Infoteca's E-Journal

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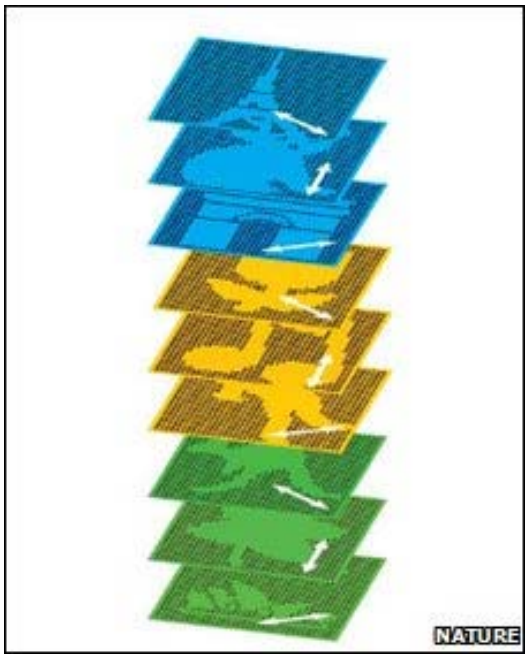
CONTENTS

How to fit 300 DVDs on one disc	3
IVF twins 'sicker in early life'	5
Low Oxygen Levels In Prostate Tumors Can Predict Recurrence	7
AIDS Patients With Serious Complications Benefit From Early Retroviral Use	8
Arsenic In Irrigation Water Is Transferred To Crops	10
Plastic That Grows On Trees	12
Sprained Ankle Rehab Complicated By Delayed Muscle Response, Study Finds	14
Neurons That 'Mirror' The Attention Of Others Discovered	16
Epigenetics: 100 Reasons To Change The Way We Think About Genetics	18
Asteroid Attack 3.9 Billion Years Ago May Have Enhanced Early Life On Earth	20
Exposure To Two Languages Carries Far-reaching Benefits	23
River Delta Areas Can Provide Clue To Environmental Changes	25
Environmental Exposure To Particulates May Damage DNA In As Few As Three Days	27
World's Largest Leatherback Turtle Population Found	29
Andes Mountains Are Older Than Previously Believed	31
Brain's Organization Switches As Children Become Adults	33
Europium Found To Be A Superconductor	35
New Fuel Cell Catalyst Uses Two Metals: Up To Five Times More Effective	37
Mirror on America	39
Play It Again. And Again.	41
Faking It	43
What War Looks Like	45
Imagining the Other	47
Island in the Stream	49
The Edge of Night	51
Fair Usage	53
Vows	55
Benefits of creative classrooms	56
Yosemite's giant trees disappear	59
Seafarers' Memoirs, Written on Skin	61
'Made in U.S.A.' Shines After Makeover	63
If Paintings Had Voices,	66
Seeing the Hudson River Through 700 Windows	68
A Photographer Who Refused to Think Like a Photographer	70
At the Bridge Table, Clues to a Lucid Old Age	72
Della Robbia: A Story of Invention and Immortality	76
Pancreas cancer drug failure clue	78
Diabetes heart risk 'can be cut'	80
Disturbances of Peace	82
Creativity chemical favours the smart	96
Giant Balloon Flying High Over Atlantic To Catch Cosmic Rays	98
Biologists Call For Network Of Protected Rivers	100
'Missing Link': Revealing Fast-spinning Pulsar Mysteries	102

Earth's Climate And Ocean Acidification History 104
How An Enzyme Tells Stem Cells Which Way To Divide 106
Why Do People With Down Syndrome Have Less Cancer? 108
New 'Broadband' Cloaking Technology Simple To Manufacture 110
Robotic Therapy Holds Promise For Cerebral Palsy 112
Area Of Brain That Makes A 'People Person' Discovered 114
Agricultural Aromatherapy: Lavender Oil As Natural Herbicide 116
It's the Future, Jim, But Not As We Know It 118
Reprocessing Nuclear Fuel Makes Sense, But Is It Sensible? 121
Microfossils Challenge Prevailing Views Of 'Snowball Earth' Glaciations On Life 124
NASA Supercomputing Goes Green: Modeling Earth's Ocean Climate 126
Scientists Reaching Consensus On How Brain Processes Speech 128
What Is The Function Of Lymph Nodes? 130
Protein That Suppresses Androgen Receptors Could Improve Prostate Cancer Diagnosis 131
Spectacular Deep-water Coral Province Discovered Off Ireland's West Coast 133
Protein Identified As Critical To Insulating The Body's Wiring Could Become Treatment 135
Poor 'isolated' in private school 137
Asia facing 'diabetes explosion' 139
Natural birth classes questioned 141
Mouse genome laid bare to science 143
Giant dinosaurs 'held heads high' 145
Texting May Be Taking a Toll 147
Getting Healthy, With a Little Help From the Boss 149
Autopsies of War Dead Reveal Ways to Save Others 151
A Memory for Faces, Extreme Version 154
Referral System Turns Patients Into Commodities 156
Epidemics, Fearsome and Fascinating 158
The Coming Superbrain 160
Polaroid Lovers Try to Revive Its Instant Film 162
A Spaniard Who Liked His Vegetables 164
Clues found to menopause timing 166
Middle age spread link to frailty 167
Gene links heart and gum disease 169
Study unlocks history of the seas 171
Eczema's link to asthma uncovered 173
Let There Be Light, and Color, on Fifth Avenue 175
A Skeleton 4,000 Years Old Bears Evidence of Leprosy 177
Link Between Sociality And Brain Increase In Carnivores Questioned 178
Rapid Climate Change Forces Scientists To Evaluate 'Extreme' Conservation Strategies 180
Repeated Fire And Drought: A Menace For Mediterranean Forests 182
Fire And Water Reveal New Archaeological Dating Method 184
Mock CPR Drills In Kids Show Many Hospital Residents Fail In Key Skills 186
Opposites Attract: How Genetics Influences Humans To Choose Their Mates 188
Nimbus Rises In World Of Cloud Computing 190
Novel Approach Estimates Nanoparticles In Environment 192
New Solid Oxide Fuel Cell Seal Could Bring Efficient Energy Technology To Market 194
Compound In Turmeric Spice May Stall Spread Of Fat Tissue 196
Ultraviolet LEDs Create Darker, Redder Lettuce Richer In Antioxidants 197
Giant Galaxy Messier 87 Finally Sized Up 199

How to fit 300 DVDs on one disc

A new optical recording method could pave the way for data discs with 300 times the storage capacity of standard DVDs, Nature journal reports.



The researchers say this could see a whopping 1.6 terabytes of information fit on a DVD-sized disc.

They describe their method as "five-dimensional" optical recording and say it could be commercialised.

The technique employs nanometre-scale particles of gold as a recording medium.

Researchers at Swinburne University of Technology in Australia have exploited the particular properties of these gold "nano-rods" by manipulating the light pointed at them.

The team members described what they did as adding three "dimensions" to the two spatial dimensions that DVD and CD discs already have.

They say they were able to introduce a spectral - or colour - dimension and a polarisation dimension, as well as recording information in 10 layers of the nano-rod films, adding a third spatial dimension.

The scientists used the nanoparticles to record information in a range of different colour wavelengths on the same physical disc location. This is a major improvement over traditional DVDs, which are recorded in a single colour wavelength with a laser.

Also, the amount of incoming laser light absorbed by the nanoparticles depends on its polarisation. This allowed the researchers to record different layers of information at different angles.

The researchers thus refer to the approach as 5-D recording. Previous research has demonstrated recording techniques based on colour or polarisation, but this is the first work that shows the integration of both.

As a result, the scientists say they have achieved unprecedented data density.

" **It's not just elegant - there are a lot of experiments that are elegant - it's relatively straightforward** "
Tom Milster University of Arizona

Their approach used 10-layer stacks composed of thin glass plates as the recording medium. If scaled up to a DVD-sized disk, the team would be able to record 1.6 terabytes - that is, 1,600 gigabytes - or over 300 times the quantity stored on a standard DVD.

Significant improvements could be made by thinning the spacer layers and using more than two polarisation angles - pushing the limits to 10 terabytes per disc and beyond, the researchers say.

Bit by bit

Recent efforts based on holography have shown that up to 500 Gb could potentially be stored on standard DVD-sized disks.

Holographic methods take all of the information to be recorded and encode it in the form of a graph showing how often certain frequencies arise in it.

That means that the recording process is a complex, all-at-once, all-or-nothing approach that would be difficult to implement on an industrial scale.

By contrast, 5-D recording is "bit-by-bit", like current CD and DVD writing processes in that each piece of information is read sequentially.

That is likely to mean that recording and read speeds would be comparatively slow, but the approach would be easier to integrate with existing technology.

"The optical system to record and read 5-D is very similar to the current DVD system," says James Chon, a co-author on the research.

"Therefore, industrial scale production of the compact system is possible."

Now that the method has been demonstrated in custom-made multi-layer stacks, the team is working in conjunction with Samsung to develop a drive that can record and read onto a DVD-sized disc.

Dr Chon says that the material cost of a disc would be less than $0.05 (£0.03), but there are a number of advantages in moving to silver nano-rods that would bring that cost down by a factor of 100.

For optical data storage expert Tom Milster, at the University of Arizona, the beauty of the approach is in its simplicity.

"It's not just elegant - there are a lot of experiments that are elegant - it's relatively straightforward," he told BBC News.

For the moment, Dr Milster says, the equipment needed to write the data would make a commercial system expensive. However, that has not stopped the development of optical storage solutions in the past.

"For example, a Blu-ray player is not an easy system to realise; they've got some wonderful optics in there," Dr Milster said. "People thought that would be pretty difficult to do, but others managed to do it."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8060082.stm

Published: 2009/05/20 18:47:48 GMT

IVF twins 'sicker in early life'

IVF twins face more health problems in early life than naturally conceived twins, experts suggest.

A study found these babies were far more likely to be admitted to neonatal intensive care and to be hospitalised in their first three years of life.

Other work in the same journal, Human Reproduction, provides reassurance on the outcomes of children born after embryos are frozen and stored, however.

A quarter of fertility treatment babies are now born after freezing.

Evidence from 21 controlled studies showed embryos that had been frozen shortly after they started to divide had a better, or at least as good, outcome in terms of premature birth and birth weight as children born from fresh cycles of IVF or another common assisted reproductive technique called ICSI (intracytoplasmic sperm injection).

" **The issue of IVF twins is concerning which is why we are trying to move towards single embryo transfer in as many women as possible to give these children the best start in life** "
Dr Allan Pacey of the British Fertility Society

The same cannot be said for twins born after assisted reproductive therapy (ART) when compared with naturally conceived twins.

It is known already that ART twins are at higher risk of problems such as low birth weight and premature delivery than singletons around the time of their birth, but, to a large extent, these risks exist as part of the problems associated with multiple births in general.

Until now there has been conflicting evidence about whether assisted reproduction itself is responsible for adding to the number of problems seen in ART twins.

As a precaution, experts have recommended transferring only one embryo per IVF cycle wherever possible.

Greater risks

To explore the risks, researchers in Australia and the UK looked at perinatal outcomes and hospital admissions for all twin children born in Western Australia between 1994 and 2000.

To make sure, as far as possible, they were comparing like with like, the investigators matched the ART twins with naturally conceived, non-identical twins of different sexes.

This is because all ART twins start from separate eggs where as some naturally conceived same-sex twins start from only one egg that divides.

They found that twins conceived following ART treatment had a greater risk of poor perinatal outcome, including preterm birth, low birthweight and death that the naturally conceived non-identical twins.

And ART twins had a nearly two-thirds higher risk of being admitted to neonatal intensive care and were more likely to be admitted to hospital during the first three years of their life.

Single embryo transfer

Researcher Michele Hansen, of the Telethon Institute for Child Health Research in Western Australia, said couples undergoing fertility treatment should be made aware of this and should consider the benefits of opting for single embryo transfer.

The reason for the increased risks to ART twins is unclear, but the underlying causes of parental infertility and components of the ART procedure have been mooted.

Dr Allan Pacey, fertility expert at Sheffield University and secretary of the British Fertility Society, said: "It is reassuring news about the embryo freezing.

"But the issue of IVF twins is concerning which is why we are trying to move towards single embryo transfer in as many women as possible to give these children the best start in life."

A spokesperson for the Human Fertilisation and Embryology Authority said: "Clinicians have a duty of care to ensure that patients fully understand what IVF treatment involves and what the risks are, for both themselves and their babies.

"This study is another piece of the jigsaw that women and their doctors need to consider before treatment.

"We know that multiple pregnancy and birth pose the biggest single risk to mothers and babies following fertility treatment.

"That is why, over the past year, professional and patient organisations, together with the HFEA, have been driving forward a national strategy to reduce the number of multiple births following IVF."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8057210.stm

Published: 2009/05/20 23:04:11 GMT

Low Oxygen Levels In Prostate Tumors Can Predict Recurrence

ScienceDaily (May 21, 2009) — Fox Chase Cancer Center researchers have discovered that low-oxygen regions in prostate tumors can be used to predict a rise in prostate-specific antigen (PSA) levels, a marker of tumor recurrence in prostate cancer. The long-term study results will be presented at the 2009 American Society of Clinical Oncology annual meeting in Orlando, FL.

Aruna Turaka, M.D., radiation oncology fellow at Fox Chase and lead author on the study, explained that low oxygen, or hypoxia, in tumors is a well-known risk factor for radiation resistance in solid tumors. Between 2000 and 2002, Fox Chase research colleagues published six research papers detailing the link between tumor hypoxia, radioresistance, and the risk of increased PSA levels. But mean follow-up at the time of those studies was 19 months, she said. The current study reinforces those preliminary findings with more "mature" data and a median follow-up of 8 years.In the current study, Turaka and her colleagues used a custom-built probe to monitor the amount of oxygen that prostate tumors and non-cancerous muscle tissue were receiving. They used this probe on 57 patients with low or intermediate risk of cancer just before the patients received a form of localized radiation therapy. The researchers then tracked the patients over time, looking for a correlation between the amount of oxygen levels in the prostate tumor relative to the muscle tissue at the time of therapy and later looked at the increase in PSA levels.

Eight of the 57 patients experienced an increase in PSA levels following prostate cancer treatment, defined as an increase of 2 ng/mL above the lowest PSA reading following brachytherapy. Overall, average muscle oxygenation was 12.5-times higher than that of the tumor (30 mm Hg vs 2.4 mm Hg). Using a statistical model that accounted for such risk factors as tumor grade, PSA level, and tumor size, the team determined that hypoxia was a significant independent predictor of an increase in PSA levels.

In other words, even after accounting for PSA value, Gleason score, tumor size, age, and other prostate cancer risk factors, tumor hypoxia alone could predict the likelihood of increased PSA levels, and potentially tumor recurrence."Now", Turaka said, "the goal is to apply the results to the clinic". That, she said, requires a two-pronged approach: developing noninvasive screening methods to identify hypoxic tumors, and more potent anticancer weapons to target them.

"We already knew that there are hypoxic regions within cancers," she said. "The future goal is to interpolate that to relate to the expression of molecular markers [such as hypoxia-inducible factor-1-alpha] and attack those tumors with dose escalation radiation oncology strategies and targeted agents."

The findings were described in a poster presentation at ASCO 2009. In addition to FCCC, the authors included researchers from the University of Pennsylvania in Philadelphia, PA, and the Henry Ford Health System, Detroit, MI.

Abstract #5136: Correlation of hypoxic prostate/muscle pO2 (P/M PO2) ratio and biochemical failure in patients with localized prostate cancer: Long-term results. May 31, 2009

Adapted from materials provided by Fox Chase Cancer Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090515191556.htm

AIDS Patients With Serious Complications Benefit From Early Retroviral Use, Study Shows

ScienceDaily (May 21, 2009) — HIV-positive patients who don't seek medical attention until they have a serious AIDS-related condition can reduce their risk of death or other complications by half if they get antiretroviral treatment early on, according to a new multicenter trial led by researchers at the Stanford University School of Medicine.

The study results could lead to widespread changes in treatment for HIV patients, particularly those diagnosed at an advanced stage, experts say.

"Even in San Francisco, one of the first epicenters of HIV in the United States, we still find that many people present late in the course of their illness with an opportunistic infection," said Mitch Katz, MD, San Francisco's director of health, who was not involved in the study. "This study shows that it is life-saving to treat those persons with antiretroviral drugs while they are still in the hospital. The results of this study will change practices throughout the world."

Some 60,000 to 70,000 newly HIV-infected individuals are identified every year in the United States, according to recently revised figures from the federal Centers for Disease Control and Prevention. A growing number of these patients, particularly minorities, youth, injection-drug users and those in poor rural areas, are being diagnosed late in the disease process when they've already developed life-threatening conditions, said Andrew Zolopa, MD, associate professor of infectious diseases and geographic medicine at Stanford and first author of the study. When these patients come for treatment of these complications, doctors are often reluctant to give them anti-AIDS drugs at the same time, fearing the two therapies could interfere with one another.

"A lot of people wait, thinking, 'Let's get the patient out of acute crisis, and then we'll deal with the underlying HIV infection later,'" said Zolopa. "But that answer is wrong. If we're more aggressive with HIV drugs, we can reduce AIDS-related complications and death by 50 percent. It's a substantial clinical benefit."

The study was conducted by the AIDS Clinical Trials Group, the world's largest clinical trial organization. Results will be published May 18 in the online journal PLoS-ONE.

William Powderly, MD, dean of medicine at the University College Dublin School of Medicine, said the study addresses one of the last, longstanding unknowns in the management of AIDS.

"Clinicians have long grappled with the question of whether or not early treatment with antiviral drugs will help people who come to the hospital with advanced infections, such as pneumonia," said Powderly, the study's senior author. "The answer is clearly yes. Early antiviral treatment for HIV improves the clinical outcome, including the likelihood of surviving in the next few months. It probably does so by improving the immune system and therefore adds to the ability to resist these infections."

The study findings, presented in abstract form at an earlier scientific meeting, are already starting to change clinical practices. The International AIDS Society, the CDC and the British AIDS Society all have adopted guidelines that recommend that early antiretroviral treatment be considered in patients with an opportunistic infection, Zolopa noted.

The study involved 262 patients at 39 sites across the United States, from Puerto Rico to Seattle. An additional 20 patients were enrolled in a hospital in Johannesburg, South Africa. Eighty-five percent of the patients were men whose median age was 28. They were an ethnically diverse group: 37 percent were black, 36 percent Hispanic, 23 percent white and 5 percent Asian.

The patients all had one or more opportunistic infection, with the most common ones being pneumocystis jirovecii pneumonia, cryptococcal meningitis and serious bacterial infections. Patients with tuberculosis

were excluded from the study because it was unclear what the optimal antiviral treatment was for these patients, Zolopa said.

The patients, who were enrolled between May 2003 and August 2006, were separated into two groups: those who got antiretroviral treatment early and those for whom this treatment was delayed until their opportunistic infections had been dealt with. The patients were all offered antiretroviral drugs free of charge. The drugs for the study were supplied by Abbott Laboratories (lopinavir/ritonavir), Gilead Sciences (tenofovir and emtricitabine) and Bristol-Myers Squibb (stavudine).

The patients in the early intervention arm of the study were treated with ARVs within an average of 12 days, while those in the deferred group received the treatment within an average of 45 days after the start of treatment for the opportunistic infection. Among the patients treated early, there were 20 (14.2 percent) who died or developed another significant AIDS-related complication. That compared with 34 patients (24.1 percent) in the deferred group who died or suffered a new complication.

In addition, the patients in the early treatment group saw a much swifter recovery of their immune systems. The early group patients saw their T-cell counts, a measure of the immune cells destroyed by the AIDS virus, increase to more than 100 within four weeks. In the deferred treatment group, it took 12 weeks for the patients' T cells to reach that same level, the researchers reported.

"I was quite impressed at how rapidly these T cells could rise in these patients," Zolopa said. "By starting ARVs early you can effectively reduce the window of vulnerability where another AIDS-related complication could develop."Zolopa said there was no difference between the two sets of patients in their adherence to their prescribed regimens. One concern in treating patients with ARVs soon after being diagnosed with AIDS is that they might not stick to their treatments and could then develop drug resistance. But adherence did not prove to be an issue, he noted.

"Starting the therapies early didn't scare people off," he said.According to Zolopa, the study results probably provide some guidance for patients in developing countries, though each country would have to determine its own strategy for initiating ARVs in patients with advanced AIDS.

"These results do have important implications across the globe," he said.

Although the study did not include patients with tuberculosis, the most common AIDS-related complication among patients in sub-Saharan Africa, early ARV treatment has been shown in other, more recent studies to be of value in those patients with TB, Powderly said.

Zolopa said implementing the study findings could entail some logistical challenges, as hospitals will have to develop interdisciplinary teams, including pulmonary specialists, emergency physicians, pharmacists and others, in coordinating early treatment for these critically ill patients as they come into the system.

Other researchers in the study are Janet Andersen, ScD, and Lauren Komarow, both with Harvard School of Public Health; Ian Sanne, MD, of the South African College of Physicians; Alejandro Sanchez, MD, of the USC Keck School of Medicine; Evelyn Hogg with Social & Scientific Systems, Inc.; and Carol Suckow with the Frontier Science and Technology Research Foundation.

The study was funded by the National Institutes of Health through the Division of AIDS.

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

http://www.sciencedaily.com/releases/2009/05/090516174342.htm

Arsenic In Irrigation Water Is Transferred To Crops

Potatoes field in the study area. (Credit: Moyano et al./SINC)

ScienceDaily (May 21, 2009) — A team of researchers from the University of Valladolid (UVA) and the Salamanca Institute of Natural Resources and Agrobiology (IRNASA-CSIC) has shown that potatoes irrigated with arsenic-rich water contain this element at levels up to 35 times higher than crops on which this water was not used. The scientists have also confirmed the impact of water with high arsenic content on beet, carrot and wheat crops.

"The objective of the work we carried out was to gain an understanding of the impact of arsenic-rich subterranean waters on soil and wheat, potato, sugar beet and carrot crops", Amelia Moyano Gardini, a professor at the UVA's University School of Agrarian Engineering and co-author of the study with other experts from the engineering school of the Spanish National Research Council (CSIC)'s IRNASA centre, tells SINC.

In order to carry out the study, which has been published recently in the Journal of Environmental Monitoring, the scientists selected 23 sites located in the south of the province of Valladolid and the north of the province of Segovia, an agricultural region known for the presence of arsenic in its subterranean waters (between 38 and 136 micrograms/litre). The researchers analysed the arsenic levels in both the soil and the four crops, and compared the data with samples gathered from three control sites irrigated with water containing very little arsenic (5 µg/l or less).

The results show that arsenic levels, both in the ground (which reached levels of up to 36 milligrams/kg) and in the plants, were higher in the sites irrigated with water containing higher levels of this element in comparison to those in the control areas. The levels of dissolved arsenic in water reached 0.9 mg/kg in some samples, which is in excess of the 0.04 mg/kg limit set for agricultural use.

The scientists found arsenic levels in the potatoes to be 35 times higher in the crops irrigated with arsenic-laden water, while they also reached high concentrations in the beets (between 3.9 and 5.4 mg/kg). "Arsenic accumulates particularly in the roots of these vegetables, probably as a defence mechanism", explains Moyano.

The researcher stresses that these levels "are not currently of concern for people who eat agricultural products from this region", but the study does warn that the maximum safe limits could be exceeded in the case of wheat if people eat more than 400 grams per day (or if wheat is combined with other vegetables from the area), and this could pose a risk to health.

Arsenic is a natural chemical element that may or may not be toxic to human beings depending upon the dose consumed and its origin. Arsenic combines with carbon and hydrogen in living beings to form organic arsenic compounds, which in general are not harmful. In the environment, however, this substance combines with oxygen, chlorine and sulphur, forming inorganic arsenic compounds, which are considered to be more toxic.

Prolonged exposure to high concentrations of arsenic (for more than 10 years) can result in arsenic poisoning, the most common symptoms of which include skin alterations, although in the most serious cases it can lead to various kinds of cancer (such as skin, lung and kidney cancer). Natural arsenic contamination is a problem in countries such as Argentina, Bangladesh, Chile, China and the United States.

The maximum level of arsenic permitted in water for human consumption in Spain and the rest of the European Union is 0.01 mg/l, and the World Health Organisation (WHO) recommends this figure should not be exceeded. Levels of more than 0.05 milligrams of arsenic per litre of water (irrigation water rather than that for human consumption) were detected in all the sites analysed in this study, with levels at some sites reaching 0.136 mg/l.

Moyano says the high arsenic content in the subterranean water in the study area is not due to pollution caused by human activity, but that it is rather a geological anomaly caused by the chemical features of the water in the region's aquifers. The relevant departments in the regional government of Castilla and León are now working to mitigate this problem.

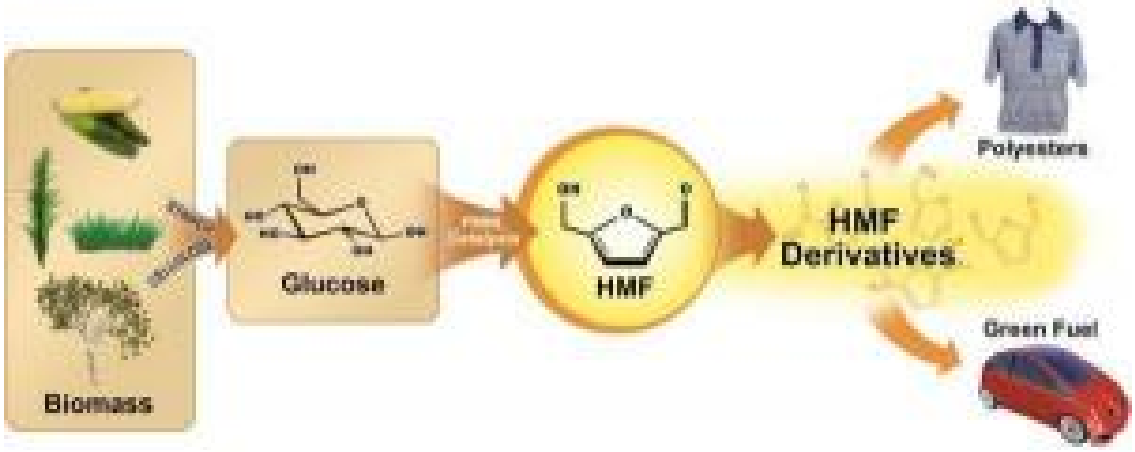
Journal reference:

1. Moyano et al. **Impact of irrigation with arsenic-rich groundwater on soils and crops**. *Journal of Environmental Monitoring*, 2009; 11 (3): 498 DOI: 10.1039/b817634e

Adapted from materials provided by Plataforma SINC.

http://www.sciencedaily.com/releases/2009/05/090513121417.htm

Plastic That Grows On Trees



PNNL researchers can now take cellulose to HMF in one step, a process that might someday replace crude oil to make fuel and plastics. (Credit: Image courtesy of DOE/Pacific Northwest National Laboratory)

ScienceDaily (May 20, 2009) — Some researchers hope to turn plants into a renewable, nonpolluting replacement for crude oil. To achieve this, scientists have to learn how to convert plant biomass into a building block for plastics and fuels cheaply and efficiently. In new research, chemists have successfully converted cellulose -- the most common plant carbohydrate -- directly into the building block called HMF in one step.

The result builds upon earlier work by researchers at the Department of Energy's Pacific Northwest National Laboratory. In that work scientists produced HMF from simple sugars derived from cellulose. In this new work, researchers developed a way to bypass the sugar-forming step and go straight from cellulose to HMF. This simple process generates a high yield of HMF and allows the use of raw cellulose as feed material.

"In biomass like wood, corn stover and switchgrass, cellulose is the most abundant polymer that researchers are trying to convert to biofuels and plastics," said chemist Z. Conrad Zhang, who led the work while at PNNL's Institute for Interfacial Catalysis.

HMF, also known as 5-hydroxymethylfurfural, can be used as a building block for plastics and "biofuels" such as gasoline and diesel, essentially the same fuels processed from crude oil. In previous work, PNNL researchers used a chemical and a solvent known as an ionic liquid to convert the simple sugars into HMF.

The chemical, a metal chloride known as chromium chloride, converted sugar into highly pure HMF. But to be able to feed cellulosic biomass directly from nature, the team still needed to break down cellulose into simple sugars -- Zhang and colleagues wanted to learn how to skip that step.

The ionic liquid has the added benefit of being able to dissolve cellulose, which as anyone who's boiled leafy vegetables knows can be stringy and hard to dissolve. Compounds called catalysts speed up the conversion of cellulose to HMF. After trying different metal chloride catalysts in the ionic solvent, they found a pair of catalysts that worked well: A combination of copper chloride and chromium chloride under 120 degrees Celsius broke down the cellulose without creating a lot of unwanted byproducts.

In additional experiments, the team tested how well their method compared to acid, a common way to break down cellulose. The metal chlorides-ionic liquid system worked ten times faster than the acid and at

much lower temperatures. In addition, the paired metal chloride catalysts allowed Zhang's research team to avoid using another compound under investigation, a mineral acid, that is known to degrade HMF.

Optimizing their method, the team found that they could consistently achieve a high yield of HMF -- the method converted about 57 percent of the sugar content in the cellulose feedstock to HMF through this single step process. The team recovered more than 90% of the HMF formed, and the final product from the process was 96% pure.

In addition, the metal chlorides and ionic liquid could be reused multiple times without losing their effectiveness. Being able to recycle the materials will lower the cost of HMF production.

"This paper is a tremendous breakthrough. By combining the cellulose-breakdown and sugar-conversion steps, we are very close to a single-step method of converting raw biomass into a new platform chemical -- a chemical you can readily turn into a transportation fuel or for synthesis of plastics and other useful materials," said PNNL geochemist and study coauthor Jim Amonette. "Advances like this can help reduce our dependence on fossil fuels."

This research was supported by Pacific Northwest National Laboratory-directed research funding.

Journal reference:

1. Y. Su, H.M. Brown, X. Huang, X.-d. Zhou, J.E. Amonette, Z.C. Zhang. **Single-Step Conversion of Cellulose to 5-Hydroxymethylfurfural (HMF), a Versatile Platform Chemical**. *Applied Catalysis A: General*, Online 9 April 2009 DOI: 10.1016/j.apcata.2009.04.002

Adapted from materials provided by DOE/Pacific Northwest National Laboratory.
http://www.sciencedaily.com/releases/2009/05/090519134837.htm

Sprained Ankle Rehab Complicated By Delayed Muscle Response, Study Finds

BYU exercise science professor Ty Hopkins studies ankle injuries and why most people don't recover full stability. (Credit: Image courtesy of Brigham Young University)

ScienceDaily (May 20, 2009) — Whether on the trail, at the gym, or even on the front-porch steps, what happens inside your ankle in the milliseconds following a single misstep could sentence you to a lifetime of ankle trouble.

And it's not just the ligaments left with lasting damage, finds Brigham Young University researcher Ty Hopkins and collaborators from the University of Michigan. Their new study points to a leg muscle whose speed and quality of protective response is permanently compromised after a sprain.

"The lateral muscles of the leg are key to ankle injury," said Hopkins, a co-author on the study in the current issue of The American Journal of Sports Medicine. "They are key because they resist the movement that is involved in injury itself and position the foot during movement."

The new study provides the latest clue as to why ankle instability persists in most cases long after the initial sprain.

Hopkins and his team recruited both weak- and strong-ankled people to walk down a runway custom built with eight trap doors. With legs cleanly shaven, each participant was hooked up to sensory equipment, launched down the runway, and told to match their steps to the beat of a metronome. As they strode to the other end, one of the trap doors would suddenly invert 30 degrees outward, tweaking their ankle just enough to trigger the series of muscle reactions in question.

While it sounds (and looks) like walking the plank, Hopkins is quick to point out that everyone walked away from the tests uninjured.

The participants' bravery gave researchers data on the speed and quality of three protective muscle contractions signaled from different parts of the nervous system: the first from receptors within the leg muscle, the second from relays within the spinal cord and the third from the brain itself. Participants with a history of weak ankles had a significant delay for the first muscle response compared to a control group with no history of sprains.

The researchers found the muscles responded within 55 milliseconds in the control group. It took more time in the group with a history of ankle trouble - as much as 90 milliseconds. The delay sounds small but in some cases could mean the difference between a painful ankle sprain and going merrily on your way.

The strength of the muscle response was also diminished in participants with prior ankle injury. Researchers believe prior injuries leave the muscle receptors with less sensitivity, impairing their ability to react as quickly or strongly as the situation may call for.

"If there are muscles that prevent or reduce the extent of injury and they don't work, you're in big trouble," Hopkins said. "We have got to somehow turn those muscles on."

The researchers focused on a particular muscle – about as thick as an index finger – called the peroneus longus. When contracted, this muscle moves the foot in the opposite direction of an ankle injury.

"The peroneus longus by itself probably isn't a very good protector simply because of its size, even if it contracted really well," Hopkins said. "We are working on other projects now to look at the system of muscles involved with stabilizing the ankle."

Hopkins and his team of researchers are continuing their search to find out why instability persists. With current research, as stated in the paper, a person should remain active to help maintain dynamic stability in their ankle. Hopkins believes that with more data they will be able to develop treatments and exercises to overcome functional ankle instability.

"Once we find out exactly why ankle instability persists, then it could be easy to correct," Hopkins said.

Hopkins teaches exercise science at BYU and earned a Ph.D. in sports medicine and life sciences from Indiana State University. Riann Palmeri-Smith and Tyler Brown of the University of Michigan are also authors on the new study.

Adapted from materials provided by Brigham Young University.

http://www.sciencedaily.com/releases/2009/05/090513091341.htm

Neurons That 'Mirror' The Attention Of Others Discovered

New research shows that whether a monkey is looking to the left or merely watching another monkey looking that way, the same neurons in his brain are firing. (Credit: Ben Hayden / Courtesy of Duke University Medical Center)

ScienceDaily (May 20, 2009) — Whether a monkey is looking to the left or merely watching another monkey looking that way, the same neurons in his brain are firing, according to researchers at the Duke University Medical Center.

"We speculate that the neurons' activity may lie beneath critical social behavior, such as joint attention," said Michael Platt, Ph.D., Duke professor of neurobiology and evolutionary anthropology and senior author of the study published in the *Proceedings of the National Academy of Sciences.* "If social inputs to the neurons are disrupted, that might contribute to the social deficits seen in autism and other disorders."

People spontaneously follow the gaze of other people, and this joint attention helps promote social bonding, enhance learning, and may even be necessary for the development of language. People who can't do these things are at a decided disadvantage, and may fail to develop normal patterns of social interaction, Platt said.

In fact, the impulse to follow the direction of another monkey's eyes was so strong, monkeys sometimes strayed from the assigned light detection task, for which they were rewarded with juice, and instead followed the gaze of a monkey they saw in the projected image.

Previous studies have reported the existence of so-called "mirror" neurons that respond both when monkeys make a particular movement, such as reaching for a peanut, and when the monkeys observe someone else doing the same thing. Given the importance of joint attention and gaze following for both monkeys and humans, many scientists predicted that neurons that mirror observed gaze would be found someday—but until the study by the Duke scientists such nerve cells had never been described.

The attention-mirroring neurons turned out to be located in the parietal lobe, a part of the brain dedicated to eye movements and attention. This is important because it suggests that reading someone else's attention involves the same brain circuits that control one's own attention, Platt said.

In the experiment, the researchers first established whether a particular neuron responded when the monkey himself gazed to the left or to the right. Then they presented the monkey with photos of monkeys randomly looking left or right, thus matching the preferred direction of the neuron on half of trials.

Images of monkey faces randomly lit up for 100 to 800 milliseconds (about the time it takes a fastball to leave the pitcher's hand and cross home plate) and then a yellow box appeared randomly either on the left or right.

Monkeys had to shift their gaze from the center to the box as quickly as possible and maintain fixation for at least 300 ms to receive a juice reward. Typically, monkeys were faster to shift gaze to the box when they had previously seen a picture of a monkey looking in that direction—presumably because their own attention had shifted in the same direction.

The researchers learned that the time period in which they saw the response by the neuron was also the time period in which they saw the biggest behavioral effect. "If the monkey saw another monkey for 100 or 200 milliseconds looking in a certain direction, that's when he is most likely to follow the gaze of that monkey or share the monkey's attention," said Platt.

Despite widespread speculation about mirror neurons in humans and what they might do, the only studies on mirror neurons to date have been performed in monkeys, Platt said.

"We argue that there is a system in place that is devoted to taking in important social information and using it to guide one's behavior," Platt said. "It is a very simple type of imitative behavior that these neurons seem to be driving. They act like mirror neurons, but for attention, not for an overt action."

Stephen V. Shepherd, formerly of Duke Neurobiology and now at the National Eye Institute at Princeton University is the lead author. Other authors include Jeffrey T. Klein of the Duke Department of Neurobiology, and Robert O. Deaner of the Department of Psychology at Grand Valley State University. The work was supported by Autism Speaks/NAAR, predoctoral and postdoctoral NIH NRSA fellowships, an NIH grant, and the Cure Autism Now Foundation.

Adapted from materials provided by Duke University Medical Center.

http://www.sciencedaily.com/releases/2009/05/090518172451.htm

Epigenetics: 100 Reasons To Change The Way We Think About Genetics

ScienceDaily (May 20, 2009) — For years, genes have been considered the one and only way biological traits could be passed down through generations of organisms.

Not anymore.

Increasingly, biologists are finding that non-genetic variation acquired during the life of an organism can sometimes be passed on to offspring—a phenomenon known as epigenetic inheritance. An article forthcoming in the July issue of *The Quarterly Review of Biology* lists over 100 well-documented cases of epigenetic inheritance between generations of organisms, and suggests that non-DNA inheritance happens much more often than scientists previously thought.

Biologists have suspected for years that some kind of epigenetic inheritance occurs at the cellular level. The different kinds of cells in our bodies provide an example. Skin cells and brain cells have different forms and functions, despite having exactly the same DNA. There must be mechanisms—other than DNA—that make sure skin cells stay skin cells when they divide.

Only recently, however, have researchers begun to find molecular evidence of non-DNA inheritance between organisms as well as between cells. The main question now is: How often does it happen?

"The analysis of these data shows that epigenetic inheritance is ubiquitous …," write Eva Jablonka and Gal Raz, both of Tel-Aviv University in Israel. Their article outlines inherited epigenetic variation in bacteria, protists, fungi, plants, and animals.

These findings "represent the tip of a very large iceberg," the authors say.

For example, Jablonka and Raz cite a study finding that when fruit flies are exposed to certain chemicals, at least 13 generations of their descendants are born with bristly outgrowths on their eyes. Another study found that exposing a pregnant rat to a chemical that alters reproductive hormones leads to generations of sick offspring. Yet another study shows higher rates of heart disease and diabetes in the children and grandchildren of people who were malnourished in adolescence.

In these cases, as well as the rest of the cases Jablonka and Raz cite, the source of the variation in subsequent generations was not DNA. Rather, the new traits were carried on through epigenetic means.

There are four known mechanisms for epigenetic inheritance. According to Jablonka and Raz, the best understood of these is "DNA methylation." Methyls, small chemical groups within cells, latch on to certain areas along the DNA strand. The methyls serve as a kind of switch that renders genes active or inactive.

By turning genes on and off, methyls can have a profound impact on the form and function of cells and organisms, without changing the underlying DNA. If the normal pattern of methyls is altered—by a chemical agent, for example—that new pattern can be passed to future generations.

The result, as in the case of the pregnant rats, can be dramatic and stick around for generations, despite the fact that underlying DNA remains unchanged.

Lamarck revisited

New evidence for epigenetic inheritance has profound implications for the study of evolution, Jablonka and Raz say.

"Incorporating epigenetic inheritance into evolutionary theory extends the scope of evolutionary thinking and leads to notions of heredity and evolution that incorporate development," they write.

This is a vindication of sorts for 18th century naturalist Jean Baptiste Lamarck. Lamarck, whose writings on evolution predated Charles Darwin's, believed that evolution was driven in part by the inheritance of acquired traits. His classic example was the giraffe. Giraffe ancestors, Lamarck surmised, reached with their necks to munch leaves high in trees. The reaching caused their necks to become slightly longer—a trait that was passed on to descendants. Generation after generation inherited slightly longer necks, and the result is what we see in giraffes today.

With the advent of Mendelian genetics and the later discovery of DNA, Lamarck's ideas fell out of favor entirely. Research on epigenetics, while yet to uncover anything as dramatic as Lamarck's giraffes, does suggest that acquired traits can be heritable, and that Lamarck was not so wrong after all.

Journal reference:

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Adapted from materials provided by University of Chicago Press Journals.
http://www.sciencedaily.com/releases/2009/05/090518111723.htm

Asteroid Attack 3.9 Billion Years Ago May Have Enhanced Early Life On Earth

The bombardment of Earth by asteroids 3.9 billion years ago may have enhanced early life, according to a new University of Colorado study. (Credit: NASA/JPL)

ScienceDaily (May 20, 2009) — The bombardment of Earth nearly 4 billion years ago by asteroids as large as Kansas would not have had the firepower to extinguish potential early life on the planet and may even have given it a boost, says a new University of Colorado at Boulder study.

Impact evidence from lunar samples, meteorites and the pockmarked surfaces of the inner planets paints a picture of a violent environment in the solar system during the Hadean Eon 4.5 to 3.8 billion years ago, particularly through a cataclysmic event known as the Late Heavy Bombardment about 3.9 billion years ago. Although many believe the bombardment would have sterilized Earth, the new study shows it would have melted only a fraction of Earth's crust, and that microbes could well have survived in subsurface habitats, insulated from the destruction.

"These new results push back the possible beginnings of life on Earth to well before the bombardment period 3.9 billion years ago," said CU-Boulder Research Associate Oleg Abramov. "It opens up the possibility that life emerged as far back as 4.4 billion years ago, about the time the first oceans are thought to have formed."

A paper on the subject by Abramov and CU-Boulder geological sciences Professor Stephen Mojzsis appears in the May 21 issue of *Nature*.

Because physical evidence of Earth's early bombardment has been erased by weathering and plate tectonics over the eons, the researchers used data from Apollo moon rocks, impact records from the moon, Mars and Mercury, and previous theoretical studies to build three-dimensional computer models that replicate the bombardment. Abramov and Mojzsis plugged in asteroid size, frequency and distribution estimates into their simulations to chart the damage to the Earth during the Late Heavy Bombardment, which is thought to have lasted for 20 million to 200 million years.

The 3-D models allowed Abramov and Mojzsis to monitor temperatures beneath individual craters to assess heating and cooling of the crust following large impacts in order to evaluate habitability, said Abramov. The study indicated that less than 25 percent of Earth's crust would have melted during such a bombardment.

The CU-Boulder researchers even cranked up the intensity of the asteroid barrage in their simulations by 10-fold -- an event that could have vaporized Earth's oceans. "Even under the most extreme conditions we imposed, Earth would not have been completely sterilized by the bombardment," said Abramov.

Instead, hydrothermal vents may have provided sanctuaries for extreme, heat-loving microbes known as "hyperthermophilic bacteria" following bombardments, said Mojzsis. Even if life had not emerged by 3.9 billion years ago, such underground havens could still have provided a "crucible" for life's origin on Earth, Mojzsis said.

The researchers concluded subterranean microbes living at temperatures ranging from 175 degrees to 230 degrees Fahrenheit would have flourished during the Late Heavy Bombardment. The models indicate that underground habitats for such microbes increased in volume and duration as a result of the massive impacts. Some extreme microbial species on Earth today -- including so-called "unboilable bugs" discovered in hydrothermal vents in Yellowstone National Park -- thrive at 250 F.

Geologic evidence suggests that life on Earth was present at least 3.83 billion years ago, said Mojzsis. "So it is not unreasonable to suggest there was life on Earth before 3.9 billion years ago. We know from the geochemical record that our planet was eminently habitable by that time, and this new study sews up a major problem in origins of life studies by sweeping away the necessity for multiple origins of life on Earth."

Most planetary scientists believe a rogue planet as large as Mars smacked Earth with a glancing blow 4.5 billion years ago, vaporizing itself and part of Earth. The collision would have created an immense vapor cloud from which moonlets, and later our moon, coalesced, Mojzsis said. "That event, which preceded the Late Heavy Bombardment by at least 500 million years, would have effectively hit Earth's re-set button," he said.

"But our results strongly suggest that no events since the moon formation were capable of destroying Earth's crust and wiping out any biosphere that was present," Mojzsis said. "Instead of chopping down the tree of life, our view is that the bombardment pruned it."

The results also support the potential for microbial life on other planets like Mars and perhaps even rocky, Earth-like planets in other solar systems that may have been resurfaced by impacts, said Abramov.

"Exactly when life originated on Earth is a hotly debated topic," says NASA's Astrobiology Discipline Scientist Michael H. New, manager of the Exobiology and Evolutionary Biology program. "These findings are significant because they indicate life could have begun well before the LHB, during the so-called Hadean Eon of Earth's history 3.8 billion to 4.5 billion years ago."

The research by Abramov and Mojzsis is sponsored by NASA Astrobiology Program's Exobiology and Evolutionary Biology Department and the NASA Postdoctoral Program. The Exobiology and Evolutionary Biology Program supports research into the origin, evolution and distribution of life on Earth and the potential for life elsewhere. Mojzsis is a member of the new NASA Lunar Science Institute through the Center for Lunar Origin and Evolution.

For more information on CU-Boulder's Early Earth and Planetary Geology Group visit http://isotope.colorado.edu. For more information on the NASA Lunar Science Institute Program visit http://lunarscience.arc.nasa.gov/. For more information on the NASA Astrobiology Institute visit http://astrobiology.nasa.gov/nai/.

Journal reference:

1. Oleg Abramov, Stephen J. Mojzsis. **Microbial habitability of the Hadean Earth during the late heavy bombardment**. *Nature*, 2009; 459 (7245): 419 DOI: 10.1038/nature08015

Adapted from materials provided by University of Colorado at Boulder.
http://www.sciencedaily.com/releases/2009/05/090520140403.htm

Exposure To Two Languages Carries Far-reaching Benefits

ScienceDaily (May 20, 2009) — People who can speak two languages are more adept at learning a new foreign language than their monolingual counterparts, according to research conducted at Northwestern University. And their bilingual advantage persists even when the new language they study is completely different from the languages they already know.

"It's often assumed that individuals who've learned multiple languages simply have a natural aptitude for learning languages," said Viorica Marian, associate professor of communication sciences and disorders at Northwestern University. "While that is true in some cases, our research shows that the experience of becoming bilingual itself makes learning a new language easier."

In the first study to explore a possible advantage in bilinguals who learned a second language at a parent's knee, Northwestern researchers asked three groups of native English speakers -- English-Mandarin bilinguals, English-Spanish bilinguals and monolinguals -- to master words in an invented language that bore no relationship to English, Spanish or Mandarin.

They found that the bilingual participants -- whether English-Mandarin or English-Spanish speakers – mastered nearly twice the number of words as the monolinguals.

And they believe the bilingual advantage is likely to generalize beyond word learning to other kinds of language learning, including learning new words in one's own language and a very basic ability to maintain verbal information.

"After learning another language, individuals can transfer language learning strategies they've acquired to subsequent language learning and become better language learners in general," said Northwestern School of Communication's Marian.

Marian and Margarita Kaushanskaya, now assistant professor of communicative disorders at University of Wisconsin-Madison, are co-authors of "The Bilingual Advantage in Novel World Learning." Their study will be published in the August issue of Psychonomic Bulletin and Review.

The study has important implications for educators who are considering the appropriate age at which to introduce foreign language instruction as well as for parents who in increasing numbers have an option to enroll their children in dual language immersion programs.

"We're seeing that exposure to two languages early in life carries far-reaching benefits," said co-author Kaushanskaya. "Our research tells us that children who grow up with two languages wind up being better language learners later on."

Although there are more opportunities today for children to participate in dual language immersion programs than in the past, parents often avoid them for fear that dual language instruction may end up confusing or distracting their children and inhibit subject learning.

In research presented in the May issue of the *Journal of Experimental Psychology*, however, the two co-authors demonstrate that bilinguals actually are better able than monolinguals to inhibit irrelevant information while learning a new language. Repressing irrelevant information, after all, is something bilinguals do every time they speak.

What's more, the majority of the world's population outside the United States is bilingual or multilingual, Marian noted. In the U.S., approximately one out of five American households speaks a language other than English at home, according to the U.S. Census. And, with higher birth rates among Hispanics relative to the rest of the population, that proportion is rapidly growing.

Previous research already indicates that individuals who have formally studied two or more languages as adults more easily acquire a new language than monolinguals. New research even indicates that the onset of Alzheimer's disease in bilinguals is, on average, delayed by four years compared to monolinguals.

The Northwestern researchers chose to study bilinguals who learned a second language at an early age and in a non-classroom study to avoid suggestions that their subjects simply were exceptionally talented or motivated foreign language learners.

For their study in Psychonomic Bulletin and Review, the researchers controlled for age, education, English language vocabulary size and, in the case of bilinguals, second language proficiency. Sixty Northwestern University students in their early twenties -- 20 monolinguals, 20 early English-Mandarin speakers and 20 early English-Spanish speakers – participated.

All participants were tested twice for word mastery in the invented language. The initial test took place immediately after they heard and repeated the invented language words. The second test occurred a week later.

Adapted from materials provided by Northwestern University, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2009/05/090519172157.htm

River Delta Areas Can Provide Clue To Environmental Changes

Sediment plume of the Mississippi River, seen in the above SeaWiFS image, as it empties into the Gulf of Mexico. (Credit: Provided by the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE)

ScienceDaily (May 20, 2009) — Sediments released by many of the world's largest river deltas to the global oceans have been changed drastically in the last 50 years, largely as a result of human activity, says a Texas A&M University researcher who emphasizes that the historical information that can be gathered from sediment cores collected in and around these large deltaic regions is critical for a better understanding of environmental changes in the 21st century.

Thomas Bianchi, a professor in the Department of Oceanography who specializes in estuarine and marine systems, and colleague Mead Allison of the University of Texas have examined sediments from delta areas around the world, most notably the Mississippi in the United States and the (Huanghe) Yellow and Yangtze in China. These sediments contain information that can provide data on past changes in nitrogen application in the drainage basin from agricultural fertilizers, records of past flooding and hurricane events, to name a few, Bianchi says.

Their work is published in the current issue of the *Proceedings of the National Academy of Sciences.*

"These deltaic sediments can serve as a history book of sorts on land-use change in these large drainage basins which is useful for upland and coastal management decisions as related to climate change issues," Bianchi explains.

"Although the information stored in these sediments can be altered during its transport from the upper drainage basin to the coast, we still find very stable tracers, both organic and inorganic, that can be used to document changes induced by natural and human forces."

Such sediments are ever-present, the authors say, noting that 87 percent of the Earth's land surface is connected to the ocean by river systems. They also explain that 61 percent of the world's population lives along a coastal boundary, and that number is expected to climb to 75 percent by 2025.

Much of the sediment from rivers forms into what are called large river delta-front estuaries, or LDEs, and human activity in some of these can be traced back more than 5,000 years ago to some of the first cities in Mesopotamia, along the Nile and in regions of China.

The knowledge learned from these delta areas tell about the history of the region from how the land was used – or not used – through time, the authors say. The world's largest 25 rivers drain about one-half of the Earth's surface and transport 50 percent of the fresh water and 40 percent of particulate materials into the ocean, they confirm.

The Mississippi River, the largest in the U.S., drains about 40 percent of the country's total land mass, plus parts of two Canadian provinces, the authors say, and we can learn critical information from its delta regions.

In the U.S., hypoxic areas – where there is little or no oxygen – can in some cases be linked with deltaic regions that are releasing large amounts of water and nutrients, Bianchi explains. "Low oxygen in aquatic systems is clearly not good for the organisms in those systems, but not all aquatic systems respond in the same way," he notes. "It affects marine life in some areas severely, while other areas seem unchanged. We need to find out why.

"Some LDE areas such as the Mississippi/Atchafalaya River system have had significant increases in the nutrient loading from fertilizers" Bianchi adds. "We know we need to reduce the amount of these nutrients from draining into our rivers, but by how much? In this particular case, the linkages between excessive nutrients, hypoxia and their affects on aquatic life are not well understood.

"It's a big problem that China is facing right now as it attempts to manage severe water shortages, over-grazing and desertification issues for a growing population by manipulating natural water sources from their major rivers through damming and diversions. Over the last 20 years, China has become the world's largest consumer of fertilizers and two of its rivers, the Yellow and the Yangtze, are among the top five in the world in terms of sediment discharge.

"Also, many scientists are expecting global temperatures to rise over the next 50 years due to climate changes, and how will these changes affect precipitation and soil erosion issues? We really don't know now because in many cases, land-use change by growing populations can be very short-term and unpredictable, making modeling very difficult. These deltaic sediments might be able to give us some clues about what is ahead for us."

Their work was funded by NASA, the Department of Energy, the Office of Naval Research and the National Science Foundation.

Journal reference:

1. Thomas S. Bianchi and Mead A. Allison. **Large-river delta-front estuaries as natural 'recorders' of global environmental change**. *Proceedings of the National Academy of Sciences*, May 19, 2009; DOI: 10.1073/pnas.0812878106

Adapted from materials provided by Texas A&M University.

http://www.sciencedaily.com/releases/2009/05/090511180707.htm

Environmental Exposure To Particulates May Damage DNA In As Few As Three Days

Smog and fog over Milan, Italy. New research shows that inhaling certain particulates can actually cause some genes to become reprogrammed in a matter of days. (Credit: iStockphoto)

ScienceDaily (May 18, 2009) — Exposure to particulate matter has been recognized as a contributing factor to lung cancer development for some time, but a new study indicates inhalation of certain particulates can actually cause some genes to become reprogrammed, affecting both the development and the outcome of cancers and other diseases.

The research will be presented on May 17, at the 105th International Conference of the American Thoracic Society in San Diego.

"Recently, changes in gene programming due to a chemical transformation called methylation have been found in the blood and tissues of lung cancer patients," said investigator Andrea Baccarelli, M.D., Ph.D., assistant professor of applied biotechnology at the University of Milan. "We aimed at investigating whether exposure to particulate matter induced changes in DNA methylation in blood from healthy subjects who were exposed to high levels of particulate matter in a foundry facility."

Researchers enrolled 63 healthy subjects who worked in a foundry near Milan, Italy. Blood DNA samples were collected on the morning of the first day of the work week, and again after three days of work. Comparing these samples revealed that significant changes had occurred in four genes associated with tumor suppression.

"The changes were detectable after only three days of exposure to particulate matter, indicating that environmental factors need little time to cause gene reprogramming which is potentially associated with disease outcomes," Dr. Baccarelli said.

"As several of the effects of particulate matter in foundries are similar to those found after exposure to ambient air pollution, our results open new hypotheses about how air pollutants modify human health," he added. "The changes in DNA methylation we observed are reversible and some of them are currently being used as targets of cancer drugs."

Dr. Baccarelli said the study results indicate that early interventions might be designed which would reverse gene programming to normal levels, reducing the health risks of exposure.

"We need to evaluate how the changes in gene reprogramming we observed are related to cancer risk," he said. "Down the road, it will be particularly important not only to show that these changes are associated with increased risk of cancer or other environmentally-induced diseases, but that, if we were able to prevent or revert them, these risks could be eliminated."

Session # A45: "Genetic Basis for Environmental and Occupational Respiratory Diseases." Abstract # 2589: "Effects of Particulate Matter Exposure on p16, p53, APC and RASSF1A Promoter Methylation" Poster Board # C51

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

http://www.sciencedaily.com/releases/2009/05/090517143218.htm

World's Largest Leatherback Turtle Population Found

Leatherback sea turtle. (Credit: NOAA)

ScienceDaily (May 18, 2009) — An international team of scientists has identified a nesting population of leatherback sea turtles in Gabon, West Africa as the world's largest. The research, published in the May issue of *Biological Conservation*, involved country-wide land and aerial surveys that estimated a population of between 15,730 and 41,373 female turtles using the nesting beaches.

The study highlights the importance of conservation work to manage key sites and protected areas in Gabon.

Leatherbacks are of profound conservation concern around the world after populations in the Indo-Pacific crashed by more than 90 percent in the 1980s and 1990s. The International Union for Conservation of Nature (IUCN) lists leatherback turtles as critically endangered globally, but detailed population assessments in much of the Atlantic, especially Africa, are lacking.

The research was led by the University of Exeter working in collaboration with the Wildlife Conservation Society (WCS) which spearheads the Gabon Sea Turtle Partnership, a network of organisations concerned with the protection of marine turtles in Gabon

During three nesting seasons between 2002 and 2007, the team's members carried out the most comprehensive survey of marine turtles ever conducted in Gabon. This involved aerial surveys along Gabon's 600 km (372 mile) coast, using video to capture footage for evaluation, and detailed ground-based monitoring. By covering the entire coastline, they were not only able to estimate the number of nests and nesting females, but also to identify the key sites for leatherback nesting, data which are crucial to developing conservation management plans for the species. Leatherbacks were first described nesting in Gabon in 1984.

