker* by Dwight Macdonald whom James Sledd called "the most eloquently mistaken" of the dictionary's critics. Macdonald scored points off W3's underexplained and potentially arbitrary distinctions between slang and not slang, the dropping of colloquial and other labels, and the dropping of encyclopedic material. In a list of examples where he preferred W2's handling of a word to W3's, he wrote "*Enthuse* is labeled *colloq*. in 2 but not 3. It still sounds *gadawf*. if not *colloq*. to me."

W2 was also tougher, he thought, on hard-to-distinguish pairs such as *nauseous* and *nauseated, deprecate* and *depreciate*, and *disinterested* and *uninterested*. For each of these words, however, W3 gave fine, informative accounts that another sensible reader might very well prefer to the entries in W2. And Macdonald made errors, as Sledd pointed out, like claiming that W3 defined *masses* as the plural of *mass*, a mistake Macdonald later admitted.

A true language snob, as befitting a professional polemicist, Macdonald picked on the seemingly inane details of W3 (e.g., the thirty-four pages listing words starting with un-) as if he had consulted the dictionary for inspiration and found monotony. In this, he, like many others in this scrum, mistook a dictionary's traditional role as that of a gilt-edged repository of verbal treasures. Morton effectively quotes Noah Webster on this point: "The business of the lexicographer is to collect, arrange, and define, as far as possible, all the words that belong to a language, and leave the author to select from them at his pleasure and according to his own taste and judgment."

Macdonald attributed W3's radical departure from what he called "the old school" to the sinister influence of structural linguistics. As evidence, he quoted from, without tracing the exact source, Gove's article on the teaching of language arts, "Linguistic Advances and Lexicography." Wrote Macdonald, "Dr. Gove and the other makers of 3 are sympathetic to the school of language study that has become dominant since 1934. It is sometimes called Structural Linguistics." He then introduced the five precepts mentioned earlier by making it sound as if Gove had written them, "Dr. Gove gives its basic concepts as . . ."

Gove's interest in linguistics as a dictionary editor was, of course, limited to pronunciation. And though Macdonald was probably not confused about the provenance of the five items, it is worth keeping in mind that Gove had not written them but only cited them, and not in W3 but in an article he'd written for Merriam's trade newsletter. Gove's sympathetic historian Morton did not take lightly Macdonald's distortion that W3 was a product of the "revolution" (Macdonald's word) in linguistics. Wrote Morton, "Looking at Gove's article today, one wonders how its meaning could have been so utterly misunderstood and why the misinterpretation gained credence."

Almost forty years later, this misinterpretation was passed on to a new generation when David Foster Wallace revisited the W3 controversy. *Infinite Jest*, Wallace's 1996 novel, considered by many a seminal work for his generation, showed a conspicuous interest in language and lexicography, as when a character claims to have memorized long stretches of the dictionary and references the OED and different editions of Webster's. But Wallace had not really strutted his stuff as a language maven until his twenty-page essay called "Tense Present: Democracy, English, and the Wars over Usage" appeared in the April 2001 issue of *Harper's*.

Calling himself a "SNOOT" (a neologism he defined as "somebody who knows what *dysphemism* means and doesn't mind letting you know it"), Wallace presented himself as a dyed-in-the-wool language purist and dictionary aficionado. He was more than passing familiar, he claimed, with the "seamy underbelly of U.S. lexicography." To find this underbelly, he wrote, one has to read introductory essays in dictionaries, such as "*Webster's Third*'s 'Linguistic Advances and Lexicography.'"

But Gove's article, "Linguistic Advances and Lexicography," was not the introduction to *Webster's Third*; in fact, it wasn't in *Webster's Third* at all, ever. And the preface Gove wrote for W3, dated June 1, 1961, is not much of a "salvo" in the usage war, as Wallace argued, but a fairly tame document, as one would expect, which mostly touts prominent features of the dictionary itself.

Had Wallace or one of his editors only glanced at the preface, there could have been no mistaking its actual contents or rather benign character. Yet Wallace unwittingly made Gove's newsletter article the centerpiece of a somewhat lengthy attack on *Webster's Third* and Gove's editing of it. And he compounded the initial error by referring to Gove's article, a few paragraphs on, as "Gove's now-classic introduction to *Webster's Third*."

It seems fair to wonder if Wallace, for all his bluster, had much experience using W3. In the same essay, he credited Philip Gove with coining the terms *descriptivist* and *prescriptivist* to represent the warring sides over usage, but he could have looked up the terms to find they were already so defined in W3, in which case they certainly predated Gove's use of them following the dictionary's publication. He also repeats the old *Life* magazine mistake concerning *irregardless* and commits yet another concerning the labeling of the dialectical variant *heighth*.

A recurring lament of Morton's history is that W3's critics were able to make their case to a much larger audience than its defenders were able to reach. Dwight Macdonald's essay ran in the *New Yorker*, with a circulation just under 450,000, and was reprinted in his 1962 collection *Against the American Grain* (itself reprinted in 1983). James Sledd's devastating refutation, accounting Macdonald's errors of fact and unfounded assertions about the history of dictionaries, was printed in *Symposium on Language and Culture*, the Proceedings of the 1962 Annual Spring Meeting of the American Ethnological Society—not exactly *Reader's Digest*. Morton's own history garnered two reviews in major newspapers, both friendly,

while almost no one noticed the sweeping errors of fact in David Foster Wallace's essay, even as it was reprinted without correction in his widely hailed collection, *Consider the Lobster*, a *New York Times* Notable Book of the Year for 2005 and available since 2007 in paperback.

