Infoteca's E-Journal

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

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A Policy of Pauperization

By Jane Gross

Middle-class, middle-aged Americans are stretched to their emotional and financial limits caring for sick parents and spouses, a situation guaranteed to get worse, given our demographic trends, without a top-to-bottom overhaul of the health care system and its focus on acute, rather than chronic, long-term care.

Happier times: Clay Felker and Gail Sheehy arrive at a party in 1994. (Patrick McMullan)

This, of course, is the overarching subject of this blog, but also the agenda for several recent expert panel discussions, including one sponsored by the American Academy of Nursing and hosted by The John A. Hartford Foundation.

I was struck by this compelling account of the program, entitled "Taking Care of Your Aging Parent: What Families Need to Know." Panelist Gail Sheehy, a best-selling author and wife of the late Clay Felker, the iconic magazine editor, vividly described the plight of all but the wealthiest Americans. Despite fame, success and a well-connected lifestyle that would be the envy of most of us, Ms. Sheehy, in her late 60s, and Mr. Felker, 82 at the time of his death last July, all but ran out of money paying for care in the last year of his life.

Throat cancer left him with a tracheotomy, a feeding tube, and the need for constant home care after he was discharged from a hospital and rehab center. Neither Medicare nor private insurance covered the home health aides and other assistance the couple needed, Ms. Sheehy told the audience, until they turned to hospice. It was the only way to get subsidized, comprehensive home care, but hospice is only available to those certified by a physician as having just six months to live. The alternative was for the couple to exhaust their remaining assets, except for $5,000, in order to qualify for Medicaid, essentially leaving Ms. Sheehy a penniless widow.

They were not willing to do that. Nor were they willing to divorce so that Mr. Felker could receive Medicaid while Ms. Sheehy would be shielded from impoverishment.

These apparently extreme solutions are commonplace when facing the astronomical costs of long-term care. But my hunch is that many readers will be surprised that a glamorous couple like Ms. Sheehy and Mr. Felker could have found themselves in the same bind as the rest of us, which Carol Raphael, president of the Visiting Nurse Service of New York, calls "a policy of pauperization."

The numbers, as reported by HealthDay.com:

* U.S. Census Bureau figures project that the number of Americans 65 or over will double by 2030, and that two-thirds of today's 65-year-olds will require some period of long-term care later in their lives.

* At the same time, according to one recent study, the number of geriatricians has actually declined in recent years, to about 7,750; that translates to one for every 4,254 older Americans. In addition, the country will face a shortage of more than 800,000 nurses by 2020.

* According to U.S. government surveys, there were 2.5 million Americans living in either nursing homes or assisted living facilities in 2004. The average cost of a private room in a nursing home, according to a recent MetLife study: $75,000 per year.

* The AARP notes that two-thirds of older Americans who needed long-term care now rely completely on unpaid help — in most cases, family.

Since many of you are spousal caregivers like Ms. Sheehy, I wonder how many of you ever considered spending down to Medicaid eligibility as a couple, despite the fact that the surviving spouse would then be all but penniless? Have any of you divorced, or seriously considered it, so one spouse would be eligible for government help and the other spared impoverishment?

http://newoldage.blogs.nytimes.com/2008/11/05/a-policy-of-pauperization/?nl=8hlth&emc=hltha6

Defining and Debating 'Double Dipping'

JACKSONVILLE, FLA. — From virtually every angle, professors are under pressure to be more productive. Pressure to publish, to earn and keep tenure. Pressure to present at conferences, to prove to their employers their visibility and viability in their disciplines. And pressure, where possible, to be public intellectuals, to try to make their work relevant to institutional leaders and policy makers, as members of the Association for the Study of Higher Education were urged to do at their annual meeting here this week.

Responding to those pressures might lead a young professor to the very logical conclusion that he or she should take every possible opportunity to write, speak and otherwise get their work in front of peers. But that temptation, when taken to an extreme and done without care, "can come back and bite you on the butt," as Marybeth Gasman, an associate professor of higher education at the University of Pennsylvania, said at a session on the phenomenon of "double dipping" — using the same scholarly material in multiple formats and settings — at the ASHE meeting last weekend.

The session was prompted in large part, said Gasman and her co-presenter, Kristen Renn, an associate professor of higher, adult and lifelong education at Michigan State University, by an *Inside Higher Ed* article last spring about a discussion raging among political scientists about whether it is appropriate or unethical to give (and claim credit for on one's CV) the same presentation at two different conferences.

That article provoked a spirited conversation not only in *Inside Higher Ed*'s comments section beneath that story but when Renn brought it up during a discussion with ASHE's Board of Directors last spring, she said, and board members agreed that it would make sense to raise it more broadly with the group's members.

Renn and Gasman expanded the definition of potential "double dipping" to include not just presenting at conferences (as was the focus of the political science debate) but publishing, too. In a series of survey questions asked of session attendees (and answered anonymously using Renn's new clicker-based response system, which both intrigued and at times perplexed her audience), consensus about what at least this select group of higher education scholars deemed appropriate (and not) came into view.

Is it ethical to submit a proposal to present the same paper to the annual meetings of both ASHE and the American Educational Research Association , which follows the higher education scholarly meeting by a few months? Yes, if the proposal is rejected by ASHE first, said 14 respondents. Yes, even if ASHE accepts it, said two. No under any circumstances, said three others.

Is it appropriate to present the same paper at more than one conference? Eleven clicked in No, and 6 yes. How about presenting a "research paper" at ASHE one year, and then the same basic paper at a "symposium" session the next year? "No!" blurted out one respondent from the back, perhaps frustrated by her lack of a clicker. The clickees agreed, with 20 nos and just 2 yeses.

Competing points of view, and some shades of gray, emerged during the discussion that followed. Shouldn't it make a difference "when you have completely different audiences?" asked one audience member. "Just because I've presented at a meeting in San Diego, I don't see why I can't present in Vienna," where hardly anyone will have heard both.

Another young faculty member said she was hearing conflicting messages from her disciplines' leaders. The theme of this year's meeting, she noted, was about "translating our research into practice," which sends the clear signal that "we need to get our work out more, and the more I do this the better." "There's some tension, and some competing goals we have," she added.

Questions of both fairness and ethics were raised in reply. Scholars who might submit a paper to multiple conferences or change a title and submit a largely similar paper to the same conference a year "set me off," said one audience member. "It's unfair to the hundreds of people who present and whose work is good yet it doesn't get accepted."

The question of "double dipping is about claiming credit" for a presentation or publication for tenure or promotion purposes, not about who hears or reads it, said another young researcher. The concern is whether people are recycling scholarly material in a way that "pads the CV," so they "get double credit for one paper." "Are we honest about why we're doing it, for what reasons? And do we make it clear to people who might read our CV's that something is the same?"

Roughly similar arguments surrounded a set of questions and answers about the publications process (Is it ethical to publish an op-ed version of an idea, then turn it into a research paper and publish it? Overwhelmingly yes. To claim credit on your CV for a non-peer reviewed paper published online, and then the same publication in a peer-reviewed journal? 22 no's and 3 yeses), but some in the audience pointed out that one had to be careful about assuming papers are exactly the same, since the whole idea of research is to improve on one's scholarly work by getting advice and reactions from peers. "If something's substantively revised" between the first and second times a work is presented or published, "it isn't exactly the same paper," said one audience member.