Lead author on the paper, Dr Matthew Witt of the University of Exeter, said: "We knew that Gabon was an important nesting site for leatherback turtles but until now had little idea of the size of the population or its global ranking. We are now focusing our efforts on working with local agencies to coordinate conservation efforts to ensure this population is protected against the threats from illegal fisheries, nest poaching, pollution and habitat disturbance, and climate change."

The study also revealed that around 79 percent of the nesting occurs within National Parks and other protected areas. This gives added hope that Gabon can continue to be one of the world's most important countries for these magnificent creatures.

Dr Angela Formia of the Wildlife Conservation Society, a co-author of the paper, said: "These findings show the critical importance of protected areas to maintain populations of sea turtles. Gabon should be commended for creating a network of National Parks in 2002 that have provided a sanctuary for this endangered species as well as other rare wildlife."

This study was carried out by the University of Exeter, Wildlife Conservation Society, University of Florence, IUCN-France, PROTOMAC (Gabon), CNDIO-Gabon, IBONGA-ACPE (Gabon), Agence Nationale des Parcs Nationaux (Gabon), Gabon Environnment, Aventures Sans Frontières (Gabon) and WWF-Gabon.

The study was made possible through funding by the Natural Environment Research Council (UK), the United States Fish and Wildlife Serve (USFWS) Marine Turtle Conservation Fund (U.S Department of the Interior), and the United States Agency for International Development (USAID) – Central African Regional Program for the Environment (CARPE). The team has now also received £300,000 (approx. $450,000 USD) Darwin funding for a three-year project, working with local agencies to improve marine biodiversity management in Gabon.

About leatherback turtles

- The leatherback is the largest sea turtle, reaching up to nearly two metres (6.5 feet) in length and 540kg (1190 pounds) in weight.
- Unlike other sea turtles, the leatherback does not have a hard shell. Its shell is made-up of a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges.
- Leatherbacks are the most widely spread marine turtles, and are found in the Pacific, Indian and Atlantic oceans, particularly in tropical regions.
- Leatherbacks are the deepest diving of all sea turtles. The deepest recorded dive is 1.2 kilometres (3/4 mile), which is slightly more than the deepest known dive of a sperm whale.
- As with other reptiles, the sex of leatherbacks is determined by the temperature of eggs during incubation. With leatherbacks, temperatures above 29 degrees centigrade (84 degrees Fahrenheit) will result in female hatchlings.
- Leatherbacks are strong swimmers and tagged individuals have been known to cross ocean basins and are known to travel many thousands of kilometres in search of their jellyfish prey.

Journal reference:

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

http://www.sciencedaily.com/releases/2009/05/090517212653.htm

Andes Mountains Are Older Than Previously Believed

Sediments that gather at the base of mountains provide important clues about how and when the mountains were formed. (Credit: Carlos Jaramillo, STRI)

ScienceDaily (May 17, 2009) — The geologic faults responsible for the rise of the eastern Andes mountains in Colombia became active 25 million years ago—18 million years before the previously accepted start date for the Andes' rise, according to researchers at the Smithsonian Tropical Research Institute in Panama, the University of Potsdam in Germany and Ecopetrol in Colombia.

"No one had ever dated mountain-building events in the eastern range of the Colombian Andes," said Mauricio Parra, a former doctoral candidate at the University of Potsdam (now a postdoctoral fellow with the University of Texas) and lead author. "This eastern sector of America's backbone turned out to be far more ancient here than in the central Andes, where the eastern ranges probably began to form only about 10 million years ago."

The team integrated new geologic maps that illustrate tectonic thrusting and faulting, information about the origins and movements of sediments and the location and age of plant pollen in the sediments, as well as zircon-fission track analysis to provide an unusually thorough description of basin and range formation.

As mountain ranges rise, rainfall and erosion wash minerals like zircon from rocks of volcanic origin into adjacent basins, where they accumulate to form sedimentary rocks. Zircon contains traces of uranium. As the uranium decays, trails of radiation damage accumulate in the zircon crystals. At high temperatures, fission tracks disappear like the mark of a knife disappears from a soft block of butter. By counting the microscopic fission tracks in zircon minerals, researchers can tell how long ago sediments formed and how deeply they were buried.

Classification of nearly 17,000 pollen grains made it possible to clearly delimit the age of sedimentary layers.

The use of these complementary techniques led the team to postulate that the rapid advance of a sinking wedge of material as part of tectonic events 31 million years ago may have set the stage for the subsequent rise of the range.

"The date that mountain building began is critical to those of us who want to understand the movement of ancient animals and plants across the landscape and to engineers looking for oil and gas," said Carlos Jaramillo, staff scientist from STRI. "We are still trying to put together a big tectonic jigsaw puzzle to figure out how this part of the world formed."

This work was published in the *Geological Society of America Bulletin* in April 2009.

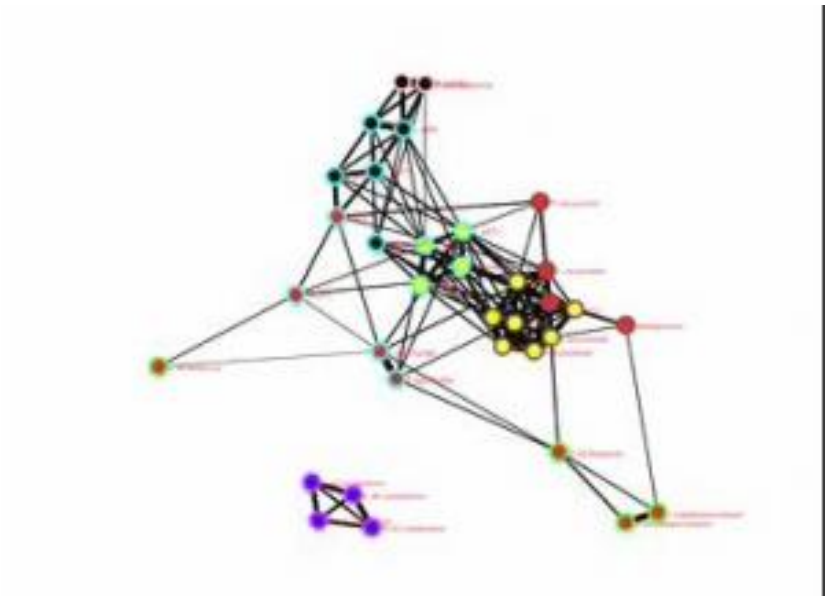
Journal reference:

1. Mauricio Parra, Andrés Mora, Carlos Jaramillo, Manfred R. Strecker, Edward R. Sobel, Luis Quiroz, Milton Rueda, and Vladimir Torres. **Orogenic wedge advance in the northern Andes: Evidence from the Oligocene-Miocene sedimentary record of the Medina Basin, Eastern Cordillera, Colombia**. *Geological Society of America Bulletin*, 2009; 121 (5-6): 780 DOI: 10.1130/B26257.1

Adapted from materials provided by Smithsonian Tropical Research Institute, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090515191558.htm

Brain's Organization Switches As Children Become Adults



The organizational structures in the human brain undergo a major shift during the transition from childhood to adulthood. Brain regions are represented by circles, with the outer color of the circle symbolizing where in the brain each region is physically located while the inner color represents the region's function. (Credit: Image courtesy of Washington University School of Medicine)

ScienceDaily (May 17, 2009) — Any child confronting an outraged parent demanding to know "What were you thinking?" now has a new response: "Scientists have discovered that my brain is organized differently from yours."

But all is not well for errant kids. The same new study also provides parents with a rejoinder: While the overarching organization scheme differs, one of the most important core principals of adult brain organization is present in the brains of children as young as 7.

"Regardless of how tempting it might be to assume otherwise, a normal child's brain is not inherently disorganized or chaotic," says senior author Steven E. Petersen, Ph.D., the James McDonnell Professor of Cognitive Neuroscience at Washington University School of Medicine in St. Louis. "It's differently organized but at least as capable as an adult brain."

Petersen and his colleagues study normal brain organization and development to learn more about how developmental disorders and brain injury can impair mental capabilities. They plan to apply what they learn to develop new treatments for such disorders.

The researchers use resting-state functional connectivity MRI to identify and study brain networks. Instead of recording mental activity when volunteers work on a cognitive task, resting-state connectivity scans the spontaneous activity that takes place in their brains while they do nothing. When this brain activity rises and falls at the same time in different brain regions, researchers conclude that those areas likely work together.

Through such studies, scientists previously revealed four brain networks with varying responsibilities in the adult brain. Two of those networks, for example, appear to be co-captains in charge of most voluntary brain function. The networks typically involve tight links between several brain regions that are physically distant from each other.

In the new study, this is where the organizational contrast arises: Instead of having networks made of brain regions that are distant from each other but functionally linked, most of the tightest connections in a child's brain are between brain regions that are physically close to each other.

The study was led by Damien A. Fair, Ph.D., a former Washington University graduate student now at Oregon Health and Science University, and Alexander L. Cohen, a current Washington University graduate student. They directed analysis of data from 210 subjects ranging from 7 to 31 years old.

"We took a group of the youngest subjects, analyzed their results, then dropped data from the youngest and added data from the next-oldest and redid the analysis until we had worked our way through all subjects," Fair says. "The result was a detailed movie of how the organizational transition from a child's brain to an adult's brain takes place. It clearly shows a switch from localized networks based on physical proximity to long-distance networks centered on functionality."

Researchers also checked children's brains for "small-world" organization, another organizational quality present in adult brains. In less formal contexts, this is sometimes called "Kevin Bacon" organization after the trivia game known as "six degrees of Kevin Bacon." The game highlights how easy it is to connect any actor or actress to Kevin Bacon in six movies or less through links among various co-stars.

"It's the idea of a large network that lets you connect one node with another in a relatively short number of steps via special nodes," Fair says. "Like Kevin Bacon, these special nodes have many connections to other nodes, allowing them to help shorten the amount of steps that have to be taken when connecting nodes."

Scientists already knew that children had many fewer long-distance links among brain regions than adults, but when they looked more closely they found there were enough of these links and nodes with multiple connections to establish small-world organization.

Researchers set the lower limit for study subjects at 7 years of age because the brain is approximately 95 percent of its adult size at this age, but they are currently examining ways to adapt the study to the changing physical geography of younger brains. They have also begun looking at the same phenomena in subjects with brain injuries and developmental disorders.

Funding from the National Institutes of Health, the National Science Foundation, the John Merck Scholars Fund, the Burroughs-Wellcome Fund, the Dana Foundation, the Ogle Family Fund, the Washington University Chancellor's Graduate Fellowship and the UNCF/Merck Graduate and Postgraduate and Science Research Fellowship supported this research.

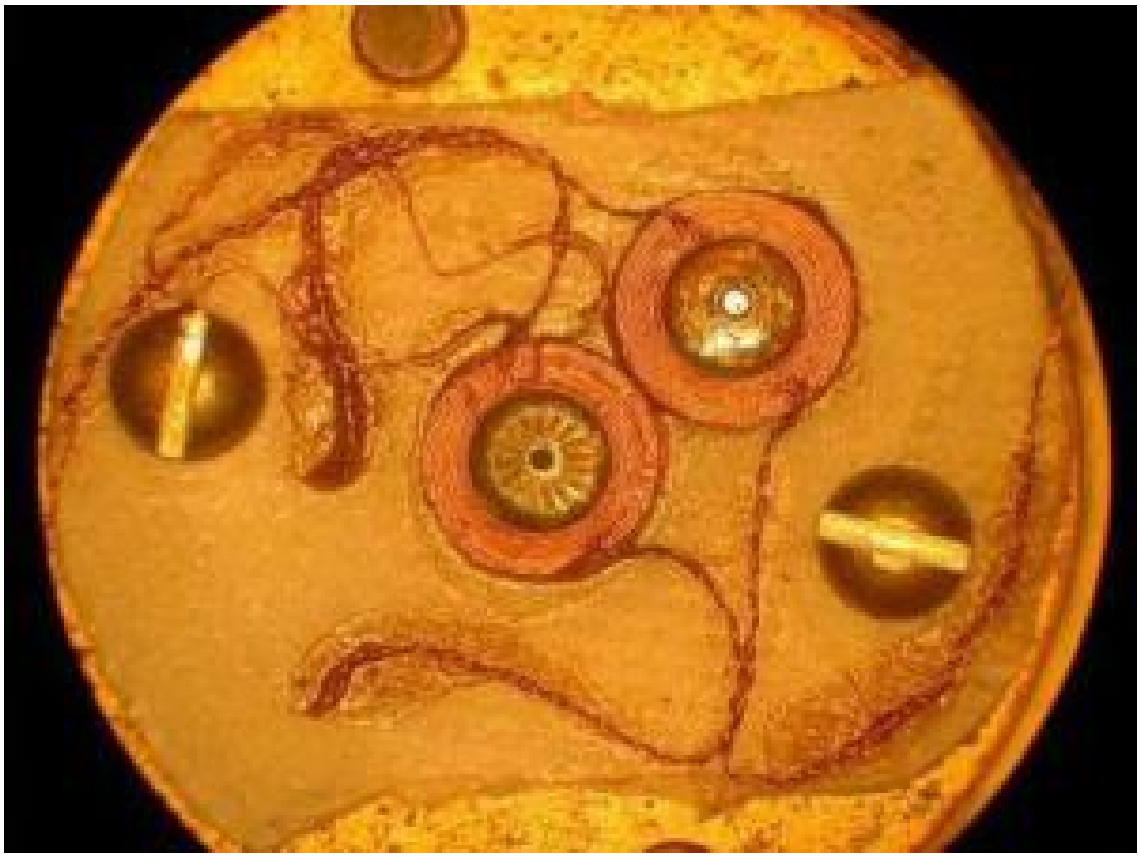
Journal reference:

1. Fair et al. **Functional Brain Networks Develop from a "Local to Distributed" Organization**. *PLoS Computational Biology*, 2009; 5 (5): e1000381 DOI: 10.1371/journal.pcbi.1000381

Adapted from materials provided by Washington University School of Medicine.

http://www.sciencedaily.com/releases/2009/05/090515093228.htm

Europium Found To Be A Superconductor



Inside of the diamond cell: In the middle is the coil system around the diamond anvil, which picks up the shielding signal from the superconducting sample. (Credit: Image courtesy of Washington University in St. Louis)

ScienceDaily (May 17, 2009) — Of the 92 naturally occurring elements, add another to the list of those that are superconductors.James S. Schilling, Ph.D., professor of physics in Arts & Sciences at Washington University in St. Louis, and Mathew Debessai — his doctoral student at the time — discovered that europium becomes superconducting at 1.8 K (-456 °F) and 80 GPa (790,000 atmospheres) of pressure, making it the 53rd known elemental superconductor and the 23rd at high pressure.

Debessai, who receives his doctorate in physics at Washington University's Commencement May 15, 2009, is now a postdoctoral research associate at Washington State University.

"It has been seven years since someone discovered a new elemental superconductor," Schilling said. "It gets harder and harder because there are fewer elements left in the periodic table."

This discovery adds data to help improve scientists' theoretical understanding of superconductivity, which could lead to the design of room-temperature superconductors that could be used for efficient energy transport and storage.

Schilling's research is supported by a four-year $500,000 grant from the National Science Foundation, Division of Materials Research.Europium belongs to a group of elements called the rare earth elements. These elements are magnetic; therefore, they are not superconductors.

"Superconductivity and magnetism hate each other. To get superconductivity, you have to kill the magnetism," Schilling explained.

Of the rare earths, europium is most likely to lose its magnetism under high pressures due to its electronic structure. In an elemental solid almost all rare earths are trivalent, which means that each atom releases three electrons to conduct electricity.

"However, when europium atoms condense to form a solid, only two electrons per atom are released and europium remains magnetic. Applying sufficient pressure squeezes a third electron out and europium metal becomes trivalent. Trivalent europium is nonmagnetic, thus opening the possibility for it to become superconducting under the right conditions," Schilling said.

Schilling uses a diamond anvil cell to generate such high pressures on a sample. A circular metal gasket separates two opposing 0.17-carat diamond anvils with faces (culets) 0.18 mm in diameter. The sample is placed in a small hole in the gasket, flanked by the faces of the diamond anvils.

Pressure is applied to the sample space by inflating a doughnut-like bellow with helium gas. Much like a woman in stilettos exerts more pressure on the ground than an elephant does because the woman's force is spread over a smaller area, a small amount of helium gas pressure (60 atmospheres) creates a large force (1.5 tons) on the tiny sample space, thus generating extremely high pressures on the sample.

Unique electrical, magnetic properties Superconducting materials have unique electrical and magnetic properties. They have no electrical resistance, so current will flow through them forever, and they are diamagnetic, meaning that a magnet held above them will levitate.These properties can be exploited to create powerful magnets for medical imaging, make power lines that transport electricity efficiently or make efficient power generators.

However, there are no known materials that are superconductors at room temperature and pressure. All known superconducting materials have to be cooled to extreme temperatures and/or compressed at high pressure."At ambient pressure, the highest temperature at which a material becomes superconducting is 134 K (-218 °F). This material is complex because it is a mixture of five different elements. We do not understand why it is such a good superconductor," Schilling said.

Scientists do not have enough theoretical understanding to be able to design a combination of elements that will be superconductors at room temperature and pressure. Schilling's result provides more data to help refine current theoretical models of superconductivity."Theoretically, the elemental solids are relatively easy to understand because they only contain one kind of atom," Schilling said. "By applying pressure, however, we can bring the elemental solids into new regimes, where theory has difficulty understanding things."When we understand the element's behavior in these new regimes, we might be able to duplicate it by combining the elements into different compounds that superconduct at higher temperatures."

Schilling will present his findings at the 22nd biennial International Conference on High Pressure Science and Technology in July 2009 in Tokyo, Japan.

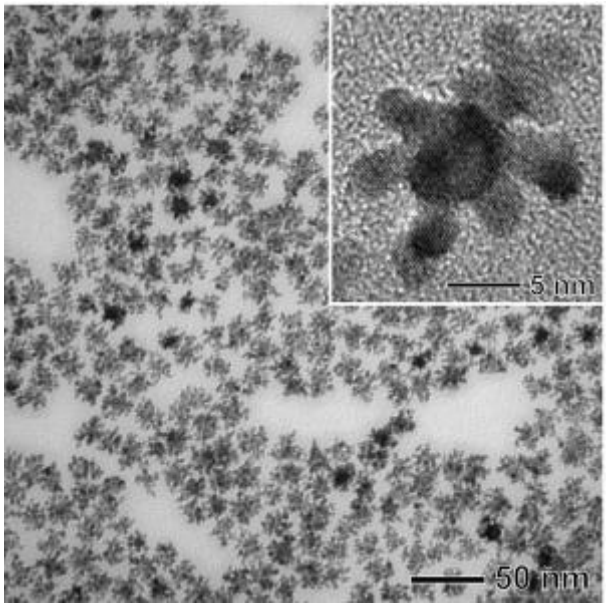
Journal reference:

1. M. Debessai, T. Matsuoka, J. J. Hamlin, and J. S. Schilling. **Pressure-Induced Superconducting State of Europium Metal at Low Temperatures**. *Physical Review Letters*, 2009; 102 (19): 197002 DOI: 10.1103/PhysRevLett.102.197002

Adapted from materials provided by Washington University in St. Louis.

http://www.sciencedaily.com/releases/2009/05/090515191554.htm

New Fuel Cell Catalyst Uses Two Metals: Up To Five Times More Effective



A new catalyst based on dendritic platinum arms grown on palladium nanocrystals has been developed by WUSTL's Younan Xia and his collaborators. Tests have shown that the "bimetallic" catalyst outperforms commercial catalysts, which could enable a cost effective fuel cell technology and ultimately provide cleaner fuels worldwide. (Credit: Younan Xia)

ScienceDaily (May 16, 2009) — Material scientists at Washington University in St. Louis have developed a technique for a bimetallic fuel cell catalyst that is efficient, robust and two to five times more effective than commercial catalysts. The novel technique eventually will enable a cost effective fuel cell technology, which has been waiting in the wings for decades, and should give a boost for cleaner use of fuels worldwide.

Younan Xia, Ph.D., the James M. McKelvey Professor of Biomedical Engineering at Washington University led a team of scientists at Washington University and the Brookhaven National Laboratory in developing a bimetallic catalyst comprised of a palladium core or "seed" that supports dendritic platinum branches, or arms, that are fixed on the nanostructure, consisting of a nine nanometer core and seven nanometer platinum arms. They synthesized the catalysts by sequentially reducing precursor compounds to palladium and platinum with L-ascorbic acid (that is, Vitamin C) in an aqueous solution. The catalysts have a high surface area, invaluable for a number of applications besides in fuel cells, and are robust and stable.

Xia and his team tested how the catalysts performed in the oxygen reduction reaction process in a fuel cell, which determines how large a current will be generated in an electrochemical system similar to the cathode of a fuel cell. They found that their bimetallic nanodendrites, at room temperature, were two-and-a-half times more effective per platinum mass for this process than the state-of-the-art commercial platinum catalyst and five times more active than the other popular commercial catalyst. At 60 C(the typical operation temperature of a fuel cell), the performance almost meets the targets set by the U.S. Department of Energy.

The Department of Energy has estimated for widespread commercial success the "loading" of platinum catalysts in a fuel cell should be reduced by four times in order to slash the costs. The Washington University technique is expected to substantially reduce the loading of platinum, making a more robust catalyst that won't have to be replaced often, and making better use of a very limited and very expensive supply of platinum in the world.

The study was published in *Science* online on May 14.

"There are two ways to make a more effective catalyst," Xia says. "One is to control the size, making it smaller, which gives the catalyst a higher specific surface area on a mass basis. Another is to change the arrangement of atoms on the surface. We did both. You can have a square or hexagonal arrangement for the surface atoms. We chose the hexagonal lattice because people have found that it's twice as good as the square one for the oxygen reduction reaction.

"We're excited by the technique, specifically with the performance of the new catalyst."

Xia says seeded growth has emerged recently as a good technique for precisely controlling the shape and composition of metallic nanostructures prepared in solutions. And it's the only technique that allowed Xia and his collaborators to come up with their unconventional shape.

"When you have something this small, the atoms tend to aggregate and that can reduce the surface area,' Xia says. "A key reason our technique works is the ability to keep the platinum arms fixed. They don't move around. This adds to their stability. We also make sure of the arrangement of atoms on each arm, so we increase the activity."

Xia and his collaborators are exploring the possibility of adding other noble metals such as gold to the bimetallic catalysts, making them trimetallic. Gold has been shown to oxidize carbon monoxide, making for even more robust catalysts that can resist the poisoning by carbon monoxide – a reduction byproduct of some fuels.

"Gold should make the catalysts more stable, durable and robust, giving yet another level of control," Xia says.

Journal reference:

1. Byungkwon Lim, Majiong Jiang, Pedro H. C. Camargo, Eun Chul Cho, Jing Tao, Xianmao Lu, Yimei Zhu, and Younan Xia. **Pd-Pt Bimetallic Nanodendrites with High Activity for Oxygen Reduction**. *Science*, 2009; DOI: 10.1126/science.1170377

Adapted from materials provided by Washington University in St. Louis.

http://www.sciencedaily.com/releases/2009/05/090514153022.htm

Mirror on America

By DAVID BROOKS
THE AMERICAN FUTURE A History

By Simon Schama

Illustrated. 400 pp. Ecco/HarperCollins Publishers. $29.99

Some people collect stamps, and others butterflies, but I have a thing for Brilliant Books. The Brilliant Book is the sort of book written by a big thinker who comes to capture the American spirit while armed only with his own brilliance.

He usually comes during an election year so he can observe the spectacle of the campaign and peer into the nation's exposed soul. He visits the stationsof officially prescribed American exotica. He will enjoya moment of soulful rapture at a black church. He will venture out to an evangelical megachurch (and combine condescension with self-congratulationby bravely announcing to the world that these people are more human than you'd think). He will swing by and be brilliant in rambunctious Texas. He'll be brilliant in the farm belt, brilliant in Las Vegas, reverential in Selma and profound in Malibu.

Along the way, his writing will outstrip his reportage. And as his inability to come up with anything new to say about this country builds, his prose will grow more complex, emotive, gothic, desperate, overheated and nebulous until finally, about two-thirds of the way through, there will be a prose-poem of pure meaninglessness as his brilliance finally breaks loose from the tethers of observation and oozes across the page in a great, gopping goo of pure pretension.

These are the moments we Brilliant Book aficionados live for.

Alexis de Tocqueville introduced the genre and ruined it by actually being brilliant. In the 19th century Brilliant authors came with their superior European sensibilities. In the 1980s, Jean Baudrillard came armed with Theory and set the modern standard by dropping puerile paradoxes from coast to coast: "Americans believe in facts, but not in facticity." Brilliant! "Here in the most conformist society the dimensions are immoral. It is this immorality that makes distance light and the journey infinite, that cleanses the muscles of their tiredness." Brilliant!

Today, Brilliant writers seem to come with camera crews, and they seem to do much of their reporting while the crews set up their visuals. I enjoyed Bernard-Henri Lévy's meditation a few years ago, and now the great historian Simon Schama has entered the field.

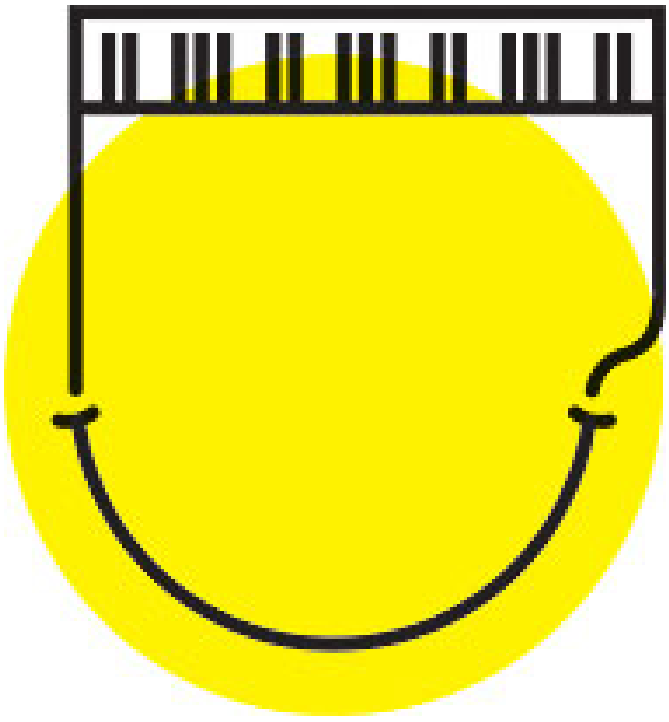
Schama was born in Britain and makes documentaries for the BBC, but he has spent more time in the United States than most Brilliant authors, having taught at Harvard and now Columbia. But this is very much an outsider's book, and if Schama doesn't come from a strictly European perspective, let's just say

he comes from the realm of enlightened High Thinking that exists where The New York Review of Books reaches out and air-kisses The London Review of Books.
His book is called "The American Future: A History" (which is a puerile paradox before you even open the cover), and it has nothing whatsoever to do with the American future.
Schama toured the country in an election year and went to a few rallies — Obama, Clinton. McCain, Romney. He did the megachurch thing, apparently coming away with the impression that the Christian Coalition is still a vibrant organization. He measured the sensibilities of his candidates and found, as you'd expect, that Barack Obama was very much to his liking.
The modern reportage is pretty thin, and as you are reading these passages your main interest is in figuring out how he is going to segue from the present, which is his service to the publishing industry, to the past, where his real talent lies. How is he going to get from, say, John McCain to the 18th-century botanist Billy Bartram? These transitions require great effort and hence arouse great interest.
Once safely in history and liberated from the insufferable demands of the Brilliant Book genre, Schama is of course quite good. His specialty is finding interesting midlevel characters from the buried mounds of history and telling their stories. In the first great chunk of the book, he tells the stories of the Meigses, a fascinating military family that has passed down the twin ideals of service and civilization from generation to generation.
By Schama's account, in the early 18th century "a young Meigs" was rebuffed by the young woman he hoped to marry. He was mounting his horse to ride away when the woman relented and cried out, "Return Jonathan Meigs." He therefore named his first son Return Jonathan Meigs, and before long Return Jonathan became a hero in the Revolutionary War.
Montgomery Meigs, a descendant, became quartermaster general for the Union Army during the Civil War — his "righteous anger translated into cold efficiency," as Schama writes. He and his wife, Louisa, lost a son in the war, and mourned him fiercely.
"He seems to have left his footprints everywhere in this house, traces of his hand in books or work of some kind I encounter every day," Louisa wrote. "He has left such a void, such an aching void in Mont's heart and mine that we must go down to our graves sorrowing. . . . Mont never dwells on this sorrow, he seldom speaks of our dear boy. I know it pains him to do so but he could not find indulgence for his grief as I do but it has entered his inmost soul."
There are many fine characters like that in the book: Jerena Lee, a black woman who traveled the country and delivered 692 sermons in 1835 alone; George White, who managed a choir in the 1870s to raise money for Fisk University; Grace Abbott, who worked with Jane Addams at Hull House in Chicago and published a groundbreaking book on immigration as the United States entered World War I.
These gripping portraits are grouped in broad categories — war, religion, race —but Schama has no argument to promote, just stories to tell and a sensibility to exude. My major complaint with Schama's history is that he reduces everything to pat morality plays, with the forces of enlightened Right Thinking squaring off against the villainous forces of reaction. Pro-immigrant activists are saints, and anti-immigrant restrictionists are villains. Peace-loving Jeffersonians are enlightened, and hawkish Hamiltonians are power-mad.
Surely it is an oversimplification to call Douglas MacArthur "the incarnation of Hamilton." Surely, it's a little simplistic to portray Theodore Roosevelt purely as a bully-boy warmonger and Andrew Jackson as an early Bull Connor. They were both more complicated than that.
But one is prone to forgive Schama these prejudices. If you're making a documentary, then each incident has to be in the form of a "60 Minutes" episode, with good guys and bad guys. It is only natural that his evaluations would reflect the standard sensibilities of his milieu.
Besides, he's a man trapped in the most punishing of literary cages. Jacques Barzun once observed that of all the books it is impossible to write, the most impossible is a book trying to capture the spirit of America (I first read this truth when I was three-quarters of the way through my own attempt). Schama has assigned himself a mission impossible. No one should wish a Brilliant Book upon any other human. And at least we can say that while Simon Schama, the Man of Brilliance, comes away from this book bruised and limping, at least Simon Schama the outstanding historian still survives.
David Brooks is an Op-Ed columnist for The Times.

http://www.nytimes.com/2009/05/24/books/review/Brooks-t.html?_r=1&8bu&emc=bua1

Play It Again. And Again.

By JOE QUEENAN



For the past few years, whenever I've found myself down in the dumps, I have turned to books that contain the word "piano" in the title. Immediately, the dark clouds fade. Whether the book is "The Piano Tuner," "The Pianist," "The Piano Lesson," "The Pianoplayers," any one of three recent novels called "The Piano Teacher" or even just "The Piano," the very fact that I am reading a book that has something to do with the glorious old 88s invariably lifts me out of the engulfing gloom.

Perhaps this is because of the elegance and majesty of the instrument itself, or because the very word "piano" is reassuringly beautiful. Or perhaps it is because I, like so many other baby boomers, have long dreamed of playing the piano but have had to settle for being able to strum a few primitive Neil Young songs on the guitar. Whatever the reason, "piano" is evocative in a way no other word for a musical instrument is. I do not get the same emotional payoff when I read "Come Blow Your Horn," "The Advancing Clarinetist," "Drums Along the Mohawk," "The Tin Drum," "The Cello Player," "The Vanishing Violin," "The Little Drummer Girl," "The Soloist," "Gideon's Trumpet," "Young Man With a Horn" or even "Corelli's Mandolin." The word "piano" itself possesses an ethereal charm that the nomenclature for other musical instruments lacks. Words like "harp," "English horn" and even "viola da gamba" do nothing for me. Literature pertaining to the banjo or the fluegelhorn isn't even in the ballpark. And just forget about books like "Accordion Crimes." The accordion is a crime.

I suppose my enthusiasm for piano-oriented literature started a few years ago, when a friend lent me Thad Carhart's uplifting book "The Piano Shop on the Left Bank." I'd been feeling a bit depressed at the time, and she guaranteed that it would cheer me immensely. Boy, did it ever. The book, whose seductive subtitle is "Discovering a Forgotten Passion in a Paris Atelier," pushes all the right buttons. It is nostalgic for an earlier, more innocent time. It is an attempt to resuscitate the squandered dreams of youth. It is filled with quirky characters. It is set in Paris. What's more, it is set on the Left Bank of Paris, where the ivory-tickling bohemians have always hung out, not on the prim, bourgeois Right Bank of tin-ear bankers and diplomats.

The real capper is that it takes place in an atelier. People of my generation love anything that takes place in anatelier: painting, composing, tuberculosis, suicide. The way we look at it, no matter how bad things get in life, they will always seem better if you can just haul your disintegrating old carcass to an atelier. Especially if the atelier contains a baby grand piano. If the folks behind Williams-Sonoma or

Anthropologie were dreaming up the perfect title for a book designed to appeal to people of my age group, they could not possibly improve on "The Piano Shop on the Left Bank." Well, maybe "The Piano Shoppe on the Left Banke." But this is mere nitpicking.

Never much of a nonfiction reader, I quickly moved on to novels that had some variation of "piano" in the title. These included "The Piano," by Jane Campion (based on her acclaimed film), in which the doomed instrument ends up in Davy Jones's locker; "The Piano Teacher," by the Nobel Prize winner Elfriede Jelinek, a tale of lust, passion and self-laceration in Vienna; and another novel called "The Piano Teacher," written by Janice Y. K. Lee. This is also a tale of lust and passion, though it is set in Hong Kong during the Second World War and, disappointingly, doesn't have a whole lot to do with pianos. Or self-laceration.

The mere fact that a book is about pianos isn't enough to attract my interest; it has to contain some variation on the word "piano" in the title. Thus, novels like "The Page Turner," whatever their literary merits, leave me cold. Generally speaking, I prefer piano-titled books where the instrument itself plays a central role in the story. One of my favorites is Daniel Mason's elegiac novel "The Piano Tuner," a Conradian yarn about a London-based piano tuner in Victorian times who accepts a bizarre request from the British government to travel all the way to Burma and then hack his way upriver through bandit-infested jungles to tune a rare Erard piano for an eccentric diplomat. As was the case in Campion's novel, the superb instrument ultimately washes overboard, a poignant image of civilization on the fritz. Aside from this powerful symbolism — love lies bleeding on the sandbar — what most impressed me about the novel was how much Mason seemed to know about piano tuning in general, and tropical piano repair in particular. The book even contains a section about what to do if you find yourself stuck with an out-of-tune grand piano that somebody has busted up with gunfire. If that's not elegiac, I don't know what is.

Novels with "piano" in the title were not always as common as they are today, nor have they always been as touching as our great contemporary piano-inspired fiction. The first book in this genre that I remember reading was Kurt Vonnegut's "Player Piano," in which the author used the mechanical device as a symbol of a dangerously mechanized society. It was a terrific read, but it was not elegiac. And while Thomas McGuane is my favorite living American male novelist, and while his wonderful second book, "The Bushwhacked Piano,"may be bawdy and picaresque and funny and brilliantly written, it is simply not elegiac. As should be pretty clear from the title.

Not every piano-oriented book has gotten the job done for me."Piano Lessons Can Be Murder" is a goofy children's tale by R. L. Stine. "The Piano Teacher: The True Story of a Psychotic Killer" is the true story of a psychotic killer. (Talk about non-elegiac.) I suspect that by now authors and publishers have caught on to the hypnotic allure of the word "piano" and are starting to overuse it as a marketing device. "The Pianist," the memoir on which the 2002 Roman Polanski film about a musician surviving the Holocaust is based, was originally published under the title "Death of a City." The classic François Truffaut movie "Shoot the Piano Player" is based on a novel by David Goodis called "Down There." But recently I noticed that the book is being sold as "Shoot the Piano Player." Which is, admittedly, a much better title.

Surely, someone will eventually come up with such gimmicky titles as "The Last Piano Repairman on the Left Bank," "American Rubato: An American Piano Teacher's American Journey in America," "From Hell to Parnassus: Dispatches From the Piano-Tuning Trenches" and "Why Pianos Still Matter." I will be in no hurry to buy these books, as I still have "Piano," "The Piano Man's Daughter," "The Odd Boy and His Precious Piano," "Confessions of a Naked Piano Player," "The Piano Player" and a book of poetry called "Competing With the Piano Tuner" lined up. By the time I have finished those, there will surely be 300 more new books with the word "piano" in the title. At this rate, I should easily get through to the end of my life without having to break down and read "The Cellist of Sarajevo," "The Blue Harpsichord" or "The Case of the Orphaned Bassoonists."

Easily.

Joe Queenan's most recent book is the memoir "Closing Time."

http://www.nytimes.com/2009/05/24/books/review/Queenan-t.html?8bu&emc=bub1

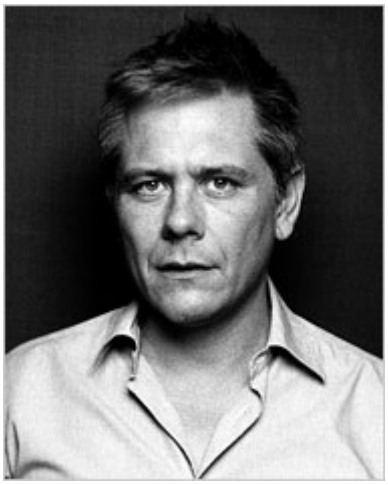
Faking It
By LAURA MILLER

LOST IN THE MERITOCRACY

The Undereducation of an Overachiever

By Walter Kirn

211 pp. Doubleday. $24.95



As tragedies go, not getting what you want is the straightforward kind, and getting it can be the ironic variety. But there is also the existential tragedy of not knowing what you want to begin with. That's the species of catastrophe recounted in Walter Kirn's memoir, "Lost in the Meritocracy: The Undereducation of an Overachiever," the witty, self-castigating story of the author's single-minded quest to succeed at a series of tests and competitions that took him from one of the lowest-ranked high schools in Minnesota to Princeton. As Kirn, a noted critic and novelist, tells it, in childhood he leapt onto a hamster wheel baited with "prizes, plaques, citations, stars," and kept rattling away at it until his junior year in the Ivy League, when he suffered a breakdown that left him nearly speechless.

Kirn cracked up as he began to suspect that he was approaching the end of the line. He didn't especially desire money or power, and even his appetite for renown was quixotic. (He spent one summer bar-backing for a legendary mixologist in Munich, thinking: "This was true fame I was witnessing, true mastery. I should stay and learn from it.") Up to that point, he'd devoted his whole life to "the great generational tournament of aptitude" in which "the ranking itself was the essential prize." Somehow he'd made it through three years of college without seriously considering what he intended to do once he got out.

Like many memoirs, "Lost in the Meritocracy" combines penetrating shrewdness with remarkable blind spots. Take the book's central question: How did anyone as smart as Kirn get into such a fix? The implication of the title is that "meritocracy" itself was to blame. Kirn grew up in the 1960s and '70s, when technocrats were thoroughly systematizing American public education. In his suburban grammar school, subjects like art and music were formed into "units" and "modules," implying that "learning could be engineered, and that it had been, perhaps by government scientists — the same ones behind the Apollo program, maybe." At the same time, the teachers were squishy, easily flattered and willing to coo over any creative daub that seemed to express "feelings." "Art" could be whatever he said it was, Kirn realized, and producing it was the equivalent of such apple-polishing activities as emptying the classroom pencil sharpener. When he concocted bogus stories about the emotions that supposedly inspired his projects, he won "praise, and sometimes hugs, eventually convincing me that art was about one feeling above all others: being loved."

So there you have it: the young Walter Kirn quickly learned that achievement could be precisely quantified, but also that the system for arriving at that quantification could be gamed. “I was the system’s pure product,” he writes, “sly and flexible, not so much educated as wised up.” He figured out how to turn a teacher’s question inside out and parrot it back in a simulation of thoughtfulness. If asked, “How does racial prejudice contribute to inner-city hopelessness?” he’d reply, “Is our conception of ‘inner-city hopelessness’ perhaps in itself a form of prejudice?” A maestro of multiple choice, he managed to ace his SATs despite having cracked only three “serious novels” by the age of 16: “Frankenstein,” “Moby-Dick” and “The Great Gatsby.”

At Princeton, however, he discovered the limits of his facility. He could beguile a professor into thinking he understood such concepts as “liminal” and “valuational,” but his peers unerringly recognized his scholarship-boy status. The heiress girlfriend of one of his freshman roommates offered him some Champagne her father had sent her, then tried to charge him for his portion of the bottle. His roommates replaced their suite’s shabby furniture, then banned Kirn from the common room when he refused to pony up $600 as his share. In no time, the suite became “a concentrated version of what the whole campus would come to represent for me: a private association of the powerful which I’d been invited to visit on a day pass that, I sensed, might be revoked at any time as arbitrarily as it had been issued.”

In one respect, Kirn lucked out: his college years coincided with the ascendancy of “theory” in American academia. Since hardly anybody understood the deconstructionists to begin with, it was that much easier for Kirn to bluff his way through, powered by bravado alone. Better yet, theory was intent on proving the illegitimacy of all those great books he’d never read. “We skipped straight from ignorance to revisionism,” he writes of his cohort, “deconstructing a body of literary knowledge that we’d never constructed in the first place.”

On campus, Kirn cultivated an identity as an avant-gardist. He wrote pretentious plays and poems about “the creeping loss of ‘personhood’ in an era of technological change.” He called his social crowd “the Joy Division” after the postpunk band he pretended to like while secretly thinking that their music sounded “like noise in a coma victim’s brain.” On a trip to Manhattan (to buy drugs with a self-styled Marxist who regarded flushing the toilet as “unpaid labor”), he hung out with a rich girl in an apartment downstairs from Truman Capote’s and overlooking the U.N. Her skin, he marveled, looked like it might have been “harvested, through some blasphemous new process, from the wrists of infants.” His life was a Jay - McInerneyish scenario, which is to say a Gatsbyish scenario, but Kirn was incapable of grasping this because he’d ludicrously misconstrued Fitzgerald’s novel as an “invigorating chronicle of several high-spirited Midwesterners storming through the mansions of the East.”

No one could be harder on the youthful Kirn than he is on himself; he has to be. He has the satirist’s cruel knack for conjuring and dispatching an individual in a single line, like the “computer whiz” described as having “all the characteristics of a bad stutterer without the stutter itself.” You can’t dish that stuff out unless you’re willing to take most of it, at least not without making yourself hateful to your readers. “Lost in the Meritocracy” betrays the roots of this skill in a wobbly notion of the self as a void encased in a posture. But did “the meritocracy” cause Kirn’s chronic hollowness, or was it simply the vehicle at hand, ideally suited to a boy starved for approval? His parents — a restless, titanically self-involved father and a mother who cultivated her inner life in strict solitude — seem a much likelier source for his condition. It was only after Princeton, while holed up with his mother’s little stash of “classics for the masses,” that Kirn finally summoned enough faith to risk losing that fragile self in other people’s books. You lose it, but it always comes back. That’s one of the ways of learning it was there to begin with.

Laura Miller writes for Salon and is the author of “The Magician’s Book: A Skeptic’s Adventures in Narnia.”

http://www.nytimes.com/2009/05/24/books/review/Miller-t.html?8bu&emc=bua2

What War Looks Like

By CHRIS HEDGES

THE PHOTOGRAPHER

Into War-Torn Afghanistan With Doctors Without Borders.

By Emmanuel Guibert, Didier Lefèvre and Frédéric Lemercier.Translated by Alexis Siegel

Illustrated. 267 pp. First Second. Paper, $29.95

It is impossible to know war if you do not stand with the mass of the powerless caught in its maw. All narratives of war told through the lens of the combatants carry with them the seduction of violence. But once you cross to the other side, to stand in fear with the helpless and the weak, you confront the moral depravity of industrial slaughter and the scourge that is war itself. Few books achieve this clarity. “The Photographer” is one.

A strange book, part photojournalism and part graphic memoir, “The Photographer” tells the story of a small mission of mostly French doctors and nurses who traveled into northern Afghanistan by horse and donkey train in 1986, at the height of the Soviet occupation. The book shows the damage done to bodies and souls by shells, bullets and iron fragments, and the frantic struggle to mend the broken.

The narrator and photographer is Didier Lefèvre. His black-and-white photographs — many reprinted directly from his uncropped contact sheets — are interwoven with drawings by Emmanuel Guibert. The small sequential frames of the contact sheets merge seamlessly into the panels of artwork. The book, at 267 pages, is long. But its length is an asset, allowing the story to build in power and momentum as it recounts the arduous trip into mountain villages, the confrontation with the devastation of war, the struggle to save lives and Lefèvre’s foolish and nearly fatal attempt to return to Pakistan ahead of the team.

The three-month mission was led by Dr. Juliette Fournot, who spoke Dari, dressed as a man and commanded the respect of the French and Afghans, including the village chiefs and local warlords. Her

role, and her immersion in the Afghan society where she spent her teenage years, repeatedly shatters easy stereotypes about Afghan and Muslim culture.

Lefèvre (who died of heart failure in 2007) tells his story with a mixture of beguiling innocence and sensitivity. He retreats in tears to a secluded corner after seeing a wounded 10-year-old girl who will never walk again and will die of septic shock six months later. Photographs of the child are juxtaposed with Guibert's drawing of Lefèvre, silhouetted and hunched over in grief.

"In a corner, a woman with a white head scarf is watching over two of her children," one panel reads, "a teenage girl and a baby, both bloodied. The little boy is maybe 2 or 3. He hardly moves but from time to time lets out a little wail of 'Aoh.' "

This panel is followed by a yellow frame with the word "Aoh" in the upper left corner, a black-and-white photo of the wounded child, another frame with the word "Aoh," a picture of anxious relatives huddled outside the door and then a half-page photograph of the bewildered boy and his sister, her face covered with blood as she gazes at her doomed brother.

The book has the feel of a film, attesting to the skill of Guibert and Frédéric Lemercier, the graphic designer. But there is nothing romantic about Afghanistan or the Afghans, who can be at once courageous and generous as well as heartless and menacing. Lefèvre, on the way back, is abandoned by his feckless guides; his horse collapses and eventually dies; and the photographer nearly succumbs in the snowy mountain passes. "I take out one of my cameras. I choose a 20-millimeter lens, a very wide angle, and shoot from the ground," he says — "to let people know where I died." The next page shows his exhausted pack horse amid snowy boulders, followed by a bleak spread of the gloomy mountain pass. Lefèvre is saved by a band of brigands, who shake him down for much of his money but get him out. The physical toll of his trip left him suffering from chronic boils. He lost 14 teeth. But before he died he returned to Afghanistan seven more times in an attempt to tell the stories of those he first met in 1986, whom he could not abandon or forget.

The disparity between what we are told or what we believe about war and war itself is so vast that those who come back, like Lefèvre, are often rendered speechless. What do you say to those who advocate war as an instrument to liberate the women of Afghanistan or bring democracy to Iraq? How do you tell them what war is like? How do you explain that the very proposition of war as an instrument of virtue is absurd? How do you cope with memories of children bleeding to death with bits of iron fragments peppered throughout their small bodies? How do you speak of war without tears?

The book concludes with contact sheets showing Lefèvre walking with his mother on the beach in Blonville with Bienchen, her small dog. A postscript notes that she did not learn the details of her son's travels until the publication of this story, two decades after his first trip.

The power of "The Photographer" is that it bridges this silence. There is no fighting in this book. No great warriors are exalted. The story is about those who live on the fringes of war and care for its human detritus. By the end of the book the image or picture of a weapon is distasteful. And if you can achieve this, you have gone a long way to imparting the truth about warfare.

Chris Hedges, a former war correspondent for The Times, is a senior fellow at the Nation Institute and author of the forthcoming "Empire of Illusion: The End of Literacy and the Triumph of Spectacle."

http://www.nytimes.com/2009/05/24/books/review/Hedges-t.html?8bu&emc=bua2

Imagining the Other

By LIESL SCHILLINGER

RHYMING LIFE AND DEATH

By Amos Oz.

Translated by Nicholas de Lange

117 pp. Houghton Mifflin Harcourt. $23

THE AMOS OZ READER

Selected and edited by Nitza Ben-Dov.

Translated by Nicholas de Lange and others

392 pp. Houghton Mifflin Harcourt. Paper, $15.95

Amos Oz has been obsessed with the land and the state of Israel and the city of Jerusalem — where he was born in 1939 — for all his writing life. Oz once wrote that he loved Jerusalem "as one loves a disdainful woman," but he has often reproved what he loves. A lifelong Zionist, he is also a staunch advocate of a two-state solution to the Israeli-Palestinian conflict, which he has characterized as a clash of "right against right" and, more recently, as "wrong against wrong." His views have made him controversial in Israel, even as his writing (most recently the haunting memoir "A Tale of Love and Darkness," set mostly in the Jerusalem of his boyhood), has made him beloved. "My stories and my articles," he admitted long ago, "have often unleashed a storm of public fury against me."

That said, Oz's views are hard to pigeonhole — and they are not immutable. In 2006, he backed Israel's war with Lebanon, then called for a cease-fire. He also resists literary classification. "I do not believe there is any such thing as a 'kibbutz literature,' " he has argued, although his own impressions of kibbutz life provide indelible evidence of the genre. To maintain this degree of self-definition, Oz has removed himself from Israel's publishing hubs, settling first on a kibbutz and later in the small desert town of Arad. "If I lived in Jerusalem or Tel Aviv," he wrote, a decade into his career, "it is very doubtful whether I would manage to elude the grip of the 'literary world,' in which writers and academics and critics and poets sit around discussing each other."

And yet, in his new book, a slight but evocative novella called "Rhyming Life and Death," beautifully translated by Nicholas de Lange, Oz thrusts his protagonist into the midst of just such a self-conscious scene. Stepping away from the ferment of faith and politics, he invites the reader to saunter through the jaded reflections and sexy daydreams of an unnamed Israeli literary lion, identified simply as the Author, who is bored with his fame and bored with his fans but has traveled to Tel Aviv to promote his latest book.

The story is set in the early 1980s, and the author is in his mid-40s — the age Oz would have been at the time. Why does he bother coming to such events, the Author wonders, as he wearily anticipates the stock questions his audience will ask him. As he ogles a waitress in a cafe and, later, as he scans his audience from the stage, the Author occupies his mind by imagining detailed fictional lives for the onlookers.

The foolish M.C. introduces his guest by citing clichéd lines by an old-fashioned poet, Tsefania Beit-Halachmi, from a volume called "Rhyming Life and Death" ("You'll always find them side by side: / never a groom without a bride"), prompting the Author to further mental sidetracks. "The poems in 'Rhyming Life and Death,' as the Author recalls, were not satirical or mordant, but generally addressed the problems of the day with good-natured if somewhat condescending amusement." How is he different, the Author wonders? "He represented the younger generation, the muscular, suntanned native-born sabras, as outwardly tough but dedicated, morally responsible and wonderfully sensitive on the inside."

Does Oz mean to invidiously compare himself with the Author, using him to illustrate the dangers of succumbing to the temptation to be an Israeli philosophe? Or might he regard his '80s self as a naïve but purist folk writer, not unlike Beit-Halachmi? These are questions the Author would surely resent, but had they been answered they might have been more engaging than these fertile but unsown ruminations.
Fortunately, this novella has been published in conjunction with "The Amos Oz Reader," which brings together excerpts from four decades of Oz's writing, relaying the theme that has haunted him throughout his life. What is this theme? (Apologies to the Author.) It is the understanding of "the other," those upon whom we project emotions and characteristics we think are different from our own — whoever "we" are, whoever "they" are. In Oz's first story collection, "Where the Jackals Howl," published in 1965 and set in the world of the kibbutz, the other could have a familiar face — like the kibbutznik in the title story whose ugliness and lack of fervency made him an outsider in his own community; or the rejected son in the story "The Way of the Wind," from the same collection, a "dark, gentle youth" who joins the paratroopers to impress his hard-line father. Or it could be a kibbutz motormouth spared from ostracism by his gift for truck repair in the novel "A Perfect Peace." But Oz's others can also have more exotic faces.
Born to cultured, educated Zionist immigrants from Eastern Europe who had come to the British mandate of Palestine in the 1930s, Oz grew up as an outsider in a city of others. His parents spoke to each other in Russian and Polish, but to their son only in Hebrew. "I was destined to be a new chapter, a plain, tough Israeli, fair-haired and free from Jewish neuroses and excessive intellectualism," he recalled in the essay "An Autobiographical Note," which appeared in his 1975 collection, "Under This Blazing Light." The new chapter took on a painful onus when the boy's mother, sunk in a deep depression, killed herself when Oz was 12. Two years later, he left Jerusalem, moving to Kibbutz Hulda.
In the 1968 essay "An Alien City," he recalled his boyhood impression of Jerusalem's inhabitants: "A taciturn, sullen race, always seemingly quelling an inner dread. Devout Jews, Ashkenazim in fur hats, and elderly Sephardim in striped robes." More alien still were the Arab inhabitants, separated from the Jewish community by the mandate's borders: "All my childhood years were spent in the proximity of streets that must not be approached, dangerous alleyways, scars of war damage, no man's land, gun slits in the Arab Legion's fortifications, where occasionally a red Arab headdress could be glimpsed." It was not until 1967, immediately following what Israelis call the Six-Day War, that Oz entered those forbidden precincts. "I visited places that years of dreaming had crystallized as symbols in my mind, and found that they were simply places where people lived," he wrote. "My dreams had deceived me, the nightmares were unfounded."
In 2005, Oz traveled to Frankfurt to accept the Goethe Prize, in recognition of his contribution to world literature. He spoke then of how, "even when Goethe was still alive, the spirit of his time was slipping away, becoming the stuff of legend. That is normal; that is the way human life and memory, like human houses and streets, flow and ebb as history moves on." Considering the continuing Israeli-Palestinian struggles, contrasted against the bitter record of World War II, he suggested that "The ultimate evil in the world is not war itself, but aggression." How to fight it? "I believe that imagining the other is a powerful antidote to fanaticism and hatred," he said. "It is, in my view, also a major moral imperative."
This charged speech is the final entry in "The Amos Oz Reader," and yet even the darkest chapters in this collection display the simple "deep and very subtle human pleasure" Oz takes, and has always taken, in his imaginative duties. In defining the myriad faces of the other in Israel, he reveals himself again and again as a vigilant watchman over the land.
Liesl Schillinger is a regular contributor to the Book Review.

http://www.nytimes.com/2009/05/24/books/review/Schillinger-t.html?8bu&emc=bua2

Island in the Stream

By ROBERT SULLIVAN

MANNAHATTA

A Natural History of New York City

By Eric W. Sanderson. Illustrated by Markley Boyer

352 pp. Abrams. $40

Among the many things to love about New York City are those serendipitous moments when you suddenly realize you are standing on the banks of an old stream. For example, if you are in the financial district on Nassau Street looking southwest, you can clearly see the remnant curve of the waterway, the sidewalk hugging its ghost bank at the foot of the Federal Reserve building and what's left of our gold — a stream the Dutch called Maagde Paetje, which is now a street know as Maiden Lane. Once, you had to spend a lot of time in the map room of the New York Public Library to get a clear mental view of what Maagde Paetje might have looked like. Now, you can see it beautifully illustrated at the opening of Eric W. Sanderson's "Mannahatta: A Natural History of New York City," a book detailing the ancestral streams, hills and forests that still haunt the physical space we Gothamites dwell in every day.
"Mannahatta" is more art book than typical natural history tome, and it's all about envisioning: see the salt marsh that is now Delancey Street, the grassy plains of Harlem, the water moving slowly through what is now Times Square to the forests along the banks of the Upper West Side, which may have been untouched even by the Lenape Indians who used to live there. The computer-generated illustrations, by Markley Boyer, are aptly called "visualizations," and are paired with photos of the contemporary real thing: for example, to portray the red-maple swamp postulated to have been where the ESPN Zone stands in Times Square today, Sanderson photographed a red-maple swamp in Orange County, some 40 miles north.
A landscape ecologist at the Wildlife Conservation Society, based at the Bronx Zoo, Sanderson has worked for 10 years on the Mannahatta Project, a continuing effort to reconstruct the ecology of the island of Manhattan at the moment when Henry Hudson showed up, on the afternoon of Sept. 12, 1609.

The larger idea here is that the best way for the city to plan ahead is to look back. "The goal of the Mannahatta Project has never been to return Manhattan to its primeval state," Sanderson writes. "The goal of the project is to discover something new about a place we all know so well, whether we live in New York or see it on television, and, through that discovery, to alter our way of life. New York does not lack for dystopian visions of its future. . . . But what is the vision of the future that works? Might it lie in Mannahatta, the green heart of New York, and with a new start to history, a few hours before Hudson arrived that sunny afternoon 400 years ago?"