Webster's Third was an important dictionary and a major addition to the American shelf of reference works, but it was not without fault. Even James Sledd complained about W3's inadequate labels and its odd style of definition-writing. Morton himself faults Gove for failing to make clear his rationales for reducing the use of labels and for failing to explain that he expected citations to give readers a heightened sense of a word's relative formality and contextual appropriateness. But it was unjust that *Webster's Third* came to be known as the "permissive" dictionary and the ugly stepchild of linguistics. The evidence presented for the first proved faulty in numerous particulars, while the public outcry betrayed more than a little ignorance and hysteria. And the primary evidence for the second charge was Dwight Macdonald's careless misreading of a newsletter.

In 1964, in the wake of the W3 controversy, the American Heritage Company made a failed attempt to buy out G. & C. Merriam before deciding to publish its own rival product, the *American Heritage Dictionary*. Merriam was bought out all the same by Encyclopedia Britannica, Inc., which continues to own the rights and operations of the Merriam-Webster family of dictionaries.

In 2008 work began on *Webster's Fourth New International Dictionary* (Unabridged), says Merriam-Webster's editor at large Peter Sokolowski, but the project so far involves only a portion of the staff. If you look at *Merriam-Webster's Collegiate Dictionary*, Sokolowski adds, you can see that over the years the editors have slowly addressed a number of quirks that set *Webster's Third* apart. Still, arriving more than fifty years since the last unabridged, *Webster's Fourth* will necessarily contain a great amount of new material and probably much to argue about.

David Skinner is editor of Humanities.
In 1989, Herbert C. Morton received NEH funding to work on The Story of Webster's Third: Philip Gove's Controversial Dictionary and Its Critics*, which was published in 1994.*
Over the years, NEH has funded numerous dictionary endeavors for languages ancient and modern. Among them are projects on Alaskan Native languages, Albanian, American regional English, Aramaic, Assyrian, Basque, Chinese, Chol, Dinka, Geez, Hittite, Hopi, Lahu, Middle English, Modern Greek, Navaho, Old High German, Old Spanish, Sumerian, Tibetan, Vietnamese, and Yiddish.
This year is the tercentenary of Samuel Johnson, possibly the greatest lexicographer in the English language. NEH has supported work on the Yale Edition of the Works of Samuel Johnson.

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http://www.neh.gov/news/humanities/2009-07/Webster.html

Artistic tendencies linked to 'schizophrenia gene'

- 15:58 16 July 2009 by **Ewen Callaway**

We're all familiar with the stereotype of the tortured artist. Salvador Dali's various disorders and Sylvia Plath's depression spring to mind. Now new research seems to show why: a genetic mutation linked to psychosis and schizophrenia also influences creativity.

The finding could help to explain why mutations that increase a person's risk of developing mental illnesses such as schizophrenia and bipolar syndrome have been preserved, even preferred, during human evolution, says Szabolcs Kéri, a researcher at Semmelweis University in Budapest, Hungary, who carried out the study.

Kéri examined a gene involved in brain development called *neuregulin 1*, which previous studies have linked to a slightly increased risk of schizophrenia. Moreover, a single DNA letter mutation that affects how much of the neuregulin 1 protein is made in the brain has been linked to psychosis, poor memory and sensitivity to criticism.

About 50 per cent of healthy Europeans have one copy of this mutation, while 15 per cent possess two copies.

Creative thinking

To determine how these variations affect creativity, Kéri genotyped 200 adults who responded to adverts seeking creative and accomplished volunteers. He also gave the volunteers two tests of creative thinking, and devised an objective score of their creative achievements, such as filing a patent or writing a book.

People with two copies of the *neuregulin 1* mutation – about 12 per cent of the study participants – tended to score notably higher on these measures of creativity, compared with other volunteers with one or no copy of the mutation. Those with one copy were also judged to be more creative, on average, than volunteers without the mutation. All told, the mutation explained between 3 and 8 per cent of the differences in creativity, Kéri says.

Exactly how *neuregulin 1* affects creativity isn't clear. Volunteers with two copies of the mutation were no more likely than others to possess so-called schizotypal traits, such as paranoia, odd speech patterns and inappropriate emotions. This would suggest that the mutation's connection to mental illness does not entirely explain its link to creativity, Kéri says.

Dampening the brain

Rather, Kéri speculates that the mutation dampens a brain region that reins in mood and behaviour, called the prefrontal cortex. This change could unleash creative potential in some people and psychotic delusions in others.

Intelligence could be one factor that determines whether the *neuregulin 1* mutation boosts creativity or contributes to psychosis. Kéri's volunteers tended to be smarter than average. In contrast, another study of families with a history of schizophrenia found that the same mutation was associated with lower intelligence and psychotic symptoms.

"My clinical experience is that high-IQ people with psychosis have more intellectual capacity to deal with psychotic experiences," Kéri says. "It's not enough to experience those feelings, you have to communicate them."

Intelligence's influence

Jeremy Hall, a geneticist at the University of Edinburgh in the UK who uncovered the link between the *neuregulin 1* mutation and psychosis, agrees that the gene's effects are probably influenced by cognitive factors such as intelligence.

This doesn't mean that psychosis and creativity are the same, though. "There's always been this slightly romantic idea that madness and genius are the flipside to the same coin. How much is that true? Madness is often madness and doesn't have as much genetic association with intelligence," Hall says.

Bernard Crespi, a behavioural geneticist at Simon Fraser University in Burnaby, British Columbia, Canada, is holding his applause for now. "This is a very interesting study with remarkably strong results, though it must be replicated in an independent population before the results can be accepted with confidence," he says.

Journal reference: *Psychological Science* (DOI: 10.1111/j.1467-9280.2009.02398.x)