Ultimately, said Gasman of Penn, the discussion about "double dipping" is mostly about "how this is going to be viewed on your CV," and for that, she said, academics may be able to bypass any problems by taking steps to ensure that they are being forthright.

She divides the list of conference presentations on her vita into "peer-reviewed presentations" and "invited presentations," the latter being talks she is invited to give at colleges that seek to tap into her expertise, rather than those at which she is presenting original research. "If somebody looks under 'peer-reviewed research' and sees the same paper more than once, I think colleagues will be critical of you," Gasman said. But if they see that you're being invited to give the same talk repeatedly, "and you make it clear that you gave it before," that can be a positive sign of a scholar's influence.

Added Renn of Michigan State: "You've got to be looking for a way to clue the reader of your CV in. Transparency is really key."

— Doug Lederman

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/10/dipping.

Deep Sea Expedition Sets Sail

ScienceDaily (Nov. 11, 2008) — Setting sail on the Pacific, a University of Delaware-led research team has embarked on an extreme adventure that will find several of its members plunging deep into the sea to study hydrothermal vents on the ocean floor.

The team, which will be conducting research in environments that include scalding heat, high pressure, toxic chemicals and total darkness, is part of the National Science Foundation-funded "Extreme 2008: A Deep-Sea Adventure."

The scientists are being joined by students from around the world on dry land who have signed up for an exciting virtual field trip. More than 20,000 students from 350 schools in the United States, Aruba, Australia, Canada, Costa Rica, Great Britain and New Zealand are participating.The expedition, led by Craig Cary, professor of marine biosciences in the University of Delaware's College of Marine and Earth Studies, left Monday, Nov. 10, aboard the research ship Atlantis from a port in Manzanillo, Mexico, with an expected return date of Dec. 1.*Team members – researchers and graduate students – are from the University of Delaware, the University of Colorado, University of North Carolina, University of Southern California, J. Craig Venter Institute, Universidad Nacional Autónoma de México and the University of Waikato, New Zealand.

The team is heading to destinations at two hydrothermal hot spots: Guaymas Basin in the Gulf of California and a group of vents in the eastern Pacific Ocean about nine degrees north of the equator.

Once above the vents, the researchers will take the submersible Alvin down from one to nearly two miles below the surface. Built to withstand crushing pressures and to pierce the utter blackness of the deep, Alvin will let the scientists observe life around the steaming vents and collect samples for analysis. Both

Atlantis and Alvin are owned by the U.S. Navy and operated by the Woods Hole Oceanographic Institution.The scientists' focus will be marine viruses and other tiny life called protists. These organisms prey on bacteria, the primary food for vent dwellers ranging from ghost-white vent crabs to bizarre-looking tubeworms."For many years, the vents have been explored with little to no attention to viruses and protists," Cary says. "Yet because these organisms eat bacteria, they have the most dramatic effect on the bacterial communities that support the vent system. Our research programs are among the first to focus on these remarkable scavengers."

Eric Wommack, an associate professor with joint appointments in both the College of Agriculture and Natural Resources and the College of Marine and Earth Studies, will join Cary in leading the UD contingent.Wommack, who is based at the Delaware Biotechnology Institute, is an expert on marine viruses and will be deploying specialized equipment to capture them for analysis in the shipboard lab.

Wommack says hydrothermal vents, although characterized by caustic chemistry, hot temperatures and high pressure, are oases of life in the deep sea. The vents provide an ecosystem for ancient and unusual microbes that are capable of extracting energy from volcanic rather than solar energy, and are home to viruses."As a group, viruses are the most abundant biological entities on Earth and contain its largest reservoir of unknown genes," Wommack says. "We know that bacteria at the deep-sea hydrothermal vents are intimately associated with relatively abundant populations of viruses. Our goal is to explore the wilderness of viral genes existing at the vents."David Caron, professor of biological sciences in the Wrigley Institute for Environmental Studies at the University of Southern California, will be studying protozoa, a class of protists that feed on other organisms and that may form a crucial bridge between bacteria and animal life.

If Caron is correct, the samples from the deep will show that protozoa feed on bacteria or on the products of bacterial activity and are in turn eaten by larger life forms. The most surprising thing about the theory may be the lack of evidence for it. While other studies have found a protozoan-animal link in surface waters, the analogous middle step in the deep ocean has been overlooked.

"Protozoa are everywhere and they're in virtually every environment. They play this intermediate food web role in a number of these environments, and there's no reason to believe that they aren't doing the same thing in the vents. It simply hasn't been looked at to any degree," Caron said.As the scientists work at sea, they will be connected to students via an interactive Web site, where blogs, dive logs, video clips, photos and interviews will be posted daily. Students also will be able to write to the scientists, design experiments and participate in a virtual science fair.A capstone experience for selected schools will be a "Phone Call to the Deep," linking classrooms with researchers working live in the submersible Alvin on the seafloor.

The University of Delaware and the National Science Foundation are sponsoring the expedition. Additional support is being provided by Olympus and by MO BIO Laboratories.

* For those interested in following the scientists, they will blog regularly about the voyage at the Extreme 2008 Web site [http://www.expeditions.udel.edu/extreme08]. The program, coordinated by the Office of Communications & Marketing, is the sixth in UD's popular "Extreme" series, which has won state and national awards for public education.

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

http://www.sciencedaily.com/releases/2008/11/081110164123.htm#

Radioactive legacy of 'lost bomb'

By Gordon Corera
Security correspondent, BBC News, Thule, Greenland

The B-52 aircraft is a long-range bomber that can carry nuclear warheads

The crash of a B-52 aircraft, armed with nuclear warheads, in north-west Greenland back in 1968 has left a lasting legacy, according to those involved in the clear-up and those who live in the region now.
There are claims of long-term damage to the environment and to the health of individuals, allegations disputed by the governments involved.
Following the fire aboard the aircraft, the high explosives surrounding the nuclear weapons exploded but without setting off the actual nuclear devices, which were not armed.

Three of the four bombs being carried by the plane smashed on to the ice and broke into tiny fragments. Radioactive material was widely dispersed across the ice and was also thrust into the sky in a plume of smoke, declassified documents show.
Danish workers rushed to the scene of the crash, near Thule, and were heavily involved in clearing up the wreckage in the subsequent weeks and months as part of an enormous US military operation.
However, some of those workers believe not enough thought was given to their safety, given the presence of radioactive material from the bombs on board the plane.
"I was never given any protective equipment; I just went out in whatever you normally wore at work," recalls Jeffrey Carswell.
"You had this special team with the airmen in full protective equipment climbing on top of these 50,000 gallon drums and containers and I was down there, on a daily basis, (with) no protective equipment."
'Limited impact'
One of the weapons melted through the ice and sank into the bay below where it was abandoned, after a submarine search failed to locate it.

Four nuclear bombs were aboard the B-52 when it crashed
US government scientists conducted numerous studies to try to work out what would happen and eventually decided that if they could not recover the remaining parts of the bomb, then no-one else could. They also decided that the environmental impact would be limited because the material had been dispersed in such a large body of water.