"Mannahatta" is a cartographical detective tale in which Sanderson finally manages to align the old maps with modern ones. First, he found the British Headquarters Map, an exquisitely accurate plan of the city made in 1782 or 1783, which he laid upon the modern grid, via computer. Later, he correlated the headquarters map with the farm maps of John Randell Jr., who was hired in 1808 to chart the still largely rural island in advance of the 1811 street grid. (See Randell cut through impenetrable woods, chased by dogs, arrested by the authorities, accosted by a woman throwing vegetables.)

He aligned elevations derived from Randell's calculations with modern readings of the heights of those of Mannahatta's 573 original hills that remain. "Thus began my career as a stander-on-rocks," Sanderson writes. "Along with a number of students, I have spent many a fine afternoon standing on Manhattan's large, glacially scratched outcrops, wherever we could find them, measuring the elevation with a barometric altimeter and their position with a GPS device."

What he ended up with are the hypothesized particulars, heights of hills that are not very high — the one in Bennett Park, in Washington Heights, topped and still tops the island at 268 feet — but are mesmerizing to see here, especially since they are mostly gone, along with Old Wreck Brook, Lispenard's Creek, Unquenchable Spring.

The big news in "Mannahatta" is this: As Times Square is sometimes billed as the Crossroads of the World, so Mannahatta was the Crossroads of Eastern Seaboard Biological Diversity Zones, or what Sanderson terms "ecological communities." It turns out that Mannahatta had 55 of them — more per acre than Yellowstone, and more than in a typical coral reef or the average rain forest of similar size. Sanderson suavely switches city terms with natural terms, a nice touch that reminds the reader we're all creatures, after all.

The last chapter imagines Manhattan in 2409, a solar- and wind-powered city with trash and goods moved through the subway tubes and people transported above ground on bicycles and streetcars. "By 2409," Sanderson writes, "popular demand for sustainability will have reshaped the landscape to support its 12 million people, who will live in a necklace of unique and extraordinary cities on only 36 percent of the land (assuming the same density as modern day Manhattan), surrounded by farms, wildlands, and a restored and thriving estuary, with boundaries redrawn by climate change."

The fact-intense charts, maps and tables offered in abundance here are fascinating, and even kind of sexy. And at the very middle of the book, the two-page spread of Mannahatta in all its primeval glory — the visual denouement of a decade's research — feels a little like a centerfold. Sanderson quotes "The Great Gatsby": "Gradually I became aware of the old island here that flowered once for Dutch sailors' eyes — a fresh, green breast of the new world." Upon closing this remarkable book, you feel revved up, at the very least, and are likely to see a way to build a future that is more aligned with what once was than with what can no longer be.

Robert Sullivan is the author, most recently, of "The Thoreau You Don't Know."

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The Edge of Night

By DAVID ORR

Many poets have been acquainted with the night; some have been intimate with it; and a handful have been so haunted and intoxicated by the darker side of existence that it can be hard to pick them out from the murk that surrounds them. As POEMS 1959-2009 (Farrar, Straus & Giroux, $40) demonstrates, Frederick Seidel has spent the last half-century being that darkest and strangest sort of poet. He is, it's widely agreed, one of poetry's few truly scary characters. This is a reputation of which he's plainly aware and by which he's obviously amused, at least to judge from the nervy title of his 2006 book, "Ooga-Booga." This perception also colors the praise his collections typically receive — to pick one example from many, Calvin Bedient admiringly describes him as "the most frightening American poet ever," which is a bit like calling someone "history's most bloodthirsty clockmaker." What is it about Seidel that bothers and excites everyone so much?

The simplest answer is that he's an exhilarating and unsettling writer who is very good at saying things that can seem rather bad. When a Seidel poem begins, "The most beautiful power in the world has buttocks," it's hard to know whether to applaud or shake your head. But that's not the entire story. There is also the peculiar attraction — and occasional repulsion — of the Seidel persona. Unlike most poets, he's rich, has known a number of famous and semifamous people, and has spent a fair amount of time whizzing around on expensive Italian motorcycles while obsessing over breasts and violence. Yet nobody really knows him. He doesn't do readings, he rarely teaches and it's almost impossible to imagine him showing up at a writers' conference, unless he was looking for someone who might go well with some fava beans and a nice Chianti.

This separation from the poetry world's institutions doesn't seem to have troubled Seidel's career. True, it's probably kept him out of several anthologies, but on the other hand, it's made him an attractive subject for reviewers (who enjoy pointing out the follies of anthologists). Seidel is published by a major house and has enjoyed long, smart, immensely positive write-ups in at least three general-interest magazines — a grim fate for which most poets would happily sacrifice their children and possibly even their cats.

Of course, none of this has much to do with Seidel's actual work, which has only gotten better as he's gotten older, regardless of who or what has been paying attention to him. He began his career in the shadow of Robert Lowell, and that shadow appears to have been nearly pitch black. Certainly there's little original in lines like these, from 1963: "Now the green leaves of Irish Boston fly or wither / Into bloodred Hebrew, Cotton Mather's fall. / When this morning the end-of-it-all / Siren, out of its head, / Turned inside out, hell-red, / Anne, you touched my wrist." By "These Days" (1989), however, Seidel has largely abandoned the mannered Lowellian angst in favor of an approach that, while still technically accomplished, is considerably more ferocious. Here is "That Fall":

The body on the bed is made of china,
Shiny china vagina and pubic hair.

The glassy smoothness of a woman's body!
I stand outside the open door and stare.

I watch the shark glide by . . . it comes and goes —
Must constantly keep moving or it will drown.
The mouth slit in the formless fetal nose
Gives it that empty look — it looks unborn;

It comes into the room up to the bed
Just like a dog. The smell of burning leaves,
Rose bittersweetness rising from the red,
Is what I see. I must be twelve. That fall.

It seems inadequate to call this a poem of adolescent male sexual desire, although that's exactly what it is. In any case, all the signature Seidel elements are present: the jeweler-exact metaphors (the shark has "a formless fetal nose"), the nightmare, Hieronymus Bosch atmosphere in which images and senses blur ("The smell of burning leaves . . . is what I see"), and the deliberate aural clumsiness ("shiny china vagina") coupled uneasily with Swinburnian fluidity ("Rose bittersweetness rising from the red").

This combination of barbarity and grace is one of Seidel's most remarkable technical achievements: he's like a violinist who pauses from bowing expertly through Paganini's Caprice No. 24 to smash his instrument against the wall. Skipping through his poems from "The Cosmos Trilogy" (2003), for instance, one finds the carefully judged quatrain that begins "October" ("It is time to lose your life, / Even if it isn't over. / It is time to say goodbye and try to die. / It is October") within a few dozen pages of the comic and terrible "Venus," which includes possibly the most intentionally awful couplet written by anyone whose last name isn't Geisel or Nash (suffice it to say the end words are "prodigious" and "steatopygous"). When people claim to be "shocked" by Seidel's work, it's not the actual content that disturbs them — if you've seen "28 Weeks Later," you've seen worse — but rather these strange juxtapositions of artful and dreadful. This is probably the reason he reminds some readers of Philip Larkin, with whom he otherwise has little in common. The anger that often motivates Larkin's rapid shifts in diction and tone becomes in Seidel a rage that can destabilize the poem entirely.

If anything, Seidel, born in 1936, has become less mellow as he's aged. A sampling of lines from the new poems gathered here under the title "Evening Man:" "I make her oink" (in reference to sex); "My face had been sliced off / And lay there on the ground like a washcloth"; "And the angel of the Lord came to Mary and said: / You have cancer. / Mary could not think how. / No man had been with her." This is grim stuff, even when meant to be amusing. But what prevents Seidel's work from being simply grotesque or decadent — what makes it, in fact, anything but grotesque or decadent — is his connection to the larger political universe. Adam Kirsch has observed that "among contemporary poets, it is Seidel's social interest that is really unusual." This is exactly right, and the nature of Seidel's social interest makes his work interesting in ways that the work of his closest peer, Sylvia Plath, often is not. Seidel and Plath are our most talented devotees of psychic violence, but whereas Plath co-opts the outside world to make her own obsessions burn hotter ("my skin, / Bright as a Nazi lampshade"), Seidel occupies a more ambiguous territory. He's as likely to be possessed by events as to possess them ("Rank as the odor in urine / Of asparagus from the night before, / This is empire waking drunk, and remembering in the dark"). To be fair, Plath died young; no one knows how her work may have changed. Still, if the Plath we know is Lady Lazarus, the figure Seidel resembles most is the sin-eater, that old, odd and possibly apocryphal participant in folk funerals in Scotland and Wales.

In the late 17th century, the Englishman John Aubrey described sin-eating like so: "When the Corps was brought out of the house, and layd on the Biere, a Loafe of Breade was brought out, and delivered to the Sinne-eater over the Corps . . . in consideration whereof he tooke upon him (ipso facto) all of the Sinnes of the Defunct, and freed him (or her) from walking after they were dead." In Aubrey's telling, the sin-eaters were poor people at society's margin, in particular "a long, leane, ugly, lamentable poor raskal" who lived alone, presumably surrounded by the many sins he had spent a lifetime taking on. Frederick Seidel isn't poor, but it's not hard to imagine him in that cottage at nightfall, looking half longingly, half contemptuously at the lights of the village while preparing for his lonely supper.

http://www.nytimes.com/2009/05/24/books/review/Orr-t.html?8bu&emc=bua2

Fair Usage

By ROY BLOUNT Jr.

ORIGINS OF THE SPECIOUS

Myths and Misconceptions of the English Language

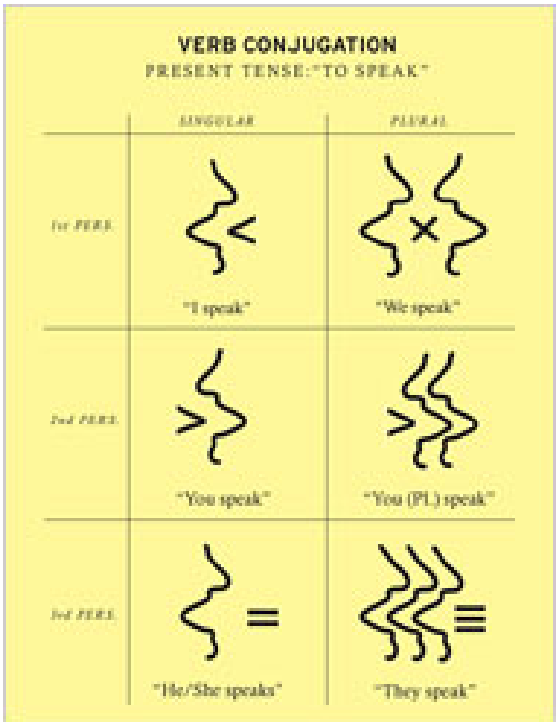
By Patricia T. O'Conner and Stewart Kellerman

266 pp. Random House. $22

IN THE LAND OF INVENTED LANGUAGES

Esperanto Rock Stars, Klingon Poets, Loglan Lovers, and the Mad Dreamers Who Tried to Build a Perfect Language

By Arika Okrent.Illustrated. 342 pp. Spiegel & Grau. $26



If language were set in concrete, there would be no call for new books on how to use it. These days, most such books are at pains not to seem prescriptive. In 1996, Patricia T. O'Conner gave us the admirably entitled "Woe Is I," aptly subtitled "The Grammarphobe's Guide to Better English in Plain English." In this lucid and sensible book she criticized the use of "hopefully" to mean "It is hoped" or "I hope": "Join the crowd and abuse 'hopefully' if you want; I can't stop you. But maybe if enough of us preserve the original meaning it can be saved. One can only hope."

Now, in "Origins of the Specious," she says, "I'm not hopeful about convincing all the fuddy-duddies out there, but here goes: It's hopeless to resist the evolution of 'hopefully.' " So use it, she says. "Hopefully, the critics will come to their senses."

According to how you look at it, O'Conner has turned on her fellow preservationists ("fuddy-duddies," is it?), or she has evolved along with the language. In "Woe Is I," she took a hard line on the difference between "disinterested" and "uninterested." Now she says the one, generally speaking, means the other, because "as we all know, in English the majority rules. All those usage experts will eventually come around. . . . You can take a stand, use 'disinterested' to mean not interested, and risk being thought an illiterate nincompoop by those who don't know any better." You'll note that "those who don't know any better," here, are the "usage experts." That is a bit much, coming from someone who is widely regarded as a usage expert. O'Conner goes on, however, to offer characteristically good advice, which is to finesse the issue (that is, to avoid confusion) by using "impartial" instead of "disinterested" and "not interested" instead of "uninterested."

But enough about her. I say that only because in this new book, O'Conner, a former editor at the Book Review, and her husband, Stewart Kellerman, are co-authors who express themselves corporately as "I." They explain in an authors' note: "Two people wrote this book, but it's been our experience that two people can't talk at the same time — at least not on the page. So we've chosen to write 'Origins of the Specious' in one voice and from Pat's point of view."

"Origins of the Specious" adeptly demolishes plausible but insupportable etymologies of "brassiere" (a garment whose inventor was not named Titzling), "rule of thumb" (nothing to do with wife beating) and other obliquely derived phrases and words. Which is not to say that the couple a k a "I" are beyond reproach.

"I was a philosophy major in college," write Pat and Stewart (if I may be so bold), "so I have no excuse if I mess this up." Well, she/they does/do. The issue is "begs the question." The authors deftly lay out this expression's history and its traditional, logical definition: "taking for granted what you're trying to

prove." But they go on to say, "English speakers have treated 'beg the question' illogically for more than a century and a half," which is no doubt true enough — but the authors' example, from Henry Adams, is quite consistent with the traditional meaning. The expression has been used, they write, "to mean avoiding, raising or dismissing a question, as well as prompting a different one." They thereby miss a chance to frame the contemporary usage issue more distinctly. Currently, "begging the question" almost always means, O.K., "prompting a different" question — but prompting with an urgency derived less from cogency than from the word "beg." Chicagotribune.com recently carried a far-fetched controversy over the decision of another newspaper's magazine section to run a cover photograph of an interracial couple kissing. "It's as if the couple is begging for attention," one posting contended about public displays of interracial affection. "Which begs the question of how real their affections were." The traditional usage of "beg the question" was analytic, probative. The current one lends itself to special pleading.

English, we are reminded in "Origins of the Specious," is not "as logical as, say, Fortran or Cobol, or even Esperanto." Segue to Arika Okrent's fascinating "In the Land of Invented Languages."

Shouldn't language be rational, foolproof, universal? Many people, in the passionate belief that it should be, have concocted alternative, ideal-in-principle tongues. Okrent lists 500 manufactured languages, dating back to Lingua Ignota (around A.D. 1150) and including Universalis Nyelvnek (1820), Ixessoire (1879), Ro (1908) and Prjotrunn (2006). Of the 500, the two spoken by the most people today are Esperanto and Klingon. (Modern Hebrew isn't exactly invented; it revives and expands an existing liturgical and literary language that had functioned as a marketplace lingua franca.) Okrent, though no Trekkie, has gone so far as to make herself vocally proficient in Klingon, which was developed, and is still overseen, by the linguist Marc Okrand for the extraterrestrial world of "Star Trek."

The author — who, according to the jacket copy, has "a joint Ph.D. in the department of linguistics and the department of psychology's Cognition and Cognitive Neuroscience Program at the University of Chicago" — examines a variety of would-be languages and related philosophical tenets (there are no pure ideas, all signs depend on conventions) in a rigorously linguistical way. And yet her book is a pleasure to read. It shows how language systems connect, or don't connect, with people.

The most interesting character she turns up is Karl Kasiel Blitz, who changed his name, for connotative reasons, to Charles Bliss and set out to invent "a better, simpler system of pictorial symbols, 'a logical writing for an illogical world.' " In the 1940s he created Blissymbolics, which failed to transform human understanding but did prove a godsend — as a gateway to English — for children so impaired by cerebral palsy that they couldn't speak.

Over Bliss's symbols hovered Bliss himself. Of his desire to realize substantial income from his decades of work, Okrent is rather less understanding than she might be. But she makes it clear that Bliss, personally, was no bargain. He was ecstatic when a rehabilitation center in Toronto recognized Blissymbolics' therapeutic usefulness — indeed, he offered its speech therapist his hand in marriage. But when the center applied his language too loosely, by his standards, he flew into tirades.

"The more successful the program became, the more Bliss complained. . . . He was outraged that in one of their textbooks, they showed his symbol for vegetable . . . next to a picture of various vegetables, including tomatoes. They had totally misunderstood his system! This was the symbol for things you eat (mouth symbol) that grow underground! Tomatoes don't grow underground!"

To catch on, Okrent concludes, a language must be useful to some particular culture. A popular presentation at the 2007 Language Creation Conference, she reports, was given by a librarian whose "language, Dritok, was born when he began to wonder if it was possible to make a language out of chipmunk noises. . . . The examples he gave sent waves of glee through the audience — they sounded so strange, so inhuman, but there was a detectable structure or system that gave Dritok a scent of 'languageness.' He had also worked out aspects of a cultural context. . . . Dritok is the language of the Drushek, long-tailed beings with large ears and no vocal cords."

Speakers of Esperanto are brought together by visions of world harmony. Speakers of Klingon have in common that they "are enjoying themselves. They are doing language for language's sake, art for art's sake. And like all committed artists, they will do their thing, critics be damned." Klingon's grammatical rules are flexible. "The language is just messy enough to be credible."

Roy Blount Jr.'s most recent book is "Alphabet Juice."

http://www.nytimes.com/2009/05/24/books/review/Blount-t.html?8bu&emc=bua2

Vows

By MAGGIE SCARF
WEDLOCK

The True Story of the Disastrous Marriage and Remarkable Divorce of Mary Eleanor Bowes, Countess of Strathmore

By Wendy Moore 386 pp. Crown Publishers. $25.95

"There was a woman who was beautiful, who started with all the advantages, yet she had no luck," D. H. Lawrence wrote in "The Rocking-Horse Winner." "She married for love, and the love turned to dust." This was certainly true of Mary Eleanor Bowes, the subject of Wendy Moore's fast-paced, horrifying book, "Wedlock." The bright, engagingly pretty sole heiress to one of the great fortunes of Georgian England, Bowes was also naïve, with a romantic, nearly fatal, soft spot for Celtic men.

Married at age 18 in 1767 to a taciturn Scotsman, John Lyon, ninth Earl of Strathmore, Bowes was the widowed mother of five children by the age of 27. In 18th-century Britain, a married woman could not own property, so Bowes's extensive holdings reverted to her husband. After his death, however, the countess found herself both wealthy and independent.

Bowes's chilly marriage had left her with a craving for affection, and even before she knew of her husband's death — the earl died at sea, on his way to sunny Portugal — she had taken a lover, George Gray, an entrepreneur who had amassed a fortune by dubious methods while employed by the East India Company. She was two months pregnant by Gray, and engaged to marry him, when she became acquainted with a charming, handsome Irish rogue named Andrew Robinson Stoney, who managed to seduce her. Stoney wove a spider's web of "incidents" that would entrap Bowes, the capstone of which was a sham duel, fought to defend her honor, in which he was said to have been fatally wounded. Naturally the countess granted Stoney's last wish, which was to marry him on his deathbed. And equally naturally he recovered with amazing rapidity. As the husband of the Countess of Strathmore, he now assumed the last name of Bowes — and a considerable share of her riches.

Within days, an ugly side of the sweet-talking Irishman's temperament emerged. He was prone to violent rages, particularly when he learned of a prenuptial document his wife had secretly signed, meant to protect her estate and yearly income. Soon the furious Stoney began setting rigid curbs on Bowes's every movement. An avid botanist, she was prohibited from visiting her gardens and greenhouses unless accompanied by her husband. Starved of both food and money, she became gaunt and shabbily dressed. A maid who brought Bowes a piece of chicken without her husband's permission was immediately dismissed.

A heavy drinker, an out-of-control wife-batterer and a flagrant adulterer, Stoney reigned supreme over his tormented spouse. He also tried to make Bowes sound stupid or deranged. "On occasions," Moore writes, "he would warn her to reply yes or no to any question, at other times only to say that the weather was hot or cold, and sometimes to refuse to speak at all." If she deviated from this behavior, her mate would frown threateningly and give her a pinch or a sly kick, "out of sight of his guests." Eventually, Bowes came to fear for her very life.

With the connivance of compassionate servants, she managed to flee her prison-like household and seek an ecclesiastical "separation from bed and board," citing a litany of outrages. The prenuptial agreement, which Stoney had sought in vain to find and destroy, became crucial to Bowes's divorce case.

As Moore makes clear, this was far more than one of Georgian England's greatest scandals. The long legal proceedings (which inspired Thackeray's novel "The Luck of Barry Lyndon") would eventually help to alter British marital law, then based firmly on a husband's unquestioned dominance. The case also serves as a provocative footnote to the country's modern-day aristocratic travails: the unhappy countess's third son, Thomas, the 11th Earl of Strathmore, was the great-great-grandfather of Elizabeth Bowes Lyon, mother of England's current queen.

Maggie Scarf's most recent books are "September Songs: The Good News About Marriage in the Later Years" and "Intimate Partners: Patterns in Love and Marriage."

http://www.nytimes.com/2009/05/24/books/review/Scarf-t.html?8bu&emc=bua2

Benefits of creative classrooms

By Mike Baker

Ten years ago this month a 243-page report on the importance of promoting creativity and culture in schools landed on ministers' desks.

It had been commissioned in the heady early days of the Blair government to recommend ways to make progress in the "creative and cultural development of young people" both in and out of school.

The review was led by Sir Ken Robinson and included leading scientists, business leaders, and key figures from the arts world.

It was widely acclaimed.

It argued that creativity was a skill that could be taught.

It was not about progressive teaching or loose discipline. Nor was it in any way an alternative to the essential skills of numeracy and literacy.

Rather it was about encouraging pupils to be innovative and to develop the ability to problem-solve in all areas of the curriculum, from maths to technology.

It argued that such skills were essential to individuals, employers and the whole economy.

Tough

But what has happened since?

There has certainly been cultural activity in schools but even the strongest champions of creative and cultural education would have to admit that the report - called All Our Futures - has not dominated schools policy.

That's because it came out just at a time when the new Labour government was investing its energy in boosting standards in the "three Rs".

Determined to show it was tough in standards, Labour's drive was focused on the Numeracy and Literacy Hours.

" **The accountability criteria that determine success or failure for schools and teachers are overwhelmingly based on formal tests, particularly covering English and maths, not on indicators that reflect pupils' creativity** "
Mike Baker

Ask a primary school pupil in England what numeracy or literacy is and they will have no hesitation in describing what they do in class for an hour each day.

But creativity? Even if All Our Futures had suggested a "creativity hour" it would probably have been seen as a distraction from the key message on standards.

Of course, it did not recommend anything as gimmicky, since the whole tenor of the report was that creativity and culture are not some sort of bolt-on activities, but are skills that should be developed throughout all aspects of teaching and learning, in science as much as in the arts.

In some ways the report was ahead of its time.

It called for a reduction in the burden of assessment and said the national curriculum should be reduced to take up no more than 80% of the timetable.

The latter recommendation probably now seems too modest, an indication of how far the call for greater freedom for schools has been reflected in subsequent reforms of the curriculum.

Results 'boost'

But any satisfaction the authors of All Our Futures may draw from subsequent events must, surely, be tempered by recognition that there is still a long way to go before creativity is seen as fundamental to teaching and learning in schools.

The current fierce debate about the national tests, or Sats, at age 11 hinges on whether they contribute to a narrowing of the curriculum, with many teachers and schools feeling they dominate the final years of primary school.

Indeed, the accountability criteria that determine success or failure for schools and teachers are overwhelmingly based on formal tests, particularly covering English and maths, not on indicators that reflect pupils' creativity.

So you could not blame head teachers if they felt it was more important to secure their school against league table failure - or the triggering of an Ofsted inspection - than to promote creativity.

However, a report published this week by the new charity Creativity, Culture and Education (CCE) highlights research suggesting that a focus on creativity in schools need not be at the expense of achievement in the basics.

Indeed, it claims the very opposite: that creativity boost exam results and attendance.

The report looks at the record of a programme called Creative Partnerships.

This programme - which fosters collaborative partnerships between schools and creative professionals including artists, performers, architects and scientists - has now engaged almost one million school students and 90,000 teachers.

According to research from the independent National Foundation for Educational Research, which covered 13,000 young people, pupils who have taken part in Creative Partnerships' programmes have often outperformed others who have not been involved.

The NFER research found many of the differences were relatively small but it did conclude that "The results of this study suggest that Creative Partnerships is contributing to improved levels of attainment."

In particular, it found that "Young people who have attended Creative Partnerships activities made, on average, the equivalent of 2.5 grades better progress in GCSE than similar young people in other schools."

While the NFER is at pains to point out that from the evidence so far the gains are small, this is clearly an encouraging sign for those who argue that creative and cultural education is not just some sort of woolly feel-good effect.

Report cards

Perhaps more important, though, is the NFER evidence which suggests Creative Partnerships programmes have been associated with an "educationally significant reduction in absence rates in primary schools".

Ofsted has also monitored Creative Partnership programmes.

It found "improvements in literacy, particularly writing, and speaking were significant in the majority of schools visited".

Educational research is rarely definitive as there are always so many other variables involved in pupil attainment.

But the evidence so far seems to back the view that putting a real emphasis on creative and cultural education in schools has broad benefits.

However, getting all schools to take this route will continue to be difficult when the accountability measures that determine the success or failure of schools continue to emphasise short-term improvements in formal qualifications.

Perhaps the government's proposed new School Report Cards can find a way of indicating whether a school is successfully promoting creative and cultural education?

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8064306.stm

Published: 2009/05/23 02:23:37 GMT

Yosemite's giant trees disappear

Matt Walker
Editor, Earth News

The oldest and largest trees within California's world famous Yosemite National Park are disappearing.

Climate change appears to be a major cause of the loss.

The revelation comes from an analysis of data collected over 60 years by forest ecologists.

They say one worrying aspect of the decline is that it is happening within one of most protected forests within the US, suggesting that even more large trees may be dying off elsewhere.

James Lutz and Jerry Franklin of the University of Washington, Seattle, US and Jan van Wagtendonk of the Yosemite Field Station of the US Geological Survey, based in El Portal, California collated data on tree growth within the park gathered from the 1930s onwards.

Their key finding is that the density of large diameter trees has fallen by 24% between the 1930s and 1990s, within all types of forest.

"These large, old trees have lived centuries and experienced many dry and wet periods," says Lutz. "So it is quite a surprise that recent conditions are such that these long-term survivors have been affected."

Large trees are not only older, but they play a distinct and important role within forest ecosystems.

Their canopies help moderate the local forest environment while their understory creates a unique habitat for other plants and animals.

Older, larger trees also tend to seed the surrounding area and crucially are able to withstand fires, short term climatic changes and outbreaks of insect pests that can kill or weaken smaller trees.

But the study by Lutz's team suggests they are no longer faring well.

In a study published in Forest Ecology and Management, the researchers collated all the data that existed on tree growth with the Yosemite National Park. In particular, this included two comprehensive surveys: one conducted in the mid 1930s and another during the 1990s.

"Few studies like this exist elsewhere in the world because of a lack of good measurements from the early 20th Century," says Lutz.

Including 21 species of tree recorded by both surveys, the density of large diameter trees fell from 45 trees per hectare to 34 trees, a decline of 24% in just over 60 years. White Firs (*Abies concolor*), Lodgepole Pines (*Pinus contorta*) and Jeffrey Pines (*Pinus jeffreyi*) were affected the most. Smaller size trees were unaffected.

"One of the most shocking aspects of these findings is that they apply to Yosemite National Park," says Lutz. "Yosemite is one of the most protected places in the US. If the declines are occurring here, the situation is unlikely to be better in less protected forests."

The cause is difficult to pin down, but "we certainly think that climate is an important driver," says Lutz.

Higher temperatures decrease the amount of water available to the trees. The suppression of natural wildfires in the park also allows younger trees and shrubs to grow, increasing the competition for the water that is around.

"The decline in large-diameter trees could accelerate as climate in California becomes warmer by mid-century," the researchers warn in the conclusions to their study.

The impact of that is unclear.

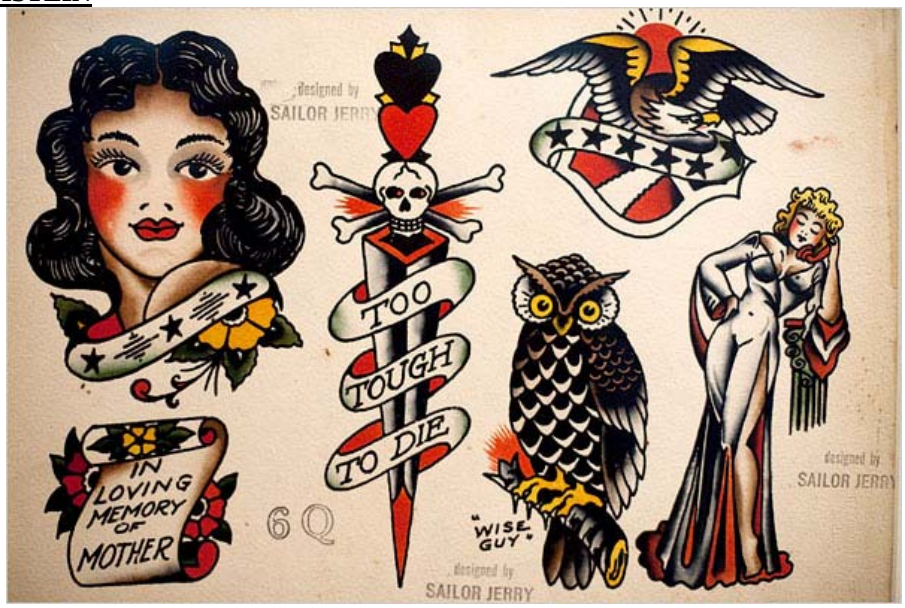
"We know that large trees disproportionately affect the ecosystem," says Lutz. "But what the consequences could be of a decline in average large tree diameter, no-one really knows."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8063000/8063392.stm

Published: 2009/05/22 15:25:27 GMT

'SKIN & BONES'
Seafarers' Memoirs, Written on Skin

By EDWARD ROTHSTEIN



PHILADELPHIA — Cain was branded on his forehead. The town of Bethlehem was once renowned for its tattoos, applied by pilgrims as if to commemorate Jesus' stigmata. During the Renaissance, tattoos of astrological signs were thought to confer cosmological powers.

So it is hardly the case, as many histories have it, that tattooing entered the Western world in the 1770s, when Captain Cook and the crew of the Endeavour came upon the elaborately inscribed flesh of Pacific Islanders, who called their markings tatau. But that is certainly when tattoos entered wider circulation, carried by currents of trade and conquest, from port to port.

It is also where the traditional shame or shamanism of the tattoo began to change into something else — something we still live with. The tattoo has now mutated into a form of popular fashion, the mark of the outlaw and outcast becoming an inscription of pride, a declaration of allegiance or a proclamation of daring.

If you want to understand something about this transformation and the culture that has grown around it — its folk history and its heroes, its origins and its significance — pay a visit to the Independence Seaport Museum here, where the curator Craig Bruns has put together a revealing exhibition about how sailors became the carriers and creators of tattoo culture: "Skin & Bones: Tattoos in the Life of the American Sailor."

It is a measure of the reach of this modestly sized show that objects come not just from the museum's own collection (scrimshaw or clothing demonstrating the iconography that became part of sailors' tattoo repertory), but also from the archives of the Kinsey Institute in Bloomington, Ind. (a photo of a sailor sitting in a tattoo parlor papered with images, getting another added to his densely decorated torso). There is even material from the Whitney Museum of American Art (a drawing by the much-tattooed artist Horace Clifford Westermann, who served as a Marine during World War II).

Last week, in conjunction with the exhibition, a documentary about a tattooist, "Hori Smoku Sailor Jerry," was shown, introduced by its director, Erich Weiss. Its subject, Norman Collins, known as Sailor Jerry, who died in 1973, is recalled in the film by his equally crusty colleagues. They testified to his merging of Japanese and American imagery in tattoos, a heritage that seemed to reveal its continuing influence on the arms or necks of young audience members. So mainstream has tattooing become that the screening was also being used to promote a "Sailor Jerry" spiced rum, along with a clothing line meant to compete with another brand trademarked by a rival tattooist.

So the exhibition is not stepping into calm seas but into vaulting, thrusting waves. On the day I visited, it was also clear from the decorative inscriptions on fellow visitors that the show hardly needs to proselytize for its subject. But the innocent among us still put their hands on a display table, selected a design from a series of buttons and, accompanied by audio of the whine of a needle and the recorded banter of a stage-set tattooist, watched as a tattoo, etched in light, took impermanent shape on virginal flesh.

The show doesn't shun such sensation, and some of the photographs and books of "flash" — recipes of images — offer plenty, but it is also careful and sober as it traces the history. It knows not to put too much weight on the Cook link or, indeed, on any single lineage, citing Darwin's comment: "Not one great country can be named, from the polar regions in the north to New Zealand in the south, in which the aborigines do not tattoo themselves."

But it shows that in the one great landless country of seafarers, the association went far deeper than it might seem. In the late 18th century, the show points out, tattoos would have served as a way of identifying bodies in cases of drowning; they were marks of association and identity that could not be eradicated by pirates, shipwrecks or enemy capture.

Early tattoos of American sailors are known mainly through description. But the exhibition shows how much can be pieced together about the nation's seamen by examining archival records. Each had a "Sailor Protection Certificate" that was carried as a form of identification that detailed the tattoos on its bearer's body; these descriptions often remain the sole remnants of individuality in these once-anonymous figures. Aaron Fullerton (born in 1778), for example, "has a ship on his right hand and on his left hand" along with his birth year etched in tattoos made by gunpowder.

Black sailors, like James Forten Dunbar (1799-1870), found a form of equality at sea that was unavailable on land; he had a tattoo on one forearm of his family, who had died before he joined the Navy, and, on the other, a mermaid.

We learn too how this tradition grew alongside other ship crafts: the carvings in bone, the weaving of fine string and rope, all displaying the literacy of meticulous workmanship. And there are tattoo tools here, whose purpose is best left to the imagination, sharp sailmaker's needles that would be used with urine and gunpowder to mark indelible images under the skin.

Sailors' tattoos also had magical associations. The exhibition's poster shows two feet, one inscribed with a rooster, the other with a pig — animals that were thought to ward off the threat of drowning, perhaps because, packed in wooden crates, such creatures often survived shipwrecks, floating landward. Sailors also often served in the Navy. Was it from this that the custom took hold for their fellow fighters, even among the landlocked, to share the same tattooed image, along with a battle?

We see, too, how these images spread via the traveling tool boxes of itinerant tattooists, who set up shop in the major harbors. (The show even traces the lineage of one particular tattoo parlor on the Bowery in Manhattan.) The red star trademark of Macy's department store, we learn, might well have evolved from the tattoo that the store's founder, Rowland Macy, had on his arm when he sailed on a whaling ship.

The exhibition is so successful that by the end it leaves you more curious rather than less, as you begin to understand a small part of this subculture's customs and heritage. Sailors were not, of course, the only conduit for the culture of tattooing. They were marginal figures once on land, and in this may have shared something with carnival workers, who also pulled into "ports" and went on their way. Many of them treated tattooing as a form of daredevil self-imagining, covering their bodies with fantastical imagery.

And any attempt to describe the contemporary preoccupation with tattoos would require yet another show, drawing on an ever-growing scholarly enterprise. (Are there courses yet in tattoo studies?) One anthropologist, Susan Benson, has pointed out that in the West, tattoos have been associated with worlds that restrict the body: on ships or in prisons.

Yet tattoos stand against constriction: their images are typically defiant, showing dragons and other fierce creatures or promising untamed sexuality. But they are also declarations, more than skin deep, soliciting the like-minded for an alliance. Tattoos proclaim a refusal to belong, but also a desire to belong. They announce with now public labels the bearers' once private passions, proudly combining sentimental rebelliousness with a sharp appeal.

"Skin & Bones: Tattoos in the Life of the American Sailor" continues through Jan. 3, 2010, at the Independence Seaport Museum, Penn's Landing, 211 South Columbus Boulevard and Walnut Street, Philadelphia; (215) 413-8655.

http://www.nytimes.com/2009/05/23/arts/design/23tatt.html?th&emc=th

'Made in U.S.A.' Shines After Makeover

By HOLLAND COTTER

When the Metropolitan Museum set up its first sculpture department in 1886, it threw in anything and everything that wasn't framed, stitched or printed: "all the sculptures, pottery, porcelain, glassware, jewelry, engraved gems, bronzes, inscriptions, and other such objects of art, commonly termed Bric-a-Brac."

No doubt to some eyes the museum's newly reopened American galleries look like Bric-a-Brac City. Twenty generously appointed period rooms, 12 of them seriously spiffed up, along with the glass-enclosed Charles Engelhard Court flooded with Central Park light, hold the full range of items specified in that early Met inventory and much, much more.

And all look good, especially the court. When it made its debut in 1980, it had a sunken floor and large beds of plantings. The floor has now been raised and paved with light-colored stone and the plantings reduced to clear a wide-open space. What was once a kind of oversize conversation pit with a cafe to the side is now a full-fledged sculpture garden, with a lot more sculpture and a lot less garden. (The cafe is still there.)

This is not to say that all has changed. Familiar architecturally scaled pieces have stayed more or less where they were. The two-story limestone facade of Martin E. Thompson's Branch Bank of the United States, built in 1822 on Wall Street, still forms a main entrance to the American galleries. The pillared loggia designed by Louis Comfort Tiffany for his home, Laurelton Hall, in Oyster Bay on Long Island, continues to face the bank from across the court.

The spectacular pulpit and choir rail carved by Karl Bitter in 1900 for All Angels Church in Manhattan has migrated from the west side of the court to the east. Near it is the marble, oak and mosaic fireplace cooked up Augustus Saint-Gaudens for the Cornelius Vanderbilt II mansion on Fifth Avenue at 57th Street. The house, which took up an entire block, is gone. The fireplace, with its two chiton-clad caryatids named "Peace" and "Love," hasn't budged since it was installed at the Met in 1980.

Yet another Saint-Gaudens divinity, his gilt bronze "Diana," holds her place at the court's very center. Lithe and poised on tiptoe, she was commissioned as a weathervane for the tower of the old Madison Square Garden. There, at the highest point on the skyline, she was the single most visible sculpture in the city and caused a public kerfuffle. There she was for the world to see, and she wasn't wearing a stitch.

In the Engelhard Court she is the pivot-point for almost three dozen other sculptures, most from the 19th century, far more than were in the space before. And this prompts the question: Is more better? After all, American sculpture is pretty strange stuff.

The oldest pieces here date from just after 1850. Neoclassicism was the high style; moralizing sentimentality the correct emotion; piety, patriotism, airbrushed sex and melodrama, together or separate, the desired content. With this mix the ideal and the real were in constant conflict, which is the basic story of earlyish American art, and we find that story coming at us wherever we turn.

The sculptor William Wetmore Story, who moved to Rome to soak up Classical vibes, specialized in synthesizing myth and history. His "Libyan Sybil" (1860) was inspired by a Michelangelo, updated with an abolitionist message, and infused with contemporary racism. "Full-lipped, long-eyed, low-browed" is how Story describes the "African" features he was after for his brooding figure. The stereotyping wasn't just his; it was engrained in the culture, a chronic condition.

The allegorical nude titled "California" (1858) by Story's contemporary Hiram Powers was advertised as an all-that-glitters-is-not-gold rebuke to the excesses of the Gold Rush. Its real ambition, however, was clearly to show some flawless marble female flesh. This worked. The piece ended up being the first American sculpture to enter the Met collection.

Randolph Rogers's "Nydia, The Blind Flower Girl of Pompeii" (1853-54) worked too, big time. The piece illustrates an episode from a best-selling novel, "The Last Days of Pompeii," in which a character risks her life to lead others to safety. The combination of danger and virtue was a winner. The piece was, by some accounts, the single most popular American sculpture of the 19th century. Rogers, who fully understood the realities of marketing, replicated his docudrama-like chef-d'oeuvre more than 160 times in two different sizes and made a fortune.

The impulse to shoot for the ideal in art is least conflicted in funerary sculpture, where a certain degree of decorum is built in. Americans have always been obsessed with death, dwelling on it and denying it with equal avidity. In 17th- and 18th-century Puritan America, mortality was a hard, crass fact, aggressively spelled out in images of skulls and as-I-am-now-so-you-will-be warnings chiseled on headstones.

In the 19th century the obsession was, if anything, stronger, but the attitude changed. Denial set in, in the form of aesthetic sugarcoating. Cemeteries were transformed from grim charnel grounds to earthly Edens, where temple-tombs popped up like mushrooms, and transcendent meetings took place.

Two such encounters are frozen in stone at the Met in reliefs by Daniel Chester French. One, "The Angel of Death and the Sculptor from the Milmore Memorial," is a marble version of a bronze commissioned by the family of the artist Martin Milmore (1844-83). In French's relief the young sculptor is hard at work carving a sphinx — Milmore really did carve one; it was installed in Mount Auburn Cemetery in Cambridge, Mass. — at the moment that death, in the guise of a veiled woman, interrupts and restrains his hand.

In the second relief, "Mourning Victory from the Melvin Memorial," begun in 1906, the spiritual encounter is interactive rather than simply observed. An angelic female figures seems to be emerging, face forward, from a stone slab and moving out into space toward us. Here our lives are being interrupted, but benignly, by the personification of victory over death rather than by death herself.

There's something about these spiritualizing tableaus that feels at best New Agey, at worst hopelessly hokey to our secular era. But revolutions in taste and belief don't necessarily make this a dismissible art. Both reliefs are formal tours de force, theatrically bold and rich in naturalistic details: the carved spray of poppies that death holds is a marvel of botanical accuracy; the meeting of her hand and Milmore's has a gentle finality worthy of Gluck.

And like other 19th-century public sculpture both works have interesting things to say about the artists who made them and the audiences they were addressing. All such was, after all, contemporary art: freshly minted for eyes as hungry for novelty, and for minds as in need of sustenance and reassurance, as our own.

For years, beginning in 1884, the Met displayed such work in a gallery called the Hall of Modern Statuary. Modern as used there wasn't exactly Modernism, but it did identify certain kinds of new art as embodying up-to-the-minute values, aesthetic, social and political. It might even be said that American 19th-century art, with its bias toward moral commentary and its eclectic fusions of real and ideal, high and low, Old World and New, was postmodern before the fact.

Eclecticism is given free rein in the American Wing installation, organized under the curatorial aegis of Morrison H. Heckscher. It is certainly the name of the game in the period rooms, each a miniature stage set with real antiques for props.

They move from 17th-century interiors on the third floor to 1912 Frank Lloyd Wright on the first, with areas for the display of individual objects on each floor. Met habitués will notice that the sequence of the rooms has been slightly jiggered to ensure chronological flow. One new room — a Dutch colonial interior from the Daniel Peter Winne House near Albany — has been added, and several others have been repainted and relighted.

Also new, and well worth a try, are some of the best digital displays I've seen in any museum. With a brush of the finger on a touch screen you get information about the room's original location, about the people who lived in it and about the history of its display at the Met, along with data about individual objects on view.

But for die-hard modernists who demand pure, no-gadgets, context-free encounters with art, the smart thing to do is head to the Engelhard Court's wrap-around upper balcony, where portions of the museum's collection of American silver, ceramics and jewelry are set out. This material used to be arranged by medium; now everything's mix-and-match, primarily by era, with contemporaneous examples of silver and glass in adjoining cases.

This is a nice idea. It creates visual texture. It presents the objects more realistically, side-by-side as they would have been in a household. And it underscores the global scope of American art from its earliest days, with items made in China, England, France and New Jersey on the same shelf, and expert immigrant craftsmen working shoulder to shoulder with the likes of the Boston homeboy Paul Revere.

Ceramics devotees, and potential converts, will want to gather in the Engelhard Court's new mezzanine balcony, floated half-way up the windows on the Central Park side. There the museum's curator of American decorative arts, Alice Cooney Frelinghauser, has placed some 250 examples of art pottery made between the United States Centennial of 1876 and 1956, all a promised gift from the collector Robert A. Ellison Jr.

It's a brilliant and daft array: delicate-daft in the case of the pinched and poked ceramics of George E. Orr, the Bernini of Biloxi, Miss.; cool-daft in the case of the iridescent Arts and Crafts vases of a kind you may have seen gathering dust in your grandparents' attic; and plain old crazy-daft in the case of Tiffany & Company's "Magnolia Vase," its glaze-drenched surface relief of flowers, pine cones and cactuses suggesting a spreading malignancy.

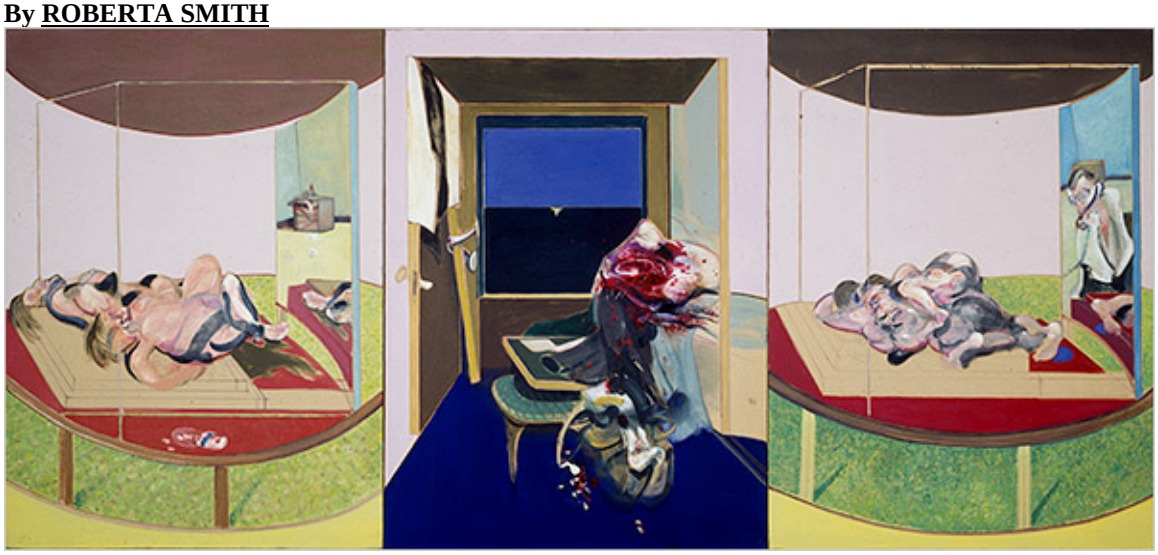
Is this extreme piece of American eclecticism merely weird or really beautiful? Is it pop art or high craft or low-taste or no-taste, or what? Whatever it is, it is very right there, too preposterous to be pretentious, too busy to be self-conscious, too consumption-driven to be precious. A lot of art in the American Wing is like that and like it or not — and I do like it, sort of — it is us.

The American Wing's new galleries remain on permanent view at the Metropolitan Museum of Art, (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/05/22/arts/design/22amer.html?ref=design

If Paintings Had Voices,

Francis Bacon's Would Shriek
By ROBERTA SMITH



Francis Bacon is an artist for our time. You may love or hate his work, which is still vigorously polarizing after all these years. But more than that of any other artist who emerged at the end of World War II, his work tells us about the strengths and weaknesses of the moment.

For nearly 50 years, until his death in 1992 at 82, Bacon worked the fault lines dividing abstraction and representation and sometimes photography, where many contemporary painters from subsequent generations have staked claims of one kind or another.
His contorted figures and portraits, his screaming popes and apes, his flanks of beef and crime-scene gore, and his wrestling lovers bring to mind any number of video-melodramatists, most quickly Bill Viola, reflecting a taste for hokey humanism, spectacle and sensationalism that often seems pervasive today. His emphasis on loaded narrative over form, which can make his art seem formulaic and repetitive, is now nearly epidemic.
The stately if cursory survey of Bacon's paintings that opened Wednesday at the Metropolitan Museum of Art suggests a more lasting pertinence: Bacon's depiction of the love that until a few decades ago dared not say its name, much less demand the right to marry. Bacon convincingly painted men having sex and sometimes making love. Whether this makes him a great painter, it certainly secures him a place in the history of both painting and art. He emphatically turned the male gaze toward males.
Bacon did for men in lust or in love what his hero Picasso had done for men and women in the same spot — or at least for Picasso and women. He turned sex and genuine passion into a pictorial event, using paint on canvas with finesse and no small sense of drama and without getting clinical. He operated, like Picasso, under cover of modernism.
Picasso often diagrammed an itinerary of heterosexual engagement by mapping the female orifices and curves in a flattened Cubo-Surrealist style. Bacon specialized in blur and atmosphere; he captured the tumult of homosexual sex in motion by borrowing from photographs, film stills or images of other art, conveying a sense of athleticism and sweat, violence and tenderness, furtiveness and shame. Homosexual sex was a criminal act in Britain, where he lived most of his life, well into the 1960s.
The show, which originated at the Tate Britain last fall, has been slightly reconstituted and installed at the Met by Gary Tinterow, the curator in charge of 19th-century modern and contemporary art. It is freshest where it delves into Bacon's use of photographs, not only those clipped from magazines and books but also images he had taken of friends and lovers. He often blew up images and used their cut-out forms as templates. (You can see this especially with George Dyer, his handsome, distinctively profiled companion, whom he painted often in the 1960s and '70s.)
"Francis Bacon: A Centenary Retrospective" begins in full cry. First come the screeching fiends of "Three Studies for Figures at the Base of a Crucifixion," the triptych with which Bacon announced

himself to the London art scene in 1944. Against bright orange grounds that would become something of a signature, gape-mouthed furies — part human, part monster, and one per canvas — foretell postwar deprivation, rage and existential doubt. The dogs of war are not going to be leashed anytime soon; the world itself is on the cross.

These overwrought creatures work better in movies, like "Alien." Their screams continue in the next gallery, where the open, dentally precise mouths gradually migrate to human heads, mostly from 1949, and the first of Bacon's famous, often glib screaming popes, after Velázquez, arrives. The Museum of Modern Art's "Painting" from 1946 is also here, encapsulating much of the Bacon repertory: matching slabs of meat that might be said to couple, a seated male, a half-hidden screaming face and the luxurious surface and color. Even so, his mastery was more than a decade away.

Only in the third gallery does this show dial back the hysteria and risk real emotion, in particular the tenderness passing between two men in "Untitled (Two Figures in the Grass)," from around 1952. Pale, soft-fleshed and naked, his back to us, one sits with his legs tucked beneath him, bowing his head over the other, who apparently lies in the grass, his presence indicated mostly as a pair of bent knees that are, ominously, faintly touched with red. Theirs is a sorrowing intimacy stolen amid a gale of blue-black strokes. The faint outlines of a bed and room hint at an imagined interior, a safe, private haven.

Bacon later said that he regretted having wasted so much time while young. Instead of learning his craft, he was often drinking, gambling, sleeping around and having a brutal affair with a violent, alcoholic, drug-addicted sadist named Peter Lacy that sometimes made his friends fear for his life.

This show concurs by bringing on more popes, along with screaming apes, slinking dogs and mute businessmen. Scant of surface and image, with glancing, uneasy brushwork, they imply a divided attention and a reliance on pictorial short cuts and ambiguities to disguise limited skills. Although they are some of Bacon's best-known works, they barely pass muster as paintings.

Yet the Met's exhibition disputes the notion that Bacon's art declined, indicating that it often improved as his colors brightened, his paint handling gained muscularity. It was equally important that he began to focus on people he knew and cared about, giving them faces that seem simultaneously masked, gouged out of wet clay and recognizably individual.

Bacon may have been saved by the physicality of van Gogh's art, as evidenced by the 1957 "Study for a Portrait of van Gogh VI," with its thick, troweled paint, raking light and a plowed field that resembles a butterflied slab of meat marbled with red and green. In the same room "Three Studies for a Crucifixion" from 1962 announces Bacon's maturity: in pulsations of red, orange and black we see two assassins; the bloody pulp of their victim, curled on a striped mattress; and a hanging side of beef — with human teeth — that suggests a saint's martyrdom.

In the show's second half Bacon paints from his life, his imagination or somewhere in between, uncoiling new, ambiguous narratives that were often enhanced by the expansiveness of the triptych format. These paintings may not always work, but it is rarely for lack of trying. Sex, both violent and not, takes place; crimes are committed; guts are spilled. Colors become electrifying, textures enrich. The curved shelf of space that becomes the norm circles around, implicating us as intimates, voyeurs or unwilling witnesses. Often we seem to see people posing in the studio, fidgeting, ready to jump out of their skins (even though Bacon didn't paint from life, only from photographs). In "Two Studies for a Portrait of George Dyer," the subject sits near a canvas that is pinned with a nude picture of him, which is truer to Bacon's working method. An especially fraught 1967 triptych that Bacon allowed to be named for T. S. Eliot's poem "Sweeney Agonistes" has two scenes of lovers on low platforms raised above grass-green carpet. They flank an interior in which a hideous partial carcass is propped up before a window. One imagines it as the remnants of a man who, from loneliness, has literally howled out his heart to the implacable black sea visible beneath a violet sky. Except that the violet plane is a window shade, a regal color commensurate with the sacrifice. Whatever Bacon's mangled, solitary or coupled beings meant to him, they starkly remind us that, while we look at the painting, others are dying, seizing up with loneliness or having sex.

I'm not sure that this show will do much to alter the polarities of opinion around Bacon; that will take much more curatorial precision and imagination. But it is always bracing to see his work and to realize that part of its energy derives from its refusal to go softly in art history. He reminds us that in the end very little about art is fixed, and that we should always be ready to turn on a dime.

"Francis Bacon: A Centenary Retrospective" continues through Aug. 16 at the Metropolitan Museum of Art; (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2009/05/22/arts/design/22baco.html?ref=design

Seeing the Hudson River Through 700 Windows

By CAROL VOGEL

It was the sight of 700 mullioned windows covered with greasy plastic sheeting that inspired the Brooklyn artist Spencer Finch to create the first temporary public art commission for the High Line, that $170 million park being built on the elevated freight rail structure that stretches 22 blocks, from Gansevoort Street to 34th Street, near the Hudson River.

"Those industrial New York spaces are disappearing," said Mr. Finch, who is known for work that explores the relationship between light and color. His new piece will be housed in a tunnel-like former loading dock between 15th and 16th Streets. "I thought that rather than drop something of my own making in the space, I would use the existing architecture."
Since the Hudson River is visible from the site, Mr. Finch wanted the art to capture the narrative of the river. So last June 12 he fastened a high-resolution digital camera to the railing of a tugboat and documented an 11-hour 40-minute journey on the river in a single day.
Traveling on Manhattan's West Side past the High Line, Mr. Finch photographed a single point on the river's surface every minute of his journey. He then chose a single pixel from each photograph, sandwiched each one between glass and has arranged them chronologically in the former loading dock's steel mullions.
He organized the panels as though viewers were "reading a book," he said, placing them in a sequence that starts at 9:15 a.m. and goes until 8:54 p.m., from left to right, top to bottom, capturing the changing reflective and translucent conditions of the water's surface.
"It's lighter at the top than at the bottom," he explained. "I wanted to make this as much a narrative as a composite."
Because this is one of the few semi-enclosed spaces on the High Line, Meredith Johnson, a curator and producer at Creative Time, the organization that has helped present Mr. Finch's project, said "it has a cathedral-like feeling." The space will be illuminated at night to approximate daylight, so viewers can see the panels around the clock.
The title of the work, "The River That Flows Both Ways," is a translation of Muhheakantuck, the American Indian name for the Hudson, and refers to the river's natural flow in two directions, like the trains that once ran on the High Line.

The project, which will be on view for a year starting in mid-June, was commissioned by two nonprofit organizations — Creative Time, which presents art around the city, and Friends of the High Line — as well as the New York City Parks and Recreation Department.

"Art has always been an important component," said Robert Hammond, co-founder of Friends of the High Line. "From the beginning dealers and artists were some of our most ardent constituents. We knew we wanted something that was temporary and didn't want plot art. We also didn't want to make it an outdoor sculpture park."

To ensure a continuing stream of art projects, Friends of the High Line recently hired Lauren Ross, a former interim curator at the Brooklyn Museum who was also a director and chief curator at White Columns, to oversee its arts programming with a focus on emerging artists and site-specific commissions.

THE ART OF STEEL BEAMS

In 1984 the conceptual artist Chris Burden created "Beam Drop," a sculptural project in which a hydraulic crane hoisted 60 steel beams a hundred feet into the air and then dropped them into a pool of wet concrete 30 feet square.

The site was Artpark, a 200-acre state park in Lewiston, N.Y., about 10 miles north of Niagara Falls on the Canadian border.

Three years later "Beam Drop" was dismantled and destroyed.