"The bottom of the ocean is not a bad place in terms of environmental effects," William H Chambers, formerly of Los Alamos Nuclear Laboratory, told BBC News.
Before the base was established in 1953, the land was home to the local Greenlanders, who were then relocated 60 miles further north up the coast to the village of Qannaq.
In Qannaq, hunting is still an integral part of life and livelihood; some of the hunters believe they have seen the effects of the 1968 crash's radioactive material.
"There were two times when I hunted, when the seal's insides were dried out. Something must have happened to them," Ussaaqqak Qujaukitsoq told me on the waterfront of the village.
"If we think about the walruses and the other birds that have eating grounds on the bottom of the ocean, we will see the impact of it."
Other villagers, who went to the crash, also complain of undiagnosed, unusual illnesses.
And the workers at the crash site, like Jeffrey Carswell, also believe they have paid a price.
"I was referred to a specialist and they discovered I had a particular condition that needed to be operated [on] straight away," Mr Carswell told me.
"My doctor said that my particular condition was caused by exposure to radiation and plutonium.
"As we found out when we started talking to colleagues, a lot of those of us who were there at the time had problems of various types, all sorts of shocking problems that is, for sure, linked to what happened at Thule."

The workers have taken a case through Europe's courts, arguing that Denmark failed to abide by a European directive requiring their health be monitored.
To date, they have been unsuccessful.
"There are four petitioners included in this case," explains their lawyer Ian Anderson.
"Two of them have died of radiation illnesses and they are being represented by their next of kin. Two of them are seriously ill with radiation-related conditions.
"The case is quite simple: had they been medically monitored from the year 2000 when that directive came in to force, their conditions would have been detected at an earlier stage with a much better prognosis."
But the Danish government is adamant there is no hard evidence to suggest a long-term health impact.
"We have found no link between the crash and the illness of the Thule workers," says Kaare Ulbak, from the Danish National Institute of Radiation Protection.
"We have very good registers for cancer incidents and cancer mortality and we have made a very thorough investigation."
According to Dr Ulbak, between 0.5kg and 1kg of plutonium has been on the seabed, seeping into the marine environment over the years, but surveys show that this also poses no danger to humans in the region.
But former workers believe that the lack of proof of a link between the crash and their ill-health is precisely because they have not been monitored over time in a way that would allow such a link to be proved.
The head of the Association of Former Thule Workers, Jens Zieglersen, who also helped at the crash, remains unconvinced.
"I think it's a cover-up. We are getting older and the Danish authorities and the Danish government will wait and keep their mouths sealed for another 15, 20 years; then there's no-one left that remembers and who was a part of the accident back in the days of '68."
It is now 40 years since the crash of the B-52. But for those who were in Thule then and for those living in the region now, life and death is still defined by the events of that day.

http://news.bbc.co.uk/2/hi/science/nature/7720466.stm

A Computing Pioneer Has a New Idea

By JOHN MARKOFF

SAN FRANCISCO — Steven J. Wallach is completing the soul of his newest machine.

Thirty years ago, Mr. Wallach was one of a small team of computer designers profiled by Tracy Kidder in his Pulitzer Prize winning best seller, "The Soul of a New Machine."

It was Mr. Wallach, then 33, who served as the architect and baby sitter for his "microkids," the young team that designed the Data General MV 8000, the underdog minicomputer that kept the company alive in its brutal competition with the Digital Equipment Corporation.

At 63, he is still at it. He plans to introduce his new company, Convey Computer, and to describe the technical details of a new supercomputer intended for scientific and engineering applications at a supercomputing conference in Austin, Tex., this week.

Mr. Wallach thinks he has come upon a new idea in computer design in an era when it has become fashionable to say that there are no new ideas. So far, he has persuaded some of the leading thinkers in the high performance computing world that he might be right. Both Intel and a second chip maker, Xilinx, have joined as early investors.

"Steve comes from a long history of building successful machines," said Jack Dongarra, a computer scientist at the University of Tennessee who helps maintain the list of the world's fastest 500 computers. "He understands where the bottlenecks are."

After leaving Data General, Mr. Wallach helped found Convex in 1982 to build a low-cost supercomputer.

Mr. Wallach may be one of the few people remaining to recall a bold generation of computer designers once defined by Seymour Cray, the engineer who created the world's first commercial supercomputers during the 1960s.

His newest effort in computing design is intended to tackle one of the principal limitations in the world of supercomputing. Typically supercomputers are intended to excel in solving a single class of problems. They may simulate the explosion of a nuclear weapon or model global climate change at blinding speed, but for other problems they will prove sluggish and inefficient.

Today's supercomputers are assembled from thousands or even tens of thousands of microprocessors, and they often consume as much electricity as a small city. Moreover, they can prove to be frightfully difficult to program. Many new supercomputers try to deal with the challenge of solving different classes of problems by connecting different kinds of processors together Lego-style. This can give programmers fits.

For decades, computer designers have struggled with different ways to sidestep the complexity of programming multiple chips, in order to break up problems into pieces to be computed simultaneously so that they can be solved more quickly.

Mr. Wallach came up with his new design idea in 2006 after he found himself rejecting many of the start-up companies who were coming to the venture capital companies he was advising.

"I would say, 'No, no, no, they're clueless,' " he said. "I find it difficult to think of myself as the old man of the industry, but it feels the same as it was in the early 1980s."

One of the venture capitalists grew frustrated with Mr. Wallach's repeated criticisms and said to him, "All right Mr. Bigshot, what would you do?"

Two weeks later, Mr. Wallach had a new idea. He had long been fascinated with a chip technology called Field Programmable Gate Arrays. These chips are widely used to make prototype computer systems because they can be easily reprogrammed and yet offer the pure speed of computer hardware. There have been a number of start-ups and large supercomputer companies that have already tried to design systems based on the chips, but Mr. Wallach thought that he could do a better job.

The right way to use them, he decided, was to couple them so tightly to the microprocessor chip that it would appear they were simply a small set of additional instructions to give a programmer an easy way to turbocharge a program. Everything had to look exactly like the standard programming environment. In contrast, many supercomputers today require programmers to be "heroic."

"The past 40 years has taught us that ultimately the system that is easiest to program will always win," he said.

Mr. Wallach approached Advanced Micro Devices about partnering, but it was skeptical. So he went to Intel, where he knew Justin Rattner, the company's chief technology officer and a veteran supercomputer designer.

"We've had enough debates over the years that Justin has some respect for me," he said.

The Convey computer will be based around Intel's microprocessors. It will perform like a shape-shifter, reconfiguring with different hardware "personalities" to compute problems for different industries, initially aiming at bioinformatics, computer-aided design, financial services and oil and gas exploration.

Mr. Wallach acknowledges that starting a company going into a recession in the face of stiff competition from Cray, I.B.M., Hewlett-Packard, Sun Microsystems and more than a dozen smaller companies is daunting. However, Convey was put together in just two years on a shoestring. It has raised just $15.1 million.

"In a lot of ways, it's easier than it was in 1982," he said. "You need less money and I don't think a lot of people have grasped this."

One who does get the idea and who is enthusiastic about it is Larry Smarr, an astrophysicist who is director of the California Institute for Telecommunications and Information Technology at the University

of California, San Diego. He believes that the most important quality of the Convey computer is that it will be a green supercomputer.

“The I.T. industry is going to become the boogeyman for global warming,” he worries.

Three decades after designing the computer that brought the idea of computing into the public consciousness, Mr. Wallach gives no hint that he is slowing down.

He still wears the earring that he began wearing 15 years ago when his daughter suggested that he was getting old.

“Isn’t that required to be a computer architect?” he asked recently.

http://www.nytimes.com/2008/11/17/technology/business-computing/17machine.html?_r=1&th&emc=th

Periods of healthy old age 'vary'

The health of older Europeans varies widely between countries, even in those with longer life expectancies, a report has claimed.

The study found people in Estonia, Latvia and Finland had fewer years of good health after the age of 50.

People in the UK fare relatively well, enjoying nearly 20 years on average.

The lead authors of the Lancet study, from Leicester University, said the figures could help governments plan for future health needs.

BREAKDOWN FOR MEN
Life expectancy/healthy years after age 50
UK: 79.5/19.7
Sweden: 80.3/20.2
France: 79.6/18.0
Spain: 79.5/19.2
Austria: 79.1/14.5
Germany: 79.0/13.6
Finland: 78.5/12.9
Denmark: 78.3/23.6
Estonia: 72.4/9.0
Latvia: 71.3/11.0

The researchers collected data on life-expectancy, then surveyed older people from each country to find out whether they felt that illness had limited their ability to carry out normal activities.

This was used to calculate how many "healthy life years" a man and woman from each EU country could expect after their 50th birthday.

In some cases, this revealed problems not immediately apparent by just looking at life expectancy charts.

For example, Austrian men and women can expect to live on average to 79 and almost 84 respectively.

However, only half of their years after 50 will be free of ill-health, according to the figures.

In Germany and Finland, the gap between life expectancy and healthy years is even worse.

The newest entrants to the EU, already recording lower life expectancies than established members, appear to have populations blighted by chronic illness in old age.

In Estonia, men live on average to just under 73 years old, and women to over 80 - but men can expect only nine years' good health after 50, and women only a year more than this.

UK 'average'

While the UK has a generally lower life expectancy than some other EU states, its "healthy life year" score suggests that the health gap is not as wide as suggested by life expectancy alone.

BREAKDOWN FOR WOMEN
Life expectancy/healthy years after age 50
UK: 82.7/20.8
France: 85.4/19.7
Spain: 85.0/18.6
Finland: 84.1/13.9
Sweden: 84.0/20.3
Austria: 83.7/15.7
Germany: 83.0/13.5
Denmark: 81.9/24.1
Estonia: 80.5/10.4
Latvia: 79.3/12.7

Men here can expect to live until almost 80, and women to more than 82. However, for men, almost 20 years of this will be in good health, and just over 20 for women.

This compares to Spanish women, who live to 85, but can expect fewer of those extra years to be healthy ones.

Lead researcher Professor Carol Jagger, from Leicester University, said: "What we have here, for the very first time, is data we can really compare.

"And it really questions whether the countries with the longest life expectancies are the healthiest.

"In the case of the UK, we are looking pretty average, but slightly better than our life expectancy figures suggest."

She said that the figures might be useful to governments who are trying to work out the number of older people able to remain working, or who will need health care.

The results might mean that an EU target of increasing the number of older people working might be a difficult one to meet.

"Without an improvement in the state of health of older people, it will be difficult to raise the retirement age or bring more older workers into the workforce for certain EU countries."

John Appleby, from the health policy think tank The King's Fund, said that the figures threw up some "interesting differences" between countries.

He said: "I'm not entirely surprised by the results for the UK. It possibly partly reflects a better health and welfare system which supports older people in this country.

"This is an area which is often missed out in comparisons between countries. Life expectancy on its own is quite a crude measure, and just doesn't tell you about the quality of that life."

In which part of Europe do you live? Do you live in Estonia, Latvia or Finland? Do you agree with the findings of the research? Send us your comments using the form below.

Name
Your E-mail address
Town & Country
Phone number (optional):
Comments
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7728837.stm

Published: 2008/11/17 00:03:36 GMT

Obesity 'programmed before birth'

Eating a high-fat diet in pregnancy may cause changes in the foetal brain that lead to over-eating and obesity early in life, research suggests.

Tests on rats showed those born to mothers fed a high-fat diet had many more brain cells specialised to produce appetite-stimulating proteins.

The Rockefeller University team say the finding may help explain why obesity rates have soared in recent years.

The study appears in the Journal of Neuroscience.

Previous research on adult animals had shown that when fats known as triglycerides circulate in the blood they stimulate the production of proteins in the brain known as orexigenic peptides, which in turn stimulate the appetite.

We are programming our children to be fat
Dr Sarah Leibowitz
Rockefeller University

The latest study suggests exposure to triglycerides from the mother's diet has the same effect on the developing foetal brain - and that the effect then lasts throughout the offspring's life.

The researchers compared the offspring of rats fed a high-fat diet for two weeks with those whose mothers ate a moderate amount of fat.

They found that the pups born to the high-fat diet mothers ate more, weighed more throughout life, and began puberty earlier than those born to mothers who ate a normal diet.

They also had higher levels of triglycerides in the blood at birth, and as adults, and a greater production of orexigenic peptides in their brains.

Brain cells

More detailed analysis showed that, even before the birth, the high-fat pups had a much larger number of brain cells that produce orexigenic peptides - and they kept them throughout their lives.

The time to start feeding your child a healthy diet is right at the beginning of pregnancy
Dr Ian Campbell
Weight Concern

Their mothers' high-fat diet appeared to stimulate production of the cells, and their subsequent migration to parts of the brain linked to obesity.

In contrast, rats whose mothers had a balanced diet had far fewer of these specialised cells, and they appeared much later after birth.

Lead researcher Dr Sarah Leibowitz said: "We believe the high levels of triglycerides that the foetuses are exposed to during pregnancy cause the growth of the neurons earlier and much more than is normal.

"This work provides the first evidence for a foetal program that links high levels of fats circulating in the mother's blood during pregnancy to the overeating and increased weight gain of offspring after weaning."

The researchers suggest that the foetal brain is programmed so that the offspring can survive on the same diet as their mother - and they believe a similar mechanism may be operating in humans.

Dr Leibowitz said: "We are programming our children to be fat."

Dr Ian Campbell, medical director of the charity Weight Concern, said it had already been known that a high-fat diet in pregnancy made a child prone to a preference for fatty foods - but it had not been clear why.

He said: "The message is clear. We are not just 'what we eat'; we are also to some extent 'what our mothers eat'.

"The time to start feeding your child a healthy diet is right at the beginning of pregnancy."

Professor Ian MacDonald, an expert in the biology of obesity at the University of Nottingham, said there was clear evidence that nutrition before and soon after birth had an on-going impact on the genes.