Now an even bigger version of the work has risen again, this time in Brazil at the Inhotim Center for Contemporary Art, a three-year-old museum and botanical garden on 3,000 acres outside the city of Belo Horizonte. The center was founded by Bernardo Paz, a Brazilian collector and mining magnate who began collecting art in the early 1990s.

The center is known for outsized permanent projects by artists like Matthew Barney, Pipilotti Rist, Olafur Eliasson and Doug Aitken.

"I think 'Beam Drop' is one of the most important large-scale sculptures in modern art," said Allan Schwartzman, the chief curator of Inhotim. "It's both a summation and a deconstruction of sculpture."

This version of "Beam Drop" consists of 71 beams, many of them larger and heavier than those in the original work. "We spent six months scouring the region for old steel I-beams of various sizes, forms and colors," Mr. Schwartzman said, "including several beams that had been part of a turn-of-the-century industrial bridge."

Inhotim is not the only place to see a version of Mr. Burden's "Beam Drop" this season. On May 30 "Beam Drop Antwerp" will be constructed before a live audience in the sculpture park of the Middelheim Museum in Antwerp. The city will also host an exhibition of other work by Mr. Burden in the Braem Pavilion and Middelheim Castle.

NEW GALLERY IN TOWN

While many galleries are paring down the number of exhibitions they present, shrinking their staffs or closing altogether, Hauser & Wirth — a 17-year-old business that operates exhibition spaces in London and Zurich — has decided to open a gallery in New York. It will be primarily devoted to artists it represents, an international group that includes Dan Graham, Subodh Gupta and Paul McCarthy.

"The economic crisis is not stopping us," said Iwan Wirth, one of the gallery's founders. "This is a long-term strategy."

For several years now it has had office space in Manhattan at 32 East 69th Street, in a building where Zwirner & Wirth is located. (Zwirner & Wirth, which mostly handles modern masters, is owned in part by Iwan Wirth and the New York dealer David Zwirner.)

Hauser & Wirth will now take over all four floors of the building, and Annabelle Selldorf, the New York architect, will design the space. (Zwirner & Wirth will no longer have a gallery in New York, but David Zwirner will open his own space at 524 West 19th Street in the fall.)

When Hauser & Wirth opens in September it will be showing "Yard," an environment created by Allan Kaprow, the artist who coined the term "Happenings" in the 1950s and who died three years ago. "Yard," from 1961, consists of a massing of used automobile tires.

This article has been revised to reflect the following correction:

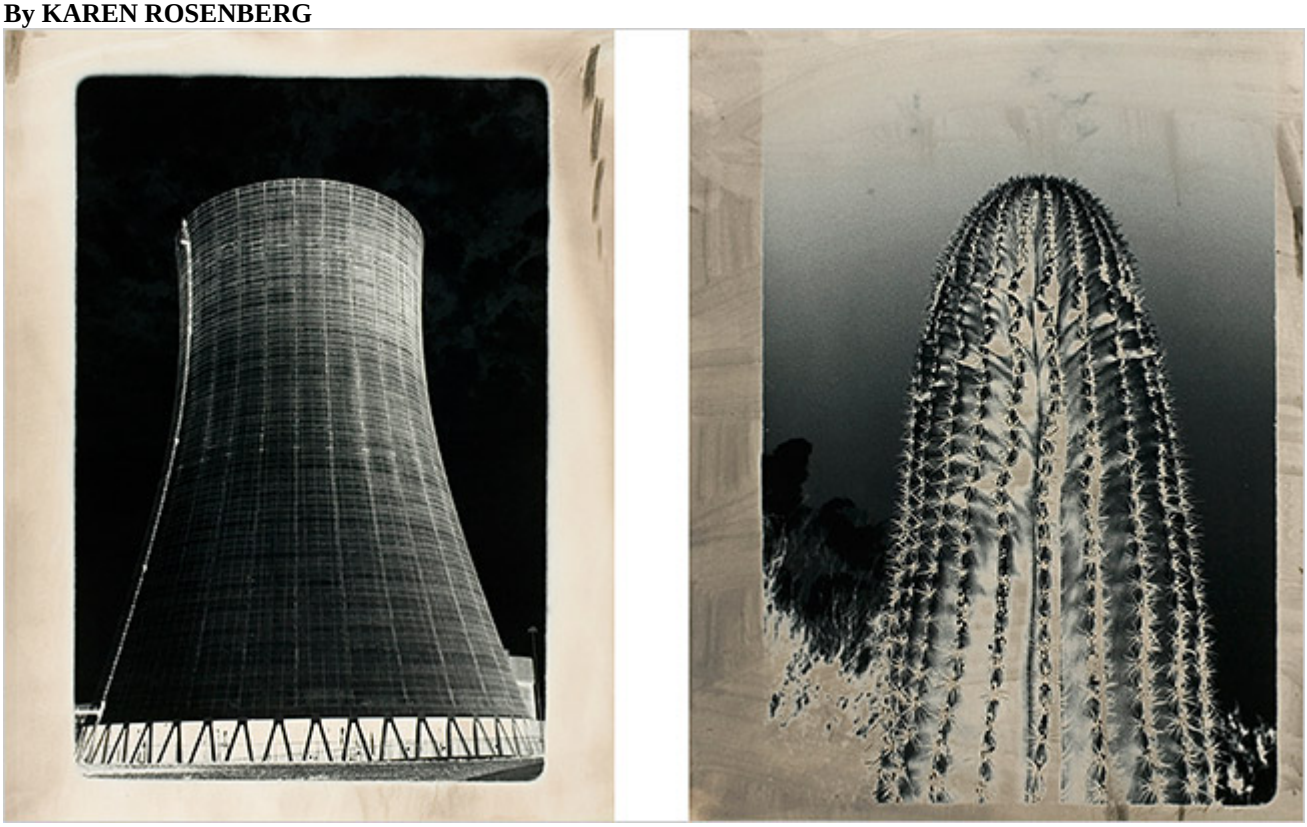
Correction: May 23, 2009

A report in the Inside Art column on Friday about the opening of the Hauser & Wirth gallery in New York next September, using information provided by the gallery, referred incompletely to the Hauser & Wirth company's relationship with the artist Louise Bourgeois. Although it represents her, it does so only in Europe — not in New York or elsewhere. (The Cheim & Read gallery represents her outside Europe.)

http://www.nytimes.com/2009/05/22/arts/design/22voge.html?ref=design

JOHN WOOD
A Photographer Who Refused to Think Like a Photographer

By KAREN ROSENBERG



If you were a serious photographer in the 1960s, you traveled the country documenting social change (Garry Winogrand, Robert Frank) or pursued technical perfection in the studio (Richard Avedon, Irving Penn). Photography had to be pure, true to itself and its subjects.

This was unfair, because other artists were allowed to incorporate bits of photographs into their paintings, drawings and prints, or work from photographic sources. Yet any attempt by a photographer to dabble in older art forms was suspect. It smacked of deference or, worse, manipulation.
Digital technology has since changed the rules, but it's still liberating to see the experimental mixed-media works in an exhibition spread over two museums: "John Wood: On the Edge of Clear Meaning," at the Grey Art Gallery at New York University, and "John Wood: Quiet Protest," at the International Center of Photography. Mr. Wood trained as a photographer, but refused to think like one.
Beginning in the 1950s, he made unique objects with combinations of drawing, collage, printmaking and early forms of photography (cyanotype, photogram, cliché-verre). The only rule, to paraphrase Jasper Johns, seems to be: Take a photograph. Do something to it. Do something else to it.
Mr. Wood, 86, grew up during the Depression in a household that was constantly on the move. As a young man he served as a pilot in World War II. He later said that flying helped him escape from "a static one-point perspective."
Like many artists of his generation, he went to school on the G.I. Bill, at the Institute of Design in Chicago, established by the Bauhaus-trained artist Laszlo Moholy-Nagy. Mr. Wood sought out the school after reading Moholy-Nagy's memoir-manifesto-artist's-book "Vision in Motion," which reinforced his sense that art was becoming intertwined with politics and technology and that photography, in particular, was ascendant.
The show reinforces a sense that Mr. Wood, like John Baldessari at CalArts, has been most influential as a teacher. He taught photography and printmaking for more than three decades at Alfred University's School of Art and Design, in upstate New York.

When he arrived, Alfred was mainly known for its ceramics program; he transformed it into an East Coast hippie Bauhaus. In the catalog a former student recalls that his drawing class was once given the assignment to "build something out of paper that could enable them to float in the university's swimming pool."

"John Wood: On the Edge of Clear Meaning" was organized by another former student, Nathan Lyons, now the director emeritus of the Visual Studies Workshop at George Eastman House in Rochester. It includes more than 210 photographs, artist's books and works that fall under the catch-all heading of mixed media.

Among the earliest works on view are a number of "straight" photographs from the mid-1960s: gelatin silver prints of landscapes, still lifes and scenes of daily life in upstate New York. Some are quite beautiful — an image of striped candy wrappers laid out in a grid on a tabletop, a bizarre picture of women holding a rattlesnake — but it soon becomes clear that Mr. Wood wasn't satisfied with this kind of image-making.

Over the next decade or so he printed negatives salvaged from trash cans, took up Kodalith and Polaroid film, experimented with the Thermofax (an early photocopier) and made montages and collages. He mounted sequential prints of landscapes on the diagonal and linked their horizon lines. (These vertiginous images, Mr. Wood has said, came out of his experience as a wartime pilot.)

The five frames of "Positional Sequences, Rio Grande" (1976) move the eye away from the riverbank in stepping-stone increments. In "Nathan Lyons Left to Right and Right to Left" (1974), even the human body is sliced and diced.

When he wanted to, Mr. Wood could make seamless photographic abstractions in the style of Moholy-Nagy or Aaron Siskind (another Chicago influence). A small nook within the main gallery is devoted to a series of contact prints ("cameraless" photographs) made with paper stencils.

The works in the International Center of Photography portion of the show express anguish over topics including Vietnam, nuclear waste, endangered species and the Exxon Valdez oil spill. But they do so through the subtle disruptions of photomontage.

In a pair of eerie, solarized prints from 1989, "Cooling Tower" and "Cactus," Mr. Wood compares a nuclear-plant structure and a spiky desert shrub. These works mimic the typological approach of Bernd and Hilla Becher's studies of water towers, but with a conscience.

"My Lai Massacre" (1969) reproduces a famous photograph from the Vietnam War, enlarging it each time so that the pile of bodies becomes a close-up of a foot and finally an abstract pattern of dots. It's one of the oldest works in this portion of the show, but it speaks to current anxieties about releasing disturbing photographs to the news media.

It's instructive to compare the art in "On the Edge of Clear Meaning" with that in "The Pictures Generation," at the Metropolitan Museum. Both attack the "purity" of the photograph, but from different angles.

The Pictures artists embraced photography as a matter of convenience; it wasn't painting and it was close to advertising, movies and television. Mr. Wood believed in the medium but felt that in its "straight" form it hadn't quite fulfilled its expressive potential.

Mr. Wood is credited with anticipating the digital photo-collages that proliferate in Chelsea today. You can also see a connection in the work of contemporary photographers like Paul Graham, whose haikulike sequences of images don't shy away from socioeconomic reality.

The quality of his works varies as much as the process. Some are simple cut-and-paste jobs; others require an understanding of darkroom wizardry. But in the best of them, impure photography becomes pure poetry.

"John Wood: On the Edge of Clear Meaning" continues through July 18 at the Grey Art Gallery, New York University, 100 Washington Square East, Greenwich Village; (212) 998-6780, nyu.edu/greyart.
"John Wood: Quiet Protest" continues through Sept. 6 at the International Center of Photography, 1133 Avenue of the Americas, at 43rd Street; (212) 857-0000, icp.org.

http://www.nytimes.com/2009/05/22/arts/design/22wood.html?ref=design

At the Bridge Table, Clues to a Lucid Old Age

By BENEDICT CAREY

LAGUNA WOODS, Calif. — The ladies in the card room are playing bridge, and at their age the game is no hobby. It is a way of life, a daily comfort and challenge, the last communal campfire before all goes dark.

“We play for blood,” says Ruth Cummins, 92, before taking a sip of Red Bull at a recent game.

“It’s what keeps us going,” adds Georgia Scott, 99. “It’s where our closest friends are.”

In recent years scientists have become intensely interested in what could be called a super memory club — the fewer than one in 200 of us who, like Ms. Scott and Ms. Cummins, have lived past 90 without a trace of dementia. It is a group that, for the first time, is large enough to provide a glimpse into the lucid brain at the furthest reach of human life, and to help researchers tease apart what, exactly, is essential in preserving mental sharpness to the end.

“These are the most successful agers on earth, and they’re only just beginning to teach us what’s important, in their genes, in their routines, in their lives,” said Dr. Claudia Kawas, a neurologist at the University of California, Irvine. “We think, for example, that it’s very important to use your brain, to keep challenging your mind, but all mental activities may not be equal. We’re seeing some evidence that a social component may be crucial.”

Laguna Woods, a sprawling retirement community of 20,000 south of Los Angeles, is at the center of the world’s largest decades-long study of health and mental acuity in the elderly. Begun by University of Southern California researchers in 1981 and called the 90+ Study, it has included more than 14,000 people aged 65 and older, and more than 1,000 aged 90 or older.

Such studies can take years to bear fruit, and the results of this study are starting to alter the way scientists understand the aging brain. The evidence suggests that people who spend long stretches of their days, three hours and more, engrossed in some mental activities like cards may be at reduced risk of developing

dementia. Researchers are trying to tease apart cause from effect: Are they active because they are sharp, or sharp because they are active?

The researchers have also demonstrated that the percentage of people with dementia after 90 does not plateau or taper off, as some experts had suspected. It continues to increase, so that for the one in 600 people who make it to 95, nearly 40 percent of the men and 60 percent of the women qualify for a diagnosis of dementia.

At the same time, findings from this and other continuing studies of the very old have provided hints that some genes may help people remain lucid even with brains that show all the biological ravages of Alzheimer's disease. In the 90+ Study here, now a joint project run by U.S.C. and the University of California, Irvine, researchers regularly run genetic tests, test residents' memory, track their activities, take blood samples, and in some cases do postmortem analyses of their brains. Researchers at Irvine maintain a brain bank of more than 100 specimens.

To move into the gated village of Laguna Woods, a tidy array of bungalows and condominiums that blends easily into southern Orange County, people must meet several requirements, one of which is that they do not need full-time care. Their minds are sharp when they arrive, whether they are 65 or 95.

They begin a new life here. Make new friends. Perhaps connect with new romantic partners. Try new activities, at one of the community's fitness centers; or new hobbies, in the more than 400 residents' clubs. They are as busy as arriving freshmen at a new campus, with one large difference: they are less interested in the future, or in the past.

"We live for the day," said Dr. Leon Manheimer, a longtime resident who is in his 90s.

Yet it is precisely that ability to form new memories of the day, the present, that usually goes first in dementia cases, studies in Laguna Woods and elsewhere have found.

The very old who live among their peers know this intimately, and have developed their own expertise, their own laboratory. They diagnose each other, based on careful observation. And they have learned to distinguish among different kinds of memory loss, which are manageable and which ominous.

A Seat at the Table

Here at Laguna Woods, many residents make such delicate calculations in one place: the bridge table.

Contract bridge requires a strong memory. It involves four players, paired off, and each player must read his or her partner's strategy by closely following what is played. Good players remember every card played and its significance for the team. Forget a card, or fall behind, and it can cost the team — and the social connection — dearly.

"When a partner starts to slip, you can't trust them," said Julie Davis, 89, a regular player living in Laguna Woods. "That's what it comes down to. It's terrible to say it that way, and worse to watch it happen. But other players get very annoyed. You can't help yourself."

At the Friday afternoon bridge game, Ms. Cummins and Ms. Scott sit with two other players, both women in their 90s. Gossip flows freely between hands, about residents whose talk is bigger than their game, about a 100-year-old man who collapsed and died that week in an exercise class.

But the women are all business during play.

"What was that you played, a spade was it?" a partner asks Ms. Cummins.

"Yes, a spade," says Ms. Cummins, with some irritation. "It was a spade."

Later, the partner stares uncertainly at the cards on the table. "Is that ——"

"We played that trick already," Ms. Cummins says. "You're a trick behind."

Most regular players at Laguna Woods know of at least one player who, embarrassed by lapses, bowed out of the regular game. "A friend of mine, a very good player, when she thought she couldn't keep up, she automatically dropped out," Ms. Cummins said. "That's usually what happens."

Yet it is part of the tragedy of dementia that, in many cases, the condition quickly robs people of self-awareness. They will not voluntarily abandon the one thing that, perhaps more than any other, defines their daily existence.

"And then it's really tough," Ms. Davis said. "I mean, what do you do? These are your friends."

Staying in the Game

So far, scientists here have found little evidence that diet or exercise affects the risk of dementia in people over 90. But some researchers argue that mental engagement — doing crossword puzzles, reading books — may delay the arrival of symptoms. And social connections, including interaction with friends, may be very important, some suspect. In isolation, a healthy human mind can go blank and quickly become disoriented, psychologists have found.

"There is quite a bit of evidence now suggesting that the more people you have contact with, in your own home or outside, the better you do" mentally and physically, Dr. Kawas said. "Interacting with people regularly, even strangers, uses easily as much brain power as doing puzzles, and it wouldn't surprise me if this is what it's all about."

And bridge, she added, provides both kinds of stimulation.

The unstated rule at Laguna Woods is to support a friend who is slipping, to act as a kind of memory supplement. "We're all afraid to lose memory; we're all at risk of that," said one regular player in her 90s, who asked not to be named.

Woody Bowersock, 96, a former school principal, helped a teammate on a swim team at Laguna Woods to race even as dementia stole the man's ability to form almost any new memory.

"You'd have to put him up on the platform just before the race, just walk him over there," Mr. Bowersock said. "But if the whistle didn't blow right away, he'd wander off. I tell you, I'd sometimes have to stand there with him until he was in the water. Then he was fine. A very good swimmer. Freestyle."

Bridge is a different kind of challenge, but some residents here swear that the very good players can play by instinct even when their memory is dissolving.

"I know a man who's 95, he is starting with dementia and plays bridge, and he forgets hands," said Marilyn Ruekberg, who lives in Laguna Woods. "I bring him in as a partner anyway, and by the end we do exceedingly well. I don't know how he does it, but he has lots of experience in the game."

Scientists suspect that some people with deep experience in a game like bridge may be able to draw on reserves to buffer against memory lapses. But there is not enough evidence one way or the other to know.

Ms. Ruekberg said she cared less about that than about her friend: "I just want to give him something more during the day than his four walls."

Drawing the Line

In studies of the very old, researchers in California, New York, Boston and elsewhere have found clues to that good fortune. For instance, Dr. Kawas's group has found that some people who are lucid until the end of a very long life have brains that appear riddled with Alzheimer's disease. In a study released last month, the researchers report that many of them carry a gene variant called APOE2, which may help them maintain mental sharpness.

Dr. Nir Barzilai of the Albert Einstein College of Medicine has found that lucid Ashkenazi Jewish centenarians are three times more likely to carry a gene called CETP, which appears to increase the size and amount of so-called good cholesterol particles, than peers who succumbed to dementia.

"We don't know how this could be protective, but it's very strongly correlated with good cognitive function at this late age," Dr. Barzilai said. "And at least it gives us a target for future treatments."

For those in the super-memory club, that future is too far off to be meaningful. What matters most is continued independence. And that means that, at some point, they have to let go of close friends.

"The first thing you always want to do is run and help them," Ms. Davis said. "But after a while you end up asking yourself: 'What is my role here? Am I now the caregiver?' You have to decide how far you'll go, when you have your own life to live."

In this world, as in high school, it is all but impossible to take back an invitation to the party. Some players decide to break up their game, at least for a time, only to reform it with another player. Or, they might suggest that a player drop down a level, from a serious game to a more casual one. No player can stand to hear that. Every day in card rooms around the world, some of them will.

"You don't play with them, period," Ms. Cummins said. "You're not cruel. You're just busy."

The rhythm of bidding and taking tricks, the easy conversation between hands, the daily game — after almost a century, even for the luckiest in the genetic lottery, it finally ends.

"People stop playing," said Norma Koskoff, another regular player here, "and very often when they stop playing, they don't live much longer."

http://www.nytimes.com/2009/05/22/health/research/22brain.html?em

Della Robbia: A Story of Invention and Immortality

By RODERICK CONWAY MORRIS

Leon Battista Alberti assured immortality for Luca della Robbia by naming him, along with Brunelleschi, Donatello, Ghiberti and Masaccio, in the prologue to his landmark treatise "On Painting" of 1436, as a pioneer of what was later to be called the Renaissance.

Luca's "invention" of a method of creating tin-glazed terra cotta sculptures — rendering them, in Vasari's words, "almost eternal" — was hailed as a major scientific and artistic discovery. And it was all the more important because here was "a new art, useful and very beautiful" that was not known to the Ancients. The story of the della Robbia studio, founded by Luca and continued by his nephew, Andrea, and Andrea's siblings and children, is vividly and colorfully illustrated by more than 130 exhibits in "The Della Robbia: The Dialogue between the Arts in the Renaissance," expertly curated by Giancarlo Gentilini with the assistance of Liletta Fornasari. (Further works by the della Robbia studio can be found in situ in churches in Arezzo and in the surrounding countryside.)

Luca's was an age of experimentation as well as a revival of antique skills. Brunelleschi was largely responsible for the rediscovery of terra cotta as an art form in Florence, and others, notably Donatello, followed his lead. But, although highly flexible and expressive, terra cotta was a fragile medium and as an architectural adornment vulnerable to weather.

The imaginative leap that Luca made was to marry painting and sculpture in a novel fashion to create a new product durable enough to be placed on the exterior of buildings and resist the elements, and sufficiently luminous — many of his Madonna and Child sculptures, for example, were pure white high-reliefs against cobalt blue backgrounds — to shine even in poorly lit churches and other interiors.

The maiolica technique Luca adapted had been used in Italy for at least two centuries to manufacture household ceramics. It had been imported from the Islamic world and Luca would have been familiar with accounts of Oriental buildings clad in maiolica tiles. Also, the decoration of Giotto's Campanile for the Santa Maria del Fiore cathedral included lozenges with marble sculptures set against backgrounds of blue-glazed terra cotta tiles. (Luca's first important commission was for the Cantoria, or singing gallery, for the Duomo.)

Byzantine ideas also played a role in underpinning the philosophical and religious significance of these radiant new sculptures. This was a period of intense contact and cultural exchange with the Greek East. Neoplatonic concepts, eagerly received in Florence, emphasized light as an expression of philosophical illumination, the spirit, purity and ideal beauty. Luca makes this relationship explicit in a refulgent monochrome white Madonna and Child at the Arcispedale di Santa Maria Nuova in Florence by placing in the Christchild's hands a scroll reading: "Ego Sum Lux Mundi" (I am the Light of the World).

The formulas of the della Robbia glazes were a closely guarded secret, passed down through the family. Andrea, Luca's nephew, brought them to new levels of perfection. Andrea also put the studio, established by Luca in 1446 on Via Guelfa (then on the edge of the city, a suitable location given the fire risks involved) on an almost industrial footing.

The use of molds and other production-line techniques meant that pieces could be produced in substantial quantities in series. Large sculptures and groups of figures were made in sections and reassembled on arrival at their destinations. Compared with marble and bronze, terra cotta was an inexpensive material, light and therefore cheap to transport. The studio developed professional packing methods to make sure the products arrived undamaged.

Although the Madonna and Child sculptures — the best of them of captivating delicacy and grace — remained the most popular single della Robbia product, under Andrea's management the range of offerings expanded to include complex dramatic tableaux of figures, decorative architectural features, among them elaborate schemes for cupolas and vaults, family crests and coats of arms, representations of fruit, flowers, vegetation and up-market floor and wall tiles. Orders came in not only from all over Italy but also from France, Spain, Portugal, Flanders and England.

The della Robbia palette came to embrace various colors and shades. Ironically, seeing their family name derived from their dyer forebears, the "robbia" nickname referring to the "ruby" dye of their cloth, the technical challenges presented by firing reds defeated the Via Guelfa studio, preventing it from employing the color. (The highly skilled Venetian imitators of Iznik ceramics, too, long struggled in vain to reproduce the tomato reds of the Ottoman masters.)

The della Robbia were influenced by parallel trends in painting and sculpture but they influenced contemporary artists in turn, such as Filippo Lippi. In the 1470s, Andrea's style showed affinities to those of Antonio Rossellino and Verrocchio.

The studio took in its stride the emergence in the 1490s of Savonarola, indeed Andrea was evidently a supporter of the Domenican hell-fire preacher against materialism and luxury, with della Robbia products reflecting the new austerity. Two of Andrea's sons entered Savonarola's San Marco Convent in 1495, and continued to make tin-glazed terra cottas for the order.

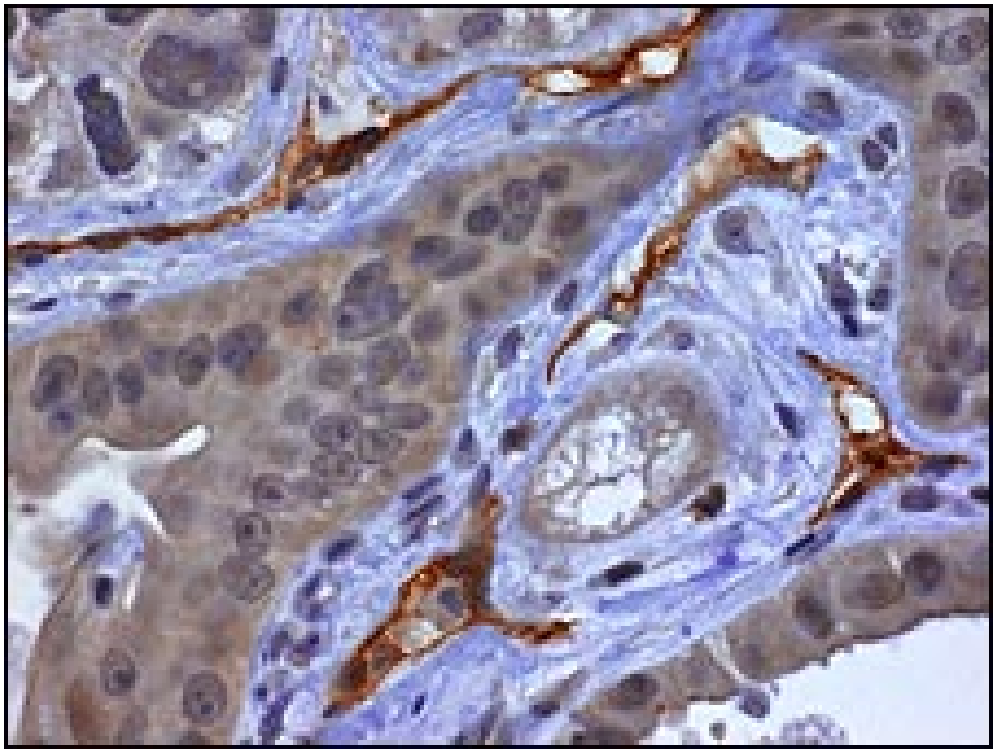
The studio was outstandingly one of the most successful of the Italian Renaissance, spanning three generations and well over a century. Andrea's sons, Luca the Younger and Girolamo, took the enterprise into the era of Mannerism, absorbing the stylistic innovations of Raphael, Sansovino and Andrea del Sarto.

In 1517, Girolamo moved to France to establish a studio there, contributing to the decoration of Fontainebleau. The youngest of Andrea's sons, Girolamo died in Paris in 1566. Two years later, in his updated "Lives of the Artists" Vasari wrote of Girolamo that "not only did his house die out and his family become extinct, but art was deprived of the knowledge of the proper method of glazing."

http://www.nytimes.com/2009/05/16/arts/16iht-robbia.html

Pancreas cancer drug failure clue

Experts believe they have discovered why pancreatic cancer can be so resistant to drug treatment.



There are 7,600 new cases in the UK each year - but only 3% of those diagnosed are alive five years later.

Cancer Research UK scientists led an international team which used mouse tests to show tumours have poor blood supply, stopping drugs working.

Writing in Science, they say the findings could help overcome resistance to the chemotherapy drug gemcitabine.

" **This is a very substantial finding** "
Dr Lesley Walker, Cancer Research UK

Tests on human pancreatic cancer samples also contained a deficient blood supply, suggesting that their observation should also be applicable to patients.

Dr David Tuveson, of Cancer Research UK's Cambridge Research Institute, led the research.

He said: "We're extremely excited by these results as they may help explain the disappointing response that many pancreatic cancer patients receive from chemotherapy drugs."

Treatment boost

The team, which included scientists from the US and Europe, also tested a new chemical compound called IPI-926, which was created by US company Infinity Pharmaceuticals.

They found that when this was used in combination with gemcitabine in genetically modified mice, there was increased cell death and a reduction of the pancreatic tumour size.

The scientists suggest the compound could be added to a number of other treatments which had previously proved disappointing in trials.

" **Each type of cancer needs its own specific research** "
Maggie Blanks, Pancreatic Cancer Research Fund

Cancer Research UK director of cancer information Lesley Walker said: "This is a very substantial finding.

"If these results hold in future studies, we hope that scientists will be able to make better use of current treatments and develop a range of new options which will help people with pancreatic cancer live longer.

"Results like these give us real confidence that we will combine this focus with our other research efforts and meet our goals of improving survival from all forms of the disease," Dr Walker added.

Maggie Blanks, founder of Pancreatic Cancer Research Fund, said: "Pancreatic cancer patients have very few treatment options.

"If these findings help in the development of more effective treatments, this will be a big step forward in improving the outlook for pancreatic cancer patients.

"This research illustrates the point that cancer is not one disease, and that each type of cancer needs its own specific research.

"Pancreatic cancer has had little research attention in the past and so the understanding of the disease - that can advance diagnosis and treatment - lags behind other cancer types.

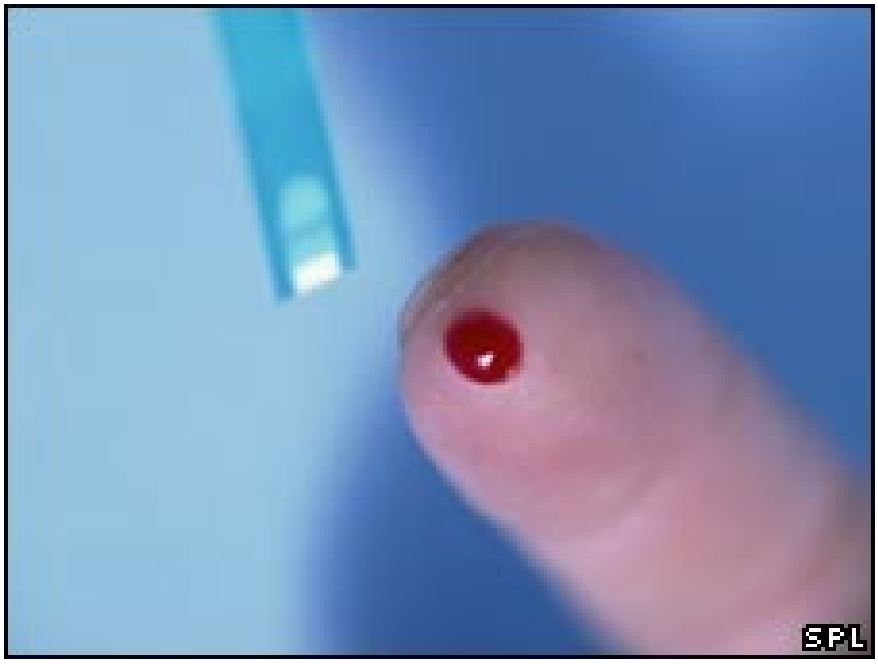
"The findings of Dr Tuveson and his team can add significantly to that understanding."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8061920.stm

Published: 2009/05/22 02:07:07 GMT

Diabetes heart risk 'can be cut'

Tighter control of blood sugar levels in people with diabetes may cut their risk of heart problems, a study says.



People with type 2 diabetes tend to have a glucose level above average despite the medication they are given.

The Cambridge University study of 33,000 people found getting it closer to the level for healthy people could cut the risk of heart attacks by 17%.

But charity Diabetes UK warns the steps the researchers recommend in the Lancet will not be appropriate for everyone.

" **Previous studies have been inconclusive, leaving diabetics and their doctors unsure as to whether maintaining lower blood sugar levels actually benefited the patients** "
Dr Kausik Ray, lead researcher

For elderly and frail people with diabetes there is a risk that, if their blood sugar levels are brought too low, they can become dizzy and light-headed and in the worst cases fall into a coma.

The Cambridge team decided to review five of the major research projects carried out into this issue because expert opinion remained divided over the benefits to tighter sugar control.

The current guidance in the UK for the 2.5m with the disease is to keep blood sugar levels at about the 7% mark.

But the study found extra benefits for those who kept the levels closer to the 4% to 5% mark that is common for healthy people.

As well as the reduction in heart attacks, there was a 15% fall in heart disease when blood sugar levels were kept to 6.6% on average.

Lifestyle changes

The researchers said the findings would mean that for every 200 people treated for five years, three lives would be saved from heart attacks.

Lead researcher Dr Kausik Ray said: "Previous studies have been inconclusive, leaving diabetics and their doctors unsure as to whether maintaining lower blood sugar levels actually benefited the patients.

"Although additional research needs to be conducted, our findings provide insight into the importance of improving glucose levels. However, this has to be done through lifestyle changes as well as medication."

But Dr Victoria King, of Diabetes UK, warned tighter sugar control would not be appropriate for everyone.

"Diabetes UK advises that people with diabetes should work towards keeping their blood glucose levels within the target ranges agreed with their healthcare team.

"This reduces the risk of long-term diabetes complications such as heart disease, kidney disease and stroke as well as short-term diabetes complications such as hypoglycaemia."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8060215.stm

Published: 2009/05/22 01:52:20 GMT

Disturbances of Peace

Adam Kirsch, The New Republic Published: Wednesday, May 20, 2009

Yale University Press
Attributed to Li Sixun, "Sailing Boats and a Riverside Mountain," 7th century C.E.

Classical Chinese Poetry: An Anthology

Translated and edited by David Hinton

(Farrar, Straus and Giroux, 475 pp., $45)

Du Fu: A Life in Poetry

Translated by David Young

(Knopf, 226 pp., $16.95)

The oldest poems translated in David Hinton's magnificent anthology *Classical Chinese Poetry* date to the fifteenth century B.C.E., long before the Bible was written. For the English-speaking world, however, this ancient art is effectively less than a hundred years old. Chinese poetry in English was born in 1913, when the widow of Ernest Fenollosa, an American professor who taught at the University of Tokyo, sent Ezra Pound a bundle of her late husband's notes on Chinese poetry. Fenollosa, who went to Japan to teach philosophy and economics, did not speak any Chinese; he studied these classic texts with Japanese tutors, but needed an interpreter to talk with them. By the time Pound, who knew neither Chinese nor Japanese, transformed Fenollosa's notes into the poems published in *Cathay*, his slim volume of 1915, he was thus at least four steps removed from the original Chinese. Yet English speakers knew so little about Chinese poetry that Pound's versions, however approximate, carried the authority of originals. In a sense, they were originals: as Eliot remarked, Pound was "the inventor of Chinese poetry for our time."

Inventing Chinese poetry meant not just translating it, but also teaching people how to read it. Here is Pound's translation of a poem by Li Po, which he titled "The Jewel Stairs' Grievance":

The jeweled steps are already quite

white with dew,

It is so late that the dew soaks my

gauze stockings,

And I let down the crystal curtain

And watch the moon through the

clear autumn.

The properties of the poem are exotic, but the tone, the syntax, and the music are entirely straightforward. Compared to a nineteenth-century English lyric, this eighth-century Chinese poem sounds modern. "The Jewel Stairs' Grievance" shows how perfectly Li Po met Pound's modernist criteria of directness and imagistic precision.

Yet Pound was also aware that the Chinese poet's concision was licensed by a complex of implications and conventions that the modern reader could not be trusted to know. And so he thought it necessary to append to his translation a note that was longer than the poem itself: "Jewel stairs, therefore a palace. Grievance, therefore there is something to complain of. Gauze stockings, therefore a court lady, not a servant who complains. Clear autumn, therefore he has no excuse on account of the weather. Also she has come early, for the dew has not merely whitened the stairs, but has soaked her stockings. The poem is especially prized because she utters no direct reproach."

Almost a century later, it is possible for English speakers to read much more widely and deeply in Chinese poetry, and in more accurate versions, thanks to several generations of erudite and talented poet-translators, from Arthur Waley to Kenneth Rexroth to A.C. Graham. A scholar-translator such as David Hinton, whose new anthology forms the capstone to a long and productive career, certainly knows infinitely more about Chinese language, culture, and literature than Pound ever did. In addition to his many volumes of translations of individual poets--including Li Po, Tu Fu, and Wang Wei, the three greatest poets of the T'ang Dynasty--Hinton has brought into English the classics of Chinese philosophy.

But the striking thing is that Hinton's version of what he calls "Jade-Staircase Grievance" is not very different from Pound's:

Night long on the jade staircase, white

dew appears, soaks through gauze

stockings.

She lets down crystalline blinds,

gazes out

through jewel lacework at the autumn

moon.

And it is doubtful whether Hinton's readers are any better prepared than Pound's were to encounter the deeply attractive, and profoundly alien, aesthetics of Chinese poetry. For while many readers of poetry now have an idea of what they think Chinese poetry in translation should sound like, we have almost no sense at all of what Chinese poetry actually is. The reason is simple and quite insurmountable. It is that so many of the features of the Chinese language, which poets manipulate in complex and subtle ways, are totally untranslatable into English.

The ideograms, which Pound turned into an obsession, that make up some (though far from all) Chinese characters; the very notion of words as single characters, rather than permutations of an alphabet; the tones that determine the meaning of words, and whose patterning is a central element of Chinese verse; the attenuation or absence of many features of English grammar, including pronouns and tenses--all these factors make it impossible for the reader of an English translation to have any accurate sense of how a Chinese poem sounds, moves, and feels to a Chinese reader.

And beyond the linguistic barrier between us and the Chinese poets lie the barriers of literary convention and historical background. The T'ang Dynasty poets, who lived during the golden age of Chinese civilization in the eighth and ninth centuries C.E., belonged to and wrote for an extremely sophisticated audience, most of whom were officials in the imperial government: the original mandarins. Reading commentaries on Chinese poetry--notably, Stephen Owen's *The Great Age of Chinese Poetry*, which deals with the High T'ang period of Li Po and Tu Fu--one begins to get an inkling of how many layers of meaning even the simplest, most imagistic poem contained for its original readers. Each genre of Chinese poetry had rules about rhyme, line length, and parallelism so intricate as to make the English sonnet look like free verse. Then there were conventions about how poems should start and end, and what images they could use, and what register of formality was appropriate to different subjects and different readers.

Li Po, for instance, was known as a shockingly original poet, and it is easy for any reader of his poems about the joys of drunkenness to see that there is something cheerfully subversive about his persona. Consider these lines from Hinton's version of one of Li Po's most famous poems, "Drinking Alone Beneath the Moon":

Among the blossoms, a single jar of wine. No one else here, I ladle it out myself.
Raising my cup, I toast the bright moon,
and facing my shadow makes friends
three,

though moon has never understood
wine,
and shadow only trails along behind me.

I sing, and moon rocks back and forth;
I dance, and shadow tumbles into pieces.

This is clearly enough a poem against decorum, though it is hard to gauge just how unusual or subversive such praise of drunkenness is supposed to sound. It is far otherwise with another poem of Li Po's, translated by Owen, on the conventional theme of visiting a monk's retreat:

A dog barks amid the sound of waters,

Peach blossoms dark, bearing dew.

Where trees are thickest, sometimes

see a deer,

And when noon strikes the ravine,

hear no bell.

Bamboo of wilderness split through

blue haze,

A cascade in flight, hung from an

emerald peak.

But no one knows where you've gone--

Disappointed, I linger among these

few pines.

Nothing could seem more peaceful or reverent than these lines. So how could a contemporary English reader suspect that to a T'ang-era reader, in Owen's words, this poem also "violates basic decorum," because it contains "too many trees and at least two streams"? Or that the opening couplet is a "serious fault" because "a poem should begin with the general scene or an indication of the occasion," not with a specific detail like the dog barking, which "should be placed where the 'evidence trope' belongs, in the middle couplets, where its ingenuity can be muted by a parallel"?

When so much information is missing--and how could it be included?--from even a skillful translation, can an English reader be said to be reading Li Po at all? Or to put it another way, could a Chinese reader appreciate "The Rape of the Lock" if he knew nothing about eighteenth-century English social and sexual mores, about the rules of the epic and the tradition of the mock-epic, about the movements and the connotations of the heroic couplet? "Much of the energy and directness that readers feel in Li Po's poetry," Owen observes, "arises from his weakening of the barrier between couplets." But in Hinton's translations this feature of Li Po's verse disappears, because Hinton uses enjambment and run-ons between couplets throughout the anthology. "I have freely used the resources available in English, even when they do not correspond to anything in the original: enjambment, for instance, is rare in classical Chinese poetry," he writes in his notes. Nor could the reader guess from Hinton's free-verse lines that, in fact, many Chinese poems follow an elaborate rhyme scheme.

This is not, of course, a criticism. No translator of Chinese verse attempts to follow the original in meter or rhyme, for the simple reason that, if such fidelity is difficult even in translating a kindred language such as French or German, it is utterly impossible when dealing with a language like Chinese. That is why it is so appropriate that Pound, who knew no Chinese, should be the inventor of Chinese poetry in English. When reading English versions of Chinese poems, we are getting as close as the conditions of our knowledge will allow, but no closer--we are reading the phenomenon, while the noumenon, the lyrical thing-in-itself, remains always out of reach.

Yet all this notwithstanding, there is a great profusion of Chinese poetry in English, and this fact, too, is significant. It suggests that, despite all the barriers, this poetry does communicate, even urgently, to modern Western readers. Both the difficulty and the urgency are elegantly demonstrated in a short book by Eliot Weinberger called *Nineteen Ways of Looking at Wang Wei*. Weinberger simply collates and

comments on a series of translations of Wang Wei's famous poem "Deer Park," allowing the reader to see how even this brief poem--twenty characters, in four lines--contains endless shades of meaning and implication. More, he shows how certain features of the Chinese--for instance, the absence of pronouns--are virtually uncapturable in English, so that almost every translator turns Wang's series of images into a first-person narration.

Yet again and again translators have returned to Wang Wei, hoping to create an English equivalent for his instant of illumination. Here is how Hinton translates the poem in *Classical Chinese Poetry*, successfully avoiding the "I":

No one seen. Among empty mountains,

hints of drifting voice, faint, no more.

Entering these deep woods, late

sunlight

flares on green moss again, and rises.

It is fruitless for the reader to wonder whether "flares" has the same connotations in English as what Wang wrote. Comparing this to other English versions, however, shows that Hinton's word is well chosen. Almost every translator in Weinberger's book uses "shine" to describe the action of light on moss, though Rexroth opts for "gleam." Hinton's "flares" emphasizes the suddenness of the light's appearance, allowing the reader to feel the poet's surprise as the sunlight trespasses on his dark, quiet retreat in the forest. The surprise is not just visual, Hinton emphasizes, but also temporal: the light is said to flare "again" because the sun is now setting, and the poet has not seen it since it rose.

Reading Wang Wei in the context of Hinton's anthology also helps the reader in a more profound sense, by placing in its literary and philosophical context what is, in fact, a deeply enigmatic poem. For if Wang takes care to tell us what he sees and hears, he has not a word to say about why it matters, or why he wished to record it in verse. This reticence is especially characteristic of Wang, whom Hinton describes as "the great condensery of Chinese poetry." Wang, who lived from 701 to 761, was a painter as well as a poet, and the visual inspiration of his verse is unmistakable. As Hinton says, his poems "often turn on the sparest of images: a bird's cry, a splinter of light on moss, an egret's wingbeat." We have already seen the light on moss; the egret appears in another poem from the same sequence, "Wheel-Rim River," this one titled "Golden-Rain Rapids":

Wind buffets and blows autumn rain.

Water cascading thin across rocks,

waves lash at each other. An egret

startles up, white, then settles back.

Here all is movement, just as in "Deer Park" all is silence. It is the ability to conjure such sensations using just a few details that makes Wang's poems so effective. If all poems are distillations of experience, Wang's poems are doubly distilled: mere notations in which, paradoxically, a lived moment is powerfully preserved. Once Wang has seen something, the reader has seen it; and because what he sees is so elemental, no barriers of time and distance seem to separate the reader from the poet. This identification,

this communication of a moment across the centuries and the cultures, is the real power of Wang's short poems, even more than their visual beauty.

Poems, even the most pictorial poems, are never really visual. They are not about things seen, but about why the poet feels compelled to preserve in writing what he sees. This is certainly true of Wang Wei and the many other poets in Hinton's anthology, who render individual moments not just for their own sake, or for the sake of a poetic image, but as demonstrations of a certain way of being in the world. The wanderer in "Deer Park" is able to forget himself, and to forget time, so deeply that he seems no longer to exist, until the sun flares to remind him. The egret in "Golden-Rain Rapids" is battered by the world but displays no more than an instant's discomposure before "settling back" into the integrity of his indifference. It is impossible to describe these poems without using a vocabulary that is more philosophical and even ethical than visual.

Wang Wei's views of the world imply a worldview. That worldview, which might be described as a fusion of Taoist cosmology and Buddhist epistemology, is not just Wang's, but animates almost every poet in Hinton's anthology. To some extent, this is because Hinton himself is intent on teaching the reader to share the ethics and the metaphysics that he finds so appealing in the Chinese poets. This is a matter of overcoming subjectivity, of curing the breach between consciousness and the universe:

Self and its constructions of the world dissolve away, and what remains of us is empty consciousness itself, known in Ch'an [the Chinese word we know in its Japanese form, Zen] terminology as "empty mind" or "no mind." As absence, empty mind attends to the ten thousand things [i.e., everything that exists] with mirrorlike clarity, and so the act of perception itself becomes a spiritual act: empty mind mirroring the world, leaving its ten thousand things utterly simple, utterly themselves, and utterly sufficient. This spiritual practice is a constant presence in classical Chinese, in its fundamentally pictographic nature. It is also the very fabric of Chinese poetry, manifest in its texture of imagistic clarity.

There is something unmistakably late twentieth century in Hinton's love for Tao and Ch'an, and in his way with it. Sometimes he overly domesticates this ancient wisdom, making it sound like a familiar form of progressive orthodoxy, as when he congratulates Taoism for being "deeply ecological" and "radically feminist." As with Rexroth, these Chinese poets can sound distinctly New Age. Just as often, though, Hinton makes the Chinese poets sound like late Heidegger, as when he writes of their interest in "dwelling," or translates the central Taoist concept *tzu-jan* as "occurrence appearing of itself," echoing Heidegger's translation of the Greek *physis* as "things ... insofar as they originate and come forth from themselves." (Both words, *tzu-jan* and *physis*, are more conventionally translated simply as Nature.) As with late Heidegger, and no doubt for the same historical reasons, Hinton admires a philosophy that seems more quietistic, modest, and anti-technological than Western rationalism.

Just how radical this detachment can become is apparent from Hinton's selections from the *Tao Te Ching*, the wisdom-classic traditionally attributed to Lao Tzu (a name that, Hinton remarks, "simply means 'Old Master'"). Again and again, this work advocates withdrawal from a world bound up with change and suffering:

Presence and absence give birth to

one another,

difficult and easy complete one another,

long and short measure one another,

high and low fill one another,

music and noise harmonize one

another,

before and after follow one another:

that's why a sage abides in the realm of

nothing's own doing,

living out that wordless teaching.

This diagnosis of the world and its becoming can sound like Platonism. But only a little: for what differs, radically, is Lao Tzu's prescription. The ideal here is not erotic-intellectual flight to a world of Being, but withdrawal into a world of Nothing. The wisdom of the sage is insistently negative:

Never bestow honors

and people won't quarrel.

Never prize rare treasures

and people won't steal.

Never flaunt alluring things

and people won't be confused.

"Honor is a contagion deep as fear,/renown a calamity profound as self," reads another section; "If we didn't have selves/ what calamity could touch us?" It is this wisdom, in which self-abnegation is pushed to the limits of possibility, that Hinton teaches us to find in the great Chinese poets. Wang Wei's restraint, his preference for a minimum of speech against a maximum of silence, thus comes to look like a Taoist gesture. In this context, it becomes easier to understand why Wang's treatment of Nature differs so radically from that of any Western poet before the twentieth century. English poetry uses nature to entice us into the world: it is a token of Creation's benevolence, or a summons to love and sex, or a teacher of wisdom, or a mirror of the self. For Wang, however, Nature is beautiful because it is the last stop on the mind's itinerary out of this world:

The cold river spreads boundless away.

Autumn rains darken azure-deep skies.

You ask about Whole-South Mountain:

mind knows far beyond white clouds.

With other poets, the Taoist, and later Buddhist, imperative toward withdrawal and renunciation is more explicit. Here is Tu Fu's "Thoughts":

Caught in the scramble for glory, we

people made bedlam lice of ourselves.

Before emperors, people ate their fill

and were content, then someone began

knotting ropes, and now we're mired

in the glue and varnish of government.

It all started with Sui, inventor of fire,

and Tung's fine histories made it utter

disaster. If you light candles and lamps,

you know moths will gather in swarms.

Search out through all eight horizons:

you find nothing anywhere but isolate

emptiness, departure and return one

movement, one ageless way of absence.

"Knotting ropes" was the original Chinese method of writing: here is a writer suggesting that it would have been better for human beings never to have learned how to write. And here, too, is a direct echo of the *Tao Te Ching*: "Let people knot ropes for notation again/and never need anything more."

These lines of Tu Fu, who as Hinton writes is "generally described as the greatest of China's poets," offer a very pointed expression of the paradox that runs through *Classical Chinese Poetry*. It is impossible to be at the same time a poet and a sage, because the sage insists on withdrawal, inactivity, selflessness, and silence, while the poet lives by observation, creation, introspection, and speech. The poet who achieved enlightenment would not, and could not, still write poetry. Yet the significant fact, of course, is that all these poets did still write poetry--which is to say, the fact that they kept writing poetry is reason enough to doubt whether the great Chinese poets were quite so devoted to withdrawal and enlightenment as Hinton's philosophical introductions suggest. Self-abnegation was their trope, and perhaps even their ideal, but it was never their practice: they were too committed to perception and expression to desire a radical or permanent detachment.

It is true that almost all these poets wrote poems scorning the *beau monde* of the imperial capital, Chang'an--in the T'ang period, probably the largest city on earth--and declaring their longing for the simple life of the mountain recluse. Indeed, at "the head of the great Chinese poetic tradition," Hinton

observes, stands T'ao Ch'ien, a nom de plume that means "Recluse T'ao." T'ao Ch'ien lived from 365 to 427, and became an exemplary figure to the T'ang poets, three centuries later, because he preferred a humble life as a farmer to the intrigue and glamour of the court. As he writes in "Home Again Among Fields and Gardens":

Nothing like all the others, even as a

child,

rooted in such love for hills and

mountains,

I stumbled into their net of dust,

that one

departure a blunder lasting thirteen

years.

But a tethered bird longs for its old

forest,

and a pond fish its deep waters--

so now,

my southern outlands cleared, I nurture

simplicity among these fields and

gardens,

home again.

This Horatian note is struck again and again by the great T'ang poets. Wang Wei addresses a poem to an imperial official named Vice-Magistrate Chang: "Mind free of all ten thousand affairs,/selfregard free of all those grand schemes,/I return to my old forest, knowing empty." Li Po's "Mountain Dialogue" is a recluse's boast:

You ask why I've settled in these

emerald mountains:

I smile, mind of itself perfectly idle,

and say nothing.

Peach blossoms drift streamwater

away deep in mystery

here, another heaven and earth,

nowhere people know.

And Tu Fu writes idyllically about "The River Village" where "My wife draws a paper chessboard,/and tapping at needles, the kids contrive fishhooks./Often sick, I need drugs and herbs--but what more,/come to all this, what more could a simple man ask?"

Reading such poems, it is easy to forget that their audience was precisely the well-connected literati who staffed the imperial bureaucracy, and that each of these poets eagerly pursued an official career. Even a poet such as Meng Hao-Jan--who, Hinton writes, "never left his native region to follow a government career," but "cultivated the independence of a simple life in his home mountains"--knows that he is writing for the capital: one of his poems is titled "Sent to Ch'ao, the Palace Reviser," and contrasts the bureaucrat's "rue- scented libraries" with his own "bamboo-leaf gardens." Wang Wei came from a prominent family and rose to a high position in the bureaucracy. For Hinton, however, this is essentially irrelevant to his poetry: "Wang enjoyed a long and successful career in the government ... but it is clear that he found his truest self in mountain solitude." Likewise, Wei Ying-Wu, who "never left government service completely," was still "by nature a recluse." All this is entirely in keeping with Hinton's view of Chinese poets as teachers of Taoist-Buddhist wisdom.

But there is another way to look at these poets. It is possible to see them as worldly and sophisticated men who--like Horace, or like the Elizabethan court poets--found it creditable to praise rusticity, without intending to practice it unless bad luck and old age compelled them to do so. (If it is a sort of Stoicism that these poets seem to espouse, it is worth remembering that the great Stoics of Rome, Seneca and Cicero, spent their lives in the corridors of power.) As Stephen Owen notes, "Most High T'ang poets either served the state or wished to do so: the disdain for high office expressed by many famous poets was sporadic, and rarely accompanied by the conviction of action when an attractive opportunity for service was offered." This is not a question of hypocrisy or bad faith, but of the complex ways in which ideals and realities shape each other for any individual in any culture. It is telling that one of the standard subjects of Chinese poetry was visiting a remote monastery: they were good places to visit, but would the poet really want to live there? If he did, who would see his poetry?

The exception that proves this rule, in *Classical Chinese Poetry*, is Han Shan, whose name means Cold Mountain. There was in fact no such person, only a collection of poems that legend attributed to a wild monk who lived on Cold Mountain, writing verses on rocks and trees. In these poems, Hinton observes, the ambiguity of Chinese grammar makes it unclear whether the Cold Mountain that speaks is the author or the mountain itself:

Everyone who glimpses Cold Mountain

starts complaining about insane winds,

about a look human eyes can't endure

and a shape nothing but tattered robes.

They can't fathom these words of mine.

Theirs I won't even mention. I just tell

all those busy people bustling around:

Come face Cold Mountain for a change.

This elated contempt for the world is something different from most Chinese poets' philosophical disdain: it is more confrontational, and therefore sounds more authentic. It is no wonder that Gary Snyder's translation of the Cold Mountain poems was popular in the 1960s, since Han Shan can easily be made to sound like a counterculture dropout: "Go tell families with silverware and cars/ 'What's the use of all that noise and money?'" Snyder wrote, with Poundian anachronism.

But it is not necessary to change the stage properties of this thirteen- hundredyear-old poetry to make it sound contemporary. That is what David Young demonstrates in *Du Fu: A Life in Poetry*. (The names of most Chinese poets are familiar to English readers in the old Wade-Giles system of transliteration. The *pinyin* system, which became standard in the 1980s, can sometimes obscure their identities: it is clear enough that Du Fu is Tu Fu, but one would not necessarily recognize Li Bai as Li Po, or Bo Juyi as Po Chu-i.) The subtitle of Young's book explains his method. He arranges the poems of Tu Fu in chronological order and links them to the periods of his life, and of Chinese history, in which they were written.

Young is a poet with a self-confessed "limited knowledge of Chinese," a translator more on the Pound model than the Hinton model. But he insists that "my being able to situate a poet like Du Fu in the poetic practices of his time is more important, finally, than any fluency in Chinese," and his book offers strong support for this doubtful-sounding claim. For Tu Fu's life and times are a central part of his legend for Chinese readers. As Hinton says in *Classical Chinese Poetry*, he is known for "a realism that opened poetry to all aspects of human experience, from the intimate and concrete to the political and abstract, " and he is referred to as "the poet-historian." Hinton's selection of twenty-two poems gives the reader some sense of this realism, as in "First-Devotion Return Chant":

I come home to sounds of weeping,

wailing

cries for a child stone-dead now of

hunger.

Neighbors sob in the street. And who

am I

to master my grief like some sage,

ashamed

even to be a father--I whose son has

died

for simple lack of food?

This is a different world from the jade staircases and the gauze robes of Li Po's erotic lament, or the moss and the egrets of Wang Wei's nature scenes (though Tu Fu also writes those kinds of poems). And reading Young's *Du Fu* helps the reader to grasp just how completely the poet's verse flows from his experience.

The central event in Tu Fu's life was the An Lushan rebellion of 755, in which a rebel general took up arms against the T'ang emperor Xuanzong and captured Chang'an. The resulting civil war devastated China on a scale similar to the Thirty Years' War in Germany, and it disrupted the poet's life, embroiling him in political intrigues and making him a refugee for extended periods.