But he warned against extrapolating too readily from animal studies, particularly as the rats in the latest study were fed a very unnatural diet.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7721438.stm

Published: 2008/11/17 00:03:51 GMT

Shifts In Soil Bacterial Populations Linked To Wetland Restoration Success

Freshwater tidal wetland at John Heinz National Wildlife Refuge in Philadelphia, Pennsylvania. (Credit: iStockphoto/Andrea Gingerich)

ScienceDaily (Nov. 17, 2008) — A new study led by Duke University researchers finds that restoring degraded wetlands -- especially those that had been converted into farm fields -- actually decreases their soil bacterial diversity.But that's a good thing, say the study's authors, because it marks a return to the wetland soils' natural conditions.

"It sounds counter-intuitive, but our study shows that in restored wetlands, decreased soil bacterial diversity represents a return to biological health," said Wyatt H. Hartman, a Ph.D. candidate in wetlands and environmental microbiology at Duke's Nicholas School of the Environment."Our findings are novel because they are the opposite of the response seen in terrestrial ecosystems, where restoration improves conditions from a more barren, degraded state," said Curtis J. Richardson, director of the Duke University Wetland Center and professor of resource ecology at the Nicholas School. Richardson is Hartman's faculty adviser.

Their report on the study will be published online November 14 in the Proceedings of the National Academy of Sciences.Soils in undisturbed wetlands present harsh conditions, with elevated acidity and low oxygen and nutrient availability in which fewer bacterial groups can survive and grow, they explained. In comparison, former wetlands that have been drained, limed and fertilized for farming host greater soil bacterial diversity because they present conditions more suitable for bacterial growth.

"The bacterial communities in these fields almost resemble those found in wastewater treatment plants," Hartman noted.Soil bacteria are essential to wetland functions that are critical to environmental quality, such as filtering nutrients and storing carbon. "The mixture of bacterial groups in wetland soils can reflect the status of wetland functioning, and the composition of these populations is as telling as their diversity," Richardson said.

Measuring whether the right mix of bacteria is returning to a restored wetland can be a valuable biological indicator scientists can use to evaluate restoration success, he added.

"We found that one of the simplest and most promising indicators of restoration success was the ratio of Proteobacteria, which have the highest affinity for nutrient-rich environments, to Acidobacteria, which have the highest tolerance for poor conditions," Hartman said.

The researchers determined soil bacterial composition and diversity within restored wetlands, agricultural fields and undisturbed wetlands across North Carolina's coastal plain. They sampled these paired land-use categories across three distinct types of wetlands: pocosin bogs, floodplain swamps and backwater swamps that were not connected to streams.

Samples were also taken from sections of the Everglades, the largest wetland in the United States, where a $10.9 billion effort is now underway to remediate the effects of agricultural runoff.

"We identified bacterial groups by their evolutionary relationships, which were determined by sequencing DNA extracted from soils," Hartman said. "This approach allowed us to capture a much greater diversity of bacteria than would be possible using conventional laboratory culturing, which works for only a small fraction of the 10,000 to 1 million species of bacteria that can be found in a single cubic centimeter of soil."

Previously, researchers have used genetic techniques to target known organisms or bacterial groups in wetland soils, he said. "But this study is unique in that we used these methods to capture the full range of bacterial groups present, and determine how their composition shifts with land-use changes and restoration."

"These types of findings can only be obtained in studies done on sites that have been restored and studied over a number of years and assessed with these modern techniques," Richardson said.

Wetlands filter and reduce nutrients and pollutants from agricultural and urban runoff as well as improve water quality and store around 25 percent of the world's soil carbon, while covering only 4 to 6 percent of its land mass.

More than half of original wetland acreage in the U.S. has been destroyed or degraded, but some has been restored in recent decades under the federal government's "no net loss" policy.

"Re-establishment of microbial communities indicates a restoration of the biological functions of soils. This study across a wide range of wetlands is the first to establish that shifts in soil bacteria populations may be a key marker of restoration success," Richardson said.

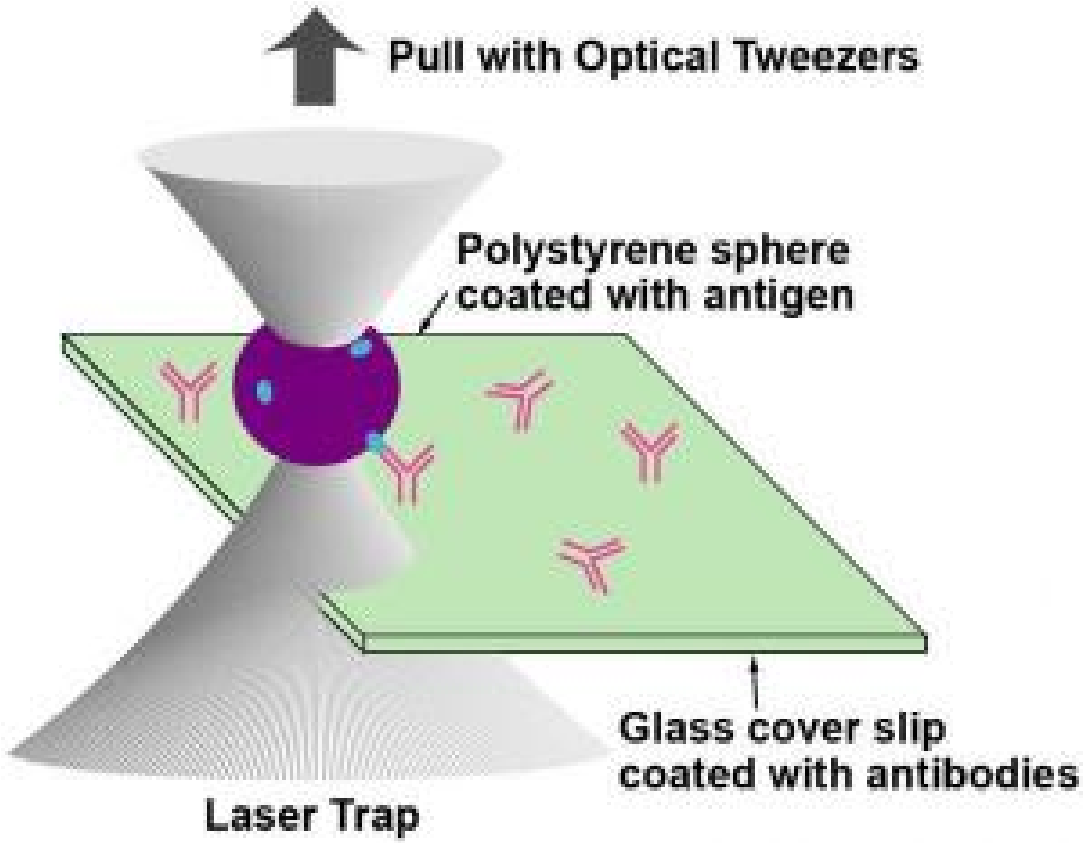
Rytas Vilgalys, professor of biology at Duke, and Gregory L. Bruland, assistant professor of soil and water conservation at the University of Hawaii at Manoa, were co-authors on the report. Bruland received his Ph.D. from the Nicholas School in 2004; Richardson was his faculty adviser.

The study was funded by a Duke University Wetland Center Case Studies Endowment and a National Science Foundation Graduate Research Fellowship.

Adapted from materials provided by Duke University.

http://www.sciencedaily.com/releases/2008/11/081112113655.htm

'Femtomolar Optical Tweezers' May Enable Sensitive Blood Tests



Basic scheme of an optical tweezer-based sensor of biological particles. A microsphere covered with a specific antigen (such as a virus or other infectious agent) is trapped and pulled away from a surface containing the corresponding antibodies. The minimum amount of force applied to the tweezers to break the bonds can provide information on the concentration of antibodies on the surface. (Credit: NIST)

ScienceDaily (Nov. 17, 2008) — Cutting-edge "tweezers" are so sensitive that they can feel the tell-tale tug of tiny concentrations of pathogens in blood samples, yet don't ever need to be sterilized—or even held—as they are ephemeral and weightless.

The National Institute of Standards and Technology (NIST) has licensed a patented "optical tweezers" technique for detecting and measuring very small concentrations of a biological substance—such as a virus on a surface. NIST has issued a non-exclusive license for the technology to Haemonetics, a global health care company that provides blood management technologies for hospitals and blood and plasma collection agencies.

Optical tweezers are actually tightly focused laser beams. They can trap certain objects, such as latex microspheres or biological cells, and move them around in water. This occurs because the lasers' electric fields interact with electric charges on the objects.

To detect disease-causing agents, researchers can coat a microsphere with antibody particles and then touch it to a surface containing infectious particles (antigens). The antigens then stick to the antibodies on the sphere, reminiscent of Velcro, in which loops on one strip combine with hooks on the other. By determining how much laser power is required to pull the microsphere away from the surface, one can then calculate the amount of force needed to break off the antibodies from the antigens and thus count the number of individual antigens that were bound to the sphere. This in turn can detect and count biological

antigens at extraordinarily low "femtomolar" concentrations—roughly equivalent to one antigen particle per quadrillion (1,000,000,000,000,000) water molecules.

Following up on earlier work in optical tweezers in the industrial and academic research communities in the 1970s, the licensed technology was patented in 1997 (patent #5,620,857), as a result of research conducted under the NIST BioSensor Consortium. The inventors are Howard Weetall (since retired), Kristian Helmerson, and guest researcher Rani Kishore.

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

http://www.sciencedaily.com/releases/2008/11/081113162901.htm

Forecasting Rain: Radars For Estimating Rainfall Rates

A new generation of radars is being tested by Cemagref in the Var department, a mountainous region with a high flood risk. (Credit: Photo Cemagref)

ScienceDaily (Nov. 17, 2008) — To be effective, flood warning systems use rainfall data available in real time. These data come from the ground observation network and estimations made based on the national network of climate radars operated by Météo France.

Today, mountain zones are only partially covered by this rain detection technology. Within the INTERREG project, a new generation of radars is being tested by Cemagref in the Var department, a mountainous region with a high flood risk. The radar is currently located in the countryside immediately inland from Nice.

Measuring the intensity of rain as it is falling is indispensable to anticipating rapidly rising waters and reacting to the associated flood risk. To the classical rain gauges installed throughout the area, new radar technologies were added in the 1990s to detect rain and measure the accumulation of precipitations in real time.

Today, Météo France has a national network of 24 weather radars available within approximately 100 km. However, all regions in France are not covered by this mesh, in particular the mountain zones where the relief masks downstream rain zones by creating an obstacle to wave displacement. Within the FRAMEA project, a new radar technology developed by Novimet is being tested at the Aix-en-Provence Cemagref. The experiments conducted in the Maures massive have proven to be highly promising.

More compact and less expensive radars

The radars used at the beginning to monitor planes flying overhead were extended to the detection and quantification of precipitations. Large-scale radars, 6–8 m in antenna diameter, are used today in weather stations located in the plains. In mountain zones, the number of radars must be multiplied in relation to the relief, which requires smaller and less expensive models. The new Hydrix radar responds to these demands. However, by reducing the diameter of the parabolic antenna to 1.5 m, the wave frequency must be boosted, which increases the attenuation of waves during their displacement.

To compensate this signal attenuation effect, a profiling algorithm (ZPHI) is used. Finally, the radar operates in double polarization, which provides information on the size of the rain drops and estimates precipitations without resetting ground network observations. Today, in a doctoral dissertation supervised by both Cemagref and the firm Novimet, this new radar technology is being tested in the Var department, a mountainous region that experiences very intense flash floods.

Results that are coherent with ground readings

The Hydrix is installed near Réal Collobrier, Cemagre's instrumented research catchment, located in the Maures massif. The total rainfall in autumn 2006 calculated by the radar was compared to the rain gauge readings on the ground and to the accumulation estimated by one of the nearby radars belonging to the Météo France network. Within a 60- to 80-km radius, the data supplied by the radar were in coherence with the quantities of rain collected on the ground. In addition, the algorithmic signal processing retransmitted rain gauge data in real time that were as good quality as the data sent by the classical radar managed by Météo France. Today, the research is continuing so as to integrate the rain gauge data supplied by the radar into existing rainfall-runoff models.

By converting rainfall into runoff, these mathematical tools can calculate the runoff of rivers at the outlet of a catchment. These rainfall and runoff data then feed the flood warning systems, such as the Aiga system developed by Cemagref and Météo France in 2005. By completing the existing radar network, the Hydrix technology will contribute to the extension of the flood warning system over the entire area, including mountainous zones.

Adapted from materials provided by Cemagref.

http://www.sciencedaily.com/releases/2008/11/081106065555.htm

Telemedicine: Researchers Broadcast Live Surgery Using Internet2

This demonstration showed the potential of multicast/unicast technology to transmit DV-quality live video of medical endoscopic procedures simultaneously to multiple sites over a high-speed network (Internet2) at 30 Megabits per sec. (Credit: Image courtesy of Rochester Institute of Technology / Research Computing)

ScienceDaily (Nov. 17, 2008) — Imagine a scenario where doctors from different hospitals can collaborate on a surgery without having to actually be in the operating room. What if doctors in remote locations could receive immediate expert support from top specialists in hospitals around the world?

This environment could soon become a reality thanks to research by a multi-university partnership that is testing the live broadcast of surgeries using the advanced networking consortium Internet2.

Rochester Institute of Technology is collaborating with a team led by the University of Puerto Rico School of Medicine that recently tested technology, which allows for the transmission of high quality, real time video to multiple locations. Using a secure, high-speed network, an endoscopic surgery at the University of Puerto Rico was broadcast to multiple locations in the United States. The experiment also included a multipoint videoconference that was connected to the video stream, allowing for live interaction between participants.

Results from the test were presented at a meeting of the collaboration special interest group at the fall 2008 Internet2 member meeting in New Orleans.

“The University of Puerto Rico has been performing this type of transmission between two sites for more than a year, but we are now able to utilize a combination of technologies that allows us to transmit to

multiple sites simultaneously," notes José Conde, director of the Center for Information Architecture in Research at the University of Puerto Rico Medical Sciences Campus.

"Being isolated geographically from major research centers, we need to use information technology to foster research collaborations with scientists around the world," Conde adds.

"Previous efforts in telemedicine have been hampered by the quality of the video stream produced and the potential for network interruptions," says Gurcharan Khanna, director of research computing at RIT and a member of the research team. "This test demonstrates that by using the speed and advanced protocols support provided by the Internet2 network, we have the potential to develop real-time, remote consultation and diagnosis during surgery, taking telemedicine to the next level."