This biography leads Young to compare Tu Fu to such casualties of Europe's twentieth century as Paul Celan and Czeslaw Milosz, and to characterize his work as "a remarkable and spirited rejoinder to the disasters and contingencies of history." This interpretation informs both Young's selections and his translations. Here, for instance, is how he renders the heartbreaking passage about the death of Tu Fu's son, quoted above in Hinton's version:

thinking ahead to my wife

trying to cope with this weather

desperate to be with my family

I arrive at last to learn

my little son has died

probably from sheer hunger

and I stand and weep in the street

the neighbors crowd round me,

  weeping

my shame overwhelms me, a father

who couldn't feed his family....

Young's Tu Fu is considerably blunter, faster, and more casual than Hinton's--and doubtless less faithful to the original. But we do hear an individual human voice in these lines, a voice that we come to know and to sympathize with more and more deeply as Tu Fu's tragic story unfolds. By the end of Young's book, knowing as much as we now do about Tu Fu's constant displacements and long journeys, we are prepared to recognize the pathos of his self-description in "Ready to Go":

old age can't carry

sorrow's heavy burden

lots of able men

here at headquarters

fine people, you have done

brave deeds

I'm heading north

into the rain and snow

who'd spare a thought, even a tear,

for this traveler in shabby fur?

The poets of the T'ang Dynasty are by far the best known to English readers, and they make up the core of *Classical Chinese Poetry*. The poets of the subsequent Sung Dynasty, in the eleventh and twelfth centuries, are not nearly as celebrated. In 1971, when Kenneth Rexroth included the work of Su Tung-P'o and Lu Yu in his enormously influential *One Hundred Poems from the Chinese*, he complained that these Sung masters had never been translated into English, and were "not anthologized satisfactorily even in Chinese." Yet Rexroth also noted that "the whole spirit of this time in China is very congenial today, especially to the romantic, empirical-mystic and antinomian taste which has prevailed in the arts of the West since 1940"; and it is still true, I think, that the Sung poets feel more approachable, closer to us in sensibility and in approach, than their T'ang predecessors.

The Sung Dynasty restored order to China after the fifty-year period of anarchy that followed the collapse of the T'ang Dynasty in the early 900s. According to Hinton, the new regime "returned the country to stability, peace, and prosperity"; and fittingly, for a time of rebuilding and retrenchment, the Sung poets seem to speak with a certain disillusioned realism, even a conscious belatedness. They can be seen as the naturalists and confessional post- modernists to the brilliantly abstract T'ang modernists. "Rather than looking to a carefully constructed realm of artifice for insight," Hinton remarks, "they looked to the workaday world in which we live our actual lives." Reading Su Tung-P'o (1037-1101), the greatest poet of the Sung, we find ourselves in a world of imperial injustices and battered ideals that we have no trouble recognizing as our own:

On New Year's Eve I should be home

early,

but this office full of business keeps me.

Writing-brush in hand, hiding my tears,

I face all these bound prisoners, helpless

l

ittle people scrambling for food, snared

in the law's net, and no reason for

shame.

I'm no different: adoring a meager

salary,

I follow orders, losing my chance to live

quiet and far away. No telling who's

noble,

who vile: we're all just angling for a meal.

Could I free them for the holiday at

least?

I brood in shame before ancients who

did.

No doubt our own time of troubles, our own ugly and vicious world, which separates the world of *Cathay* from the world of *Classical Chinese Poetry*, is the reason why the Chinese poets seem to speak to us more intimately now when they speak of suffering and disillusionment rather than of beauty and perfection--or even, in David Hinton's magisterial book, of enlightenment.

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http://www.tnr.com/politics/story.html?id=cd5b73e0-bb67-4c8c-b986-14998b4382b9&p=1

Creativity chemical favours the smart

- 20 May 2009 by **Linda Geddes**

High levels of a chemical, which seems to increase creativity in really intelligent people, has the opposite effect in those of average intellect (Image: Dex Images / Getty)
THERE may be more to creativity than simply letting the ideas flow- brain measurements of a "creativity chemical" are revealing a complex interplay between ingenuity and intelligence. While high levels of the chemical in a certain part of the brain seem to increase creativity in really smart people, the reverse is true in those of average intellect.

N-acetyl-aspartate is found in neurons and seems to be associated with neural health and metabolism. Rex Jung at the University of New Mexico in Albuquerque and his colleagues already knew that high levels of NAA in the left parieto-occipital lobe, which coordinates sensory and visual information, were associated with intelligence.

To investigate whether NAA also plays a role in creativity, Jung's team measured NAA levels in various regions of the brain in 56 men and women aged 18 to 39. They also tested the volunteers' general intelligence and, more specifically, their capacity for divergent thinking, a factor in creativity that includes coming up with novel ideas, such as new uses for everyday objects.

Overall, volunteers' creativity scores correlated with levels of NAA in a brain region called the anterior cingulate gyrus (ACG), which regulates the activity of the frontal cortex - implicated in higher mental functions. But while low levels of NAA in the ACG correlated with high creativity in

people of average intelligence, in people with IQs of above 120, the reverse was true (*The Journal of Neuroscience*, DOI: 10.1523/jneurosci.0588-09.2009).

Jung speculates that if there is less NAA to regulate frontal cortex activity in "average" brains, they are freer to roam and find new ideas. In highly intelligent people, however, tighter control over the frontal cortex seems to enhance creativity. Perhaps this is because they are more likely to come up with new ideas anyway, and the tighter control allows them to "fine-tune" that ability.

"People say you have to let your mind wonder freely to be creative," says Jung. "For people of average intelligence, perhaps it's true that you need to utilise more areas of your [frontal cortex] for something truly novel and creative to emerge, but in more intelligent folks, there's something different going on."

Paul Howard-Jones of the University of Bristol, UK, agrees that different cognitive processes may underlie creativity in people with different IQs. "This backs up behavioural evidence for a threshold in IQ, beyond which the relationship with creativity changes," he says.

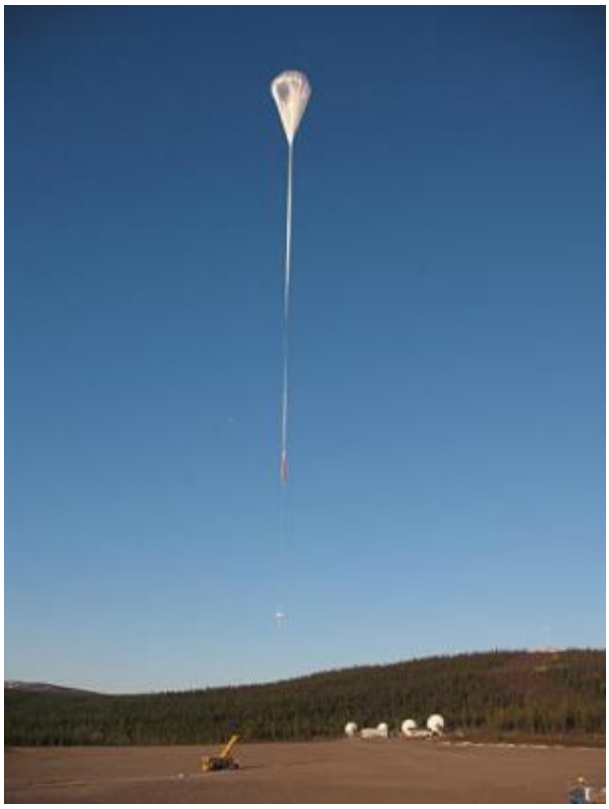
However, both Howard-Jones and Kenneth Heilman at the University of Florida caution that, since we don't fully understand how NAA affects neurons, Jung's conclusions remain speculative.

Heilman adds that it would be interesting to test whether NAA also correlates with a facet of creativity known as convergent thinking - the ability to bring lots of individual factors together into a single idea.

Jung also believes his findings could shed new light on what made the brains of creative geniuses like Einstein tick. "I don't think his IQ was ever tested, but it was likely around 120 - high, but not stratospheric," he says. "I would have loved to see what his ACG looked like, as IQ alone did not get him there, in my opinion, but rather intelligence plus creativity."

http://www.newscientist.com/article/mg20227084.300-creativity-chemical-favours-the-smart.html

Giant Balloon Flying High Over Atlantic To Catch Cosmic Rays



Launch of high-altitude balloon carrying cosmic ray detectors over Kiruna, Sweden, May 17, 2009. The balloon is made of a polyethylene film (the same material used to make trash bags) and weighs 4,150 pounds without its payload. (Credit: Photo by James Roth/University of Delaware)

ScienceDaily (May 22, 2009) — University of Delaware researchers in Sweden have launched a giant balloon taller than a football field that is now flying at the edge of space to collect data on cosmic rays -- the most super-charged particles in the universe.

The balloon, which is 396 feet tall and 459 feet in diameter when fully inflated, was set aloft at 4:34 a.m. on May 17 from Esrange Space Center near Kiruna, Sweden, in the Arctic Circle. It is flying at a speed of more than 40 knots and an altitude of nearly 27 miles. Its payload of cosmic ray detectors, housed in a pressurized shell, will be cut free in northwestern Canada and float back down to Earth on a parachute, and then secured and recovered, likely by helicopter.

Cosmic rays are extraterrestrial high-energy electrons, protons, and heavier nuclei that enter our atmosphere.

“The bulk of cosmic rays are likely produced by strong shock waves from Supernova explosions within our galaxy,” said John Clem, research associate professor of physics and astronomy at the University of Delaware's Bartol Research Institute. “It is well documented that these high-energy particles can threaten the health of astronauts in space and expose airline workers to radiation,” Clem noted.

With support from a $961,710 grant from NASA, Clem is leading a research team from UD and NASA's Columbia Scientific Balloon Facility in Palestine, Texas, to learn more about cosmic rays. The effort entails launching two helium-filled high-altitude balloons -- one to carry the “Low Energy Electrons” (LEE) instrument payload, which is now afloat, and one to carry the “Anti-Electron Sub-Orbital Payload” (AESOP), which will be in flight on May 23 and travel to the upper limits of the atmosphere.

Clem says about a thousand cosmic rays strike every square meter of Earth's atmosphere each second, depending somewhat on the location. The data from the balloon flights will be used to study solar modulation, the variation in cosmic ray intensity that is correlated with solar activity.

AESOP can detect electrons with energies up to about 10 gigaelectron volts, according to Clem. The instrument utilizes a system of different radiation detectors and a magnetic spectrometer to identify the particle's electric charge, energy, and mass. The major component in the magnetic spectrometer is the spark chamber.

AESOP's chambers contain five parallel aluminum plates connected, in alternate order, to ground and a high-voltage pulser. The medium between the plates is a slow-moving mixture of neon and helium. As a charged particle passes through a chamber, it leaves behind an ion trail in the gas. In the presence of a high electric field, the ions in the gas are accelerated toward the plate surface, resulting in a bright red vertical spark, which is digitized and recorded by a linear charge-coupled device (CCD) camera.

According to Clem, the level of solar activity rises and falls over a period of approximately 11 years and influences cosmic ray intensity. As solar activity rises, cosmic ray activity decreases. Currently, solar activity is low, and we are in a period of high cosmic ray intensity, Clem said.

“We're working to better understand how the sun's changing magnetic field affects cosmic ray propagation through the solar system,” Clem noted.

Clem's research team in Sweden includes senior electronics instrumentation specialists James Roth and Chris Elliott, who will be joined next week by Paul Evenson, professor and director of UD's Center for the Study of Space Radiation Effects, and Jessica Sun, who is working on her bachelor's degree in engineering at UD.

In 2002, the University of Delaware's LEE cosmic ray detector rode aboard the largest high-altitude balloon ever flown. The 60 million cubic foot balloon, fabricated by NASA's Columbia Scientific Balloon Facility, flew at a height of 161,000 feet from Lynn Lake in Manitoba, Canada.

Adapted from materials provided by University of Delaware.

http://www.sciencedaily.com/releases/2009/05/090521195147.htm

Biologists Call For Network Of Protected Rivers

An international research team has used the Guadiana River basin, in which 92% of the species are under threat, as a reference point to measure the loss of aquatic biodiversity and its conservation value. (Credit: Virgilio Hermoso / SINC)

ScienceDaily (May 22, 2009) — An international research team has used the Guadiana River basin, in which 92% of the species are under threat, as a reference point to measure the loss of aquatic biodiversity and its conservation value. A new study reveals that the state of fragmentation of Iberian river basins is "seriously endangering" the freshwater fish that inhabit them, and highlights the need to create new protected aquatic reserves.

"At present, conservation of waterways is both insufficient and inefficient, as water courses within nature reserves are nearly always used simply as administrative boundaries that do not guarantee the conservation of aquatic biodiversity", Virgilio Hemoso, chief author of the new study and a researcher at the University of Queensland, Australia, tells SINC.

The study, which has been published in the latest issue of *Hydrobiologia*, is based on the premise that there are few nature reserves for the conservation of aquatic biodiversity. "Rivers have been treated as being of secondary importance, unless they represent an opportunity to conserve the land environment", Hermoso adds.

To date, the criteria used to select protected areas have had "nothing to do with conservation", the scientist points out. Factors such as scenic value, lack of development, inaccessibility and low potential for commercial use are applied to select areas, resulting in "conservation strategies focused on areas that are the easiest to protect and with the least need for short-term protection."

In order to design a reserve system that protects aquatic biodiversity, the biologists evaluated the fish communities in the Guadiana River basin. With so few resources being devoted to conservation, and conservation itself competing with other human uses, the researcher stresses that "it is more sensible to focus conservation efforts on water courses with healthy populations".

In order to do this, the team measured potential biodiversity loss and calculated the conservation value. Their method highlights areas that have not suffered significant losses of biodiversity and which "are therefore worthy of special attention."

Guadiana River basin, a reference point in conservation

In the context of the Mediterranean, the Guadiana River basin stands out due to both its richness in freshwater fish species, "which is only comparable to that found in two other river basins: the River Po in northern Italy and the River Orontes in southern Turkey", and the degree to which it is threatened. "This makes it an ideal place to hone tools and processes which could be applied to other Mediterranean river basins", Hermoso states.

One of the main problems in the conservation of aquatic ecosystems is the lack of any evaluation of the biodiversity in areas under threat. Hermoso stresses: "Given the high degree of fragmentation of Iberian river basins, we need new studies to analyse the importance of the best-conserved areas and to design a system of reserves to protect all the species".

The team is now studying how to incorporate criteria relating to connectivity, ecological processes and the effects of climate change into the design of aquatic reserves. "These aspects are essential in order to ensure our reserves are able to react to future changes and to consolidate the long-term survival of species," Hermoso insists.

However, according to the scientist, "the best-conserved areas are not necessarily representative, and do not cover the needs of all the species in the reserves, such as migratory species or those which live downstream, experiencing high stress levels in areas where conservation is poor".

The biologists are in no doubt: incorporating degraded areas into the current aquatic reserve system would provide new opportunities for the conservation of biodiversity.

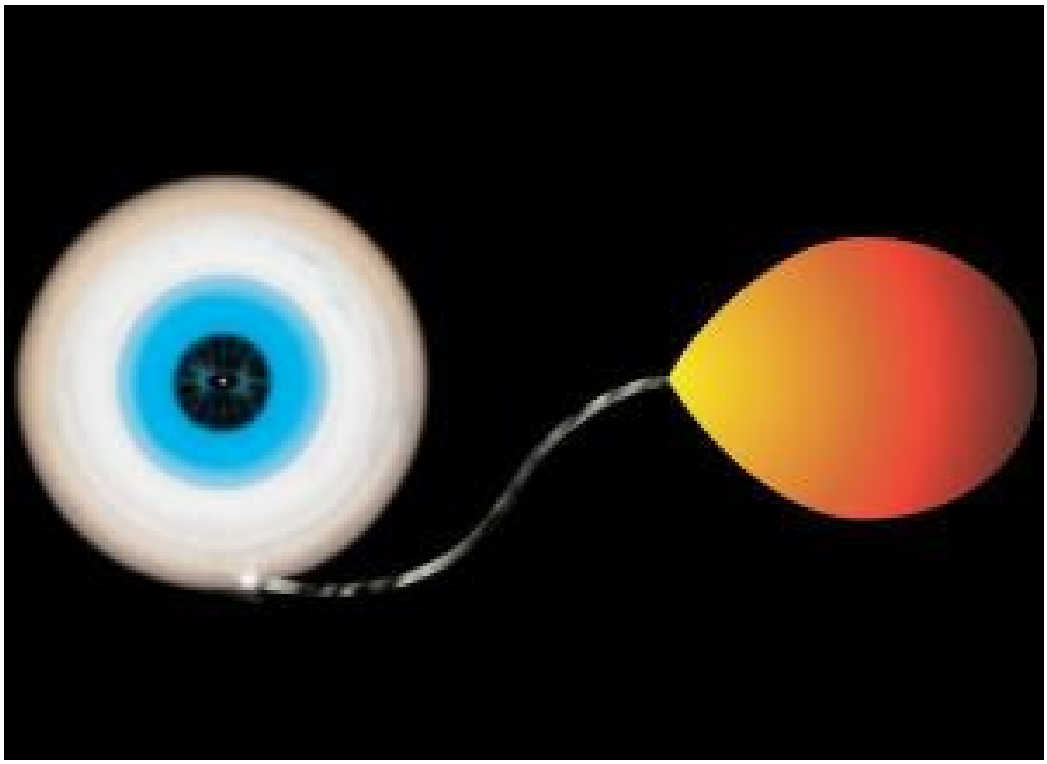
Journal reference:

1. Hermoso et al. **Identifying priority sites for the conservation of freshwater fish biodiversity in a Mediterranean basin with a high degree of threatened endemics**. *Hydrobiologia*, 2009; 623 (1): 127 DOI: 10.1007/s10750-008-9653-0

Adapted from materials provided by Plataforma SINC.

http://www.sciencedaily.com/releases/2009/05/090520140613.htm

'Missing Link': Revealing Fast-spinning Pulsar Mysteries



Rendering of material from distended "normal" star on right, streaming onto accretion disk (white and blue) surrounding neutron star, left. (Credit: Bill Saxton, NRAO/AUI/NSF)

ScienceDaily (May 22, 2009) — Astronomers have discovered a unique double-star system that represents a "missing link" stage in what they believe is the birth process of the most rapidly-spinning stars in the Universe -- millisecond pulsars.

"We've thought for some time that we knew how these pulsars get 'spun up' to rotate so swiftly, and this system looks like it's showing us the process in action," said Anne Archibald, of McGill University in Montreal, Canada.

Pulsars are superdense neutron stars, the remnants left after massive stars have exploded as supernovae. Their powerful magnetic fields generate lighthouse-like beams of light and radio waves that sweep around as the star rotates. Most rotate a few to tens of times a second, slowing down over thousands of years.

However, some, dubbed millisecond pulsars, rotate hundreds of times a second. Astronomers believe the fast rotation is caused by a companion star dumping material onto the neutron star and spinning it up. The material from the companion would form a flat, spinning disk around the neutron star, and during this period, the radio waves characteristic of a pulsar would not be seen coming from the system. As the amount of matter falling onto the neutron star decreased and stopped, the radio waves could emerge, and the object would be recognized as a pulsar.

This sequence of events is apparently what happened with a binary-star system some 4000 light-years from Earth. The millisecond pulsar in this system, called J1023, was discovered by the National Science Foundation's (NSF) Robert C. Byrd Green Bank Telescope (GBT) in West Virginia in 2007 in a survey led by astronomers at West Virginia University and the National Radio Astronomy Observatory (NRAO).

The astronomers then found that the object had been detected by NSF's Very Large Array (VLA) radio telescope during a large sky survey in 1998, and had been observed in visible light by the Sloan Digital Sky Survey in 1999, revealing a Sun-like star.

When observed again in 2000, the object had changed dramatically, showing evidence for a rotating disk of material, called an accretion disk, surrounding the neutron star. By May of 2002, the evidence for this disk had disappeared.

"This strange behavior puzzled astronomers, and there were several different theories for what the object could be," said Ingrid Stairs of the University of British Columbia, who has been visiting the Australia Telescope National Facility and Swinburne University this year.

The 2007 GBT observations showed that the object is a millisecond pulsar, spinning 592 times per second."No other millisecond pulsar has ever shown evidence for an accretion disk," Archibald said. "We know that another type of binary-star system, called a low-mass X-ray binary (LMXB), also contains a fast-spinning neutron star and an accretion disk, but these don't emit radio waves. We've thought that LMXBs probably are in the process of getting spun up, and will later emit radio waves as a pulsar. This object appears to be the 'missing link' connecting the two types of systems," she explained.

"It appears this thing has flipped from looking like an LMXB to looking like a pulsar, as it experienced an episode during which material pulled from the companion star formed an accretion disk around the neutron star. Later, that mass transfer stopped, the disk disappeared, and the pulsar emerged," said Scott Ransom of the NRAO.

The scientists have studied J1023 in detail with the GBT, with the Westerbork radio telescope in the Netherlands, with the Arecibo radio telescope in Puerto Rico, and with the Parkes radio telescope in Australia. Their results indicate that the neutron star's companion has less than half the Sun's mass, and orbits the neutron star once every four hours and 45 minutes.

"This system gives us an unparalled 'cosmic laboratory' for studying how millisecond pulsars evolve," Stairs said. Maura McLaughlin, of West Virginia University, agrees: "Future observations of this system at radio and other wavelengths are sure to hold many surprises."

Archibald, Ransom, Stairs and McLaughlin are members of an international scientific team with representatives from McGill University, the University of British Columbia, the NRAO, West Virginia University, and others. The scientists announced their discovery in the May 21 online issue of the journal *Science*.

The National Radio Astronomy Observatory is a facility of the National Science Foundation, operated under cooperative agreement by Associated Universities, Inc.

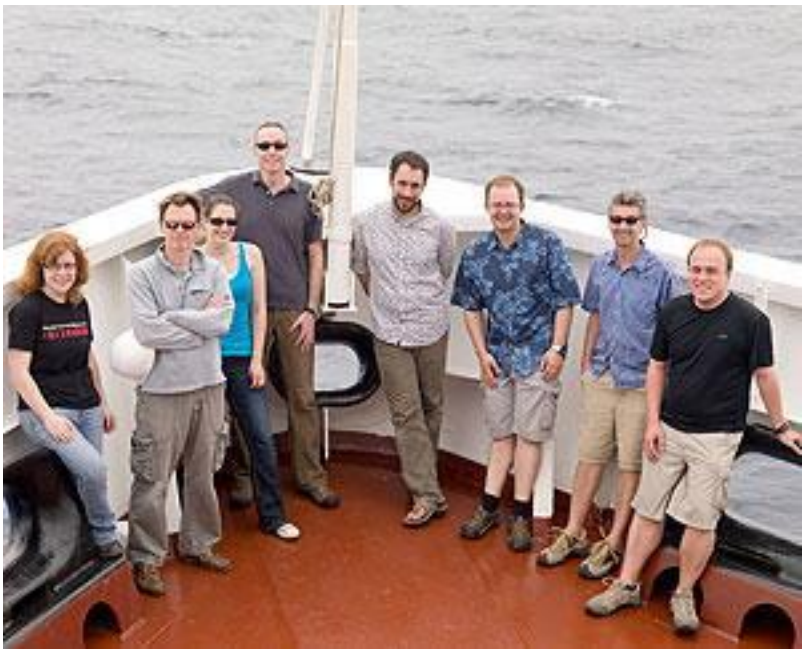
Journal reference:

1. Archibald et al. **A Radio Pulsar/X-ray Binary Link**. *Science*, 2009; DOI: 10.1126/science.1172740

Adapted from materials provided by National Radio Astronomy Observatory.

http://mail.google.com/mail/?hl=es&tab=wm#inbox/12167a06ca6363de

Earth's Climate And Ocean Acidification History



A scientific research cruise following the palaeo-equator has uncovered nearly 53 million years of climate and ocean acidification history. (Credit: Image courtesy of National Oceanography Centre, University of Southampton)

ScienceDaily (May 22, 2009) — A scientific research cruise following the palaeo-equator has uncovered nearly 53 million years of climate and ocean acidification history. Three scientists from the National Oceanography Centre, Southampton were onboard.

The Integrated Ocean Drilling Program drillship JOIDES Resolution has returned to Honolulu after a two-month voyage to chart the detailed climate history of the Earth. This was the first of two voyages of the 'Pacific Equatorial Age Transect' project, and the first international scientific drilling expedition since the JOIDES Resolution underwent a multi-year, more than $100-million transformation into a 21st century floating science laboratory. Onboard were 29 scientists from seven nations, 25 technicians, and an international crew of 66.

The first expedition, led by Heiko Pälike of the University of Southampton's School of Ocean and Earth Science, based at the Centre, and Hiroshi Nishi (Sapporo, Japan), ended on 4 May after successfully coring over 3.5 km of the sediments and rocks from below the Pacific Ocean seafloor. A second expedition to the equatorial Pacific will depart Honolulu, Hawaii, on 9 May and will recover sediment cores from the seafloor at three more drilling locations.

The entire scientific team is made up of 60 scientists from over 15 different countries and represents scientists at every stage of their career from graduate students to senior professors. Scientists, drillers, and technical staff participated in live interactive video conferences with enthused students and teachers who learned about the expedition's discoveries, ocean drilling, and life at sea. The scientists supported by the UK are Heiko Pälike, Paul Wilson, Edgar Kirsty (National Oceanography Centre, Southampton), Paul Bown and Tom Dunkley Jones (University College London), and Peter Fitch (University of Leicester).

The scientists are using mud and rocks from far below the equatorial Pacific Ocean floor to uncover details about the climate history on Earth. The sediment layers recovered from six drilling locations act like pages from a book, and record inch-by-inch Earth's climate history. The two-month expedition succeeded in obtaining records ranging from the present to the warmest sustained 'greenhouse' period on

Earth around 53 million years ago. At that time, alligators lived as far north as the Arctic, and palm trees grew in the Rocky Mountains. Reconstructions have shown that there were no significant polar ice caps, and greenhouse gas concentrations were several times higher than today.

The super-greenhouse early Eocene was followed by gradual cooling and the sudden buildup of major ice caps on Antarctica around 34 million years ago, leaving its mark in the equatorial sediment cores that the scientists are bringing back to Hawaii. The voyage discovered the effect of large-scale climatic changes on the oceans of the past. 53 million years ago, carbon dioxide in the atmosphere was much higher than today, and made the ocean much more acidic, such that only little carbonate is preserved in sediments recovered from those times. In contrast, during the buildup of ice on Antarctica, the ocean became less acidic very rapidly, and more carbonate was suddenly preserved in the deep ocean. The transition from warm to cool climates took place in less than 100,000 years – well within the time span that humans have been living on our planet.

The onboard studies revealed that changes in ocean acidification, linked to climatic change, have a large and global impact on marine organisms. Co-Chief Scientist Heiko Pälike remarked: "It is truly awesome to see 53 million years of Earth's history pulled up onto the drill ship's deck, and then to pass through our hands and past our eyes. We saw the effects of Earth's climate machine in action. Ocean drilling is the equivalent of the space programme to the Earth Sciences, and this truly international exploration would not have been possible without more than 40 years of scientific drilling research helping us find the best places to drill."

Because of the important role of the equatorial Pacific in climate processes, environmental changes are recorded by shells of microfossils the size of a pinhead that make up the sediments, which the international group of scientists have now brought from more than three miles below the sea surface onboard the unique scientific drilling vessel JOIDES Resolution.

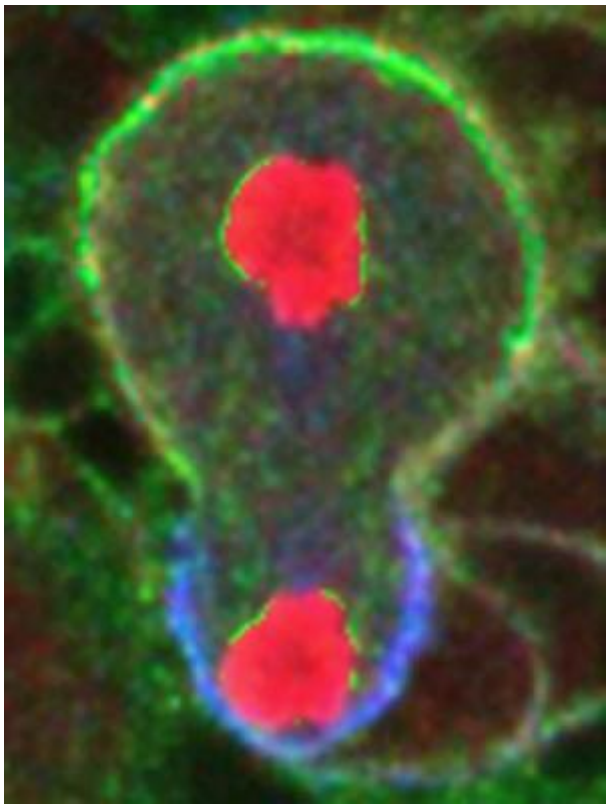
"We can use the microfossils and layers of this superb sediment archive as a 'yardstick' for measuring geological time. This will allow us to determine the rates of environmental change, such as the rapid first expansion of large ice-sheets in the Antarctic 33.8 million years ago," said Expedition Co-Chief Scientist Hiroshi Nishi. "This polar process had a profound impact on phytoplankton even at the Equator. We managed to catch several records of this important climatic transition."

The JOIDES Resolution is a research vessel with unique capabilities for exploring and monitoring the sub-seafloor; it operates as part of the Integrated Ocean Drilling Program (IODP). IODP is supported by the US National Science Foundation and Japan's MEXT. Additional programme support comes from the European Consortium for Ocean Research Drilling (ECORD) to which the UK Natural Environment Research Council (NERC) contributes. Other contributors are India (Ministry of Earth Sciences), the People's Republic of China (Ministry of Science and Technology), the Republic of Korea (Korea Institute of Geoscience and Mineral Resources), Australia and New Zealand. The JOIDES Resolution is now poised to help IODP continue to push the envelope of science by collecting unique sub-seafloor samples and data that would otherwise remain out of reach to researchers.

Adapted from materials provided by National Oceanography Centre, University of Southampton

http://www.sciencedaily.com/releases/2009/05/090519111031.htm

How An Enzyme Tells Stem Cells Which Way To Divide



aPKC is shown in green at the top half of a fruit fly neuroblast. Miranda, in blue, has been driven away to the opposite side. Upon division, the top half will remain a stem cell, while the bottom will become a differentiated cell. (Credit: Courtesy of Kenneth Prehoda)

ScienceDaily (May 21, 2009) — Driving Miranda, a protein in fruit flies crucial to switch a stem cell's fate, is not as complex as biologists thought, according to University of Oregon biochemists. They've found that one enzyme (aPKC) stands alone and acts as a traffic cop that directs which roads daughter cells will take.

"Wherever aPKC is at on a cell's cortex or membrane, Miranda isn't," says Kenneth E. Prehoda, a professor in the chemistry department and member of the UO's Institute of Molecular Biology. When a stem cell duplicates into daughter cells, the side, or cortical domain, containing aPKC (atypical protein kinase C) continues as a stem cell, while the other domain with Miranda becomes a differentiated cell such as a neuron that forms the central nervous system.

Prehoda and co-author Scott X. Atwood, who studied in Prehoda's lab and recently earned his doctorate, describe how the mechanism works in the May 12 issue of the journal *Current Biology*.

Instead of a complex cascade of protein deactivation steps that many biologists have theorized, Prehoda said, aPKC strips phosphate off an energy-transfer nucleotide known as ATP and then attaches it to Miranda. This process forces Miranda away from aPKC and helps determine the fates of subsequent daughter cells.

"This process is pretty simple," he said, when viewed from a biochemical perspective. "What happens is that Miranda gets phosphorylated by aPKC, turning it into an inactivated substrate and pushing it into another location in the cell."

Much of the paper in Current Biology is devoted to why the more complex scenarios are not accurate. "There have been a lot of ideas on how this works, and most seemed to be really complicated and difficult to explain. We have found it's a much simpler mechanism," Prehoda said, adding that the mechanism likely is similar in many other types of cells, not just stem cells.

"It's a basic-research question. How does this polarity occur? In order to develop stem cell-specific therapeutics based on a rational methodology you have to understand the mechanism," he said.

If Miranda is improperly isolated into other regions by aPKC, the stem cell divides symmetrically, with both daughter cells adopting the same fate, In turn, Prehoda said, these cells can become tumorous as they continue to rapidly divide without proper polarization.

The National Institutes of Health supported the research through a Developmental Biology Training Grant to Atwood and a research grant to Prehoda.

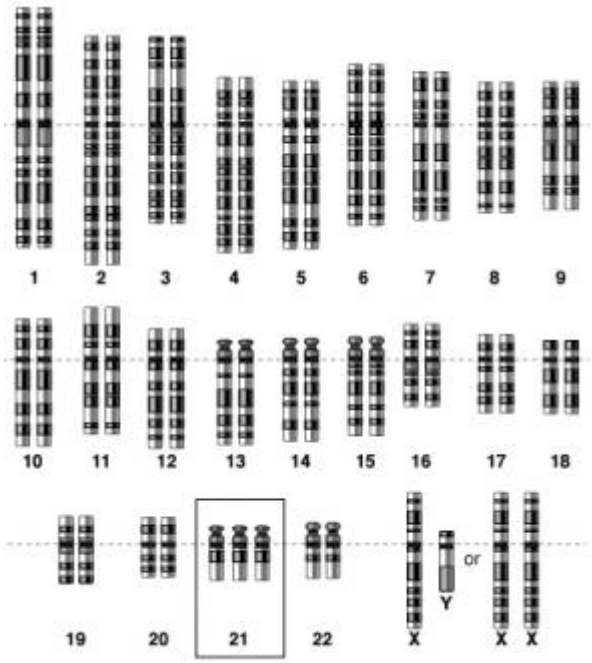
Journal reference:

1. Scott X. Atwood, Kenneth E. Prehoda. **aPKC Phosphorylates Miranda to Polarize Fate Determinants during Neuroblast Asymmetric Cell Division**. *Current Biology*, 2009; 19 (9): 723 DOI: 10.1016/j.cub.2009.03.056

Adapted from materials provided by University of Oregon.

http://www.sciencedaily.com/releases/2009/05/090514102102.htm

Why Do People With Down Syndrome Have Less Cancer? Research In Mice And Human Stem Cells Suggests New Therapeutic Targets



Karyotype for trisomy Down syndrome. Notice the three copies of chromosome 21. (Credit: Image courtesy of Talking Glossary of Genetics, NIH/National Human Genome Research Institute)

ScienceDaily (May 21, 2009) — Most cancers are rare in people with Down syndrome, whose overall cancer mortality is below 10 percent of that in the general population. Since they have an extra copy of chromosome 21, it's been proposed that people with Down syndrome may be getting an extra dose of one or more cancer-protective genes.

The late cancer researcher Judah Folkman, MD, founder of the Vascular Biology Program at Children's Hospital Boston, popularized the notion that they might be benefiting from a gene that blocks angiogenesis, the development of blood vessels essential for cancer's growth, since their incidence of other angiogenesis-related diseases like macular degeneration is also lower.

A study from Children's now confirms this idea in mice and human cells, and identifies specific new therapeutic targets for treating cancer.

Publishing online May 20 in the journal *Nature*, cancer researcher Sandra Ryeom, PhD, and colleagues from Children's Vascular Biology Program show that a single extra copy of Dscr1 (one of the 231 genes on chromosome 21 affected by trisomy, with three copies rather than two) is sufficient to significantly suppress angiogenesis and tumor growth in mice, as well as angiogenesis in human cells. The team also found its protein, DSCR1, to be elevated in tissues from people with Down syndrome and in a mouse model of the disease.

Further study confirmed that DSCR1 acts by suppressing signaling by the angiogenesis-promoting protein vascular endothelial growth factor (VEGF). In a mouse model of Down syndrome, endothelial cells (which make up blood vessel walls) showed a decreased growth response to VEGF when they had an extra copy of Dscr1. An extra copy of another chromosome 21 gene, Dyrk1A, also appeared to decrease cells' response to VEGF.

Finally, Ryeom and colleagues showed that these extra genes suppress VEGF signaling via a specific signaling pathway inside endothelial cells -- the calcineurin pathway. Until now, Ryeom says, little has been known about the internal pathways VEGF activates once it binds to cellular receptors; most existing anti-VEGF drugs work by simply binding to VEGF (like Avastin) or blocking its ability to bind to its cellular receptors.

"We're now moving further downstream by going inside the cell," Ryeom says. "When we targeted calcineurin, we suppressed the ability of endothelial cells to grow and form vessels. While it's likely not the only pathway that's involved, if you take it out, VEGF is only half as effective."

Ryeom and her group next validated the mouse findings in human cells. In collaboration with George Daley, MD, PhD, and colleagues in the Stem Cell program at Children's, she worked with induced pluripotent stem cells (iPS cells) created from skin cells from a patient with Down syndrome -- one of 10 disease-specific lines recently developed in Daley's lab.

Knowing that iPS cells tend to induce tumors known as teratomas when inserted into mice, Ryeom guessed that teratomas grown from iPS cells with an extra chromosome 21 would have far fewer blood vessels than teratomas from iPS cells with the normal number of chromosomes. She was right: blood vessels budded in the Down teratomas, but never fully formed.

"The studies in the iPS cells helped validate and confirm that the suppression of angiogenesis that we saw in mouse models also holds true in humans," says Ryeom. "It suggests that these two genes might point to a viable cancer therapy."

Ryeom's group has identified which part of the DSCR1 protein blocks calcineurin and is testing to see whether that fragment can be delivered specifically to endothelial cells, to prevent them from forming new blood vessels, without affecting calcineurin pathways in other cells and causing side effects. "Immunosuppressive drugs also target calcineurin in T-cells," Ryeom notes. "We think that Dscr1 blocks calcineurin specifically in endothelial cells, without affecting T-cells, but we need to check."

Folkman's interest in why patients with Down syndrome have such a reduced risk for cancer focused on endostatin, an anti-angiogenic compound made by the body. Discovered in the Folkman lab, endostatin is a fragment of collagen 18 -- whose gene is also on chromosome 21. People with Down syndrome reportedly have almost doubled levels of endostatin because of the extra copy of the gene.

"I think there may be four or five genes on chromosome 21 that are necessary for angiogenesis suppression," says Ryeom. "In huge databases of cancer patients with solid tumors, there are very few with Down syndrome. This suggests that protection from chromosome 21 genes is pretty complete."

The study was funded by the Howard Hughes Medical Institute, the Harvard Stem Cell Institute and the NIH Director's Pioneer Award (supporting George Daley, MD, PhD); as well as the Smith Family Medical Foundation, the Garrett B. Smith Foundation and Annie's Fun Foundation (supporting Sandra Ryeom, PhD). Kwan-Hyuck Baek, PhD, of Children's Vascular Biology program was the paper's first author.

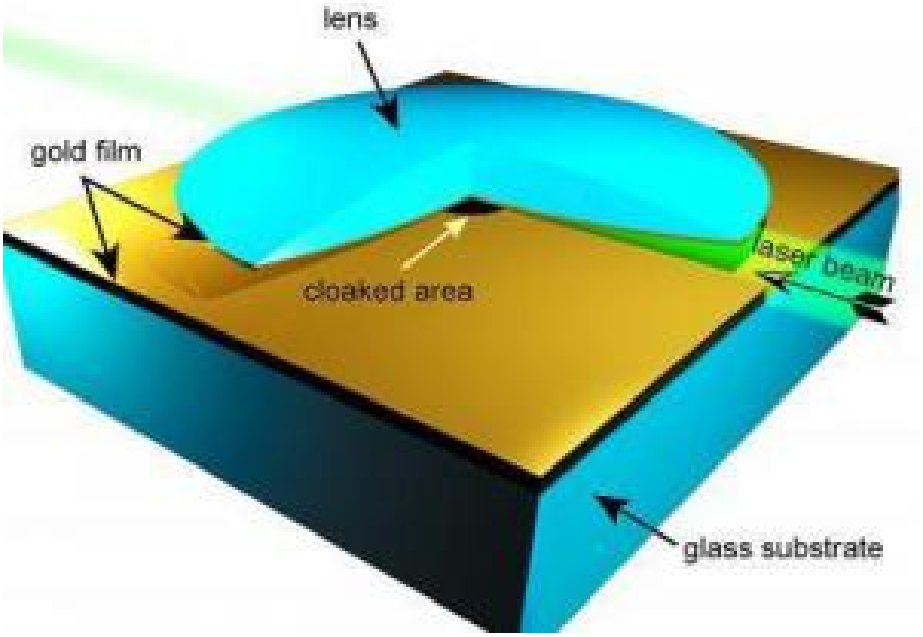
Journal reference:

1. Kwan-Hyuck Baek, Alexander Zaslavsky, Ryan C. Lynch, Carmella Britt, Yoshiaki Okada, Richard J. Siarey, M. William Lensch, In-Hyun Park, Sam S. Yoon, Takashi Minami, Julie R. Korenberg, Judah Folkman, George Q. Daley, William C. Aird, Zygmunt Galdzicki & Sandra Ryeom. **Down's syndrome suppression of tumour growth and the role of the calcineurin inhibitor DSCR1**. *Nature*, 2009; DOI: 10.1038/nature08062

Adapted from materials provided by Children's Hospital Boston, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090520140359.htm

New 'Broadband' Cloaking Technology Simple To Manufacture



This image shows the design of a new type of invisibility cloak that is simpler than previous designs and works for all colors of the visible spectrum, making it possible to cloak larger objects than before and possibly leading to practical applications in "transformation optics." (Credit: Purdue University)

ScienceDaily (May 21, 2009) — Researchers have created a new type of invisibility cloak that is simpler than previous designs and works for all colors of the visible spectrum, making it possible to cloak larger objects than before and possibly leading to practical applications in "transformation optics."

Whereas previous cloaking designs have used exotic "metamaterials," which require complex nanofabrication, the new design is a far simpler device based on a "tapered optical waveguide," said Vladimir Shalaev, Purdue University's Robert and Anne Burnett Professor of Electrical and Computer Engineering.

Waveguides represent established technology - including fiber optics - used in communications and other commercial applications.The research team used their specially tapered waveguide to cloak an area 100 times larger than the wavelengths of light shined by a laser into the device, an unprecedented achievement. Previous experiments with metamaterials have been limited to cloaking regions only a few times larger than the wavelengths of visible light.

Because the new method enabled the researchers to dramatically increase the cloaked area, the technology offers hope of cloaking larger objects, Shalaev said.Findings are detailed in a research paper appearing May 29 in the journal *Physical Review Letters*. The paper was written by Igor I. Smolyaninov, a principal electronic engineer at BAE Systems in Washington, D.C.; Vera N. Smolyaninova, an assistant professor of physics at Towson University in Maryland; Alexander Kildishev, a principal research scientist at Purdue's Birck Nanotechnology Center; and Shalaev.

"All previous attempts at optical cloaking have involved very complicated nanofabrication of metamaterials containing many elements, which makes it very difficult to cloak large objects," Shalaev said. "Here, we showed that if a waveguide is tapered properly it acts like a sophisticated nanostructured material."

The waveguide is inherently broadband, meaning it could be used to cloak the full range of the visible light spectrum. Unlike metamaterials, which contain many light-absorbing metal components, only a small portion of the new design contains metal.

Theoretical work for the design was led by Purdue, with BAE Systems leading work to fabricate the device, which is formed by two gold-coated surfaces, one a curved lens and the other a flat sheet. The researchers cloaked an object about 50 microns in diameter, or roughly the width of a human hair, in the center of the waveguide.

"Instead of being reflected as normally would happen, the light flows around the object and shows up on the other side, like water flowing around a stone," Shalaev said.The research falls within a new field called transformation optics, which may usher in a host of radical advances, including cloaking; powerful "hyperlenses" resulting in microscopes 10 times more powerful than today's and able to see objects as small as DNA; computers and consumer electronics that use light instead of electronic signals to process information; advanced sensors; and more efficient solar collectors.

Unlike natural materials, metamaterials are able to reduce the "index of refraction" to less than one or less than zero. Refraction occurs as electromagnetic waves, including light, bend when passing from one material into another. It causes the bent-stick-in-water effect, which occurs when a stick placed in a glass of water appears bent when viewed from the outside. Each material has its own refraction index, which describes how much light will bend in that particular material and defines how much the speed of light slows down while passing through a material.Natural materials typically have refractive indices greater than one. Metamaterials, however, can be designed to make the index of refraction vary from zero to one, which is needed for cloaking.

The precisely tapered shape of the new waveguide alters the refractive index in the same way as metamaterials, gradually increasing the index from zero to 1 along the curved surface of the lens, Shalaev said.Previous cloaking devices have been able to cloak only a single frequency of light, meaning many nested devices would be needed to render an object invisible.

Kildishev reasoned that the same nesting effect might be mimicked with the waveguide design. Subsequent experiments and theoretical modeling proved the concept correct.

Researchers do not know of any fundamental limit to the size of objects that could be cloaked, but additional work will be needed to further develop the technique.

Recent cloaking findings reported by researchers at other institutions have concentrated on a technique that camouflages features against a background. This work, which uses metamaterials, is akin to rendering bumps on a carpet invisible by allowing them to blend in with the carpet, whereas the Purdue-based work concentrates on enabling light to flow around an object.

Journal reference:

1. Igor I. Smolyaninov, Vera N. Smolyaninova, Alexander V. Kildishev, Vladimir M. Shalaev. **Anisotropic Metamaterials Emulated by Tapered Waveguides: Application to Optical Cloaking**. *Physical Review Letters*, 2009; (submitted) [link]

Adapted from materials provided by Purdue University.

http://www.sciencedaily.com/releases/2009/05/090520151438.htm

Robotic Therapy Holds Promise For Cerebral Palsy

A young patient tests out an MIT-developed robotic therapy device at Blythedale Children's Hospital in Westchester County, N.Y. (Credit: Photo / Peter Lang)

ScienceDaily (May 21, 2009) — Over the past few years, MIT engineers have successfully tested robotic devices to help stroke patients learn to control their arms and legs. Now, they're building on that work to help children with cerebral palsy.

"Robotic therapy can potentially help reduce impairment and facilitate neuro-development of youngsters with cerebral palsy," says Hermano Igo Krebs, principal research scientist in mechanical engineering and one of the project's leaders.

Krebs and others at MIT, including professor of mechanical engineering Neville Hogan, pioneered the use of robotic therapy in the late 1980s, and since then the field has taken off.

"We started with stroke because it's the biggest elephant in the room, and then started to build it out to other areas, including cerebral palsy as well as multiple sclerosis, Parkinson's disease and spinal cord injury," says Krebs.

The team's suite of robots for shoulder-and-elbow, wrist, hand and ankle has been in clinical trials for more than 15 years with more than 400 stroke patients. The Department of Veterans Affairs has just completed a large-scale, randomized, multi-site clinical study with these devices.

All the devices are based on the same principle: that it is possible to help rebuild brain connections using robotic devices that gently guide the limb as a patient tries to make a specific movement.

When the researchers first decided to apply their work to children with cerebral palsy, Krebs was optimistic that it would succeed, because children's developing brains are more plastic than adults', meaning they are more able to establish new connections.

The MIT team is focusing on improving cerebral palsy patients' ability to reach for and grasp objects. Patients handshake with the robot via a handle, which is connected to a computer monitor that displays tasks similar to those of simple video games.

In a typical task, the youngster attempts to move the robot handle toward a moving or stationary target shown on the computer monitor. If the child starts moving in the wrong direction or does not move, the robotic arm gently nudges the child's arm in the right direction.

Krebs began working in robotic therapy as a graduate student at MIT almost 20 years ago. In his early studies, he and his colleagues found that it's important for stroke patients to make a conscious effort during physical therapy. When signals from the brain are paired with assisted movement from the robot, it helps the brain form new connections that help it relearn to move the limb on its own.

Even though a stroke kills many neurons, "the remaining neurons can very quickly establish new synapses or reinforce dormant synapses," says Krebs.

For this type of therapy to be effective, many repetitions are required — at least 400 in an hour-long session.

Results from three published pilot studies involving 36 children suggest that cerebral palsy patients can also benefit from robotic therapy. The studies indicate that robot-mediated therapy helped the children reduce impairment and improve the smoothness and speed of their reaching motions.

The researchers applied their work to stroke patients first because it is such a widespread problem — about 800,000 people suffer strokes in the United States every year. About 10,000 babies develop cerebral palsy in the United States each year, but there is more potential for long-term benefit for children with cerebral palsy.

"In the long run, people that have a stroke, if they are 70 or 80 years old, might stay with us for an average of 5 or 6 years after the stroke," says Krebs. "In the case of cerebral palsy, there is a whole life."

Most of the clinical work testing the device with cerebral palsy patients has been done at Blythedale Children's Hospital in Westchester County, N.Y., and Spaulding Rehabilitation Hospital in Boston. Other hospitals around the country and abroad are also testing various MIT-developed robotic therapy devices.

Krebs' team has focused first on robotic devices to help cerebral palsy patients with upper body therapy, but they have also initiated a project to design a pediatric robot for the ankle.

Among Krebs' and Hogan's collaborators on the cerebral palsy work are Dr. Mindy Aisen '76, former head of the Department of Veterans Affairs Office of Research and Development and presently the director and CEO of the Cerebral Palsy International Research Foundation (CPIRF); Dr. Joelle Mast, chief medical officer, and Barbara Ladenheim, director of research, of Blythedale Children's Hospital; and Fletcher McDowell, former CEO of the Burke Rehabilitation Hospital and a member of the CPIRF board of directors.

MIT's work on robotic therapy devices is funded by CPIRF and the Niarchos Foundation, the Department of Veterans Affairs, the New York State NYSCORE, and the National Center for Medical Rehabilitation Research of the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

Adapted from materials provided by Massachusetts Institute of Technology.

http://www.sciencedaily.com/releases/2009/05/090520161335.htm

Area Of Brain That Makes A 'People Person' Discovered

Whether someone is a 'people-person' may depend on the structure of their brain, researchers have discovered. (Credit: iStockphoto/Jacob Wackerhausen)

ScienceDaily (May 21, 2009) — Cambridge University researchers have discovered that whether someone is a 'people-person' may depend on the structure of their brain: the greater the concentration of brain tissue in certain parts of the brain, the more likely they are to be a warm, sentimental person.

Why is it that some of us really enjoy the company of others while some people are detached and independent? In an effort to explore these questions, Maël Lebreton and colleagues from the Cambridge Department of Psychiatry, in collaboration with Oulu University, Finland, examined the relationship between personality and brain structure in 41 male volunteers.

The volunteers underwent a brain scan using Magnetic Resonance Imaging (MRI). They also completed a questionnaire that asked them to rate themselves on items such as 'I make a warm personal connection with most people', or 'I like to please other people as much as I can'. The answers to the questionnaire provide an overall measure of emotional warmth and sociability called social reward dependence.

The researchers then analysed the relationship between social reward dependence and the concentration of grey matter (brain-cell containing tissue) in different brain regions. They found that the greater the concentration of tissue in the orbitofrontal cortex (the outer strip of the brain just above the eyes), and in the ventral striatum (a deep structure in the centre of the brain), the higher they tended to score on the social reward dependence measure. The research is published in the European Journal of Neuroscience.

Dr Graham Murray, who is funded by the Medical Research Council and who led the research, said: "Sociability and emotional warmth are very complex features of our personality. This research helps us understand at a biological level why people differ in the degrees to which we express those traits." But he cautioned, "As this research is only correlational and cross-sectional, it cannot prove that brain structure

determines personality. It could even be that your personality, through experience, helps in part to determine your brain structure."

Interestingly, the orbitofrontal cortex and ventral striatum have previously been shown to be important for the brain's processing of much simpler rewards like sweet tastes or sexual stimuli.

Dr Murray explained: "It's interesting that the degree to which we find social interaction rewarding relates to the structure of our brains in regions that are important for very simple biological drives such as food, sweet liquids and sex. Perhaps this gives us a clue to how complex features like sentimentality and affection evolved from structures that in lower animals originally were only important for basic biological survival processes."

The research could also lead to new insights into psychiatric disorders where difficulties in social interaction are prominent, such as autism or schizophrenia.

"Patients with certain psychiatric conditions often experience difficulties in feeling emotional closeness, and this can have a big impact on their life. It could be that the cause of these difficulties is at least partly due to brain structural features of those disorders," said Dr Murray.

Journal reference:

1. . **The brain structural disposition to social interaction**. *European Journal of Neuroscience*, 20 May 2009

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

http://www.sciencedaily.com/releases/2009/05/090519214936.htm

Agricultural Aromatherapy: Lavender Oil As Natural Herbicide

Lavender flowers blooming in a field. (Credit: iStockphoto/Carly Hennigan)

ScienceDaily (May 21, 2009) — Could essential oils extracted from lavender be used as a natural herbicide to prevent weed growth among crops? Research carried out in Italy and reported in the current issue of the International Journal of Environment and Health suggests the answer may be yes.

Elena Sturchio of the National Institute of Health and Safety at Work in Rome and colleagues there and at the Department of Infectious and Tropical Diseases, and the Department Crop Production, at Tuscia University, in Viterbo, have investigated the inhibitory effects on weed growth of aromatic oils, or mixtures of phytochemicals, from plants such as lavender, Lavandula officinalis.

Essential oils, are as the name suggests, often the plant's "essence" in terms of odour. Essential oils are complex chemical mixtures of natural products made by the plant for its own purposes, including terpenes, alcohols, aldehydes and phenols. Indeed, several plant essential oils are present as natural inbuilt herbicides and pesticides.

Synthetic pesticides and herbicides have been in common use for decades and have protected crops from parasites, insects, bacteria, viruses, fungi, and eliminated weeds. However, by virtue of their design, these substances are toxic and in some cases thought to be carcinogenic. Their incorrect use or inadvertent exposure have been the focus of numerous studies on animal and human health, the results of which have led to serious initiatives to find alternative approaches to pest and weed control.

Other researchers have investigated the potential of essential oils from cinnamon plants, and peppermint to prevent seed germination of some weed species found in the Mediterranean region.

Sturchio and colleagues have investigated the effects of lavender oil on root growth in a plant, Vicia faba in trials. This weed has large chromosomes and so was also amenable to studies in the laboratory that investigated the genetic toxicity of the essential oil on the weed. Their analysis showed the oil to be

effective at killing the weed even at low concentration. Moreover, the oil affects growth of soil microbes and fungi involved in crop growth.

The team concludes that, "Essential oils could be useful as potential bioherbicides as an alternative strategy to the chemical remedy." They add that, "The use of phytochemicals permits the development for more sustainable agriculture at low environmental impact. Further studies are now needed to evaluate use of such oils "in the field".

The team points out that the oils would most likely be used either before planting or prior to transplantation of seedlings, so the essential oil would not have toxicity effects on the crop itself. Sturchio adds that, "essential oils are not accumulated in the environment, because of their low persistence due to the easy degradation by microbial and enzyme activity. This aspect could represent an advantage compared to the bioaccumulation of chemicals on soil."

Journal reference:

1. Miriam Zanellato, Eva Masciarelli, Laura Casorri, Priscilla Boccia, Elena Sturchio, Mario Pezzella, Andrea Cavalieri, Fabio Caporali. **The essential oils in agriculture as an alternative strategy to herbicides: a case study**. *International Journal of Environment and Health*, 2009; 3 (2): 198 DOI: 10.1504/IJENVH.2009.024878

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http://www.sciencedaily.com/releases/2009/05/090514083921.htm

It's the Future, Jim, But Not As We Know It

By: Michael Todd

This has been a solid summer for big-screen science fiction, with movies like *Terminator Salvation* pushing aside the successful resurrection of the *Star Trek* franchise, which in turn outshone the latest *X-Men* flick.

But to historian Michael Bess, the Chancellor's Professor of History at Vanderbilt University, such single-variable visions of tomorrow almost inevitably come up well short of a future that is already in sight.

As he says, changes in pharmaceuticals, bioelectronics and genetic manipulation have launched narratives that are usually ignored — both in fiction and in policymaking.

His poster child for this failure of imagination?

Meet George Jetson.

Jetson, the patriarch of a cartoon family, launched his animated arc in 1962 as *The Flintstones* of the future after that animated show — itself based on the live-action sitcom *The Honeymooners* — was a prime-time hit. *The Jetsons* depicted an average suburban family of the year 2062, but the family of the future looked a lot like the family of the present, Bess noted, "patriarchal dad, well-coiffed wife, tyrannical boss. ... What marked their world as different were the gadgets."

As he told a recent gathering at the Center for Nanotechnology in Society at the University of California, Santa Barbara, "The gadget-rich world encapsulates misconceptions of the future. Technologies will evolve while we humans remain the same. I call it the 'Jetsons fallacy.'"

Of course, George Jetson's two-dimensional shoulders are a little frail - even if "Astro" is there to help out - to bear all the blame. Bess points to *Star Trek* in all its incarnations, where the only routine body modifications are the chilling Borg, or *Star Wars*, where "strange beings exist alongside unmodified humans who are no different than what we have today.