The researchers utilized a 30-megabit-per-second broadcast quality video stream, which produces high quality images, and configured it to be transmitted via multicast using Microsoft Research's ConferenceXP system. This level of real time video was not possible in the past due to slower and lower quality computer networks. The team also utilized a Polycom videoconferencing system to connect all parties.

The team will next conduct additional tests with different surgical procedures and an expanded number of remote locations. The researchers' goal is to transfer the technology for use in medical education and actual diagnostic applications.

"Today, physicians often need to travel to both examine patients and conduct consultations," says Khanna. "Given the growing capacity of Internet technologies, the development of live remote consultation with high quality video could revolutionize medicine and greatly enhance the care patients can receive while reducing overall costs to the health care system."

The research is being funded through a grant from the National Center for Research Resources at the National Institutes of Health to the University of Puerto Rico. The team also includes Johns Hopkins Hospital, the University of Michigan School of Medicine and the Office of High-Performance Computing at the National Library of Medicine. For more information about the project visit http://rc.rit.edu/endo.html or http://rcmi.rcm.upr.edu.

Adapted from materials provided by Rochester Institute of Technology.

http://www.sciencedaily.com/releases/2008/11/081112160853.htm

Damage To Optic Nerve In Glaucoma Patients May Indicate Significant Carotid Artery Narrowing

ScienceDaily (Nov. 17, 2008) — Glaucoma is often associated with elevated pressure inside the eye (intraocular pressure, or IOP) which can damage the optic nerve, leading to vision loss and even blindness. Medication and/or surgery allow patients to control their IOP, thus preventing the development of vision loss.

Mostafa Elgohary, MD, of Essex County and Broomfield Hospitals in the UK and his colleagues were concerned when several patients who had been under their care for several years continued to lose their vision in one or both eyes even though their IOP had been kept within normal limits either through medicine or surgery.

The authors reviewed 16 retrospective case reports to determine if there was a possible association of internal carotid artery narrowing, or stenosis, with the development of glaucoma or glaucoma-like damage to the optic nerve. The internal carotid arteries are the main arteries in the neck that carry the blood to the brain and the eye. On further investigation, the authors found that six of those patients had significant carotid artery narrowing (greater than 60 percent of the artery lumen) and some even had total blockage of the artery on the same side as the eye with the glaucoma, or on both sides.

One patient showed improvement in the visual field after undergoing surgery to remove the blockage. The authors then extended their investigation by prospectively collecting data for 58 patients who were referred with similar optic nerve or visual field changes and carotid artery stenosis as part of the hospital audit system and found that 17 percent of these patients had significant carotid artery narrowing.

The study results are significant because they add to the evidence for the role of reduced blood flow to the optic nerve as a possible cause or predisposing factor for glaucoma or glaucoma-like optic nerve damage. Moreover, the results indicate a possible association with significant carotid artery narrowing which is a potentially serious condition as it carries the risk of stroke. "The study is of a small scale and will obviously need further research to confirm the findings," the authors say.

"However, in the meantime it may be prudent to consider referring patients with progressive or asymmetric glaucoma despite normal eye pressure---especially in the presence of cardiovascular risk factors such as hypertension, hypercholesterolemia or ischemia heart disease---for carotid artery Doppler scan to pick up those who could be at high risk for stroke and may benefit from carotid artery treatment."

This research was presented at the 2008 Joint Meeting of the American Academy of Ophthalmology (Academy) and European Society of Ophthalmology (SOE) that runs November 8 to 11 at the Georgia World Congress Center, Atlanta.

Adapted from materials provided by American Academy of Ophthalmology, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/11/081109120537.htm

Making Higher Ed Research Matter

JACKSONVILLE, FLA. — Discussions about the immediacy and relevance of scholarly research take place in virtually every discipline. They are probably most common in the sciences, where debates about the relative health and ascendancy of basic vs. applied studies are a battleground not just of prestige but, often, of big money, too.

But tensions over how much researchers should (or must) address practical and public policy questions, as opposed to philosophical and esoteric ones, arise in social science and humanities fields, too. Debate tends to crop up most visibly when there are flashpoints over a typical type of research, as when

anthropologists argue over the propriety of doing research for the Pentagon or scholars of disability studies disagree about whether they should weigh in on a controversial legal issue. In most disciplines, though, questions about the relevance and public visibility and application of research simmer rather than boil over (as in this recent discussion at a meeting of sociologists), ebbing and flowing with the years.

Scholars who study higher education have been grappling with the connection between research and practice intensely for a while now, so much so that the annual meeting this year of the Association for the Study of Higher Education here is entitled, well, "Research and Practice: Embracing Connections." (Last year's was "Informing the Public Agenda: The Role & Relevance of Research," if you sense a theme.)

In her address to the association Thursday, the group's current president, Linda Eisenmann, wrestled with the relevance of higher education research to institutional decision making, exploring the extent to which her background as a historian of higher education informed her work as dean of the college of arts and sciences at John Carroll University.

But the question of how scholars of higher education should ensure that their work "matters" — and the attendant question of whether, to do so, they should do different kinds of research, or merely do a better job of making existing work on timely subjects and problems accessible to policy makers and the public — came up most directly in a session Thursday sponsored by the association's board. Its focus was on the special committee that ASHE has created on "linkages," whose charge, over the next five years, is to "institutionalize" connections between the group's members, their research, and "policy makers and practitioners."

"ASHE has promoted scholarship about higher education for all of its existence," said Barbara K. Townsend, a professor of higher education at the University of Missouri at Columbia. "We can sometimes run the risk of doing rather esoteric scholarship that is only seen and heard by other researchers, but really has no effect on policy and practice. It's important that we are trying to live in the real world."

Townsend and others made clear that plenty of higher ed researchers do work that is relevant to and used by public policy makers, and that there have been times in the past when higher education researchers have been actively involved in federal and other policy discussions. But that has happened much less commonly since the 2005 demise of the American Association for Higher Education, from which ASHE sprang. AAHE was primarily a policy group that worked directly with other such groups and helped keep higher ed researchers engaged in those discussions.

The major thrust of the ASHE task force's initial set of recommendations focused on finding ways to publicize and translate to lay audiences the politically relevant work they are already doing on important issues such as college access and affordability, the higher education work force, and the like, by increasing the group's ties to policy groups and writing for general interest publications as well as for scholarly journals.

But participants also discussed the need for higher ed researchers to spend more time talking to policy makers about the problems they are trying to solve and, in turn, doing scholarly work that helps them. "Those discussions can help inform our research and make sure that it is used more by those outside our community," said Adrianna Kezar, associate professor for higher education at the University of Southern California.

The suggestion that higher education researchers should spend significant time reaching out to policy makers or write for nonscholarly audiences brought a common practical complaint from some in the audience: that the reward system for professors, particularly those pre-tenure, is structured to devalue any work that is not traditional and published in a scholarly book or journal. "It's not just not encouraged, but actively discouraged" in tenure and promotion standards, said Marc Cutright, associate professor of higher education at the University of North Texas.