"The exception is Darth Vader — a cyborg." And his redemption comes when he removes his prosthetic helmet — the subliminal message, Bess suggested, that "humans should be humans, not modified."

And even when popular speculative fiction does touch on body modification — think *Iron Man*, *The Incredible Hulk*, *Alien: Resurrection* or even *Inspector Gadget*, the modification is always the exception, not the routine.

To be fair, Bess acknowledged the goal of most science fiction is to make a buck, not a point — "to beguile us and not freak us out." And he doesn't paint every sci-fi work with the same brush, pointing to varied works like the dystopian classic *Brave New World* ("the only systematic effort to depict a world filled with genetically modified humans") and to the more recent film *Gattaca* (where "good ol' fashioned humans can still prevail" against the modified).

Bess is not a historian of speculative fiction per se — his last book was a nuanced look at the moral quandaries of World War II that dove well past the obvious milestones of the Holocaust and Hiroshima, and the book before that examined ecology and technical modernity in France.

And ultimately, he isn't really focused on science fiction at all, but on the real future that humans — policymakers and just plain folks — seem unwilling to confront. *The Jetsons* just make a handy prism for viewing that denial.**Multiple Human Species**
Bess suggested that the fiction reflects a fact: "We are psychologically unprepared for what will exist," something he feels is dangerous. "It presents a false image of blandness and business as usual, while a careful study points to a very different conclusion."

That conclusion might be the (genetically modified) elephant in the room right now. He suggested a historian in the year 2300 communicating about this time would almost certainly focus on the rise of biotechnology as the key story of today.Specifically, he follows three threads from that tapestry of redesigning the human platform: pharmaceuticals, implanted prostheses and genetic interventions. None are new, whether talking about drinking coffee, domesticating animals or installing peg-legs. And yet breeding several generations of prize sheep over years is a long way from cloning Dolly, and putting human insulin in cow's milk or helping the paralyzed use their brain signals to operate machinery represent amazing changes.

"A skeptic might say, 'This is hype. Haven't we always done this?'" Bess admitted. "But that misses the increase in potency. We have reached that qualitative threshold in all of these biotech arenas."

But to steal a line from the *Ringworld* series, sometimes there ain't no justice. Or to be exact, there's justice — or body enhancements — for those who can afford them.

And the result of that would be a speciation gap that mimics the current concerns about income inequality, both within a culture and between the first and third worlds.

"The division between the haves and the have-nots will then be inscribed in our biology," Bess suggested. He then asked a series of provocative questions.

How will parents cope with designing their offspring, and will they fall prey to fads? Will genetically based political parties arise? How will patents deal with enhancements that are seen as necessary and not just voluntary? Will personhood become a commodity? And as performance standards keep rising, what happens to those who reject enhancements?

"We accept levels of disparity as it is, but these will blow those up," he suggested.

One policy option might be the European focus on equality of health access, in which everyone has a theoretical ability for "basic" enhancement. "We may be forced to that sort of model for these enhancements, or else inequality would be even more severe," he said.

How about just legislating a stop?

"How much of a say do we really have on where this is going to go?" Bess asked rhetorically. "Some may think they have a say where this will go, but we probably can't stop them. As long as some subset of 6 billion people can afford this and want this, they will occur."And besides, these changes won't come in wolf's clothing, but in (probably cloned) sheep's skin, Bess said. "This all comes from medicine, the desire to heal the sick. And when the ability to do something to help someone opens up, who will say no? And thus it moves from treatment to enhancement."

He pointed to Ritalin, a drug marketed to combat attention deficit disorder now being repurposed by some college students as a studying aid. "What's morally wrong with becoming more cognitively adept," he posited, asking the sorts of complicated questions about benefits from any enhancement taken as a single advancement that look simpler when looking at all the permutations in concert.

Dissing Utopia

Bess is currently writing a two-volume book, tentatively titled, *Icarus 2.0: Justice and Identity in a Post-Bionic Civilization*, in which he deals with possible answers for the hard questions he's just asked in a sober and academic way. But in keeping with his swipe at poor George Jetson, the first volume of Icarus will be ... a science-fiction novel.

As such, it will extend a literary experiment he made in his second book, *The Light-Green Society: Ecology and Technological Modernity in France, 1960-2000*. Despite that tome's uber-academic title, one chapter was a fictional representation of where the policies of the French Greens were likely to lead the country. (Spoiler alert: He used the term "full-scale ecological utopia.")

Now, the first half of his bi-furcated latest work, Bess said, will lay out the world of 2088, and how some of the questions and policy choices may play out. Some of the subject matter will concern itself with the collateral and horrifying damage — enhanced animals that approach human intelligence but are neither fish nor foul, and whose defining trait is loneliness, or "mistakes who are persons," humans who still have rights and feelings but no place in society.

As such, the book will travel the path of much science fiction, where the goal is to beguile and not freak us out.

On the whole, Bess promised, the book will actually be utopian, at least compared to the disturbing visions of Orwell's *1984* or Huxley's *Brave New World*.

But it might be dystopian to those who treasure the status quo.

"It's a return to the big questions about the long-term survival of the species. We may survive, but we may not survive as something we recognize. I really think 50 years from now, people sitting around in a room like this will look really, really different" — and not like George Jetson at all.

http://www.miller-mccune.com/science_environment/future-not-as-we-know-it-1247

Reprocessing Nuclear Fuel Makes Sense, But Is It Sensible?

By: Max S. Power

Concern over global warming resulting from burning fossil fuels brings renewed interest in nuclear power. Some say that recycling uranium and other elements from nuclear fuel burned in reactors is a logical companion to nuclear electricity generation. The United States stopped reprocessing of fuel — recycling — in the late 1970s. Is it time to reconsider fuel reprocessing as well as nuclear power?

Recently, as I walked among the four massive structures that comprise the guts of Hanford's Waste Treatment Plant, I wondered about the validity of William Tucker's published claim that "there is no such thing as nuclear waste." After all, the Department of Energy is building the $12 billion-plus complex in southeast Washington's Columbia Basin just to deal with the leftovers from reprocessing nuclear fuel. In this case, reactors burned the fuel to produce plutonium.

nuclear power is a necessary alternative to carbon-fueled generation to meet base-load needs. Solar and wind generation, in this view, are not reliable 24/7 power providers.

At present, about 20 percent of U.S. electricity comes from nuclear plants, and the federal government has received or expects license applications for 30 new reactors. The present policy of the United States is that spent fuel from these reactors will be disposed of in a deep geologic formation, such as weapons waste that is stored at the Department of Energy's Waste Isolation Pilot Plant in New Mexico. Since 1987, the Nuclear Waste Policy Act has assumed that civilian nuclear waste would be at Yucca Mountain, Nev. However, both Congress and the Obama administration have suspended work developing a waste repository there.

Tucker and other recycling advocates argue not only that recycling makes sense here as in other environmental fields, but also that it will greatly reduce the volume of highly radioactive waste to be disposed. Concern about waste disposal long has been a major stumbling block to a reinvigorated nuclear power industry.

Opponents retort that the weapons proliferation concerns and costs that stymied reprocessing 30 years ago remain solid reasons to reject recycling nuclear reactor fuel.

The United States abandoned reprocessing of spent nuclear fuel in the late 1970s. France, Britain, Russia and Japan, on the other hand, continued to develop and use reprocessing facilities.

The two primary reasons the United States did not pursue reprocessing were:

• Concern over creation and separation of fissile materials (especially plutonium 239) that can fuel atomic weapons
• Cost

Congress adopted the policy of direct disposal for spent nuclear fuel after public opinion had turned against nuclear power following the accident at Three Mile Island, and the abandonment both of domestic reprocessing plants and a number of nuclear power reactor projects. The commercial reprocessing facility at West Valley, N.Y, had experienced an expensive failure. Developers abandoned two others, one in Morris, Ill., and the other in Aiken, S.C. Meanwhile, the media focused public attention on the environmental problems that resulted from reprocessing for defense purposes at Hanford, the Savannah River Site in South Carolina and the Idaho National Laboratory.

People committed to nuclear disarmament and who fear the spread of nuclear weapons among other nations and terrorist groups oppose reprocessing because it creates more plutonium 239 — the highly fissile isotope that fueled the Trinity test and the Nagasaki bomb.

Between 1944 and the end of the Cold War, the United States and the Soviet Union each created about 100 metric tons of the material. (Each metric ton contains enough plutonium 239 to create about 167 Trinity or Nagasaki nuclear explosions.)

The Nuclear Control Institute, a highly regarded nuclear nonproliferation group, asserts that commercial power reactors have already produced six times as much plutonium as weapons programs.

This plutonium could be extracted and available for weapons if commercial fuel were reprocessed. (Plutonium is created by a nuclear chain reaction in solid uranium fuel. When reprocessed, the fuel is dissolved chemically to separate out reusable uranium and plutonium.)

From the point of view of those concerned about nuclear weapons, plutonium locked up in spent fuel, whether recycled or newly created, is more acceptable than separated plutonium that could find its way into weapons. People are much less likely to steal or deal in highly radioactive solid spent fuel than in less directly harmful separated plutonium. The complexity and cost of the industrial facilities to reprocess and extract the plutonium are thought to be further deterrents to weapons proliferation. The United States and Russia have adopted a policy of taking surplus plutonium from weapons stockpiles to enrich fuel for commercial power reactors.

Cost
Based on weapons proliferation concerns, U.S. Presidents Ford and Carter adopted policies to curtail reprocessing. President Reagan did not share that point of view, and made it clear he had no problem with privately financed reprocessing — but no one started developing reprocessing facilities after his election in 1980.

It is likely that some form of government assistance is necessary to make reprocessing viable. This was part of the Global Nuclear Energy Partnership proposed by the George W. Bush administration in 2006. (A description of GNEP and the reprocessing principle is at nuclear.inl.gov/gnep/ The Government Accountability Office assessed government participation in this report here.)

The costs of cleanup of existing reprocessing facilities are notable, too. Perhaps as much as a third of the estimated $157 billion cost of cleanup of the Hanford, Savannah River and Idaho National Laboratory defense nuclear sites deals with the aftermath of chemical reprocessing of spent nuclear fuel. Commercial operators left their West Valley facility rather than correct its problems; the U.S. Department of Energy and the state of New York have borne the approximately $2 billion cost of cleanup and closure.

By most accounts, new nuclear plants remain a relatively expensive option compared to carbon-fueled generating facilities — and reprocessing may well make the nuclear option even more expensive. A report commissioned by the French government in 2000 estimated that reprocessing costs more than obtaining fresh fuel and directly disposing of spent fuel.

Balancing Costs and Impacts

The United States needs to balance a broad range of environmental concerns. Nuclear power and reprocessing are attractive in that they do not produce significant carbon emissions. However, fuel manufacturing and reprocessing do produce radioactive and chemical contaminants and wastes.

The French reprocessing plant at La Hague — hailed as a model by Tucker and others — has released substantial amounts of gaseous and liquid radioactivity since its opening in 1966. According to one calculation, its gaseous and liquid emissions of such isotopes as radioactive iodine, carbon 14, tritium, ruthenium and plutonium would account for a worldwide radiation dose about one-tenth that created by the Chernobyl accident. Even under much more stringent regulations imposed in 2007, the plant's permitted emissions will be two to four orders of magnitude greater than those allowed for a nearby nuclear power reactor.

Friedman suggests in his book *Hot, Flat and Crowded*, the United States is on its way to being a BNANA (Build Nothing Anywhere Near Anything) republic, concern over reprocessing's relatively larger emissions may well be more decisive than cost in forestalling its reintroduction. At the same time, one must recognize that uranium mining and milling, and uranium enrichment for commercial power reactors have had significant public health, environmental and cost consequences. These must be considered if the U.S. increases its reliance on nuclear power without reprocessing.

In a recent report on nuclear power, directors of the country's national laboratories, including current Secretary of Energy Stephen Chu, argue that any worldwide increase in reliance on nuclear power is not sustainable without reprocessing. The directors call for a broad research and development program addressing cost, waste and nonproliferation issues. They also regard the hiatus in American reprocessing as a benefit in that the country is not saddled with "dated recycling infrastructure."

As I stood among cranes pouring concrete over densely woven, heavy rebar at Hanford's waste treatment complex — with the stacks of two of the site's now-shuttered reprocessing plants in view — two conflicting impressions struck me:

- The immense cost in time, labor and resources required to deal with reprocessing's aftermath
- The capacity to create robust, thoughtful and, by earlier standards, much safer nuclear facilities

** Max S. Power's book, America's Nuclear Wastelands: Politics, Accountability, and Cleanup, has been chosen one of the "Best of the Best from the University Presses" for 2009 by the American Library Association. It was published last year by the Washington State University Press.*

http://www.miller-mccune.com/science_environment/reprocessing-nuclear-fuel-1223

Microfossils Challenge Prevailing Views Of 'Snowball Earth' Glaciations On Life

This is an exposure of the Chuar Group in Carbon Canyon, Grand Canyon. (Credit: Carol Dehler)

ScienceDaily (May 27, 2009) — New fossil findings discovered by scientists at UC Santa Barbara challenge prevailing views about the effects of "Snowball Earth" glaciations on life, according to an article in the June issue of the journal *Nature Geoscience*.

By analyzing microfossils in rocks from the bottom of the Grand Canyon, the authors have challenged the view that has been generally assumed to be correct for the widespread die-off of early life on Earth.

"Snowball Earth" is the popular term for glaciations that occurred between approximately 726 and 635 million years ago and are hypothesized to have entombed the planet in ice, explained co-author Susannah Porter, assistant professor of earth science at UCSB. It has long been noted that these glaciations are associated with a big drop in the fossil diversity, suggesting a mass die-off at this time, perhaps due to the severity of the glaciations. However, the authors of the study found evidence suggesting that this drop in diversity occurred some 16 million or more years before the glaciations. And, they offer an alternative reason for the drop.

A location called the Chuar Group in the Grand Canyon serves as "one of the premier archives of mid-Neoproterozoic time," according to the article. This time period, before Snowball Earth, is preserved as a sort of "snapshot" in the canyon walls.

The scientists found that diverse assemblages of microscopic organic-walled fossils called acritarchs, which dominate the fossil record of this time, are present in lower rocks of the Chuar Group, but are absent from higher strata. In their place, there is evidence for the bacterial blooms that, the authors hypothesize, most likely appeared because of an increase in nutrients in the surface waters. This process is known as eutrophication, and occurs today in coastal areas and lakes that receive abundant runoff from fertilizers used in farming.

"One or a few species of phytoplankton monopolizes nutrients at the expense of others," said Porter, explaining the die-off of diverse acritarchs. "In addition, the algal blooms result in high levels of organic matter production, which we see evidence of in the high organic carbon content in upper Chuar Group

rocks. In fact, the organic carbon content is so high in the upper Chuar Group, oil companies were interested in the Chuar Group as a possible source of oil and natural gas." As a result of high levels of organic matter, oxygen levels in the water can become depleted, resulting in widespread "dead zones." Porter and colleagues also found evidence for extreme anoxia in association with the bacterial blooms.

In an accompanying article describing the process of discovering the microfossils, Porter described a highlight of the trip, "…when we rode through the rapids and descended into 'Powell's bowels' — where the oldest rocks in the Grand Canyon frame the river passage. These rocks formed deep in the Earth approximately 1.8 billion years ago, and are very different in appearance from the overlying rocks."

The scientists braved extreme sun, rattlesnakes, scorpions, and dehydration to gather their data. They traveled by foot, helicopter, and river rafts, the last of which capsized on one occasion — although the samples remained intact.

The first author on the paper is former UCSB graduate student Robin Nagy, who did the research as part of her work to obtain her master's degree. Nagy now teaches seventh and eighth grade science at Williams Elementary Middle School in Williams, Arizona. Other co-authors are Carol M. Dehler of Utah State University, and Yanan Shen of the University of Quebec.

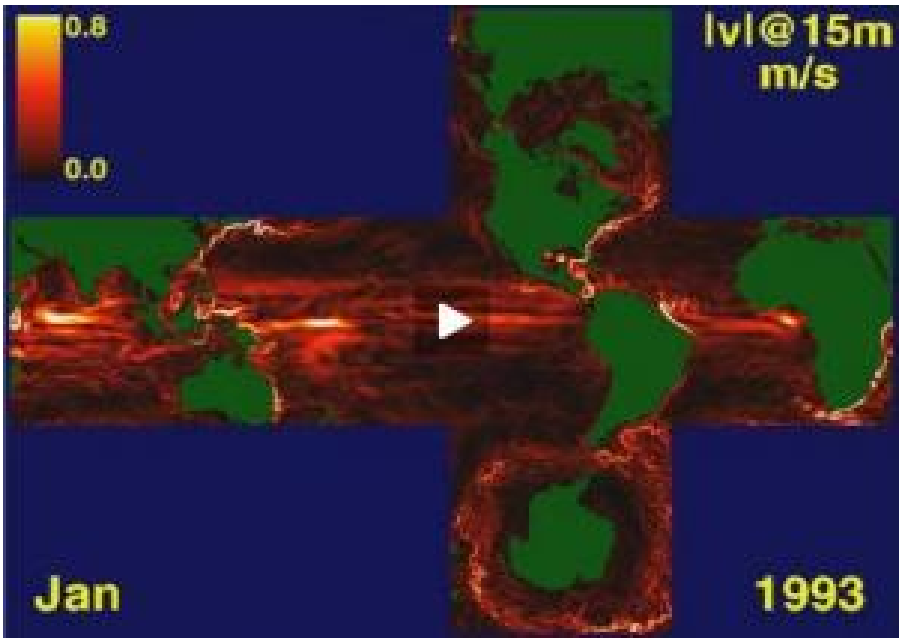
Journal reference:

1. Robin M. Nagy, Susannah M. Porter, Carol M. Dehler & Yanan Shen. **Biotic turnover driven by eutrophication before the Sturtian low-latitude glaciation**. *Nature Geoscience*, 2009; DOI: 10.1038/ngeo525

Adapted from materials provided by University of California - Santa Barbara.

http://www.sciencedaily.com/releases/2009/05/090526140846.htm

NASA Supercomputing Goes Green: Modeling Earth's Ocean Climate



Still image from an animation that shows ocean surface current speeds evolving in time (Jan. 1993 to Dec. 2002) and projected onto the cube grid. Red are faster surface currents (for example the Gulf Stream). (Credit: Image courtesy of NASA)

ScienceDaily (May 27, 2009) — Earth scientists are reaping huge benefits from research performed on NASA's advanced supercomputers. New cube-based simulations are helping to improve estimates of ocean circulation and climate.

Researchers from NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif. and Massachusetts Institute of Technology (MIT), Cambridge, Mass., are using a new gridding method that projects the faces of a cube onto the surface of a sphere. They found that this method covers the sphere more uniformly than a latitude-longitude grid, and that it produces more accurate results near Earth's poles.

"The NASA Advanced Supercomputers (NAS) facilities at Ames Research Center have been critical to our cube-based approach. We were able to scale the cube at higher resolutions to improve model accuracy," said Chris Hill, a MIT science researcher. "Without the NAS resources, both hardware and people, we would not have been able to perform these calculations in a timely manner."

Scientists believe the ocean and its interactions with the atmosphere are key to studying climate change. To better understand these interactions, they identified three important areas in climate research. They look at the 'states' of the ocean and sea-ice, which includes their temperature, salinity, current speeds, and sea-surface elevation, and study their changes at and below the surface. They also look at the 'state' of the atmosphere, which includes its temperature, humidity, and wind patterns, and study how it was affected by the changes in the ocean. These interactions between the atmosphere and ocean directly affect the weather, according to Hill. Finally, the scientists study the biological activity in the ocean and its responses to the changing 'state' of the ocean.

"The day-to-day weather comes from the atmosphere state, but it is strongly modulated by the ocean state. Other less apparent processes, such as the carbon dioxide extracted from the atmosphere by the ocean, depend on the oceans' physical and biological state," said Hill.

Following work begun by Carl Wunsch and colleagues at MIT as part of the World Ocean Circulation Experiment, a NASA-sponsored project called Estimating the Circulation and Climate of the Ocean, Phase II (ECCO2), is modeling the global ocean currents and their fluctuations, the changes in temperature and salinity, and the growth and melting of sea-ice in the polar regions.

The project's goal is to produce quantitative images of the state of the ocean globally, including its evolution. These images use data from all available NASA satellites and from on-site instruments, and are the result of combining and assimilating these data into global full-ocean-depth and sea-ice configurations built by the MIT general circulation model (MITgcm). These data combinations, called data syntheses, help quantify the role of the ocean in the global carbon cycle, explain the recent evolution of the polar oceans, and monitor time-evolving balances within and between different components of the Earth system.

The first Earth-orbiting satellite designed for remote sensing of Earth's ocean was the Seasat mission, which was launched in 1978. Since then, NASA has developed a series of ocean observing satellites that monitor sea surface elevation and temperature, surface wind stress, and the ocean's gravitational field. Part of this series is NASA's Earth Observing System, which is the data system used by ECCO2 today.

According to Dimitris Menemenlis, a JPL Earth scientist and ECCO2 researcher, the available oceanographic data will be enhanced by two forthcoming satellites: the Aquarius and the Surface Water Ocean Topography (SWOT) missions. Both satellites will provide different information that will be assimilated into a single coherent picture of the ocean state. Aquarius is due to launch in 2010 and will provide global maps of sea surface salinity. The SWOT mission is still in development and aims to observe sea surface elevation with unprecedented resolution and spatial coverage.

In the past, the standard model gridding methods, using longitude and latitude, had difficulty assimilating data at the poles. To solve this problem, researchers started looking at the world in a new way, using a new cube-based method. But advanced computers and algorithms were needed to enable modeling at higher resolutions, said Hill.

"Currently, NAS is home to two of the fastest supercomputers in the world, Pleiades and Columbia," said William Thigpen, NAS manager at Ames Research Center. "NAS provides data analysis, visualization tools and support that enable the exploration of huge data-sets that provide insights not previously possible."

Initially, the cube-based computation was simulated on the NAS SGI Altix system, Columbia, but was later moved to the NAS Pleiades cluster facility to take advantage of the increased size and performance of the new supercomputer's architecture. Over time and with improvements, supercomputing evolved into 'green technology.' Using a total of 2.09 megawatts, or 233 megaflops per watt, Pleiades ranked number 22 on the November 2008 Green500 list. This ranking makes Pleiades the second-most powerful and energy-efficient supercomputer in the world.

According to Menemenlis, these improvements have increased the accuracy of ocean data syntheses to such an extent that they are starting to resolve ocean eddies and other narrow currents, which transport heat, carbon, and other properties within the ocean. The importance of this endeavor is recognized by numerous national and international organizations, such as the World Meteorological Organization's World Climate Research Programme and the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Intergovernmental Oceanographic Commission.

Adapted from materials provided by NASA.

http://www.sciencedaily.com/releases/2009/05/090526110349.htm

Scientists Reaching Consensus On How Brain Processes Speech

Researchers are finding that both human and non-human primate studies have confirmed that speech, one important facet of language, is processed in the brain along two parallel pathways, each of which run from lower- to higher-functioning neural regions. (Credit: iStockphoto/Don Bayley)

ScienceDaily (May 27, 2009) — Neuroscientists feel they are much closer to an accepted unified theory about how the brain processes speech and language, according to a scientist at Georgetown University Medical Center who first laid the concepts a decade ago and who has now published a review article confirming the theory.In the June issue of *Nature Neuroscience*, the investigator, Josef Rauschecker, PhD, and his co-author, Sophie Scott, PhD, a neuroscientist at University College, London, say that both human and non-human primate studies have confirmed that speech, one important facet of language, is processed in the brain along two parallel pathways, each of which run from lower- to higher-functioning neural regions.

These pathways are dubbed the "what" and "where" streams and are roughly analogous to how the brain processes sight, but are located in different regions, says Rauschecker, a professor in the department of physiology and biophysics and a member of the Georgetown Institute for Cognitive and Computational Sciences.

Both pathways begin with the processing of signals in the auditory cortex, located inside a deep fissure on the side of the brain underneath the temples - the so-called "temporal lobe." Information processed by the "what" pathway then flows forward along the outside of the temporal lobe, and the job of that pathway is to recognize complex auditory signals, which include communication sounds and their meaning (semantics). The "where" pathway is mostly in the parietal lobe, above the temporal lobe, and it processes spatial aspects of a sound - its location and its motion in space - but is also involved in providing feedback during the act of speaking.

Auditory perception - the processing and interpretation of sound information - is tied to anatomical structures; signals move from lower to higher brain regions, Rauschecker says. "Sound as a whole enters the ear canal and is first broken down into single tone frequencies, then higher-up neurons respond only

to more complex sounds, including those used in the recognition of speech, as the neural representation of the sound moves through the various brain regions," he says.

Both human and nonhuman primate studies were examined in this review.

In humans, researchers use functional magnetic resonance imaging (fMRI) to "watch" activity move between brain regions in experiments testing speech "(re)cognition," Rauschecker says. In non-human primates, investigators use a technique known as single-cell recording, which can measure changes within a single neuron. To do this, anesthetized animals are equipped with microelectrodes that can pick up activity in pinpointed brain areas, a technique that can be used only rarely in human patients but provides much better resolution.

"In both species, we are using species-specific communication sounds for stimulation, such as speech in humans and rhesus-specific calls in rhesus monkeys," Rauschecker says. "We find that the structure of these communication sounds is similar across species."What is so interesting to Rauschecker is that although speech and language are considered to be uniquely human abilities, the emerging picture of brain processing of language suggests "in evolution, language must have emerged from neural mechanisms at least partially available in animals," he says.

"Speech, or the early process of language, is well modeled by animal communication systems, and these studies now demonstrate that primate auditory cortex, across species, displays the same patterns of hierarchical structure, topographic mapping, and streams of functional processing," Rauschecker says. "There appears to be a conservation of certain processing pathways through evolution in humans and nonhuman primates."

While this research is basic science trying to solve fundamental questions about the brain, it may ultimately yield some valuable insights into disorders that involve problems in comprehending auditory signals, such as autism and schizophrenia, he says.

"Understanding speech is one of the major problems seen in autism, and a person with schizophrenia hears sounds that are just hallucinations," Rauschecker says. "Eventually, this area of research will lead us to better treatment for these issues.

"But mostly, we are fascinated by the fact that humans can make such exquisite sense of the slight variation in sound waves that reach our ears, and only lately have we been able to model how the brain knows how to attach meaning to these sounds in terms of communication." he says.

The study was funded by two grants from the National Science Foundation and a grant from the National Institute for Neurological Disorders and Stroke as well as the British Wellcome Trust. Rauschecker reports no related financial interests.

Journal reference:

1. Josef P Rauschecker, Sophie K Scott. **Maps and streams in the auditory cortex: nonhuman primates illuminate human speech processing**. *Nature Neuroscience*, 2009; 12 (6): 718 DOI: 10.1038/nn.2331

Adapted from materials provided by Georgetown University Medical Center.

http://www.sciencedaily.com/releases/2009/05/090526140733.htm

What Is The Function Of Lymph Nodes?

ScienceDaily (May 27, 2009) — If we imagine our immune system to be a police force for our bodies, then previous work has suggested that the Lymph nodes would be the best candidate structures within the body to act as police stations – the regions in which the immune response is organised.

However, Prof. Burkhard Becher, University of Zurich, suggests in a new paper – published in *PLoS Biology* – that lymph nodes are not essential in the mouse in marshalling T-cells (a main immune foot soldier) to respond to a breach of the skin barrier. This result is both surprising in itself, and suggests a novel function for the liver as an alternate site for T-cell activation.

When a child falls off its bike and scratches its skin, the body responds via the immune system. Scavenger cells at the site of the wound pick up antigens –tiny particles derived from invading microorganisms and dirt that the body will recognize as foreign. These antigens are delivered to the nearest lymph node. T and B cells (immune cells) carrying the matching antigen-receptors on their surface will be stimulated by the concentrated antigen now present in these lymph nodes. T cells will then go on and orchestrate the defensive response against the invaders, whereas B cells will transform into antibody-producing cells flooding the body with antibodies which act against the hostile microorganisms.

Mice that lack lymph nodes due to a genetic mutation (alymphoplasia) are severely immuno-compromised and struggle in fighting infections and tumors. New work by Melanie Greter, Janin Hofmann and Burkhard Becher from the Institute of experimental Immunology at the University of Zurich reports that the immunodeficiency associated with alymphoplasia is not due to the lack of lymph nodes, but caused by the genetic lesion on immune cells themselves.

The new paper shows that in the mouse T cell function is unperturbed in the absence of lymph nodes, whereas B cell activation and antibody secretion is strongly affected. That T cell responses can be launched outside of lymph nodes is highly surprising, because this means that T cells can encounter antigens elsewhere in order to become activated. By tracing the migration of fluorescent particles from the site of antigen invasion (i.e. the wound) the scientists discovered that the liver could serve as a surrogate structure for T cell activation. During embryonic development, the liver is the first organ to provide us with blood and immune cells. Apparently, at least in the mouse the liver continues to serve as an "immune organ" even during adulthood.

This work suggests an explanation for the curious fact that patients receiving a liver transplant sometimes inherit the donor's allergies and immune repertoire, so in keeping with the idea that donor immune information is being transplanted. It also suggests that the liver as an immune organ is an evolutionary remnant from the time before lymph nodes developed in higher birds and mammals. Cold-blooded vertebrates have functioning T and B cells but no lymph nodes. The main achievement of the development of lymph nodes in mammals is a drastic improvement for the production of better antibodies. T cells on the other hand have not changed their function much during evolution and the work by the Zurich group finally provides solid evidence for the versatility and promiscuity of this cell type.

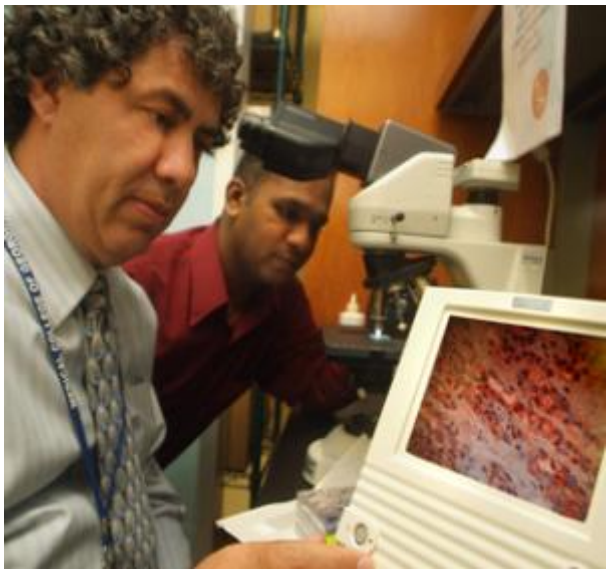
Journal reference:

1. Greter M, Hofmann J, Becher B. **Neo-Lymphoid Aggregates in the Adult Liver Can Initiate Potent Cell-Mediated Immunity**. *PLoS Biology*, Volume 7, Issue 5, 2009 DOI: 10.1371/journal.pbio.1000109

Adapted from materials provided by University of Zurich, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/05/090525211216.htm

Protein That Suppresses Androgen Receptors Could Improve Prostate Cancer Diagnosis, Treatment



Drs. Yehia Daaka (left) and Vijayabaskar Lakshmikanthan. (Credit: Image courtesy of Medical College of Georgia)

ScienceDaily (May 26, 2009) — A protein that helps regulate expression of androgen receptors could prove a new focal point for staging and treating testosterone-fueled prostate cancer, Medical College of Georgia researchers say.

Levels of the protein, βarrestin2, are lower in some prostate cancer cells than in normal prostate cells while expression of testosterone-fed androgen receptors is higher, they recently reported in *Proceedings of the National Academy of Sciences Online Early Edition.*

"An increase in the number of androgen receptors is believed responsible for prostate cancer progression in men with advanced disease," says the study's corresponding author, Dr. Yehia Daaka, Distinguished Chair in Oncologic Pathology in the MCG School of Medicine.

With increased numbers of androgen receptors, prostate cancer can make use of the limited testosterone available after a diseased prostate gland is removed or after testosterone production is blocked by drug therapy. In fact, the increased number of androgen receptors may mutate so they can start feeding off other steroids or even growth factors, Dr. Daaka says.

These wily skills help explain why cancer returns despite initially promising treatment results.

"It is clear that signaling by the androgen receptor is paramount for not only the initiation but also the progression of the disease, including escape to a hormone-refractory disease," he says. Moves androgen receptors make to support cancer growth make it "unbeatable at this point," for some patients.

However increased levels of βarrestin2 appear to halt the potentially deadly increase in androgen receptor expression, the MCG research team has found.

Androgen receptors have co-factors that can activate or repress their activity. "You could make the leap and say perhaps prostate cancer initiation and progression may be regulated by expression or non-expression of these co-factors," says Dr. Daaka, a Georgia Cancer Coalition Distinguished Cancer Scholar.

Their studies in human tissue – both in culture and transplanted into mice – show this appears the case for βarrestin2. First the team identified βarrestin2 as cofactor for androgen receptors. Next they found a reciprocal relationship: androgen receptor expression is low when βarrestin2 expression increases. That's the scenario in healthy prostate cells while the exact opposite is true in some prostate cancer. When they forced increased expression of βarrestin2, androgen receptor expression and activity went down.

βarrestin2 locks up an androgen receptor by binding to it, then the pair bind to yet another protein, ubiquitin ligase, which tags the receptor as waste and the trio make their way to the cell's garbage dump. "The neat thing about it is βarrestin2 inhibits or blunts the androgen receptor by promoting its degradation. So it disappears," Dr. Daaka says.

His future studies include determining what happens when βarrestin2 expression is further decreased in the face of prostate cancer. These studies will also help determine how big a player βarrestin2 is in prostate cancer progression, says Dr. Daaka, noting that numerous other corepressors and activators of androgen receptors are known.

Since all the happenings occur inside prostate cells, the findings don't point toward a new blood or urine test for prostate cancer but could lead to new ways to stage prostate cancer from the first biopsy. In fact, Dr. Daaka and his team already are collecting samples from patients whose cancer has been staged to see if specific levels of βarrestin2 expression correlate with different stages of disease.

Another goal is to develop a small molecule that can get inside a patient's cell and mimic βarrestin2's ability to suppress androgen receptor expression and so restore healthy levels found in prostate cells.

Prostate cancer falls behind skin cancer as the second most common cancer in men and more than 192,000 new cases will be diagnosed this year in the United States, according to the American Cancer Society.

Collaborators include Dr. Vijayabaskar Lakshmikanthan, postdoctoral fellow; Dr. Lin Zou, former postdoctoral fellow; Jae Kim, graduate student; Dr. Nidia C. Messias, assistant professor; and Dr. Zhongzhen Nie, assistant professor; from the MCG Department of Pathology; and Drs. Allison Michal and Jeffrey L. Benovic from Thomas Jefferson University.

Adapted from materials provided by Medical College of Georgia.

http://www.sciencedaily.com/releases/2009/05/090520100513.htm

Spectacular Deep-water Coral Province Discovered Off Ireland's West Coast

A large Phycis sp. feeding on a smaller fish with ROV arm visible in bottom right of shot. (Credit: Dr Anthony Grehan, Earth and Ocean Sciences, NUI Galway)

ScienceDaily (May 26, 2009) — NUI Galway researchers, during a recent deep-water expedition, have confirmed the existence of a major new coral reef province on the southern end of the Porcupine Bank off the west coast of Ireland. The province covers an area of some 200 sq. km and contains in the order of 40 coral reef covered carbonate mounds. These underwater hills rise as high as 100m above the seafloor.

The deep-water research expedition took place earlier this month aboard the Marine Institute research vessel, the RV *Celtic Explorer*. The research used the new national Remotely Operated Vehicle (ROV) *Holland I* to survey the seafloor and capture unique video footage. The expedition, led by Dr Anthony Grehan, was a collaboration between NUI Galway and the Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) and involved researchers and students from both institutions.

Dr Anthony Grehan, NUI Galway, said: "These are by far the most pristine, thriving and hence spectacular examples of cold-water coral reefs that I've encountered in almost ten years of study in Irish waters. There is also evidence of recent recruitment of corals and many other reef animals in the area suggesting this area is an important source of larvae supply to other areas further along the Porcupine Bank". Dr Grehan suggested that given the rugged terrain, its unsuitability for trawling and its well defined boundaries, that the area would be an excellent additional candidate to the four existing off-shore coral Special Areas of Conservation (SAC). He said that NUI Galway's Department of Earth and Ocean Sciences would in due course provide a copy of all video footage to the National Parks and Wildlife Service to facilitate them in their work of further SAC designations to comply with the European Union's Habitat Directive.

The expedition began in French waters with a series of ROV dives in previously unexplored canyons in the Bay of Biscay which confirmed the presence of coral and geogenic reefs that will be notified to the new French Marine Protected Area Agency. Dr Brigitte Guillaumont from the newly established agency, said: "The video and images obtained from the high definition video camera of the Irish ROV are very impressive and will greatly assist us in our work of designating areas for the protection of corals".

Moving into Irish waters, the use of high resolution bathymetry charts, provided by the Irish National Seabed Survey, a collaboration between the Geological Survey of Ireland and the Marine Institute, enabled the identification of new areas likely to support coral reefs. The ROV was then used to dive on

one of these areas, the Archipelagos Mounds (or Arc Mounds), to reveal a seascape of spectacular coral reefs. Anna Rensdorf, a Griffith Geoscience PhD student in the Department of Earth and Ocean Sciences, NUI Galway, who had previously worked on tropical corals, said: "I can't believe that coral reefs like these can be found in the cold waters of Ireland. On many of the mounds surveyed, living coral thickets stood up to 2m high where ordinarily they are less than half a metre in height".

The NUI Galway study is part of a larger pan-European project funded by the European Commission's 7th research Framework Programme, called 'CoralFISH' that is studying in detail the interactions between corals, fish and fisheries. Dr Grehan, coordinator of the European study, said: "At the recent International Council for the Exploration of the Sea (ICES) deep-sea symposium delegates expressed increasing concern about the level of bottom fishing related damage sustained by vulnerable marine ecosystems (VMEs) in the High Seas (i.e. areas beyond national jurisdiction). Because cold-water corals remain the best example of VMEs, much research is focused on them. One of the key areas in the management of fisheries now appears to be improving our understanding of how fish use habitat. We need to understand what effect damage or removal of that habitat will have on fish stocks and communicating that knowledge to fishermen".

Dr Grehan noted that vulnerable marine ecosystems such as coral reefs represent one of the last untapped reservoirs of potentially useful bio-compounds that might support the development of new anti-viral or anti-bacterial pharmaceuticals. Currently, there is a major biodiscovery programme underway at NUI Galway funded through the Marine Institute under Sea Change – A Marine Knowledge, Research and Innovation Strategy for Ireland 2007-2013.

Adapted from materials provided by Marine Institute - Foras na Mara, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/05/090526153010.htm

Protein Identified As Critical To Insulating The Body's Wiring Could Also Become Treatment Target

Dr. Lin Mei, the study's corresponding author and director of MCG's Institute of Molecular Medicine and Genetics, and Dr. Yanmei Tao says, postdoctoral fellow in neurobiology and the study's first author. (Credit: Image courtesy of Medical College of Georgia)

ScienceDaily (May 26, 2009) — A new protein identified as critical to insulating the wiring that connects the brain and body could one day be a treatment target for divergent diseases, from rare ones that lower the pain threshold to cancer, Medical College of Georgia researchers say.

They report this week in *Proceedings of the National Academy of Sciences* that in the peripheral nervous system that controls arms and legs, the protein erbin regulates the protein neuregulin 1, stabilizing and interacting with the ErbB2 receptor on Schwann cells so they can make myelin, which insulates the wiring.

Their studies in mice have shown that when erbin is missing or mutated, the insulation is inadequate, slowing communication.

"Erbin is like a tuner to make signaling stronger or weaker," says Dr. Lin Mei, the study's corresponding author and director of MCG's Institute of Molecular Medicine and Genetics.

Without erbin, the myelin production system falls apart. Eventually raw, over-exposed nerves can die.

"Receptors for neuregulin 1 just get degraded and lost," says Dr. Mei, Georgia Research Alliance Eminent Scholar in Neuroscience."Schwann cells can see neuregulin 1 sitting there but they can't do anything without the receptor."

Impaired myelin formation and maintenance is implicated in a variety of neurological and psychiatric diseases including schizophrenia, multiple sclerosis and Charcot-Marie-Tooth neuropathy, a genetic, progressive disease that weakens muscles.

Cancer is an issue because the ErbB2 receptor also is an oncogene highly expressed in tumors. ErbB2 helps cancer cells grow and spread so finding its role in the receptor's stability and function provides a potential new site for targeted cancer therapy, says Dr. Yanmei Tao says, postdoctoral fellow in neurobiology and the study's first author. In fact, antibodies to ErbB2 already are available to patients with breast and prostate cancers.

For nerves to communicate with each other or another cell type, such as a muscle cell, they reach out with an arm or extension called an axon. Much like the telephone lines that line roadways, these arms require proper insulation, called myelin, composed mostly of lipids and some proteins.

Axons that transmit quick messages – such as telling legs to walk – need a lot of insulation. Sensory nerves – such as those on the fingertips that prompt retraction from a hot stovetop – need less.

"In any given nerve, some axons are wrapped heavily by myelin," Dr. Mei says. "It's based on nerve function. For example, if the nerve needs more speed in conducting a signal or information, like motor nerves, they would be wrapped more."

In fact, erbin is enriched in regions with a lot of myelinated axons, such as the sciatic nerve, which runs down the lower back into the legs, the researchers found.

Dr. Mei also is exploring the role of neuregulin 1 in cell talk in the brain. He and collaborators have identified a sort of a sort of check and balance for brain cell activity managed by neuregulin-1 in the area of the brain where complex reasoning and decisions about appropriate social behavior occur. They showed that neuregulin-1 and another receptor, ErbB4, help keep a healthy balance between excitation and inhibition of brain cells.

Their studies published in Neuron in 2007 showed neuregulin-1 and ErbB4, promote inhibition at the site of inhibitory synapses in the brain by increasing release of GABA, a major inhibitory neurotransmitter.

In 2000, the researchers showed the pair also are at excitatory synapses, communication points between neurons where the neurotransmitter glutamate excites cells to action. Here, neuregulin-1 and ErbB4 suppress excitation.

These findings have implications for conditions such as schizophrenia and seizures, where cell talk is out of control.

Adapted from materials provided by Medical College of Georgia.

http://www.sciencedaily.com/releases/2009/05/090519134826.htm

Poor 'isolated' in private school

Pupils offered free or subsidised places at independent schools can often feel isolated, a report suggests.

Research into the assisted places scheme (APS), which operated in the 1980s, found some pupils felt estranged or even alienated from their schools.

The Sutton Trust education charity said this held lessons for how private schools today should devise schemes to accommodate poorer children.

It found they could not go on school trips, for example, due to the expense.

The APS was brought in by Margaret Thatcher's Conservative government in 1979 in an attempt to provide a ladder of opportunity for academically able children from poorer backgrounds.

It was abolished 18 years later as Tony Blair's first education policy announcement.

Cultural visits

A total of 25 former recipients of an assisted place in the 1980s were interviewed by the Institute of Education at the University of London for the research.

Virtually all said they could not participate in out-of-school activities, such as field trips, cultural visits or foreign exchanges, because their parents could not afford to pay for them.

" **This research shows that private schools need to look beyond the simple question of fees when opening their doors** "
Sir Peter Lampl, chairman of the Sutton Trust

For some this was a key factor in becoming estranged or alienated from the independent school they had attended.

Those interviewed also often spoke of not being able to participate in weekend and after-school activities.

Very long journeys to and from school were also a barrier to involvement.

Suggestions that private schooling provided useful social networks for adulthood were not backed up by the research - only four reported strong friendships with former schoolmates.

'Important lessons'

The Sutton Trust promotes social mobility through education. It has funded a large number of access projects in early years, school and university settings.

Independent schools increasingly are providing financial support for their pupils' families.

The recent Independent Schools Council census showed that about a third of pupils in member schools, 168,564, received assistance with fees, up 6.08% on 2008.

The Sutton Trust chairman, Sir Peter Lampl, said: "Although the assisted places scheme ended a decade ago, it has important lessons for contemporary efforts to open up independent schools and for the current debate over these schools' charitable status.

"This research shows that private schools need to look beyond the simple question of fees when opening their doors.

"Poorer students need other financial and pastoral support if they are to make the most of the opportunities the private sector can offer."

The director of the Institute of Education, Geoff Whitty, said: "There is no doubt that many recipients of assistance enjoyed great benefits, both at school and in later life.

"However, the most disadvantaged pupils found it difficult to fit in and were at higher risk of dropping out of education early.

"A proper assessment of the costs and benefits of the scheme also needs to consider its impact on local state schools, some of which lost their brightest pupils to the scheme."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8068008.stm

Published: 2009/05/26 11:30:52 GMT

Asia facing 'diabetes explosion'

New research suggests diabetes is becoming a global problem, with more than 60% of all cases likely to occur in Asia.

A study in the Journal of the American Medicine Association shows those hit in Asia are younger and less likely to be overweight than those in the West.

The study says numbers worldwide could grow by a third by 2025, with low and middle income countries worst hit.

The disease is expensive to treat and could hit Asian economies hard.

The study said trends of diabetes in Asia are influenced by everything from genetic and cultural differences, to smoking and rates of urbanisation.

Weighty surprise

While in the West, type-2 diabetes is often seen as a consequence of diet, age and obesity, researchers say those affected in Asia are relatively young and less likely to be struggling with weight gain.

Citing figures from the International Diabetes Federation, researchers say while people from Japan to Pakistan generally have lower rates of fat, they can have a similar or even higher prevalence of diabetes than in the West.

The problem is that although Asian obesity rates are low, changing diets and sedentary lifestyles, associated with rapid economic development, are taking their toll.

That transition, which took about 200 years in Europe, has taken just half a century in Asia, experts noted.

The age differential was also stark. Diabetes most often affects people in the West at the age of 60 to 79 years, compared to the age range of 20 to 59 years in Asia.

The study suggested that this appears to be the result of both low birth weights and over-nutrition in later life, partly because Asian women are two- to three-times as likely to have gestational diabetes as their white counterparts.

India will see its numbers grow from 40 million to nearly 70 million; China 39 million to 59 million; and Bangladesh 3.8 million to 7.4 million; the numbers for Indonesia, the Philippines, Malaysia, Vietnam and others will also rise dramatically.

The findings were based on analysis of hundreds of articles, data and studies published between January 1980 and March 2009.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/asia-pacific/8069431.stm

Published: 2009/05/27 03:45:55 GMT

Natural birth classes questioned

Learning relaxation and breathing techniques does not reduce the need for an epidural in labour, a study shows.

More than 1,000 mothers-to-be took part in the Swedish trial, thought to be the first major analysis of the efficacy of such preparation for childbirth.

They attended one of two classes: the first taught natural coping methods, the other emphasised pain relief.

But the BJOG study found no difference in the use of epidurals between the women when they went into labour.

Just over half the women in each group ultimately opted for the spinal analgesia which reduces or eliminates the pain of contractions.

" **This research may temper the statements of the more pro-natural people** "
Patrick O'Brien RCOG

Some 70% of the women who had attended the natural childbirth class said they employed the psychoprophylaxis techniques they had learned, which included breathing and relaxation methods as well as ways of coping with pain such as positive imaging.

As well as there being no difference in epidural rates, which researchers saw as a useful measurement of perceptions of pain, the proportion of vaginal births and emergency Caesareans was the same between the two groups.

In the natural childbirth group, there was a slightly higher rate of instrumental births, involving forceps or a ventouse.

Normal birth

But overall the majority of women in both groups were satisfied with their birth experience, with the same small minority in both describing it as "negative" or "very negative".

"Our conclusion is that natural childbirth preparation with psychoprophylaxis does not reduce the need for epidural analgesia or improve the birth experience, when compared with the standard form of antenatal education," said Malin Bergstroem, a clinical psychologist at the Karolinska Institute who co-authored the study.

In the UK, the contents and availability of classes varies across the country. The majority are carried out by the NHS or the National Childbirth Trust (NCT).

Patrick O'Brien, a consultant at UCLH and spokesman for the Royal College of Obstetricians and Gynaecologists, said it was "only fair that women should be told the results of this study".

"It's almost accepted that these techniques might help but the evidence out there is not that strong. This is the first good evidence to compare the two approaches.

"I'm not suggesting discarding relaxation techniques completely. They could still help people feel more in control and more relaxed. But this research may temper the statements of the more pro-natural people."

Professor Cathy Warwick, general secretary at the Royal College of Midwives (RCM), said: "We believe that preparation for birth is an important component of delivering high quality maternity services.

"These classes can boost a mother and her partner's confidence. Classes here do more than focus on breathing and relaxation techniques, they allow mothers to develop a support system and learn about becoming a parent."

Belinda Phipps, head of the NCT, said: "This limited study in Sweden compares two slightly different types of antenatal education and does not look at the more common situation in the UK which is no or limited antenatal preparation.

"Testing to see whether breathing and relaxation techniques alongside antenatal preparation have an effect on birth outcomes is a tall order - they are only one small part of antenatal education."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8068889.stm

Published: 2009/05/26 23:04:50 GMT

Mouse genome laid bare to science

By Paul Rincon
Science reporter, BBC News

Scientists have finished sequencing the mouse genome after a 10-year effort.

The humble mouse is the experimental workhorse in laboratories worldwide, so this high-quality genome sequence will aid in the fight against human disease.

The search for novel treatments could benefit from a greater understanding of the mouse genetic code, which is about 75% similar to our own.

An international team of researchers have published details of the work in the open-access journal PLoS Biology.

The sequence comprises the full complement of genetic material in the nucleus of a cell. It is effectively the genetic "instruction booklet" for a living animal.

The mouse (*Mus musculus*) becomes only the second mammal after humans to have its complete genome laid bare.

But draft sequences have been published for the chimp, dog, rat, cat, macaque and even the duck-billed platypus

The mouse is the animal most often used to better understand human illnesses and how they develop.

Research carried out using mice has led to advances in the treatment of cancer, diabetes, heart disease and countless other conditions.

Good model

Co-author Professor Chris Ponting, from the University of Oxford, told BBC News the work confirmed that the mouse was an excellent experimental model for human disease.

"Completion of the genome is extremely important in helping us to identify the genes that underpin biology that is the same across all mammals," he said.

But he said it was also important to separate the genes humans shared with mice from those which differed between them.

About 75% of mouse genes have a single equivalent in humans. But some 5,000 genes arose after the ancestors of mice and humans went their separate evolutionary ways.

"In retrospect, our previous picture of the mouse genome was incomplete," said Dr Leo Goodstadt from the University of Oxford.

"Only when all the missing pieces of the genomic puzzle had been filled in did we realise that we had been missing large numbers of genes found only in mice, and not in humans."

The mouse genome sequencing effort began in 1999, and a draft sequence was published in 2002.

The cost, borne by US and UK sequencing centres, is estimated to exceed $100m (£62m).

Some groups oppose animal experimentation, campaigning to ban or limit the animals used.

In the UK, growth in the use of genetically modified (GM) animals - mainly mice - is largely responsible for a steady rise in the numbers of animals used in experiments since 1997.

Professor Ponting, from the Medical Research Council's (MRC) Functional Genomics Unit at Oxford, said the complete genome could provide insights into the evolution of mammals.

Humans and mice share a remarkable level of similarity, despite having evolved independently for the last 90 million years.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8069235.stm

Published: 2009/05/27 00:23:58 GMT

Giant dinosaurs 'held heads high'

By Victoria Gill
Science reporter, BBC News

Diplodocus's impressive neck sweeps along the main hall of London's Natural History museum, welcoming its visitors.

Now, findings suggest that 150 million years ago the giant may have held its head higher for much of the time.

By studying the skeletons of living vertebrates, Mike Taylor, from the University of Portsmouth, and his team, reshaped the dinosaur's resting pose.

But there is more than one way to assemble a dino-skeleton, and more than one theory on the sauropods' stance.

Dr Taylor said he is not suggesting that museums should re-pose their long-necked sauropod skeletons from the current horizontal position to a more upright posture.

"The diplodocus in the main hall vestibule of the Natural History Museum is in a perfectly good posture," he told BBC News. "It's one within a whole range of movement that would have been entirely possible."

But, after studying X-rays of members of 10 different vertebrate groups, Dr Taylor is convinced that when they were not reaching down for a drink, the sauropods stood with their heads held very high indeed.

With their necks aloft, like giraffes, the dinosaurs would have towered up to 15m above the ground.

Living model

Dr Taylor and his colleagues found that the necks of mammals and birds - the only modern groups that share the upright leg posture of dinosaurs - are "strongly inclined" vertically.

"Our approach was embarrassingly straightforward," said Dr Taylor. "We looked at real animals, and at the whole animal."

" **Sauropods are bizarre. There is no living animal built in the same way** "
Paul Barrett, Natural History Museum

Bones can only give us so much information, he explained, and the soft tissue in the animal's huge neck could "enable greater flexibility than the bones alone suggest".

Some of the earliest reconstructions of sauropod skeletons - in the late 19th and early 20th Century - were posed with erect necks, so the idea is not new.

"It's largely in recent years that this view has changed," Dr Taylor said. "But we can be confident that they held their heads upright."

Many scientists, however, still maintain a more horizontal view. And a recent paper, published by Australian scientist Roger Seymour in the journal Biology Letters, went even further.

It suggested that the creatures would not actually be able to lift their heads up to eat from high trees, because this would raise their brains so far above their hearts that their blood pressure would have to be elevated to a dangerous - possibly lethal - level.

But Dr Taylor is not swayed by this argument.

"There are some [living animals] where the heart is able to exert much greater pressure than Seymour's equations predict [is possible]. We don't see why that couldn't also be true in sauropods."

Heads up

Paul Barrett, a palaeontologist from London's Natural History Museum, thinks the sauropods were likely to have been able to lift their heads high, but he remains unconvinced that would have been their "resting posture".

"It would require lots of muscular activity, and put a lot of strain on their hearts," he said. Dr Barrett explained that, since it is impossible to know how thick the pads of connective tissue between the dinosaurs' vertebrae were, it is difficult to estimate how much of a role this tissue, along with muscles and tendons, played in the animals' range of movement.

"Sauropods are bizarre," he told BBC News. "There is no living animal built in the same way."

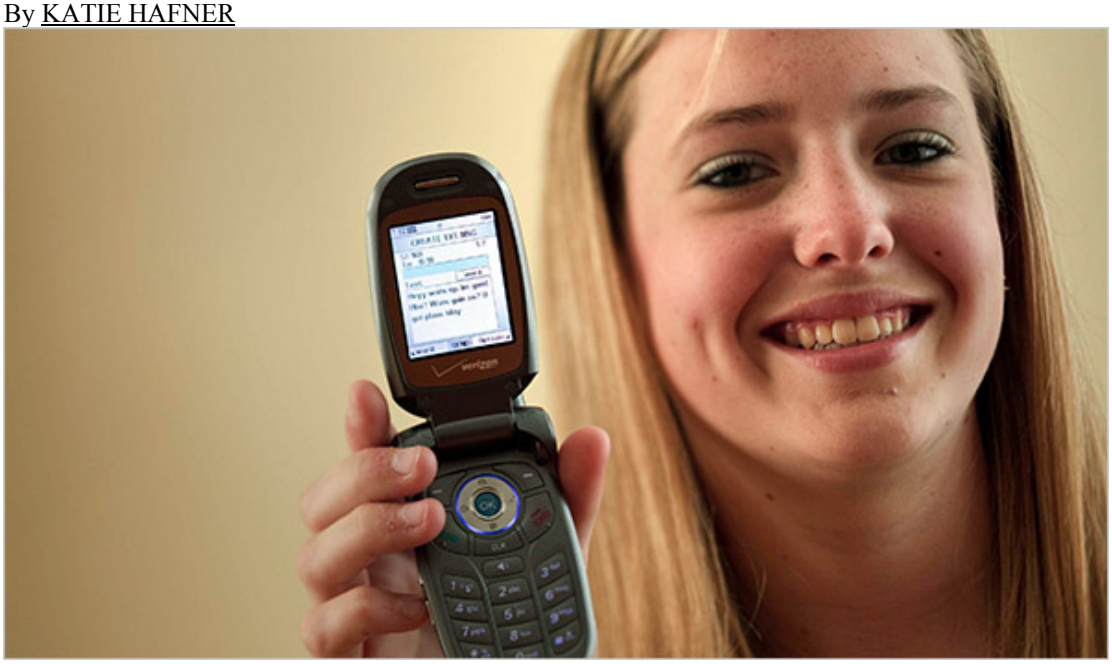
So, although the study of living animals' skeletons is very valuable, he added, "finding a model to explain the biology of these creatures is not that easy".

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8068789.stm

Published: 2009/05/27 00:23:46 GMT

Texting May Be Taking a Toll

By KATIE HAFNER



They do it late at night when their parents are asleep. They do it in restaurants and while crossing busy streets. They do it in the classroom with their hands behind their back. They do it so much their thumbs hurt. Spurred by the unlimited texting plans offered by carriers like AT&T Mobility and Verizon Wireless, American teenagers sent and received an average of 2,272 text messages per month in the fourth quarter of 2008, according to the Nielsen Company — almost 80 messages a day, more than double the average of a year earlier.

The phenomenon is beginning to worry physicians and psychologists, who say it is leading to anxiety, distraction in school, falling grades, repetitive stress injury and sleep deprivation.

Dr. Martin Joffe, a pediatrician in Greenbrae, Calif., recently surveyed students at two local high schools and said he found that many were routinely sending hundreds of texts every day.“That’s one every few minutes,” he said. “Then you hear that these kids are responding to texts late at night. That’s going to cause sleep issues in an age group that’s already plagued with sleep issues.”

The rise in texting is too recent to have produced any conclusive data on health effects. But Sherry Turkle, a psychologist who is director of the Initiative on Technology and Self at the Massachusetts Institute of Technology and who has studied texting among teenagers in the Boston area for three years, said it might be causing a shift in the way adolescents develop.

“Among the jobs of adolescence are to separate from your parents, and to find the peace and quiet to become the person you decide you want to be,” she said. “Texting hits directly at both those jobs.”

Psychologists expect to see teenagers break free from their parents as they grow into autonomous adults, Professor Turkle went on, “but if technology makes something like staying in touch very, very easy, that’s harder to do; now you have adolescents who are texting their mothers 15 times a day, asking things like, ‘Should I get the red shoes or the blue shoes?’ ”

As for peace and quiet, she said, “if something next to you is vibrating every couple of minutes, it makes it very difficult to be in that state of mind.“If you’re being deluged by constant communication, the

pressure to answer immediately is quite high," she added. "So if you're in the middle of a thought, forget it."

Michael Hausauer, a psychotherapist in Oakland, Calif., said teenagers had a "terrific interest in knowing what's going on in the lives of their peers, coupled with a terrific anxiety about being out of the loop." For that reason, he said, the rapid rise in texting has potential for great benefit and great harm.

"Texting can be an enormous tool," he said. "It offers companionship and the promise of connectedness. At the same time, texting can make a youngster feel frightened and overly exposed."Texting may also be taking a toll on teenagers' thumbs. Annie Wagner, 15, a ninth-grade honor student in Bethesda, Md., used to text on her tiny LG phone as fast as she typed on a regular keyboard. A few months ago, she noticed a painful cramping in her thumbs. (Lately, she has been using the iPhone she got for her 15th birthday, and she says texting is slower and less painful.)

Peter W. Johnson, an associate professor of environmental and occupational health sciences at the University of Washington, said it was too early to tell whether this kind of stress is damaging. But he added, "Based on our experiences with computer users, we know intensive repetitive use of the upper extremities can lead to musculoskeletal disorders, so we have some reason to be concerned that too much texting could lead to temporary or permanent damage to the thumbs."Annie said that although her school, like most, forbids cellphone use in class, with the LG phone she could text by putting it under her coat or desk. Her classmate Ari Kapner said, "You pretend you're getting something out of your backpack." Teachers are often oblivious. "It's a huge issue, and it's rampant," said Deborah Yager, a high school chemistry teacher in Castro Valley, Calif. Ms. Yager recently gave an anonymous survey to 50 of her students; most said they texted during class.

"I can't tell when it's happening, and there's nothing we can do about it," she said. "And I'm not going to take the time every day to try to police it."Dr. Joffe says parents tend to be far less aware of texting than of, say, video game playing or general computer use, and the unlimited plans often mean that parents stop paying attention to billing details. "I talk to parents in the office now," he said. "I'm quizzing them, and no one is thinking about this."Still, some parents are starting to take measures. Greg Hardesty, a reporter in Lake Forest, Calif., said that late last year his 13-year-old daughter, Reina, racked up 14,528 texts in one month. She would keep the phone on after going to bed, switching it to vibrate and waiting for it to light up and signal an incoming message. Mr. Hardesty wrote a column about Reina's texting in his newspaper, The Orange County Register, and in the flurry of attention that followed, her volume soared to about 24,000 messages. Finally, when her grades fell precipitously, her parents confiscated the phone.

Reina's grades have since improved, and the phone is back in her hands, but her text messages are limited to 5,000 per month — and none between 9 p.m. and 6 a.m. on weekdays.Yet she said there was an element of hypocrisy in all this: her mother, too, is hooked on the cellphone she carries in her purse.

"She should understand a little better, because she's always on her iPhone," Reina said. "But she's all like, 'Oh well, I don't want you texting.' " (Her mother, Manako Ihaya, said she saw Reina's point.) Professor Turkle can sympathize. "Teens feel they are being punished for behavior in which their parents indulge," she said. And in what she calls a poignant twist, teenagers still need their parents' undivided attention.

"Even though they text 3,500 messages a week, when they walk out of their ballet lesson, they're upset to see their dad in the car on the BlackBerry," she said. "The fantasy of every adolescent is that the parent is there, waiting, expectant, completely there for them."

http://www.nytimes.com/2009/05/26/health/26teen.html?nl=health&emc=a1

Getting Healthy, With a Little Help From the Boss

By LESLEY ALDERMAN

GET ready to get well. Boss's orders.

Once upon a time, corporations offered generous health benefits as a way to woo employees into their ranks. Now, most companies have turned from amorous suitors into stern parents — shifting more costs, and more responsibilities, to their employees. According to a January survey by the benefits consulting firm Hewitt Associates, nearly two-thirds of large employers planned to transfer more costs to employees. At the same time, one-third planned to put greater emphasis on wellness plans — programs that encourage employees to adopt healthier lifestyles. (So long, Big Macs).Congress is climbing onto the wellness bandwagon, too. Senator Tom Harkin, the Iowa Democrat who is a leader of the Congressional health reform movement, recently proposed giving tax incentives to companies that offer comprehensive wellness programs to their employees.

The focus on healthier lifestyles makes sense. Unhealthy employees use significantly more medical services than healthy ones and cost employers more money. "If you are an employer who wants to keep providing health care coverage, you have to target employees' exercise, diet and nutrition habits," says Dr. Kenneth E. Thorpe, chairman of the health policy and management department at the Rollins School of Public Health at Emory University. Three-quarters of the money the nation spends on health care is for chronic conditions, Dr. Thorpe pointed out. If companies can get workers to make behavioral changes to control problems like high blood pressure or diabetes, the businesses' costs typically go down.

But though the logic seems sound — employees get healthier and employers reduce their overall costs — not all wellness plans are alike.

At paternalistic companies like General Mills, employees have a host of generous options. Workers at the company's headquarters just outside Minneapolis can exercise at the on-site gym, get eye exams at the medical office and see a physical therapist for random aches and pains — all free of charge.

But some aspects of wellness plans may feel more meddlesome. About 80 percent of big employers offer health risk surveys, which are aimed at identifying health problems or potential health problems. And 60 percent of employers give financial incentives to employees who fill them out, according to a joint survey by the benefits consulting firm Watson Wyatt and the National Business Group on Health, an association of more than 300 large employers. After a worker takes such a survey — the results are off limits to the employer — a coach or nurse from the outside contractor running the program will call the person and suggest medical interventions or lifestyle changes. Those changes may involve exercising more, eating less meat or losing weight.

"It's one thing for an employer to offer insurance that protects you from illness," says Ronald C. Kessler, a professor of health care policy at Harvard Medical School. "It's another when they start suggesting that you shouldn't eat a P.B.&J. sandwich for lunch. That can feel intrusive."But whether you love them or hate them, wellness programs are probably here to stay. Here's how you can make them work for you.

UNDERSTAND THE TOOLS More and more companies are using health questionnaires as a way of to create personalized health improvement plans for their workers. These surveys ask about your body mass index, how much you exercise and whether you smoke, and are typically administered by a third party.

According to privacy laws, the information you provide to the plan administrators cannot be used by your employer for any purpose related to your employment status. In addition, an employer cannot deny health insurance to an employee for failure to complete a health risk questionnaire, says Martin J. Moderson, vice chairman of employee benefits and executive compensation at Sonnenschein Nath & Rosenthal.

While many employers offer incentives for filling out health surveys, there is some debate over whether it is legal for them to do so. Under the federal health privacy law known by its acronym, Hipaa (pronounced HIP-ah), your employer can provide an incentive for filling out a risk survey, as long as the reward does not exceed 20 percent of the cost of coverage under the plan, and certain other requirements are satisfied, Mr. Moderson said. The Equal Employment Opportunity Commission, however, has questioned whether such incentives would violate the American with Disabilities Act. If you feel coerced into filling out a questionnaire, or annoyed that some employees get paid for doing so, speak to the human resources department.

MAKE IT WORK FOR YOU If you're already using your company's wellness plan, great. But if you've been reluctant, find out what your company has to offer. "The guy who is not taking advantage of the company wellness plan is underwriting the one who is," Mr. Kessler said. "You're basically leaving money on the table." Call up your human resource department and find out what you might be entitled to. Or go on your company's intranet site and look for a health portal. Common perks are ones that even the change-averse are likely to appreciate: discounts on gym memberships and free flu shots, blood pressure tests and mammograms.

MAKE SUGGESTIONS If your company doesn't offer wellness benefits, and you wish they did, talk to your supervisor or human resources department. "There's been a dramatic shift in attitudes toward health at all sized companies," said Shelly Wolff, national health and productivity leader at Watson Wyatt. "Start by asking for simple things that don't cost much money."

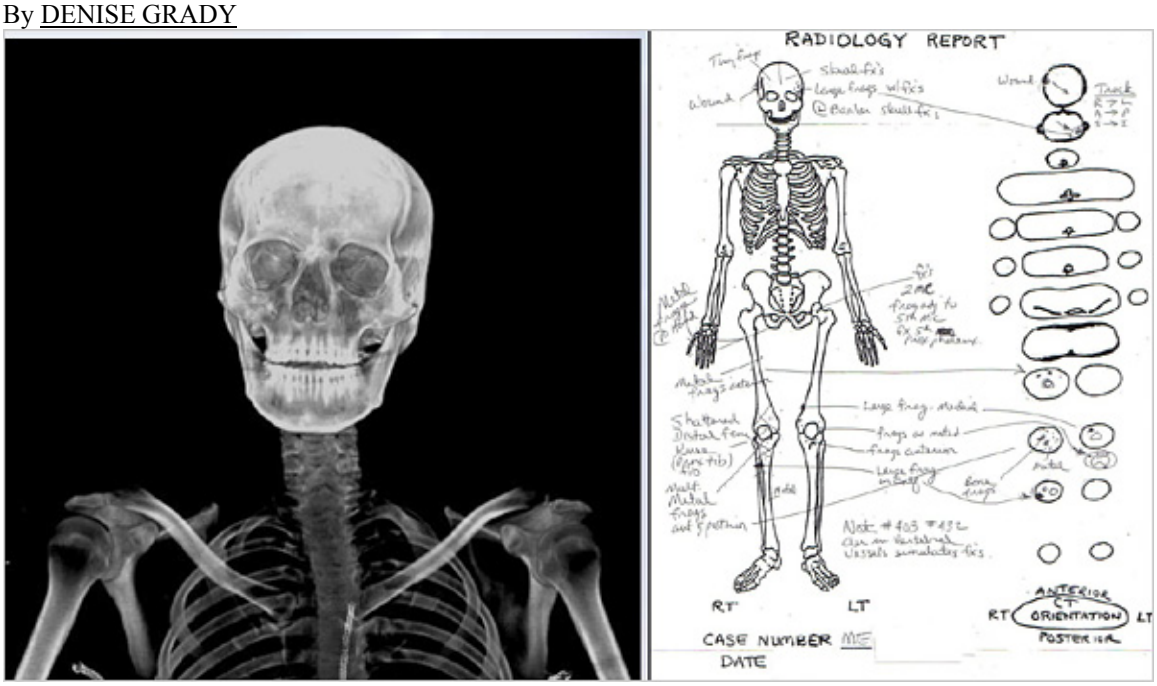
Can the company arrange for a corporate discount at a local Y or gym? Will they sponsor a baseball or basketball team? Could they arrange to have a yoga class once a week in an empty conference room? If they snarl, remind them that studies show wellness programs result in less absenteeism and lower costs.

What boss can argue with that?

http://www.nytimes.com/2009/05/23/health/23patient.html?nl=health&emc=a1

Autopsies of War Dead Reveal Ways to Save Others

By DENISE GRADY



Within an hour after the bodies arrive in their flag-draped coffins at Dover Air Force Base, they go through a process that has never been used on the dead from any other war.

Since 2004, every service man and woman killed in Iraq or Afghanistan has been given a CT scan, and since 2001, when the fighting began in Afghanistan, all have had autopsies, performed by pathologists in the Armed Forces Medical Examiner System. In previous wars, autopsies on people killed in combat were uncommon, and scans were never done.

The combined procedures have yielded a wealth of details about injuries from bullets, blasts, shrapnel and burns — information that has revealed deficiencies in body armor and vehicle shielding and led to improvements in helmets and medical equipment used on the battlefield.

The military world initially doubted the usefulness of scanning corpses but now eagerly seeks data from the scans, medical examiners say, noting that on a single day in April, they received six requests for information from the Defense Department and its contractors.

“We’ve created a huge database that’s never existed before,” said Capt. Craig T. Mallak, 48, a Navy pathologist and lawyer who is chief of the Armed Forces Medical Examiner System, a division of the Armed Forces Institute of Pathology.

The medical examiners have scanned about 3,000 corpses, more than any other institution in the world, creating a minutely detailed and permanent three-dimensional record of combat injuries. Although the scans are sometimes called “virtual autopsies,” they do not replace old-fashioned autopsies. Rather, they add information and can help guide autopsies and speed them by showing pathologists where to look for bullets or shrapnel, and by revealing fractures and tissue damage so clearly that the need for lengthy dissection is sometimes eliminated. The examiners try to remove as many metal fragments as possible, because the pieces can yield information about enemy weapons.

One discovery led to an important change in the medical gear used to stabilize injured troops on the battlefield.

Col. Howard T. Harcke, a 71-year-old Army Reserve radiologist who delayed retirement to read CT scans at Dover, noticed something peculiar in late 2005. The emergency treatment for a collapsed lung involves inserting a needle and tube into the chest cavity to relieve pressure and allow the lung to reinflate. But in one case, Colonel Harcke could see from a scan that the tube was too short to reach the chest cavity. Then he saw another case, and another, and half a dozen more.

In an interview, Colonel Harcke said it was impossible to tell whether anyone had died because the tubes were too short; all had other severe injuries. But a collapsed lung can be life-threatening, so proper treatment is essential.

Colonel Harcke pulled 100 scans from the archives and used them to calculate the average thickness of the chest wall in American troops; he found that the standard tubing, five centimeters long, was too short for 50 percent of the troops. If the tubing was lengthened to eight centimeters, it would be long enough for 99 percent.

“Soldiers are bigger and stronger now,” Colonel Harcke said.

The findings were presented to the Army Surgeon General, who in August 2006 ordered that the kits given to combat medics be changed to include only the longer tubing.

“I was thrilled,” Colonel Harcke said.

The medical examiners also discovered that troops were dying from wounds to the upper body that could have been prevented by body armor that covered more of the torso and shoulders. The information, which became public in 2006, led the military to scramble to ship more armor plates to Iraq.

It was Captain Mallak who decided that autopsies should be performed on all troops killed in Afghanistan or Iraq. Federal law gives him that authority.

“Families want a full accounting,” he said. During World War II and the Vietnam War, he explained, families were told simply that their loved one had died in service of their country.

“Personally, I felt that families would no longer just accept that,” Captain Mallak said.

The examiner’s office has not publicized the autopsy policy and has not often discussed it. Families are informed that autopsies are being performed and that they can request a copy of the report. Occasionally, families object, but the autopsy is done anyway. About 85 percent to 90 percent of families request the reports, and 10 percent also ask for photographs from the autopsy, said Paul Stone, a spokesman for the medical examiner system. Relatives are also told they can call or e-mail the medical examiners with questions.

“Every day, families come back for more information,” Captain Mallak said. “The No. 1 question they want to know is, ‘Did my loved one suffer?’ If we can say, ‘No, it was instantaneous, he or she never knew what happened,’ they do get a great sense of relief out of that. But we don’t lie.”

Indeed, the reports are sent with cover letters urging the families not to read them alone.

The possibility that a relative burned to death is a particular source of anguish for families, and one area in which CT can outperform an autopsy. In a body damaged by flames, CT can help pathologists figure out whether the burns occurred before or after death. The scans can also tell whether a person found in

water died from drowning. Families who request the autopsy reports often put off reading them, said Ami Neiberger-Miller, a spokeswoman for the Tragedy Assistance Program for Survivors, a nonprofit group for people who have lost relatives in war.

"I think people feel, 'We should request it; we may not want to read it today, but we may want to read it 10 years from now,' " Ms. Neiberger-Miller said. Her brother was killed in Baghdad in 2007, she said, and her family has never opened his autopsy report.

Liz Sweet, whose 23-year-old son, T. J., committed suicide in Iraq in 2003, requested his autopsy report and read it.

"For our family, we needed it," Mrs. Sweet said. "I just felt better knowing I had that report." T. J. Sweet's coffin was closed, so Mrs. Sweet asked Captain Mallak for a photograph taken before the autopsy, to prove to herself that it really was her son who had died.

"He was one of the most compassionate people throughout this whole process that I dealt with from the Department of Defense," Mrs. Sweet said of Captain Mallak.

The scans and autopsies are done in a 70,000-square-foot facility at the Dover base that is both a pathology laboratory and a mortuary. Journalists are not allowed inside. The CT scanning began in 2004, when it was suggested and paid for by the Defense Advanced Research Projects Agency, or Darpa, part of the Defense Department. Darpa got the idea of using CT scanners to perform virtual autopsies from Switzerland, where it started about 10 years ago.

Now the idea of virtual autopsies has begun to catch on with medical examiners in this country, who are eager to use it in murder cases but also to learn the cause of death in people from religious groups that forbid traditional autopsies. Scans can also help pathologists plan limited autopsies if a family finds a complete one too invasive.

John Getz, the program manager for the Armed Forces medical examiners, said mobile CT scanners could also be used to screen mass casualties during disasters like Hurricane Katrina, to help with identification and also to determine if any of the dead were the victims of crimes rather than accidents.

The Armed Forces CT scanner, specially designed to scan entire corpses one after another, is the envy of medical examiners and crime laboratories around the country, and several states have asked Captain Mallak and his colleagues for advice on setting up scanners.

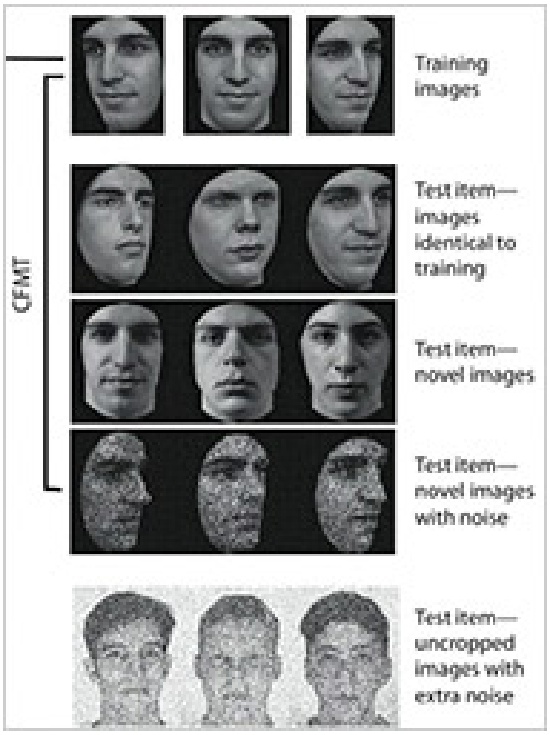
Colonel Harcke said he hoped the technology would help to increase the autopsy rates at civilian hospitals, which now perform them only 5 percent to 10 percent of the time.

"We hope to return to a time where we were 50 years ago," he said, "when autopsies were an important part of the medical model, and we continued to learn after death."

http://www.nytimes.com/2009/05/26/health/26autopsy.html?_r=1&nl=health&emc=a1

A Memory for Faces, Extreme Version

By RONI CARYN RABIN



Jennifer Jarett never forgets a face.

A few years ago, shortly after she moved to New York City, one of her friends pointed out a young man standing on the other side of the room at a party. Ms. Jarett took one look and said, "Oh, I know who he is — I went to Hebrew school with him in fourth grade."

At the time, Ms. Jarett, who is now 38, had not seen the boy in nearly two decades, since they were both children.

In a study published in April, Harvard scientists coined the term "super-recognizers" to describe people like Ms. Jarett who have an uncanny ability to recognize and remember faces. The brain's ability to identify faces varies from person to person: while a small minority are unable to recognize others at all, the "super-recognizers" have an extraordinary talent for recollection, occupying the extreme end of the face-recognition spectrum, said Richard Russell, a postdoctoral researcher in psychology at Harvard University and lead author of the paper, published in Psychonomic Bulletin & Review.

Dr. Russell assessed the recognition abilities of four subjects, including Ms. Jarett, who identified themselves as having a knack for remembering faces. In one exam, they were asked to identify celebrities through 56 photographs taken before they achieved fame or when they were children.

In another, the subjects were asked to learn to recognize unfamiliar faces and then to pick those faces from lineups that included profile shots, cropped photographs and other images obscured by visual noise or snow.

All four subjects had nearly perfect scores on the tests, far higher than those of control subjects, the researchers found.

"This suggests we don't all see faces the same way, and we don't all have the same abilities," Dr. Russell said. "It occurs along a continuum." Assessing this ability could be important for selecting security personnel or determining the trustworthiness of an eyewitness, he added.

"Super-recognizers" appear to be the opposites of prosopagnosics, people who suffer from "face blindness," sometimes even failing to recognize immediate family members. Prosopagnosia, a term that combines the Greek words prosopon, or face, and agnosia, or ignorance, is believed to affect 2 percent of the population and can be congenital or the result of a brain injury or a stroke.

Facial recognition is both extremely complex and vitally essential, said Dr. Marlene Behrmann, a professor of cognitive neuroscience at Carnegie Mellon University in Pittsburgh. Dr. Behrmann has found that in prosopagnosics, structural fibers connecting the subregions of the brain involved in facial recognition are compromised.

"These regions are optimized for something that is really important and that, evolutionarily, is perhaps the most important thing we do," she said. "You've go to know friend from foe really quickly. It's crucial."

Ms. Jarett, who scored the highest of all the volunteers in Dr. Russell's study, is the kind of person who easily picks out celebrities in a crowd. Walking down the street, she recognizes the likes of Soon-Yi Previn even before noticing Woody Allen beside her.

"Even if I'm not looking out for a familiar face, something jumps out at me. It's almost like people have an aura about them, something that draws me over to look at them," she said. For years, she said, she thought people who did not remember her after a brief casual introduction were being rude.

"My friends joke that I'm a stalker — I used to remember so many details about everyone," she said. "People get weirded out."

http://www.nytimes.com/2009/05/26/health/26face.html?nl=health&emc=a3

Referral System Turns Patients Into Commodities

By SANDEEP JAUHAR, M.D.

I was chatting recently with a doctor friend who was depressed because he thought he had lost a referral source.

"This internist was sending me patients," he told me, as I recall. "Then last month he sent me only one patient. And this month only one patient."

I nodded hesitantly, unsure what he was driving at.

"So I understand something must have happened," he said.

"Like what?" I asked.

He threw up his hands, exasperated by my obliviousness. "He met someone else! He developed a relationship with another cardiologist."

I smiled at the overwrought response, with its connotations of a romantic breakup. But to my friend, this was no joke. Like most specialists, his livelihood depends on referrals. And like most, he will go to great lengths to preserve his referral sources.

Physician-to-physician referrals are the currency of day-to-day transactions in medicine, but as with any currency, they can be manipulated. Logic says that a referral should depend only on a patient's needs and the reputation and skill of the physician to which the patient is referred. But medicine is a business too, so that isn't how it always works in practice.

The talk springs up in every doctors' lounge: "Dr. X is opening shop — let's give him some business." When my wife told me she wanted to start an endocrinology practice, I reassured her that I would send patients to her, and that so would my brother, also a doctor, and his friends. As far as I can tell, there are no restrictions on such a practice.

Studies suggest that physicians receive up to 45 percent of new patients by referral, usually from other physicians. Referral rates to specialists in the United States are estimated to be at least twice as high as in Great Britain. The rates reflect several aspects of American medicine: increasing specialization, the lack of time for any doctor to give to complex cases, and fear of lawsuits over not consulting an expert. At the same time, referrals are a way for cash-strapped doctors to generate business.

When I was in training, simple referrals from internists, like patients with only mild hypertension, bothered me as a waste of time. Now that I am in practice, I welcome them. I haven't changed my mind that these referrals are probably unnecessary, and there is plenty of evidence that wasteful expert consultation is adding to health costs and creating redundant care. But as a full-fledged doctor, I appreciate the business. It is hard not to view a referral as an overture from another physician, and it is equally hard not to return the favor.

A sort of paradox is at work. Specialists are better paid than primary care physicians, but they are also less autonomous because, unlike primary care physicians, they depend on other doctors for referrals. There is pressure on specialists to keep referral sources happy, especially in doctor-saturated metropolitan areas like New York City.

There are limits, of course, on the autonomy of referring physicians, too. For instance, by federal law a doctor cannot refer patients to himself or to a business in which he has a significant financial stake, like a laboratory or imaging center, and he cannot be paid for a referral. The reasoning is that such behavior can interfere with clinical judgment, decrease quality and increase costs.

In 2006, Tenet Healthcare Corp., based in Dallas, agreed to pay $21 million to settle a whistleblower lawsuit asserting that a hospital it owned in San Diego had paid kickbacks to physicians for referrals. (Tenet did not admit wrongdoing.) That same year, a New Jersey teaching hospital was investigated for giving sham salaries to community doctors in a reported attempt to increase the number of referrals to its cardiac surgery program. Two cardiologists pleaded guilty to federal fraud charges.

But there are gray areas in practice. The Office of the Inspector General in the Department of Health and Human Services has investigated office space rentals, for example. Across the country, mobile medical imaging companies have made arrangements with internists to perform, in their offices, cardiac ultrasounds, which the companies send to cardiologists for interpretation. Insurance companies that cover the imaging pay the companies, and the companies pay rent to the internists. By law, these rent payments must reflect fair market value and be unrelated to the volume of patients referred by the internists for imaging. But according to doctors familiar with these agreements, that isn't always the case.

"Obviously you get more rent if you provide 50 patients than if you provide 5," an internist on Long Island, who did not want his name used, told me.

When I asked whether it wasn't just a form of a kickback, he shrugged.

"When the companies take more time, they have to pay more rent," he said. "You don't say it is per patient; you say per hour. But patients equal time."

Though he no longer participates in these contracts, he was open about the payments — about $100 per patient — and he saw nothing wrong with them. "As internists, we don't bill for procedures, so we have to figure out another way to make money," he said. "Every little bit helps."

Whether the rent payments amount to indirect kickbacks is an open question still being investigated by the inspector general. The real issue, I think, is not the rentals but a referral system that is too easily corrupted. There is so much pressure to generate referrals that lines become crossed.

Our health care system needs a different approach, one in which patients are not treated as commodities.

One possibility is what Gail Wilensky, a health policy expert, argued for this year in The New England Journal of Medicine: a single payment that would cover all physician services and hospital care for any one patient. A major driver of referral proliferation is that doctors are paid piecework. There is less of an incentive to increase volume if payments are bundled rather than discrete for every service.

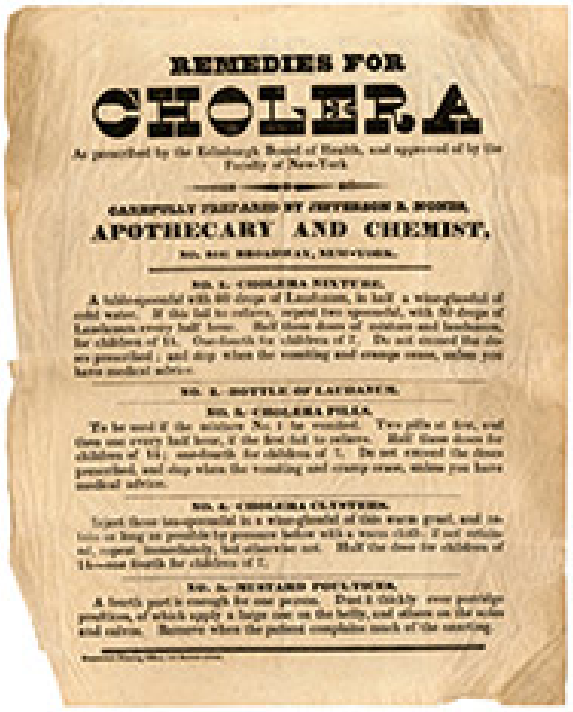
A bundled-payments system is already in place for hospitals, dialysis centers and nursing homes. Extending such a strategy to individual doctors' payments seems to be the logical next step.

Sandeep Jauhar is a cardiologist on Long Island and the author of the recent memoir "Intern: A Doctor's Initiation."

http://www.nytimes.com/2009/05/26/health/26essa.html?nl=health&emc=a9

Epidemics, Fearsome and Fascinating

By ABIGAIL ZUGER, M.D.


REMEDIES FOR
CHOLERA
APOTHECARY AND CHEMIST,

You have probably had your fill by now of swine flu, bird flu, flu of all descriptions; you have turned off your television, tossed the front section of this newspaper into the trash, and called for not one more word about the flu or any of the other dire infections breaking news around the globe.

Sad news: you are out of luck. There will unquestionably be more words — many more — and you will probably wind up reading them. An insatiable fascination with contagious illness is hard-wired into all of us, as two new books make clear.

From Philip Alcabes, an epidemiologist and a professor at Hunter College in New York, comes "Dread," a sober analysis of why exactly this should be so. What is it that distinguishes epidemic infection from all other diseases, the ones that fail to generate breathless headlines and have failed to inspire the gigantic body of literature and commentary that trail behind history's epidemics?

The answer is logical enough: epidemics hit us right at the nexus of self-interest and altruism, that exquisitely uncomfortable spot where our brother's misfortune nudges us just enough that we need to examine it and distance ourselves from it (and, in more highly evolved civilizations, take care of it before it takes care of us).

The history of epidemic infection is actually somewhat less about disease and treatment than the various ways humans have found to create a nice thick wall between the ill and the well, the "us" and the "them." Only quite recently has the radical notion of reaching through the wall and protecting the well by treating the ill gained much support.

Dr. Alcabes takes a methodical tour of the terrain, from the leprosy of biblical times through the bubonic plague outbreaks of medieval and Renaissance Europe, cholera and tuberculosis in the 19th century,

AIDS in the 20th. Politics, religion and economic concerns shaped the public response to each, with feeble medical intervention generally trailing far behind.

The language itself, Dr. Alcabes argues, can sometimes transform the facts: once you call a disease an "epidemic," for instance, you immediately imply that it has a story line, with a beginning and an end, a certain moral tenor and a narrative flow that regular old illness lacks.

And so, he asks provocatively, is obesity is really the newest modern epidemic? Or is the word being used cannily by public health officials, with the intent of inspiring a specific public reaction — creating an "us" and a "them" ("they" have bad habits and have made poor choices) and implying that someday it will be "over"?

This is fascinating stuff, or at least it should be. Unfortunately, Dr. Alcabes writes with the trademark mumble of the social scientist, and he has successfully gutted most of the human interest from his story. The facts are there, but the color has bled far away.

For living color, turn to "The Lassa Ward," which effortlessly transmits both the facts and the fascination of a bad infectious outbreak. Dr. Ross Donaldson spent two months in Sierra Leone as a medical student in 2003. Malaria, tuberculosis, yellow fever and AIDS were rampant, but Dr. Donaldson, for reasons clear perhaps only to the invulnerable post-adolescent he was at the time, decided to spend his time with Lassa fever patients.

This rat-borne illness is one of Africa's dire viral hemorrhagic fevers; like Ebola, it can reduce a human body to a bruised, bloated corpse in days. It is terrifying — the secretions of infected patients easily spread the disease — but it is also treatable, and in the best cases patients get well and go home.

Dr. Donaldson had trailed the elderly Lassa specialist Dr. Conteh for only a few weeks when, to his horror, he was left alone in charge of the Lassa isolation ward. "No matter how low a cotton tree falls, it is still taller than grass," the old doctor said as he left to teach in another town. In other words, the inexperienced Dr. Donaldson, with three years of medical school, had more formal education than anyone else around.

With patients who were sicker than sick, and little in the way of tests or treatments, Dr. Donaldson clung to the usual life preservers: the advice of a couple of experienced nurses and his own common sense. At the end of two weeks, he writes, "I hardly recognized the person I had become." He was a Lassa expert, veteran of the old education-by-immersion process that terrifies medical students no matter where they are.

His take on epidemic infection is dead-on, down to the bizarre stubbornness that often permeates stricken communities and prevents the very changes that might save lives. (For Lassa, a key preventive measure was to stop eating rats, but rat meat tasted far too good for that advice to be taken seriously.)

Dr. Donaldson shows how life can be strangely orderly at the deep center of an epidemic: meals are eaten, drugs are dispensed, patients die but others recover, and a little girl lying bloated and moribund in the hospital makes it home to play in a rat-infested yard. She may be immune to Lassa now, but her playmates are not. This is the portrait of contagion at the highest possible magnification, and all the abstruse details of policy, prevention and financing are right there, if you look hard enough.

Tara Parker-Pope's Well blog is at nytimes.com/well.

http://www.nytimes.com/2009/05/26/health/26books.html?nl=health&emc=a9

The Coming Superbrain

By JOHN MARKOFF

Mountain View, Calif. — It's summertime and the Terminator is back. A sci-fi movie thrill ride, "Terminator Salvation" comes complete with a malevolent artificial intelligence dubbed Skynet, a military R.&D. project that gained self-awareness and concluded that humans were an irritant — perhaps a bit like athlete's foot — to be dispatched forthwith.

The notion that a self-aware computing system would emerge spontaneously from the interconnections of billions of computers and computer networks goes back in science fiction at least as far as Arthur C. Clarke's "Dial F for Frankenstein." A prescient short story that appeared in 1961, it foretold an ever-more-interconnected telephone network that spontaneously acts like a newborn baby and leads to global chaos as it takes over financial, transportation and military systems.

Today, artificial intelligence, once the preserve of science fiction writers and eccentric computer prodigies, is back in fashion and getting serious attention from NASA and from Silicon Valley companies like Google as well as a new round of start-ups that are designing everything from next-generation search engines to machines that listen or that are capable of walking around in the world. A.I.'s new respectability is turning the spotlight back on the question of where the technology might be heading and, more ominously, perhaps, whether computer intelligence will surpass our own, and how quickly.

The concept of ultrasmart computers — machines with "greater than human intelligence" — was dubbed "The Singularity" in a 1993 paper by the computer scientist and science fiction writer Vernor Vinge. He argued that the acceleration of technological progress had led to "the edge of change comparable to the rise of human life on Earth." This thesis has long struck a chord here in Silicon Valley.

Artificial intelligence is already used to automate and replace some human functions with computer-driven machines. These machines can see and hear, respond to questions, learn, draw inferences and solve problems. But for the Singulatarians, A.I. refers to machines that will be both self-aware and superhuman in their intelligence, and capable of designing better computers and robots faster than humans can today. Such a shift, they say, would lead to a vast acceleration in technological improvements of all kinds.

The idea is not just the province of science fiction authors; a generation of computer hackers, engineers and programmers have come to believe deeply in the idea of exponential technological change as explained by Gordon Moore, a co-founder of the chip maker Intel.

In 1965, Dr. Moore first described the repeated doubling of the number transistors on silicon chips with each new technology generation, which led to an acceleration in the power of computing. Since then "Moore's Law" — which is not a law of physics, but rather a description of the rate of industrial change — has come to personify an industry that lives on Internet time, where the Next Big Thing is always just around the corner.

Several years ago the artificial-intelligence pioneer Raymond Kurzweil took the idea one step further in his 2005 book, "The Singularity Is Near: When Humans Transcend Biology." He sought to expand Moore's Law to encompass more than just processing power and to simultaneously predict with great precision the arrival of post-human evolution, which he said would occur in 2045.

In Dr. Kurzweil's telling, rapidly increasing computing power in concert with cyborg humans would then reach a point when machine intelligence not only surpassed human intelligence but took over the process of technological invention, with unpredictable consequences.

Profiled in the documentary "Transcendent Man," which had its premier last month at the TriBeCa Film Festival, and with his own Singularity movie due later this year, Dr. Kurzweil has become a one-man marketing machine for the concept of post-humanism. He is the co-founder of Singularity University, a school supported by Google that will open in June with a grand goal — to "assemble, educate and inspire a cadre of leaders who strive to understand and facilitate the development of exponentially advancing technologies and apply, focus and guide these tools to address humanity's grand challenges."
Not content with the development of superhuman machines, Dr. Kurzweil envisions "uploading," or the idea that the contents of our brain and thought processes can somehow be translated into a computing environment, making a form of immortality possible — within his lifetime.
That has led to no shortage of raised eyebrows among hard-nosed technologists in the engineering culture here, some of whom describe the Kurzweilian romance with supermachines as a new form of religion. The science fiction author Ken MacLeod described the idea of the singularity as "the Rapture of the nerds." Kevin Kelly, an editor at Wired magazine, notes, "People who predict a very utopian future always predict that it is going to happen before they die."
However, Mr. Kelly himself has not refrained from speculating on where communications and computing technology is heading. He is at work on his own book, "The Technium," forecasting the emergence of a global brain — the idea that the planet's interconnected computers might someday act in a coordinated fashion and perhaps exhibit intelligence. He just isn't certain about how soon an intelligent global brain will arrive.
Others who have observed the increasing power of computing technology are even less sanguine about the future outcome. The computer designer and venture capitalist William Joy, for example, wrote a pessimistic essay in Wired in 2000 that argued that humans are more likely to destroy themselves with their technology than create a utopia assisted by superintelligent machines.
Mr. Joy, a co-founder of Sun Microsystems, still believes that. "I wasn't saying we would be supplanted by something," he said. "I think a catastrophe is more likely."
Moreover, there is a hot debate here over whether such machines might be the "machines of loving grace," of the Richard Brautigan poem, or something far darker, of the "Terminator" ilk.
"I see the debate over whether we should build these artificial intellects as becoming the dominant political question of the century," said Hugo de Garis, an Australian artificial-intelligence researcher, who has written a book, "The Artilect War," that argues that the debate is likely to end in global war.
Concerned about the same potential outcome, the A.I. researcher Eliezer S. Yudkowsky, an employee of the Singularity Institute, has proposed the idea of "friendly artificial intelligence," an engineering discipline that would seek to ensure that future machines would remain our servants or equals rather than our masters.
Nevertheless, this generation of humans, at least, is perhaps unlikely to need to rush to the barricades. The artificial-intelligence industry has advanced in fits and starts over the past half-century, since the term "artificial intelligence" was coined by the Stanford University computer scientist John McCarthy in 1956. In 1964, when Mr. McCarthy established the Stanford Artificial Intelligence Laboratory, the researchers informed their Pentagon backers that the construction of an artificially intelligent machine would take about a decade. Two decades later, in 1984, that original optimism hit a rough patch, leading to the collapse of a crop of A.I. start-up companies in Silicon Valley, a time known as "the A.I. winter."
Such reversals have led the veteran Silicon Valley technology forecaster Paul Saffo to proclaim: "never mistake a clear view for a short distance."
Indeed, despite this high-technology heartland's deeply held consensus about exponential progress, the worst fate of all for the Valley's digerati would be to be the generation before the generation that lives to see the singularity.
"Kurzweil will probably die, along with the rest of us not too long before the 'great dawn,' " said Gary Bradski, a Silicon Valley roboticist. "Life's not fair."

http://www.nytimes.com/2009/05/24/weekinreview/24markoff.html?em

Polaroid Lovers Try to Revive Its Instant Film

By CARTER DOUGHERTY

ENSCHEDE, the Netherlands — In this small town just across the border from Germany, a small group of Dutch scientists and one irrepressible Austrian salesman have dedicated themselves to the task of reinventing one of the great inventions of the 20th century — Polaroid's instant film.

Digital cameras are ubiquitous, cheap and easy to use — the reasons Polaroid stopped making the film last year — so what this group in Enschede is attempting may seem hopelessly retrograde.

But to them, that is exactly the point. They want to recast an outdated production process in an abandoned Polaroid factory for an age that has fallen for digital pictures because they think people still have room in their hearts for retro photography that eschews airbrushing or Photoshop.

"This project is about building a very interesting business to last for at least another decade," said Florian Kaps, the Austrian entrepreneur behind the effort. "It is about the importance of analog aspects in a more and more digital world."

No one said it would be easy. Chemical processes and the chemicals themselves must be reinvented in a factory that, though littered with Polaroid detritus of yore, lacks the necessary materials to restart production. Crucial equipment nearly landed in a Dutch dump. But the group got a break when prosecutors in the United States arrested the private equity investor who owned Polaroid's assets.

Mr. Kaps is, if anything, enthusiastic despite the hurdles he faces. He hopes to start production later this year for distribution in the United States, Europe and Asia and is convinced there is still an eager market for Polaroid film packs.

He estimates the number of Polaroid instant cameras in circulation at one billion. That number is probably fanciful, or at the very least includes a lot of cameras in the back of closets. But 30 million film packs in 2007, and 24 million in the first half of 2008 were produced at the Enschede factory for sale worldwide.

The digital storm, Mr. Kaps says, has left analog opportunity in its wake. "If everyone runs in one direction, it creates a niche market in the other," he said.

Marta Bukowska, a partner in Basic Model Management in New York, said that digital cameras had entirely displaced Polaroid for the workaday tasks of scouting talent, pitching clients, and beginning a photo shoot. About 18 months ago, the agency stopped using Polaroids regularly because digital is much less expensive, but still gets requests to capture that "high-quality, old-fashioned look" with a genuine instant photo.

"It used to be something you use for a lighting test," Ms. Bukowska said. "Now it is the art itself."

Mr. Kaps, 38, was already tapping the artist market in 2005 with an online shop devoted to selling Polaroid products, and a Web site, Polanoid.net, where people can upload scanned Polaroid pictures. Mr.

Kaps, a Ph.D. biologist with the tiniest of ponytails who trots around the Enschede factory in sneakers, had been an Internet project manager for a group dedicated to preserving analog photography.
The experience left him firm in the conviction that his calling and his training were not in sync. "I wrote a very interesting thesis about spider eyes, but I was always a salesman," Mr. Kaps said.
Mr. Kaps, who lives in Vienna, was on hand in June 2008 for the ceremony when Polaroid shut down its factory in Enschede, which had manufactured film cassettes for the SX-70 — the signature Polaroid camera that folds into a squat rectangle.
There he met André Bosman, the engineering manager at the Enschede plant, a sprawling complex in the middle of the town of 150,000 people. Mr. Bosman tipped off Mr. Kaps to the fact that the machines for making Polaroid film cassettes, whose replacement cost Mr. Bosman estimates at about $130 million, still worked but would be cleared out in a matter of days.
"So we stopped drinking beer — which is a pity because Dutch beer is good — and started talking business," Mr. Kaps said.
They managed to stave off destruction of the equipment by peppering Polaroid with requests to surrender it. They might have failed had federal prosecutors last October not arrested Tom Petters, head of the Petters Group Worldwide, a private equity firm based in Minnesota, that had bought Polaroid's name and assets in 2005. He was accused of running a Ponzi scheme. (The charges are unrelated to the Polaroid investment.)
Mr. Petters had driven an aggressively digital strategy for Polaroid, and his downfall — though the case is still pending — made Polaroid receptive to Mr. Kaps's pleas. The machinery was saved.
Polaroid's last assets, including the name, its intellectual property and its inventory, were sold this month. It did not respond to requests for comment.
The Dutch owner of the factory leased the building to the company created by Mr. Kaps, who had since raised $2.6 million in capital from friends and family.
The task at hand is resurrecting production of Polaroid instant film.
Each film cassette that slips into a camera contains all the things that would normally be in a darkroom: photographic paper, a negative, a substance to fix the image and one to stop the photo from developing further. Rollers inside a Polaroid camera explode chemical packs in the cassette to set off the process.
Unfortunately for Mr. Bosman, the former head engineer, Polaroid itself once manufactured the chemicals integral to the process in the United States but dismantled that production years ago after stockpiling what it needed.
So they are now seeking, or reinventing, chemicals that can mimic what Polaroid's own once did. For example, they are searching for a form of latex that can be easily coated onto a gelatin base to recreate the "timing layer" of Polaroid film, which controls the developing process.
"We have a total of about 300 years of experience here," Mr. Bosman said. "That is the key to reinventing this process."

http://www.nytimes.com/2009/05/26/technology/26polaroid.html?th&emc=th

'LUIS MELÉNDEZ: MASTER OF THE SPANISH STILL LIFE'
A Spaniard Who Liked His Vegetables

By KEN JOHNSON

WASHINGTON — Here is a time-tested recipe for success: fail at what you want to do, then do what you really can do. It worked for Luis Meléndez. He desperately sought appointment as a salaried court artist like his contemporary Francisco Goya, but his petitions to the king were rejected. So instead of producing unctuous portraits of nobles, grandiose history paintings and saccharine mythic scenes, he painted small, intensely realistic pictures of fruit, vegetables and kitchenware. Today he is considered the greatest still-life painter of 18th-century Spain.

That assessment is easy to credit in light of "Luis Meléndez: Master of the Spanish Still Life," a splendid show at the National Gallery of Art. Only 31 pictures are on view, but because each is so absorbing to study, the exhibition seems bigger.
Meléndez (1715-1780) was not a showy painter. He worked small; more than half the paintings in the show are around 19 by 14 inches and, except for a vapid early self-portrait that starts the exhibition, none is bigger than about two by three feet. The arrangements of comestibles, crockery and cookware and the occasional piece of fine silver or porcelain imply a humble, folksy lifestyle that appealed to his upper-class clientele. There are no skulls or bugs delivering vanitas-type morals about the ephemerality of earthly existence, and there is no fancy brushwork asserting the painter's virtuosity.
What is captivating is the near-photographic verisimilitude. The leathery grain of a cantaloupe hide, the gleam of copper pots; the spongy insides of a broken bread loaf, the dull grain of old wood, the transparency of glass: everything is seen with a near-microscopic attention to detail and rendered with an almost imperceptible painterly touch. Light and color are often realized with astounding vividness. Piled oranges and gnarly yellow pears glow as though lighted from within. A picture bathed in cool morning light, with eggs in a basket, a tin funnel and a brass pot, boasts front and center what might be the most beautiful head of cauliflower in the history of art.

How Meléndez achieved the degree of realism he did is something of a mystery. No drawings related to his still-life paintings exist, and while it looks as though he must have used a device like a camera obscura or a camera lucida, evidence of that has not turned up.

He practiced some peculiar methods. In their catalog essay about his process, the exhibition's organizers, Gretchen A. Hirschauer, the gallery's associate curator of Italian and Spanish paintings, and Catherine A. Metzger, the senior conservator of paintings, explain that he did not work from complete setups. Rather he would study and paint his objects one at a time, starting with those in front, filling in those further back and ending with the tabletop and a usually blank, dark brown background.

This piecemeal approach may be a reason Meléndez's star never rose as high as that of, for example, the French still-life painter Chardin, whose dates — 1699 to 1779 — are not far off. In Chardin meticulous detail is relatively simplified, and there is a richer feeling of space, atmosphere and sculptural solidity. Also, the emotional warmth in Chardin's painting makes Meléndez's seem clinical by comparison.

Meléndez was not an easygoing man, but he was well prepared for his vocation. His father, Francisco Antonio Meléndez, was a famous painter of miniature manuscript illuminations, and he employed Luis and his other children as assistants. Father and son both taught at the provisional royal academy of art in Madrid, which Francisco Antonio helped found, but they were both fired as a result of administrative and faculty political conflicts. The younger Meléndez's ornery temper may be a reason he never got the royal appointment he so longed for.

He did achieve renown during his lifetime for his still lifes, partly as a result of one major commission. In 1771 Charles III, Prince of Asturias (later King Charles IV), contracted him to create a series of still lifes for the New Cabinet of Natural History in the royal palace. The series was to represent the four seasons, as the artist described it, "with the aim of composing an amusing cabinet with every species of food produced by the Spanish climate."

Meléndez had produced 44 paintings over a five-year period when, in 1776, the project was canceled. (Nine works from the Asturias commission are in the National Gallery show.) Four years later he declared himself a legal pauper, and he died shortly after that, leaving to posterity what the art historian and catalog essayist Peter Cherry calls "the fruits of his failure, which are among the most brilliant of their kind ever painted."

"Luis Meléndez: Master of the Spanish Still Life" is at the National Gallery of Art, Fourth Street and Constitution Avenue NW, Washington, through Aug. 23; (202) 737-4215 or nga.gov.

http://www.nytimes.com/2009/05/26/arts/design/26mele.html?ref=design

Clues found to menopause timing

Scientists have identified genetic variants which affect the age when a woman reaches the menopause.

The researchers in the Netherlands believe the discovery might help with treatments for fertility problems.

Genetic data from nine studies involving 10,339 menopausal women were analysed by the team from Erasmus University in Rotterdam.

They found 20 changes in individuals' genetic codes that were associated with early menopause. Such variants are known as single nucleotide polymorphisms (SNPs) and are located at four different sites on chromosomes 19 and 20.

The scientists suspect they influence the ovaries or the brain, although their precise effect is not yet known.

The findings were presented at the annual meeting of the European Society of Human Genetics in Vienna.

" **We might one day be able to screen women who have problems getting pregnant to see if they have one or more of these variants** "
Lisette Stolk, Erasmus University

Researcher Lisette Stolk, from Erasmus University, said: "We found that the 20 SNPs were all related to a slightly earlier menopause, and women who had one of them experienced menopause nearly a year earlier than others. "We know that 10 years before menopause women are much less fertile, and five years before many are infertile.

"In Western countries, where women tend to have children later in life and closer to menopause, age at menopause can be an important factor in whether or not a particular woman is able to become a mother."

The menopause usually occurs between the ages of 45 and 55. The researchers now plan to analyse a larger sample of women using the same technique, known as a genome-wide association study.

Ms Stolk said she hoped the studies would allow them to understand better the function of the genetic variants involved in early menopause. She added: "We might one day be able to screen women who have problems getting pregnant to see if they have one or more of these variants which might relate to their sub-fertility, and perhaps interfere with the relevant physiological pathways in order to delay their total infertility."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/8066894.stm

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Middle age spread link to frailty

Emma Wilkinson
Health reporter, BBC News

People who are overweight or obese in middle-age run the risk of being frail in later life, say Finnish researchers.

A study of more than 1,000 men found the highest risk of death and illness in those who put on weight in their 40s but lost it when they got older.

It is thought that the heart risk associated with middle-aged spread puts men at risk of "frailty" even if they have no obvious illness.

The research is published in the European Heart Journal.

The researchers said obesity was a very well-known risk factor for cardiovascular disease. But paradoxically, studies have also shown that in older patients with heart failure, being overweight may be somewhat protective.

In the latest study, the team followed the men from age 25 through to their 70s.

" **This study reinforces the importance of maintaining a healthy weight throughout our lives to help prevent heart disease** "
Alasdair Little, British Heart Foundation

As expected, those who put on weight in their 40s had a worse prognosis in middle age than those who stayed a normal weight.

However, when looking at health in later life a different picture emerged.

Those who were overweight in middle age but lost weight in later life had the highest risk of death and morbidity in their 70s.

That group also had the highest cardiovascular risk in middle age.

The weight loss, which was probably not intentional, could not be explained by diseases such as cancer or heart failure.

'Frailty syndrome'

Study leader Dr Timo Strandberg, said it seemed the unhealthy pattern of weight in their 40s was causing frailty in later life probably due to underlying cardiovascular problems, such as high blood pressure and early stages of diabetes.

"Frailty syndrome", where older people have weight loss, muscle weakness, exhaustion and struggle with even small amounts of physical activity, is attracting increasing attention from old-age researchers.

It seems to be common but in these patients there is no obvious reason, such as cancer.

"It is important because frailty is associated with death and a great deal of disability," he said.

He said doctors should pay particular attention to this group.

"It is important to notice it early."

The researchers are planning further work to find out which group has the best health - perhaps those who are normal weight throughout life or those who gain a bit of weight but not until they are in their 60s and 70s.

Alasdair Little, a cardiac nurse at the British Heart Foundation said: "This study reinforces the importance of maintaining a healthy weight throughout our lives to help prevent heart disease.

"Being obese can also lead to the development of other known risk factors for heart disease, such as diabetes and high blood pressure."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8063140.stm

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Gene links heart and gum disease

A genetic link between dental disease and heart attacks has been found by German researchers.

Gum disease - periodontitis - is known to be associated with heart disease but how exactly they are linked is unknown.

Now the University of Kiel team has found a common gene mutation in people with periodontitis and heart attack patients, a conference heard.

Study leader Dr Arne Schaefer said gum disease should be taken very seriously and treated as early as possible.

Both coronary heart disease (CHD) and periodontitis are associated with the same risk factors - most importantly smoking, diabetes and obesity.

" **Now we know for sure that there is a strong genetic link, patients with periodontitis should try to reduce their risk factors and take preventive measures at an early stage** "
Study leader, Dr Arne Schaefer

Researchers have shown similarities between the bacteria found in the oral cavity and those in coronary plaques and both diseases are characterised by an imbalanced immune reaction and chronic inflammation.

One theory is that the bacteria involved in gum disease trigger a low grade inflammatory response throughout the body, prompting changes in the arteries leading to strokes and heart attacks.

Another possibility is that bacteria disturbs the way blood vessels dilate directly, since some bacteria can enter the bloodstream.

Genetic link

Speaking at the annual conference of the European Society of Human Genetics in Vienna, study leader Dr Arne Schaefer from the University of Kiel said his team found the gene linking the conditions on chromosome 9.

It had already been associated with heart attacks but in the latest study was found both in a group of 1,097 patients with heart disease and in 151 patients with the most aggressive early-onset forms of periodontitis.

The genetic variation was identical in both diseases and the researchers confirmed the association in further groups of 1,100 CHD patients and 180 periodontitis patients.

Although it is known what protein the gene encodes it is not yet clear how this is linked with the conditions.

"Now we know for sure that there is a strong genetic link, patients with periodontitis should try to reduce their risk factors and take preventive measures at an early stage", said Dr Schaefer.

"We hope that our findings will make it easier to diagnose the disease at an early stage, and that in future a greater insight into the specific pathophysiology might open the way to effective treatment before the disease can take hold."

"In the meantime, because of its association with CHD, we think that periodontitis should be taken very seriously by dentists and diagnosed and treated as early as possible."

Dr Francesco D'Aiuto, clinical lecturer at the UCL Eastman Dental Institute, said the study had focused on a particularly aggressive form of periodontitis but the findings take researchers a step closer to working out how the two diseases are linked.

"We will be looking closely looking at this novel genetic variant to see if the finding can be replicated in the UK population.

"There l great interest whether this genetic locus is associated not only with aggressive forms of periodontitis but also with the more common chronic form, which is present in some form in at least 10-20% of the UK population."

Story from BBC NEWS:
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Study unlocks history of the seas

By Mark Kinver
Science and environment reporter, BBC News

Medieval fishermen first took to the open seas in about AD1,000 as a result of a sharp decline in large freshwater fish, scientists have suggested.

They say the decline was probably the result of rising population and pollution levels.

The study forms part of a series that examines the impact of humans on life beneath the waves throughout history.

The findings will be presented at a Census of Marine Life (CoML) conference in Canada, which begins on Tuesday.

"Fish bones are found in archaeological sites... all around the north-western part of Europe," said co-author James Barrett, from Cambridge University's McDonald Institute for Archaeological Research.

"What we have done is to start to piece together some of the information that has been gathered."

This involved looking at the fish bones to determine what species they came from, and from what time period.

" **One of the straightforward hypotheses is that freshwater fish were no longer sufficient to satisfy demand** "
Dr James Barratt, University of Cambridge

Dr Barrett observed: "At the end of the first millennium AD there is this wholesale shift in emphasis from reliance on freshwater fish towards marine species."

"It is not rocket science, it is just literally looking at the proportion of species that are obligatory freshwater ones, such as pike... and which ones are obligatory sea fish, such as cod and herring."

As for understanding what caused the shift, Dr Barratt said that it would be inappropriate to attempt to identify a single cause. "But when you look very carefully at the freshwater fish bones from the York site, where a big collection was gathered, you can see that the length of the fish are decreasing through time," he told BBC News.

"Certainly, one of the straightforward hypotheses is that freshwater fish were no longer sufficient to satisfy demand. "This was likely to have been for two reasons; one was because there had been a reduction in the availability of freshwater fish as a result of overfishing, or from things such as people building dams for water mills.

"The second thing would have been that there would have simply been more people."

Dr Barrett added that around this period there was a rapid expansion of towns and cities in north-western Europe. "So this meant that there was an increased pressure on freshwater fish, and there was an increase in demand that probably could not have been satisfied even if the supply had remained stable."

Dr Barrett's team's study will be one of a number of research projects that formed part of the CoML's History of Marine Animal Populations (HMAP). The project aims to address a number of questions, including how the diversity and distribution of marine animals have changed over the past 2,000 years, and what factors forced or influenced these changes.

Professor Poul Holm, the global chairman of the HMAP project, said that the history of marine animals had been one of the great unknowns.

But recent scientific advances was allowing researchers to gain a better understanding, he added.

"We now know that the distribution and abundance of marine animal populations change dramatically over time," he explained. "Climate and humanity forces changes and while few marine species have gone extinct, entire marine ecosystems have been depleted beyond recovery.

"Understanding historical patterns of resources exploitation and identifying what has actually been lost in the habitat is essential to develop and implement recovery plans for depleted marine ecosystems."

Many of the findings by HMAP researchers will be presented at the Oceans Past II Conference, which is begins on Tuesday at the University of British Columbia, Vancouver, Canada.

COML, which began back in 2000, is an international research programme involving thousands of scientists from around the world.

The goal of the decade-long endeavour is to assess and explain the diversity, distribution and abundance of marine life in the world's seas and oceans.

The publication of the first complete global Census of Marine Life is scheduled for October 2010.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8058351.stm

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Eczema's link to asthma uncovered

Scientists believe they have found what triggers many children with eczema to go on to develop asthma.

The Public Library of Science Biology study points to a way to stop what is known as the "atopic march".

The US team at the Washington University School of Medicine showed that a substance made by the damaged skin triggered asthma symptoms in mice.

The same substance, thymic stromal lymphopoietin (TSLP), is also produced in the lungs of asthma patients.

" **Now it will be important to address how to prevent defective skin from producing TSLP** "
Lead researcher Dr Raphael Kopan

Early treatment of the skin rash and blocking TSLP production might stop asthma developing in young patients with eczema, they hope.

Drugs that act on TSLP might also protect against asthma development even in cases that are not linked to eczema.

Atopic march

Allergies and asthma often occur together. Studies show that 50-70% of children with severe allergic skin problems - atopic dermatitis - go on to develop asthma.

The researchers studied mice bred with a genetic defect that made them develop a condition similar to eczema in humans.

The defective skin secreted TSLP, which the researchers believe alerts the body that its protective barrier has failed.

When they tested the lungs of the mice, they found this tissue also responded strongly to the TSLP signal and had the hallmark traits of asthma - mucous secretion, airway muscle contraction and invasion of white blood cells.

“ **These results were obtained from studies with mice, so it is important to establish whether the same causal link exists in humans** ”
Dr Elaine Vickers of Asthma UK

They did more experiments and found that even mice with normal skin but bred to overproduce TSLP also developed asthma-like symptoms, suggesting TSLP is indeed the culprit.

Lead researcher Dr Raphael Kopan said: "We are excited because we've narrowed down the problem of atopic march to one molecule.

"We've shown that the skin can act as a signalling organ and drive allergic inflammation in the lung by releasing TSLP.

"Now it will be important to address how to prevent defective skin from producing TSLP. If that can be done, the link between eczema and asthma could be broken."

Dr Elaine Vickers of Asthma UK said: "This is the first piece of research to suggest that the natural protein TSLP could play a direct role in causing people with eczema to develop asthma.

"These results were obtained from studies with mice, so it is important to establish whether the same causal link exists in humans.

"Scientists are already exploring the potential of targeting TSLP to create new treatments for eczema, asthma and other allergic conditions.

"Although it is still a long way off, this research raises the exciting possibility that as well as improving symptoms, these treatments might be able to limit, or even prevent, the development of asthma."

Story from BBC NEWS:
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Let There Be Light, and Color, on Fifth Avenue

By GLENN COLLINS

Music has been restored.

That is to say, the 77-year-old painted Gothic Revival window of that name — a stained-glass celebration of the glory of religious music — has been refurbished and is returning, piece by piece, to St. Thomas Church on Fifth Avenue and 53rd Street in Midtown.

For several weeks now restorers have been toiling outdoors on scaffolding 50 feet up, reinstating 12 windows to their rightful place at the north and west sides of the church. Built in 1914, St. Thomas is renowned for its London-made windows, its choir school and for recitals on its Ernest M. Skinner organ.

The 32-by-18-foot "Music" with its 18,000 pieces of colored glass was one of 12 windows removed from the church last year as part of a formidable two-year-long restoration intended to renew the splendor of its 33 windows with 9 million panes of glass designed by the firm of the architect Ralph Adams Cram. The windows' absence was hidden by great translucent vinyl window scrims, printed with stained-glass images, suspended 55 feet above the church sanctuary.

The real windows were transported to nine glass-restoration studios from Massachusetts to California, where the glass was cleaned and patched, and then releaded. The renovation of the largest windows required 4,500 worker hours: the equivalent of the labor of one artisan for two and a half years. The scrims are expected to come down — revealing the north windows' full majesty — by the end of the summer.

"This is exacting work," said Julie L. Sloan, a glass-conservation consultant from North Adams, Mass., who is overseeing the project. Each window section weighs 20 to 50 pounds, thanks to the heft of the lead that holds the panes in place. "The windows are robust, yet the glass is fragile."

The windows, installed from 1927 to 1974, were mostly created by James Powell & Sons of Whitefriars in London, a long-shuttered, but still revered, maker. Each Powell & Sons window is marked with a distinctive, diminutive signature portrait of a white-robed friar.

On a recent afternoon, with music from the Skinner emanating from inside the church, the restorers sweated to reinstall the windows, each protected within a 30-foot-high plywood construction shed that provided a platform for the laborers and kept weather out of the church.

The windows had been covered in grit through the decades, and some panes had cracked. Worse, the lead holding the glass together had corroded, causing some windows to bow out, jeopardizing their structural integrity.

Ms. Sloan pointed to a broken piece that had been painstakingly repaired with a silicone adhesive. There, the Glory of God had been cracked: that is, a 7-inch-long piece of a 25-inch panel proclaiming, in capital letters, "To the Glory of God," had fissured through the generations from the incessant pressure of freezing and thawing water.

The beauty of transmitted light is the essence of these windows' art, but "you couldn't even see the broken glass for all the dirt," Ms. Sloan said. "It is glorious now to see the light shining through these clean panes."

The $22 million window restoration project was announced last spring as the most expensive ever undertaken in the United States. Now St. Thomas expects to spend $9 million to $10 million to complete the initial 12 windows. Given the recession and its impact on the church's finances, the second phase — the southern windows — "will be postponed for a period of time," said William H. Wright, the church's senior warden.

He added: "Last fall the economic environment radically changed. We remain a healthy institution, but our finances and support have changed markedly. In the future we are looking at the potential of addressing windows individually, not as a group. But any window that is in imminent danger will be attended to."

The windows were difficult to dislodge, since their ancient glazing putty was rock hard, and chisels and days of effort were required to release the larger windows. They haven't been all that much easier to install. "This work is a lot of heavy lifting, yet it's fussy," Ms. Sloan said.

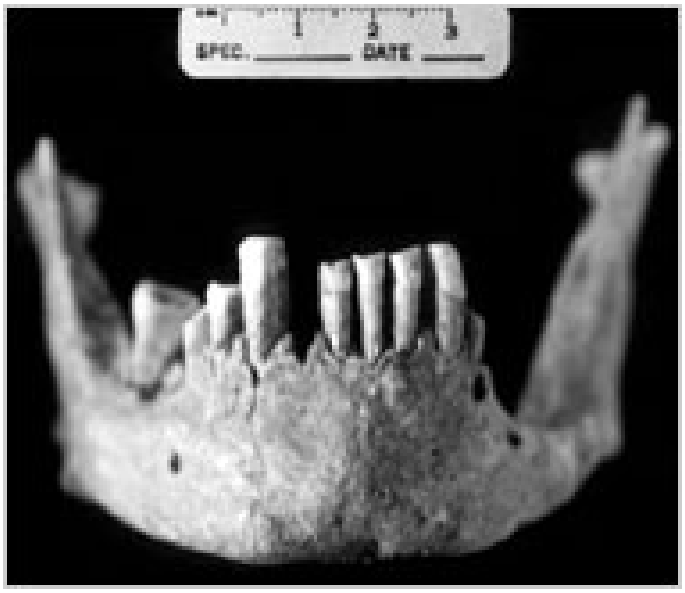
On the scaffold, Andy Cushen, 43 — a conservator from Jack Cushen Studio Restoration Inc. in East Marion, N.Y., on Long Island — was muscling a newly refurbished 20-pound segment into place. The crew was installing it not with putty or sealants, but with a mortar of lime, which is expected to last for a century.

"It's a great feeling now," Mr. Cushen said as he peered through the rainbow of glass, "to be able to see the light."

http://www.nytimes.com/2009/05/25/arts/design/25wind.html?_r=1&th&emc=th

A Skeleton 4,000 Years Old Bears Evidence of Leprosy

By NICHOLAS WADE



The oldest known skeleton showing signs of leprosy has been found in India and may help solve the puzzle of where the disease originated.

The skeleton, about 4,000 years old, was found at the site of Balathal, near Udaipur in northwestern India. Historians have long considered the Indian subcontinent to be the source of the leprosy that was first reported in Europe in the fourth century B.C., shortly after the armies of Alexander the Great returned from India.

The skeleton is described in the journal PLoS One by Gwen Robbins, an anthropologist at Appalachian State University, and colleagues in India. The authors say the skull shows signs of erosion typical of leprosy.

The authors say their find confirms that a passage in the Atharva Veda, a set of Sanskrit hymns written around 1550 B.C., indeed refers to leprosy, a reading that had been doubted because until now the oldest accepted written accounts of the disease were from the sixth century B.C.

The bacterium that causes leprosy seemed to have spread worldwide from a single clone, biologists reported three years ago. But for lack of sufficient samples, they could not tell whether the bacterium was disseminated when modern humans first left Africa about 50,000 years ago, or spread from India in more recent times.

Other biologists have contended that because the bacterium is not very transmissible, requiring prolonged intimate contact between people, it would not have started to spread until around the third millennium B.C., when people started living in dense populations in cities and long-distance trade sprang up.

Helen D. Donoghue, an infectious disease specialist at University College London, said the new finding was fascinating and fit in with the theory that Alexander's army had brought leprosy back from its campaigns in India.

This was the right period for leprosy to have spread from India to Europe, Samuel Mark, an anthropologist at Texas A&M, argued in an article in 2002. But he doubted that Alexander's troops were the mode of transmission. More likely, in his view, is the possibility that leprosy arrived with women imported as slaves by ship from India to Egypt.

Dr. Robbins said she planned to extract ancient bacterial DNA from the Indian skeleton and hoped it might resolve how the disease originated.

http://www.nytimes.com/2009/05/27/science/27leprosy.html?ref=science

Link Between Sociality And Brain Increase In Carnivores Questioned By Evolutionary Biologists

Meerkats (Suricata) are a social, small-brained carnivore. (Credit: Miles Roberts)

ScienceDaily (May 26, 2009) — Packs of hunting dogs, troops of baboons, herds of antelope: when people observe social animals, they are often struck by how intelligent they seem, and recent studies suggest that sociality has played a key role in the evolution of larger brain size among several orders of mammals. But new research from two evolutionary biologists, John Finarelli of the University of Michigan and John Flynn of the American Museum of Natural History, calls this hypothesis into question—at least for the Carnivora. After a sweeping analysis of many living and fossil carnivore species that places relative increases in brain size in an evolutionary context, Finarelli and Flynn found that increased brain size is not routinely associated with sociality.

Their new research paper is being published in this week's *Proceedings of the National Academy of Sciences.*

"The universality of the Social Brain Hypothesis does not apply," says Finarelli. "When you look at relative brain size from the point of view of the entire evolutionary history of the clade, the story starts to fall apart—at least in carnivores. This study shows that, almost assuredly, brain size is increasing for different reasons in different groups of carnivores."

Flynn adds "When you analyze carnivores group by group, canids alone are responsible for the pattern seen in the recent analysis of the Social Brain Hypothesis." Flynn is referring to a 2007 paper in Evolution that tested the Social Brain Hypothesis, which proposed that sociality has driven the relative increase in brain size among mammals in three speciose orders: carnivores, primates, and ungulates. The evolution of relative brain size is of broad interest in biology, with important implications for ecology, energetics, and life history, and the previous study found correlations between sociality and relative increase in brain size to body size for all three groups.

As part of their broader study of how brain size evolved throughout the Carnivora, Finarelli and Flynn tested the idea in further detail by analyzing 289 terrestrial carnivores, about half of which were fossil species. The fact that so many fossils were included makes this the first study to reconstruct relative brain

size across the full span of the evolutionary tree for this group of mammals. Extant carnivores span 15 families and include bears, weasels, cats, dogs, and related species. For all terrestrial carnivore groups, the authors compiled data on endocranial volume (brain size) and body mass, to estimate relative brain size or encephalization. Encephalization data was then used to map changes in relative brain size within specific clades (known as reconstructing a scaling allometry).

Their detailed analysis of the evolutionary history of carnivores documents at least six separate changes in brain sizes for the group, suggesting that the story of brain size increase is far more complex than previously assumed. Some lineages of carnivores have been remarkably stable in relative brain size (for example, one of the two major groups of living carnivores, the feliforms, except for small cats), while others like the extinct bear-dogs (Amphicyonidae) got progressively smaller brains though time when compared to their ancestors.

Dogs, on the other hand, have undergone a relatively recent increase in brain size. Finarelli and Flynn determined that this clade skews the data for the modern carnivores that were analyzed in the previous test of the Social Brain Hypothesis; deleting them from the analysis removes any correlation between brain size and sociality in other carnivores. But even though modern canids have large brains, the reason for the relative increase remains unclear: was larger brain size co-opted for sociality, or did sociality drive the brain size increase? The answer might partly lie in previous research by Finarelli analyzing evolutionary changes among dogs. That 2008 study found that the increase in brain size began around 10 million years ago with the appearance of the first representatives of modern dogs.

The relationship between brain size and sociality is variable among living carnivores as well. If social living is the cause of brain size increase for the carnivore order, or evolution of large brains fosters sociality, then the large-brained bears, small cats, and weasels should be social—but they are not. Carnivores retaining the ancestral condition also do not fit within the picture that the Social Brain Hypothesis would paint; relatively small brained hyenas and mongooses both have social and nonsocial taxa.

"This is a sophisticated and powerful analysis that integrates fossils with extant species of carnivores," says Flynn. "If you only analyze living forms, you often don't correctly reconstruct the evolutionary transformations. Our research shows another example of this, and indicates that the Social Brain hypothesis does not hold for all Carnivora."

John Finarelli is an Assistant Professor in the Department of Geological Sciences at the University of Michigan, and John Flynn is the Frick Curator of Fossil Mammals and Dean of the Richard Gilder Graduate School at the American Museum of Natural History. The research was funded by the National Science Foundation, an AMNH Collections Study Grant, the Brown Family Foundation Graduate Fellowship, and the University of Michigan's Society of Fellows.

Adapted from materials provided by American Museum of Natural History, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090525173545.htm

Rapid Climate Change Forces Scientists To Evaluate 'Extreme' Conservation Strategies

A tortoise on the edge of Athens, Greece. (Credit: Dov Sax)

ScienceDaily (May 26, 2009) — Scientists are, for the first time, objectively evaluating ways to help species adapt to rapid climate change and other environmental threats via strategies that were considered too radical for serious consideration as recently as five or 10 years ago. Among these radical strategies currently being considered is so-called "managed relocation." Managed relocation, which is also known as "assisted migration," involves manually moving species into more accommodating habitats where they are not currently found.A new, ground-breaking tool to help decision-makers determine if, when and how to use managed relocation is described in the May 25, 2009 issue of the *Proceedings of the National Academy of Sciences* (PNAS) by a multi-disciplinary working group.Partially funded by the National Science Foundation (NSF), the working group is co-led by Jessica Hellmann and Jason McLachlan of the University of Notre Dame, Dov Sax of Brown University, and Mark Schwartz of the University of California at Davis. David Richardson of Stellenbosch University in South Africa led the writing of the paper.

The researchers' tool is ground-breaking because managed relocation has been categorically eschewed by some scientists for fear that relocated species would overpopulate their new habitats, cause extinctions of local species, or clog water pipes as invasive zebra muscles have done in the Great Lakes. Nevertheless, some conservationists and groups have already used managed relocation or are currently considering doing so.

Do Something or Do Nothing?

So why is managed relocation, a once-taboo and potentially harmful strategy, now being seriously considered? "Because," says Hellmann, "it is becomingly overwhelmingly evident that climate change is a reality; and it is fast and large. Consequences will arise within decades, not centuries." So action seems much more important now than it did even five or 10 years ago when atmospheric concentrations of greenhouse gases were lower. Now, we are committed to greater degrees of climate change."What's more, a "do nothing" response to climate change involves significant risks. Hellman says, "We have previously been able to say, 'let nature run its course.' But because humans have already changed the world, there is no letting nature run its course anymore. Now, action, like inaction, has potential negative consequences." So, adds Richardson, "we must develop new tools and new ways to balance the risks of inaction vs. action."Managed relocation is not the only controversial adaptation strategy currently being considered by scientists. Other such strategies include fertilizing the oceans to increase their absorption of greenhouse gases and thereby reduce climate change, conserving huge migratory corridors that may extend thousands of kilometers, and preserving the genetic diversity of threatened species in seed banks.

Speed Kills

Many species have survived previous, slower periods of climate change by evolving or by moving to more hospitable habitats via their own power. But such survival strategies are now often precluded by: 1) the presence of cities and by other unnatural obstacles that prevent organisms from reaching new destinations; and 2) the speed of climate change, which may raise the Earth's average temperature by as much as 6 degrees Celsius in the next 100 years--a large, rapid change by nature's standards.As temperatures increase, significant percentages of the Earth's species may become trapped--like fish out of water--in habitats that have become too hot, too dry, or too something else for them. They may therefore go extinct or lose genetically important segments of their populations. Such losses may disrupt large ecosystems and damage agricultural, cultural and economic systems.

Risky Business

The working group's consideration of managed relocation has not ended the controversies surrounding this strategy's use, which sometimes still even pit members of the working group against one another. Why is managed relocation so controversial? Because it begs the question: Do we really know enough to predict how organisms will behave in new locations and whether they will harm receiving habitats?

"The results of intentional and accidental introductions of species into new habitats have taught us a great deal about the implications of moving organisms to new habitats," says Richardson. Nevertheless, predictions of whether introduced species will 'take' in new areas and their likely impacts will always involve uncertainty. But we can make informed predictions with stated bounds of uncertainty."To this end, the researchers' tool is designed to help expose managed relocation's risks, trade-offs and costs--considerations that are often absent from decision-making on natural resources. Specifically, it provides stakeholders with a system for individually scoring a proposed relocation based on multi-disciplinary criteria. These multi-disciplinary criteria include the probability of the success of a proposed relocation, its potential for harming receiving ecosystems, its costs, its potential for triggering violations of the Endangered Species Act, and the social and cultural importance of impacted species.

Comparisons of stakeholders' scores should help stakeholders identify the sources of their disagreements so that they may be resolved. However, the tool does not, by itself produce management recommendations."The tool takes advantage of the fact that, although science can't tell us exactly what will happen in the future, it can tell us how likely a favorable result is--useful information for decision-makers," says NSF Program Director Nancy Huntly.

Not Just Applicable to Endangered Species

In addition to addressing managed relocations of endangered species, the researchers' tool may also address:

- Managed relocations of species that are not endangered. For example, the working group's PNAS paper applies the tool to the debate over whether certain species of North American hardwood trees should be planted beyond their northern range boundaries into coniferous forests. This application suggests that such relocations may be supported by commercial foresters who value their high potential for producing economic returns as well as their high feasibility and low risk of harming recipient ecosystems. By contrast, conservationists who value the natural heritage of recipient ecosystems may perceive fewer benefits and greater risks.
- Controversial climate-related adaptation strategies besides managed relocation that are currently being considered by scientists.

Adapted from materials provided by National Science Foundation.

http://www.sciencedaily.com/releases/2009/05/090525173542.htm

Repeated Fire And Drought: A Menace For Mediterranean Forests

Plane dropping water on a forest fire in the Corsican mountains. (Credit: iStockphoto/Jean Schweitzer)

ScienceDaily (May 26, 2009) — Is fire an enemy of Mediterranean forests or a natural regulating factor of the ecosystem? What is the effect of climate change on the interactions? Thanks to the IRISE1 program, coordinated by Cemagref, we now know that it is a question of frequency, itself related to the stock of organic matter which determines life in soil. The results obtained have created new possibilities for better management of the most fragile ecosystems.

Fires represent one of the most serious disturbances to Mediterranean forest ecosystems, where 600,000 hectares burn every year. However, it is not so much the size of the burnt zones that worries the Cemagref researchers as the impact of fires on plant communities and the capacity of the ecosystem to regenerate itself.

Thanks to the IRISE program, coordinated by Cemagref, we now know that forests are not destroyed by a single fire, but when the frequency of fires is too high. This three-year, multi-disciplinary project brought together scientists from three research institutes (Cemagref, CNRS, INRA) and three universities from the Aix-Marseille and Lyon regions. It was possible to determine the critical frequencies above which the ecosystem is no longer balanced and its regenerative capacity is reduced. Key mechanisms involved in the regeneration or collapse of fragile ecosystems were identified. Taking advantage of the reduced rainfall from 2003 to 2008, the scientists also studied the interaction between repeated fires and droughts.

50 years to repair the effects of a fire

In areas regularly subjected to fire, biological activity in the soil is concentrated in the first centimetres where most of the organic matter is found and is exposed to combustion and erosion. Following a fire, most physico-chemical parameters of forest soils return to their initial levels after 15 to 25 years.

But a full 50 years are required before the ecosystem regains is overall and qualitative resilience. Before the 50 years have elapsed, the bacterial communities and soil fauna, essential elements in the regenerative

process, are less diversified and active. What is more, after a fire, the organic matter contains high levels of poorly degradable or toxic substances that are likely to partially inhibit the biological activity of the soil. It is only after 150 to 200 years without a fire that the carbon stored in the soil increases significantly and the structure and composition of the vegetation improve.

The first and fourth fires are critical

A single fire is sufficient to interrupt the restoration process, however it cannot compromise the long-term regenerative capacity. The latter is also not affected by one or two additional fires over a 50-year period. However a fourth fire over the same period, or two fires within a very short time span (less than ten years) can be fatal. If a fourth fire occurs, species and communities that are essential for ecosystem operation become more rare and the stock of organic matter is reduced in both quantity and quality. The fire releases a large quantity of CO_2 and the forest can no longer play its role as a carbon sink, which, in the end, contributes to the greenhouse effect. The plant community changes and the forest can gradually give way to shrubs and bushes.

When drought chimes in

An increase in the frequency of dry periods, as in 2003 to 2008, combined with a high frequency of fires, leads to a collapse of the biological operation of the ecosystem. A long dry period after a fire slows or even stops regeneration of the forest. Similarly, the impact of a fire is greater on an environment that has recently suffered a long dry period. Four successive dry years would appear to constitute a critical threshold in the resistance of forests to fire. Climate change, by intensifying the combination of fire and dryness, can only increase the fragility of ecosystems, which makes it difficult to foresee their condition over the mid and long term.

Taken together, the above work provides the means to formulate priorities for the management of Mediterranean forests. Zones that have suffered a number of recent fires and that could be irreparably damaged by another fire must receive priority attention, before other forests that have not burned for decades and are more resilient. The rare old forests (over 150 years) must also be protected at all costs. Due to the importance of the stock of organic matter in soil for forest resilience, the adjunction of compost to enhance the fertility of forest soil and environmental dynamics could be a solution in the most fragile zones. Experiments have been launched in order to assess the effectiveness of such a policy.

(1) The IRISE program (2005-2008) took place thanks to the European Forest-Focus regulation, via the French Agriculture ministry and with the support of the "Mediterranean centre for environmental sciences" federative research institute.

Adapted from materials provided by Cemagref.

http://www.sciencedaily.com/releases/2009/05/090519080045.htm

Fire And Water Reveal New Archaeological Dating Method

Ancient bricks. (Credit: Image courtesy of University of Manchester)

ScienceDaily (May 25, 2009) — Scientists at The University of Manchester have developed a new way of dating archaeological objects – using fire and water to unlock their 'internal clocks'.

The simple method promises to be as significant a technique for dating ceramic materials as radiocarbon dating has become for organic materials such as bone or wood.

A team from The University of Manchester and The University of Edinburgh has discovered a new technique which they call 'rehydroxylation dating' that can be used on fired clay ceramics like bricks, tile and pottery.

Working with The Museum of London, the team has been able to date brick samples from Roman, medieval and modern periods with remarkable accuracy.

They have established that their technique can be used to determine the age of objects up to 2,000 years old – but believe it has the potential to be used to date objects around 10,000 years old.

The method relies on the fact that fired clay ceramic material will start to chemically react with atmospheric moisture as soon as it is removed from the kiln after firing. This continues over its lifetime causing it to increase in weight – the older the material, the greater the weight gain.

In 2003 the Manchester and Edinburgh team discovered a new law that precisely defines how the rate of reaction between ceramic and water varies over time.

The application of this law underpins the new dating method because the amount of water that is chemically combined with a ceramic provides an 'internal clock' that can be accessed to determine its age.

The technique involves measuring the mass of a sample of ceramic and then heating it to around 500 degrees Celsius in a furnace, which removes the water.

The sample is then monitored in a super-accurate measuring device known as a microbalance, to determine the precise rate at which the ceramic will combine with water over time.

Using the time law, it is possible to extrapolate the information collected to calculate the time it will take to regain the mass lost on heating – revealing the sample's age.

Lead author Dr Moira Wilson, Senior Lecturer in the School of Mechanical, Aerospace and Civil Engineering (MACE), said: "These findings come after many years of hard work. We are extremely excited by the potential of this new technique, which could become an established way of determining the age of ceramic artefacts of archaeological interest.

"The method could also be turned on its head and used to establish the mean temperature of a material over its lifetime, if a precise date of firing were known. This could potentially be useful in climate change studies.

"As well as the new dating method, there are also more wide-ranging applications of the work, such as the detection of forged ceramic."

The three-year £100,000 project was funded by the Leverhulme Trust, with the microbalance - which measures mass to 1/10th of a millionth of a gram – funded by a £66,000 grant from the Engineering and Physical Science Research Council (EPSRC).

Researchers are now planning to look at whether the new dating technique can be applied to earthenware, bone china and porcelain.

The full research team comprised Dr Moira Wilson, Dr Margaret Carter, Prof William Hoff, Ceren Ince, Shaun Savage and Bernard McKay from The University of Manchester, Professor Chris Hall from the School of Engineering and Centre for Materials Science and Engineering at The University of Edinburgh and Ian Betts from The Museum of London.

The Canterbury Archaeological Trust provided additional samples and information for the study while Ibstock Brick Ltd provided kiln-fresh bricks.

Journal reference:

1. . **Dating fired-clay ceramics using long-term power-law rehydroxylation kinetics**. *Proceedings of the Royal Society A*, May 20, 2009

Adapted from materials provided by University of Manchester.

http://www.sciencedaily.com/releases/2009/05/090519214945.htm

Mock CPR Drills In Kids Show Many Hospital Residents Fail In Key Skills

Dr. Elizabeth Hunt, of Hopkins Children's, checks the heartbeat of a simulation mannequin like the ones used in her study of CPR skills among pediatric residents. (Credit: Johns Hopkins Children's Center)

ScienceDaily (May 25, 2009) — Research from the Johns Hopkins Children's Center exposes alarming gaps in training hospital residents in "first response" emergency treatment of staged cardiorespiratory arrests in children, while at the same time offering a potent recipe for fixing the problem.

The research was conducted just before the release of the 2005 American Heart Association's practice guidelines focusing on strengthening first-response skills, which suggests that at least some of the findings in the study may paint a grimmer picture than current reality, researchers say. And changes already made to the Hopkins resident training program beginning in 2005 have resulted significant improvement, they add.The Hopkins study, now available online and to be published in the July print issue of the journal *Resuscitation,* revealed critical mistakes during life-saving maneuvers like chest compressions and defibrillations in children undergoing arrests or "codes," as they are medically known.

Staging mock cardio-pulmonary arrests with life-size dummies, researchers observed that of the 70 residents participating in the drills, one-third (24) never started chest compressions, while two-thirds (46) did so with a delay of over one minute, the critical cutoff time to initiate compressions in a child without a pulse. Nearly half of the residents (46 percent) failed to restore heart rhythm using a defibrillator within the recommended three minutes. Timely resuscitation of a child whose breathing or heart beat has stopped is, of course, critical to prevent permanent brain damage and death.Because most arrests in children are caused by respiratory rather than cardiac problems, pediatric life-support training in most teaching hospitals traditionally has emphasized airway rather than heart maneuvers to resuscitate a lifeless child. But in a patient without a pulse, airway maneuvers will only work if used together with chest compressions to circulate the blood, investigators say. Therefore the Hopkins team calls for a shift in focus that would equally emphasize cardiac maneuvers along with airway ventilation.

The findings, even though not necessarily applicable to other teaching hospitals, suggest the need for an honest examination of the way academic programs across the country train pediatric residents to deliver life support during cardiopulmonary arrests.

"We're firm believers in the idea that only by identifying our weaknesses can we know exactly how and when we can improve care," says lead investigator Elizabeth Hunt, M.D. M.P.H., Ph.D., a critical-care specialist at Hopkins Children's."This has been a sobering experience," she says, noting that no one likes to have problems exposed, but without the courage to gather evidence about what really is working and what is not, change won't happen.Hunt says the solution to the problem has so far proven relatively simple: Practice, practice, practice with simulated arrests, and strict measurement of results to increase skills and speed of response.

Hands-on training including monthly mock drills on pediatric units and simulations with child mannequins—like those staged by the Hopkins researchers—appear to dramatically improve fledging doctors' performance, according to preliminary and not-yet published reports.

While length of residency training (first, second or third year) did not make much difference in performance in the study, experience in performing resuscitation did. The results show that residents who had even once used a defibrillator—either during a drill or in a real patient—were 87 percent more likely to successfully restore heart-beat during the exercise than those who had never used the life-saving device. Making the residents practice all the steps required to defibrillate rather than just watching a training video of someone else doing so, was the key to success."There's no substitute for practice," says Hunt, who is also the director of the Johns Hopkins Medicine Simulation Center.The study also demonstrates the importance of monitoring performance, the investigators say."Simply taking a course is likely not enough to ensure adequate performance, says senior investigator Peter Pronovost, M.D., Ph.D., a critical care specialist at Hopkins and an internationally renowned expert on patient safety. "We must couple hands-on training with monitoring — after all patients lives depend on it."

Past research shows that 14 percent of all arrests in hospitalized children are cardiac in origin, and many respiratory arrests quickly evolve into cardiac arrests. More than one quarter of all arrests in children involve heart rhythm abnormalities that require use of a defibrillator to shock the heart into normal rhythm.

"The prevailing wisdom of focusing on ventilation rather than circulation during pediatric arrests is well founded, but it may have caused the pendulum to swing too far," Pronovost says. "We must restore the balance and start paying attention to circulation and heart rhythm maneuvers and teach future pediatricians these are equally important."The Hopkins curriculum has already augmented its basic life-support courses and advanced life-support courses required for all residents with:

- monthly mock codes on pediatric units
- monthly resuscitation training sessions with simulator life-size dummies providing hands-on resuscitation experience and helping residents learn how to communicate during a crisis

Previous studies have shown that only 14 percent to 36 percent of children who suffer an arrest in the hospital survive. Even though the absolute number of deaths is quite small, the few deaths that do occur can be averted by strengthening first-responder instincts in residents, as well as in other hospital staff.

Co-investigators in the study include Kimberly Vera, Marie Diener-West, Jamie Haggerty, Kristen Nelson and Donald Shaffner, all of Hopkins.

Adapted from materials provided by Johns Hopkins Medical Institutions.

http://www.sciencedaily.com/releases/2009/05/090518134146.htm

Opposites Attract: How Genetics Influences Humans To Choose Their Mates

Researchers have found that females often prefer mates with a dissimilar major histocompatibility complex (MHC) in many vertebrate species, including humans, and that the MHC influences mating selection by preferences for particular body odors. (Credit: iStockphoto/Jelani Memory)

ScienceDaily (May 25, 2009) — New light has been thrown on how humans choose their partners, according to new findings presented May 25 at the annual conference of the European Society of Human Genetics.

Professor Maria da Graça Bicalho, head of the Immunogenetics and Histocompatibility Laboratory at the University of Parana, Brazil, says that her research had shown that people with diverse major histocompatibility complexes (MHCs) were more likely to choose each other as mates than those whose MHCs were similar, and that this was likely to be an evolutionary strategy to ensure healthy reproduction.

The MHC is a large genetic region situated on chromosome 6, and found in most vertebrates. It plays an important role in the immune system and also in reproductive success. Apart from being a large region, it is also an extraordinarily diverse one.

Females' preference for MHC dissimilar mates has been shown in many vertebrate species, including humans, and it is also known that MHC influences mating selection by preferences for particular body odours. The Brazilian team has been working in this field since 1998, and decided to investigate mate selection in the Brazilian population, while trying to uncover the biological significance of MHC diversity.

The scientists studied MHC data from 90 married couples, and compared them with 152 randomly-generated control couples. They counted the number of MHC dissimilarities among those who were real couples, and compared them with those in the randomly-generated 'virtual couples'. "If MHC genes did not influence mate selection", says Professor Bicalho, "we would have expected to see similar results from both sets of couples. But we found that the real partners had significantly more MHC dissimilarities than we could have expected to find simply by chance."

Within MHC-dissimilar couples the partners will be genetically different, and such a pattern of mate choice decreases the danger of endogamy (mating among relatives) and increases the genetic variability of offspring. Genetic variability is known to be an advantage for offspring, and the MHC effect could be an evolutionary strategy underlying incest avoidance in humans and also improving the efficiency of the immune system, the scientists say.

"Although it may be tempting to think that humans choose their partners because of their similarities", says Professor Bicalho, "our research has shown clearly that it is differences that make for successful reproduction, and that the subconscious drive to have healthy children is important when choosing a mate."

The scientists believe that their findings will help understanding of conception, fertility, and gestational failures. Research has already shown that couples with similar MHC genes had longer intervals between births, which could imply early, unperceived miscarriages. "We intend to follow up this work by looking at social and cultural influences as well as biological ones in mate choice, and relating these to the genetic diversity of the extended MHC region", says Professor Bicalho.

"We expect to find that cultural aspects play an important role in mate choice, and certainly do not subscribe to the theory that if a person bears a particular genetic variant it will determine his or her behaviour. But we also think that the unconscious evolutionary aspect of partner choice should not be overlooked. We believe our research shows that this has an important role to play in ensuring healthy reproduction, by helping to ensure that children are born with a strong immune system better able to cope with infection."

Adapted from materials provided by European Society of Human Genetics, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090525105435.htm

Nimbus Rises In World Of Cloud Computing

Cloud computing concept. (Credit: iStockphoto)

ScienceDaily (May 25, 2009) — Cloud computing is a hot topic in the technology world these days. Even if you're not a tech-phile, chances are if you've watched a lot of television or skimmed a business magazine, you've heard someone talking about cloud computing as the way of the future. While it's difficult to predict the future, a cloud computing infrastructure project developed at Argonne National Lab, called Nimbus, is demonstrating that cloud computing's potential is being realized now.

So what exactly is cloud computing? There are varying definitions, but cloud computing is essentially a form of distributed computing that allows users the ability to tap into a vast network of computing resources through the Internet to complete their work. If, for example, someone wanted to analyze traffic patterns on the nation's highways, they could upload and store their data into the 'cloud' and have multiple computers crunch the data and then present the results back to them in a unified way as if the work were completed by one giant machine.

Why the word 'cloud'? Some sources believe the term originated in 20th Century telephone systems. Kate Keahey, the lead on the Nimbus project at Argonne, believes the phrase was created when researchers were trying to visualize this type of computing on a whiteboard and made a circular set of squiggles to represent the many components in the internet that would do the computational work. Since these drawings looked liked clouds, Keahey says, researchers soon started saying that data would go 'up to the cloud' for processing.

If all of this sounds familiar, you may have heard this concept before, according to Keahey. Previous decades brought us something called grid computing, which was another type of distributed computing that allowed users to tap into computing resources through a network to get their computational jobs done. But Keahey argues that cloud computing is an evolution of grid computing, with some important differences. With grid computing, you submit what you want computed to a batch scheduler, which puts your job in a queue for a specific set of computing resources, for example a supercomputer, to work on.

"This means you have no control over when your job might execute," Keahey says. You may have to wait as long as a few days before your job is called up, and you're pretty much at the mercy of how that

particular grid asset is set up. If its configuration doesn't quite match the complexities of your job, fixing the problem may get very complicated.

Cloud computing, on the other hand, can greatly mitigate this one-size-must-fit-all approach to distributed computing. Many cloud computing platforms allow users to know ahead of time how much computing capacity is available from the cloud, so the work can be done faster. Users can also configure a 'virtual machine' that exists within the cloud to meet the particulars of the jobs they are trying to accomplish. Once a user has configured the type of virtual machine they need for their work, they can go to different cloud computing providers and recreate the system they need to get their jobs done, making computation power a commodity.

Nimbus is an example of such an adaptable system. Keahey and her team developed this open source cloud computing infrastructure to allow scientists working on data-intensive research projects to be able to use such virtual machines with a cloud provider. Nimbus also allows users to create multiple virtual machines to complete specific computational jobs that can be deployed throughout the cloud and still work in tandem with each other. This flexibility allows a user to configure a virtual machine and then connect it to resources on a cloud, regardless of who is providing the cloud.

Having this kind of flexibility and on-demand computing power is vital to projects that are extremely data-intensive, such as research efforts in experimental and theoretical physics. Nimbus has already been deployed successfully to support the STAR nuclear physics experiment at Brookhaven National Laboratory's Relativistic Heavy-Ion Collider. When researchers there needed to turn the massive amounts of data they had generated into viable simulations for an international conference, they used Nimbus to create virtual machines that were run through commercial cloud computing providers.

Creating the virtual machines was relatively easy. "With Nimbus, a virtual cluster can be online in minutes," Keahey says, and the computing cloud they tapped into provided the computational power they needed to get the simulations done on time. Keahey and her team are now collaborating with CERN in Europe to process the data generated by physics experiments being done there.

Keahey and others in the field believe that this use of custom-crafted virtual machines there are relatively easy to configure on computing clouds will handle more and more of the heavy computational lifting in the future.

Adapted from materials provided by National Science Foundation.

http://www.sciencedaily.com/releases/2009/05/090508190421.htm

Novel Approach Estimates Nanoparticles In Environment

Bulk titanium dioxide. (Credit: Image courtesy of Duke University)

ScienceDaily (May 25, 2009) — Without knowing how much of an industrial chemical is being produced, it is almost impossible for scientists to determine if it poses any threat to the environment or human health.

Civil engineers at Duke University believe they have come up with a novel way of estimating how much of one such material – titanium dioxide – is being generated, laying the groundwork for future studies to assess any possible risks.

This information is especially valuable if the chemicals are in the form of nano-particles, which possess unique properties because of their miniscule size. Nanoparticles are attractive for a wide range of products, little is known about their consequences in the environment. One of the most widely used is the nanoparticle form of titanium dioxide, which can be found in such diverse products as sunscreens and toothpaste to paints and papers. It is also used in water treatment.

"The biggest problem we face in trying to determine any risks of titanium dioxide nanoparticles is that no one really knows how much of it there is," said Christine Robichaud, graduate student in civil and environmental engineering at Duke's Pratt School of Engineering. The results of her analysis were published online in the *Journal of Environmental Science and Technology.*

Robichaud found it especially difficult trying to collect this data, since the companies that process titanium dioxide were not willing to reveal information they deemed proprietary. So she used a novel approach developed by collaborators Lynne Zucker and Michael Darby at the University of California Los Angeles to estimate the rate of innovation in the biotechnology industry.

"We combined science and engineering knowledge with business and economic modeling to come up with what we think is the maximum amount of titanium dioxide nanoparticles out there," Robichaud said. "By taking the amount of bulk titanium dioxide produced, which is better understood, and applying the rates of new technologies to convert it to the nanoparticle form found in journal articles and patent applications, we estimated the maximum ceiling amount."

Based on her calculations, Robichaud found that the production of titanium dioxide nanoparticles was negligible in 2002 and rose to about 2.5 percent of the total amount of titanium dioxide produced today. By 2015, nanoparticle production is estimated to be about 10 percent of the total, as more companies switch to newer technology. Under the most aggressive scenario, practically all of titanium dioxide in the U.S., about 2.5 million metric tons, would be in nanoparticle form by 2025, Robichaud concluded.

"Knowing the amount of this material is important because the more of it we make, the more likely it is to enter the environment and come into contact with humans with unknown consequences," said Mark Wiesner, professor of civil and environmental engineering and senior member of the research team. He also directs the federally funded Center for the Environmental Implications of NanoTechnology (CEINT), which is based at Duke.

"We do not have a good handle on how much is out there, and even less about what that might mean," he continued. "Finding an upper limit on the potential for exposure is the critical first step in assessing risk. Even if these nanoparticles are toxic, a low exposure to them may limit the risk. We just don't know yet. I like to use the example of sharks. Everyone knows they're dangerous, but not if you spend your entire life in Nebraska."

Now that the researchers have a better idea how much of this nanomaterial could be produced in the coming years, they plan to focus on specific types of products.

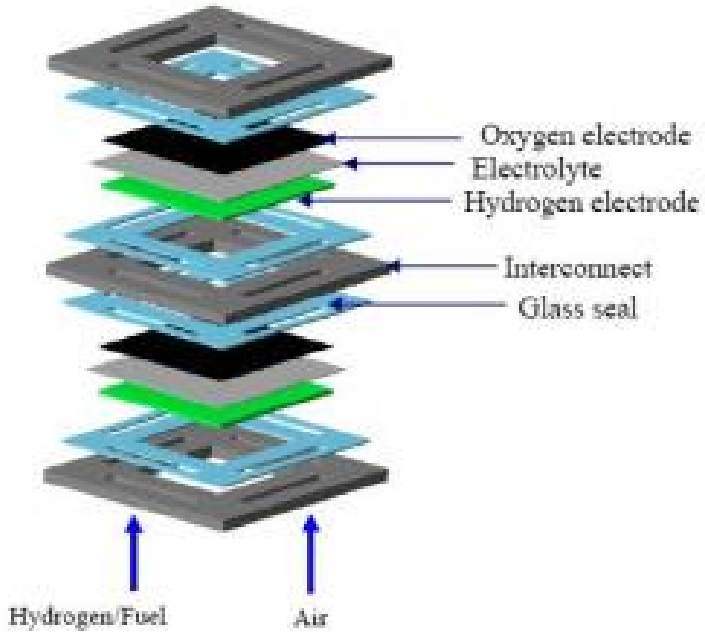
"We want to get a better idea of where in the process these nanoparticles might be released into the air, water or soil," Robichaud said. "It could be during mining, during the production of the nanoparticles, production of the specific product using the nanoparticles, the use of the product, or its ultimate disposal."

The research was funded by National Science Foundation and CEINT. Other members of the team, from Duke, are Ali Emre Uyar, Michael Darby and Lynne Zucker.

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

http://www.sciencedaily.com/releases/2009/05/090520114714.htm

New Solid Oxide Fuel Cell Seal Could Help Bring Efficient Energy Technology To Market



This drawing shows the placement of the glass seals in the solid oxide fuel cells. (Credit: Image courtesy of Virginia Tech)

ScienceDaily (May 25, 2009) — Solid oxide fuel cells (SOFCs) have great potential for stationary and mobile applications. Stationary use ranges from residential applications to power plants. Mobile applications include power for ships at sea and in space, as well as for autos. In addition to electricity, when SOFCs are operated in reverse mode as solid oxide electrolyzer cells, pure hydrogen can be generated by splitting water.

But SOFCs have had a flaw – the integrity of the seals within and between power-producing units. "The seal problem is the biggest problem for commercialization of solid oxide fuel cells," said Peizhen (Kathy) Lu, assistant professor of materials science and engineering at Virginia Tech.

So she has invented a solution.

Composed of ceramic materials that can operate at temperatures as high as 1,800 degrees F (1,000 C), SOFCs use high temperature to separate oxygen ions from air. The ions pass through a crystal lattice and oxidize a fuel– usually a hydrocarbon. The chemical reaction produces electrons, which flow through an external circuit, creating electricity.

To produce enough energy for a particular application, SOFC modules are stacked together. Each module has air on one side and a fuel on the other side and produces electrons. Many modules are stacked together to produce enough power for specific applications. Each module's compartments must be sealed, and there must be seals between the modules in a stack so that air and fuel do not leak or mix, resulting in a loss of efficiency or internal combustion.

Lu has invented a new glass that can be used to seal the modules and the stack. The self-healing seal glass will provide strength and long-term stability to the stack, she said.

The U.S. Department of Energy has funded Lu's SOFC and solid oxide elecrolyzer cell research to the tune of $365,000 so far. "For solid oxide fuel cells to run, we need to have a fuel. Hydrogen is the cleanest fuel you can ever have since the by-product is water. However, there is no abundant source of hydrogen and it has to be made. The solid oxide elecrolyzer cell process for splitting water into hydrogen and oxygen is one very desirable way of doing it," Lu said.

"Our interest is to work on the critical material problems to enable power generation and hydrogen production in large quantity and low cost," said Lu, whose expertise includes material design and material synthesis and processing.

"The invented glass seal materials are free of barium oxide, calcium oxide, magnesia, and alkali oxides, and in addition contain almost imperceptibly low amounts of boron oxide," said Mike Miller senior licensing manager with Virginia Tech Intellectual Properties. "This is important because the seals must be both mechanically and chemically compatible with the different oxide and metallic cell components as they are repeatedly cycled between room and operating temperatures," said Miller.

An article relevant to her research, which appeared in the Oct. 6, 2008 issue of the *Journal of Applied Physics* is "Network structure and thermal stability study of high temperature seal glass," by Lu and Virginia Tech materials science and engineering doctoral student M. K. Mahapatra of Egra, Purba Medinipur, India.

Adapted from materials provided by Virginia Tech, via Newswise.

http://www.sciencedaily.com/releases/2009/05/090521184437.htm

Compound In Turmeric Spice May Stall Spread Of Fat Tissue

Turmeric. Researchers theorized that dietary curcumin could stall the spread of fat-tissue by inhibiting new blood vessel growth, called angiogenesis, which is necessary to build fat tissue. Curcumin is a bioactive component in curry and turmeric that has been consumed daily in Asian countries for centuries without reported toxic effects. (Credit: iStockphoto/Vishnu Mulakala Omkaranjaneyulu)

ScienceDaily (May 25, 2009) — There may be a new way to spice up your weight loss routine, according to results from a new animal model study by Agricultural Research Service (ARS)-funded scientists and colleagues.

The researchers theorized that dietary curcumin could stall the spread of fat-tissue by inhibiting new blood vessel growth, called angiogenesis, which is necessary to build fat tissue. Curcumin is a bioactive component in curry and turmeric that has been consumed daily in Asian countries for centuries without reported toxic effects.

The study was led by nutritionist Mohsen Meydani at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, Mass. Meydani is director of the HNRCA's Vascular Biology Laboratory.

Eighteen mice were assigned to three groups of six mice each. For 12 weeks, the mice were fed special diets. A “control” group’s mix contained 4 percent fat, a “high fat” group’s mix contained 22 percent fat, and another group was fed the same “high fat” diet supplemented with curcumin. A mouse typically eats about 3,000 to 3,500 milligrams (the weight of about six or seven paper clips) daily, so the curcumin-supplemented mice would have consumed about 1.5 to 1.75 milligrams of curcumin daily—a relatively small amount.

The researchers recorded the body weight and food consumption of the mice twice each week. At the end of the 12-week period, their total body weight and fat distribution were measured.

The study found that supplementing the animals’ high-fat diet with curcumin reduced body-weight gain and total body fat, even though food-intake was not affected, when compared to the nonsupplemented high-fat-diet group.

The curcumin-treated group also had less blood vessel growth in fat tissue. Blood glucose, triglyceride, fatty acid, cholesterol and liver fat levels also were lower.

At this time, it is not known whether the amount of curcumin normally present in food dishes prepared with turmeric is sufficient to inhibit complex fat-tissue secretions that are involved in recruiting new blood vessel growth. The researchers’ next step is to determine the effectiveness of dietary intake of curcumin in reducing weight in humans.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2009/05/090522181238.htm

Ultraviolet LEDs Create Darker, Redder Lettuce Richer In Antioxidants

Darker colors in leafy vegetables are often signs of antioxidants that are thought to have a variety of health benefits. (Credit: iStockphoto/Sandra Caldwell)

ScienceDaily (May 25, 2009) — Salad dressing aside, a pile of spinach has more nutritional value than a wedge of iceberg lettuce. That's because darker colors in leafy vegetables are often signs of antioxidants that are thought to have a variety of health benefits. Now a team of plant physiologists has developed a way to make lettuce darker and redder—and therefore healthier—using ultraviolet light-emitting diodes (LEDs).

Steven Britz of the U.S. Department of Agriculture in Beltsville, Md., and colleagues will present the research at the 2009 Conference on Lasers and Electro Optics/International Quantum Electronics Conference (CLEO/IQEC), which takes place May 31 to June 5 at the Baltimore Convention Center.

The dark red tinges on a leaf of red leaf lettuce are the plant kingdom's equivalent of suntan lotion. When bombarded with ultraviolet rays from the sun, the lettuce leaf creates UV-absorbing polyphenolic compounds in its outer layer of cells. Some of these compounds are red and belong to the same family that gives color to berries and apple skin. They help block ultraviolet radiation, which can mutate plant DNA and damage the photosynthesis that allows a plant to make its food.

Polyphenolic compounds,which include flavonoids like quercetin and cyanidin, are also powerful antioxidants. Diets rich in antioxidants are thought to provide a variety of health benefits to human beings, from improving brain function to slowing the wear and tear of aging.

To create red leaf lettuce plants enriched with these compounds, Britz purchased low-power LEDs that shine with UVB light, a component of natural sunlight. In small quantities, this ultraviolet light allows humans to produce vitamin D, which has been cited for its health benefits. Britz exposed the plants to levels of UVB light comparable to those that a beach goer would feel on a sunny day, approximately 10 milliwatts per square meter.

After 43 hours of exposure to UVB light, the growing lettuce plants were noticeably redder than other plants that only saw white light. Though the team has yet to quantify this effect, it appears to increase as the intensity of the light increases. The effect also seems to be particularly sensitive to the wavelength used – peaking at 282 and 296 nanometers, and absent for longer wavelength UV. "We've been pleasantly surprised to see how effective the LEDs are, and are now testing how much exposure is required, and whether the light should be pulsed or continuous," says Britz.

To cut transportation costs and feed the market in the wintertime, more produce is grown in greenhouses. Crops grown in the winter in northern climes receive very little UVB to begin with, and plants in greenhouses are further shielded from UVB by the glass walls. Ultraviolet LEDs could provide a way to replace and enhance this part of the electromagnetic spectrum to produce darker, more colorful lettuces.

Britz also discussed the potential for using UV LEDs to preserve nutrients in vegetables that have already been harvested. Previous experiments have shown that the peel of a picked apple stays redder for a longer period of time when exposed to ultraviolet light. UVB LEDs are a promising technology for irradiating vegetables stored at low temperatures to maintain or even boost the amount of phytonutrients they contain.

Presentation PTuA3, "Shedding light on nutrition," Steven Britz, June 2.

Adapted from materials provided by Optical Society of America, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/05/090518172659.htm

Giant Galaxy Messier 87 Finally Sized Up

This deep image of the Virgo Cluster obtained by Chris Mihos and his colleagues using the Burrell Schmidt telescope shows the diffuse light between the galaxies belonging to the cluster. North is up, east to the left. The dark spots indicate where bright foreground stars were removed from the image. (Credit: Image courtesy of ESO)

ScienceDaily (May 24, 2009) — Using ESO's Very Large Telescope, astronomers have succeeded in measuring the size of giant galaxy Messier 87 and were surprised to find that its outer parts have been stripped away by still unknown effects. The galaxy also appears to be on a collision course with another giant galaxy in this very dynamic cluster.The new observations reveal that Messier 87's halo of stars has been cut short, with a diameter of about a million light-years, significantly smaller than expected, despite being about three times the extent ofthe halo surrounding our Milky Way[1]. Beyond this zone only few intergalactic stars are seen."This is an unexpected result," says co-author Ortwin Gerhard. "Numerical models predict that the halo around Messier 87 should be several times larger than our observations have revealed. Clearly, something must have cut the halo off early on."

The team used FLAMES, the super-efficient spectrograph at ESO's Very Large Telescope at the Paranal Observatory in Chile, to make ultra-precise measurements of a host of planetary nebulae in the outskirts of Messier 87 and in the intergalactic space within the Virgo Cluster of galaxies, to which Messier 87 belongs. FLAMES can simultaneously take spectra many sources, spread over an area of the sky about the size of the Moon.

The new result is quite an achievement. The observed light from a planetary nebula in the Virgo Cluster is as faint as that from a 30-Watt light bulb at a distance of about 6 million kilometres (about 15 times the Earth–Moon distance). Furthermore, planetary nebulae are thinly spread through the cluster, so even FLAMES's wide field of view could only capture a few tens of nebulae at a time.

"It is a little bit like looking for a needle in a haystack, but in the dark", says team member Magda Arnaboldi. "The FLAMES spectrograph on the VLT was the best instrument for the job".

At a distance of approximately 50 million light-years, the Virgo Cluster is the nearest galaxy cluster. It is located in the constellation of Virgo (the Virgin) and is a relatively young and sparse cluster. The cluster contains many hundreds of galaxies, including giant and massive elliptical galaxies, as well as more homely spirals like our own Milky Way.

The astronomers have proposed several explanations for the discovered "cut-off" of Messier 87's, such as collapse of dark matter nearby in the galaxy cluster. It might also be that another galaxy in the cluster, Messier 84, came much closer to Messier 87 in the past and dramatically perturbed it about a billion years ago. "At this stage, we can't confirm any of these scenarios," says Arnaboldi. "We will need observations of many more planetary nebulae around Messier 87".One thing the astronomers are sure about, however, is that Messier 87 and its neighbour Messier 86 are falling towards each other. "We may be observing them in the phase just before the first close pass", says Gerhard. "The Virgo Cluster is still a very dynamic place and many things will continue to shape its galaxies over the next billion years."

Background on planetary nebulae

Planetary nebulae (PNe) are the spectacular final phase in the life of Sun-like stars, when the star ejects its outer layers into the surrounding space. Their name is a relic of an earlier era: early observers, using only small telescopes, thought that some of these nearby objects, such as the "Helix Nebula" resembled the discs of the giant planets in the Solar System. Planetary nebulae have strong emission lines, which make them relatively easy to detect at great distances, and also allow their radial velocities to be measured precisely. So planetary nebulae can be used to investigate the motions of stars in the faint outer regions of distant galaxies where velocity measurements are otherwise not possible.

Moreover, planetary nebulae are representative of the stellar population in general. As they are relatively short-lived (a few tens of thousands of years — a mere blip on astronomical timescales), astronomers can estimate that one star in about 8000 million of Sun-like stars is visible as a planetary nebula at any given moment. Thus planetary nebulae can provide a unique handle on the number, types of stars and their motions in faint outer galaxy regions that may harbour a substantial amount of mass. These motions contain the fossil record of the history of galaxy interaction and the formation of the galaxy cluster.

Astronomers

The team is composed of Michelle Doherty and Magda Arnaboldi (ESO), Payel Das and Ortwin Gerhard (Max-Planck-Institute for Extraterrestrial Physics, Garching, Germany), J. Alfonso L. Aguerri (IAC, Tenerife, Spain), Robin Ciardullo (Pennsylvania State University, USA), John J. Feldmeier (Youngstown State University, USA), Kenneth C. Freeman (Mount Stromlo Observatory, Australia), George H. Jacoby (WIYN Observatory, Tucson, AZ, USA), and Giuseppe Murante (INAF, Osservatorio Astronomico di Pino Torinese, Italy).

[1] Although the standard value for the diameter of the Milky Way is about 100 000 light-years, its stellar halo is thought to extend out almost twice as far.

Journal reference:

1. Doherty et al. **The edge of the M87 halo and kinematics of the diffuse light in the Virgo cluster core**. *Astronomy and Astrophysics*, 2009; DOI: 10.1051/0004-6361/200811532

Adapted from materials provided by ESO.

http://www.sciencedaily.com/releases/2009/05/090520114716.htm