Patrick T. Terenzini, a distinguished professor of higher education at Pennsylvania State University's Center for the Study of Higher Education, said that while writing "policy briefs" or other sorts of nontraditional publications is "not going to get anybody promotion and tenure," there are types of writings — such as "careful and rigorous reviews" of previous studies on a research topic — that are both acceptable scholarship *and* helpful to politicians or other policy makers.

Terenzini, who is one of the deans of research on higher education, expressed the view that the field is "not a discipline" but more a "professional area of study" that should focus on the "practice of the profession," not theories about it. "If we have nothing to say to the policy makers who shape the thousands and millions of students and make decisions where to spend, and not spend, public funds, then we're just wasting our time," he said.

That pragmatic view of higher education research — or what it might become, if scholars were urged to abandon "foundational" research in lieu of more applied work — took some in the audience aback. "I worry about what might happen by moving too quickly," said Rebecca Ropers-Huilman, professor of higher education and editor of the *National Women's Studies Association Journal*. "If we only do research that we see has an immediate outcome or effect or practical implication, what are we losing?"

Susan Twombly, a professor in the department of teaching and leadership at the University of Kansas, recalled that ASHE had originally been a part of the American Association of Higher Education but had broken off to become a separate organization because it feared being "*too* focused on policy." While there is value in having higher ed researchers do work that is practical, she said, "we need to make sure not to throw the baby out with the bath water."

"Nobody is suggesting that you should abandon what you're doing," said Kezar, of USC. What the association is mainly seeking, she said, is to "make more systematic" the links between higher education researchers and public policy makers. "We need more intentionality," she said.

— Doug Lederman

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/07/ashe.

Encouraging Colleges to Look Within

The National Survey of Student Engagement — an annual report providing comparative data on student experiences at four-year institutions nationwide — is entering its 10th year. Now that the survey is reaching what some consider a critical mass of participants, this year's report finds that variations in educational quality are more prevalent within institutions than among them. As a result, NSSE officials argue that holistic assessments, such as theirs, provide a more accurate comparison than do those using institution-wide averages.

"Quality is multi-dimensional," said Alexander C. McCormick, NSSE's director and professor at Indiana University's School of Education, where the survey is based. "You can't distill everything down to one number. Quality is lumpy within institutions. You don't always have the same experience as your peers in college."

NSSE measures five areas of education performance: level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences and supportive campus environment. While McCormick acknowledges that institution-wide averages found in other assessments are worthy of note, he argues that such figures cannot be used to provide institutions with the means by which to improve themselves.

He also warns that prospective college students and their parents need to realize that a generous ranking by one or more sources taking broad institutional views — *U.S. News & World Report*'s *America's Best Colleges* being among them — does not always indicate a high quality "throughout the undergraduate experience."

In each of NSSE's five areas of education performance, there are two parts to the total variation in scores. The within-institution variation — or differences among individuals within an institution — is far greater than the gaps in averages comparing institutions to one another

The internal variations are more noticeable when one disaggregates the data for an individual institution. As NSSE does not disclose data for institutions without their permission, this year's report includes a case study using real data for two pseudonymous institutions. For example, the report notes there is a more "supportive campus environment" for students involved in either the honors program or the Educational Opportunity Program — for underrepresented students — than the other 71 percent of students at one of these shielded institutions. In another case study, data reveal that students in different disciplines show different levels of engagement. In one case, it notes that business students have less "enriching educational experiences" — study abroad, internships, etc. — than do their counterparts in engineering.

This year's NSSE report was compiled from information on almost 380,000 first-year and senior students at 727 public and private four-year institutions around the country. Also, among this year's first-time participants were some major players in for-profit education: University of Phoenix Online, University of Phoenix Southern California, and Kaplan University.

While individual institutions are provided with their own results, based on the same set of engagement questions asked to first years and seniors, only aggregated data are provided to the public. When detailed data are given to institutions, they receive customized reports showing their data compared to aggregate data from three default peer groups: geographical region and public/private, 2005-revision of the Carnegie Foundation's "basic classifications" and all current year NSSE participants.Institutions are free to publish their data if they wish. And while some institutions do release information, many only provide snapshots of data that portray their information in a positive light.NSSE made waves last year by cooperating with *USA Today* and publishing individual data from a number of institutions from whom it received permission. To coincide with the release of this year's study, the newspaper's Web site has updated its feature showing selected institutions' data. This relatively new relationship has led some in higher education to believe that NSSE was looking to get into the business of ranking institutions and nearing the point at which it would fully disclose individual institutional data to the public.

A year later after the initial experiment, McCormick said he has put those concerns to rest, noting that NSSE does not support the use of its data for ranking institutions. *USA Today* has also not done so.

"I don't think by cooperating with *USA Today* we're pressuring institutions in any way," McCormick said. "There was a lot of suspicion in the first year. Certainly some were saying this is the camel's nose under the tent and soon NSSE will be publishing our data. Still, there's no carrot and stick associated with it. It's more about providing an opportunity. Public reporting is a decision for the colleges to make."

This year's report highlights a number of "promising" and "disappointing" findings. One of the more positive discoveries was that, according to the report, two-thirds of first-year students and three-fourths of seniors "at least sometimes discussed ideas from their readings or classes with faculty members outside of class." The report also notes that writing-heavy courses engage students in deeper learning techniques such as the analysis and synthesis of concepts from multiple sources. In addition, students in writing-heavy courses reported more "personal, social, practical and academic learning and development."

Online courses are also given relatively positive reviews by the new report. In comparison to classroom-based learners, online learners were more likely to "participate in course activities that challenged them intellectually," "participate in discussions that enhanced their understanding of different cultures," and "discuss topics of importance to their major."McCormick said he could not speculate as to why online learners report these advantages over classroom-based learners. Still, he did note that many of these learners were more likely to be older, transfer or first-generation students who have a greater interest in their education. Figures like these, he said, demand further investigation.

On the negative side, the report notes that only about half of first-generation students participate in co-curricular activities. It also shows that just 57 percent of first-year students and half of seniors are encouraged by their institutions to interact with students of "different economic, social, and racial or ethnic backgrounds."Most troubling of this year's negative data points, McCormick said, was that almost 25 percent of first-year students and 20 percent of seniors report that they "frequently came to class without completing readings or assignments." These points are below the expectations set by many professors. Faculty who participated in NSSE's companion Faculty Survey of Student Engagement this year, however, reported even less engagement among their students.

Thomas F. Nelson Laird, FSSE project manager and an education professor at Indiana University, said 45 percent of faculty reported that typical first-year students "frequently (often or very often) came to class unprepared." Additionally, he said 36 percent of faculty reported that typical seniors did the same."Over all, I'd say that faculty have a realistic picture of the preparation of their students," Laird wrote in an e-mail. "Many faculty recognize that a portion — but certainly not all — of their students are frequently coming to class underprepared."Looking toward the future, NSSE is hoping to incorporate more study of shifts in its data through time. Jillian Kinzie, NSSE's associate director, wrote in an e-mail that NSSE is getting to the point where it can analyze multi-year data from individual institutions. As a result, she said, it is just now identifying institutions that have improved their scores. NSSE also hopes to report more of the ways the individual institutions are using their data to improve the quality of their programs.

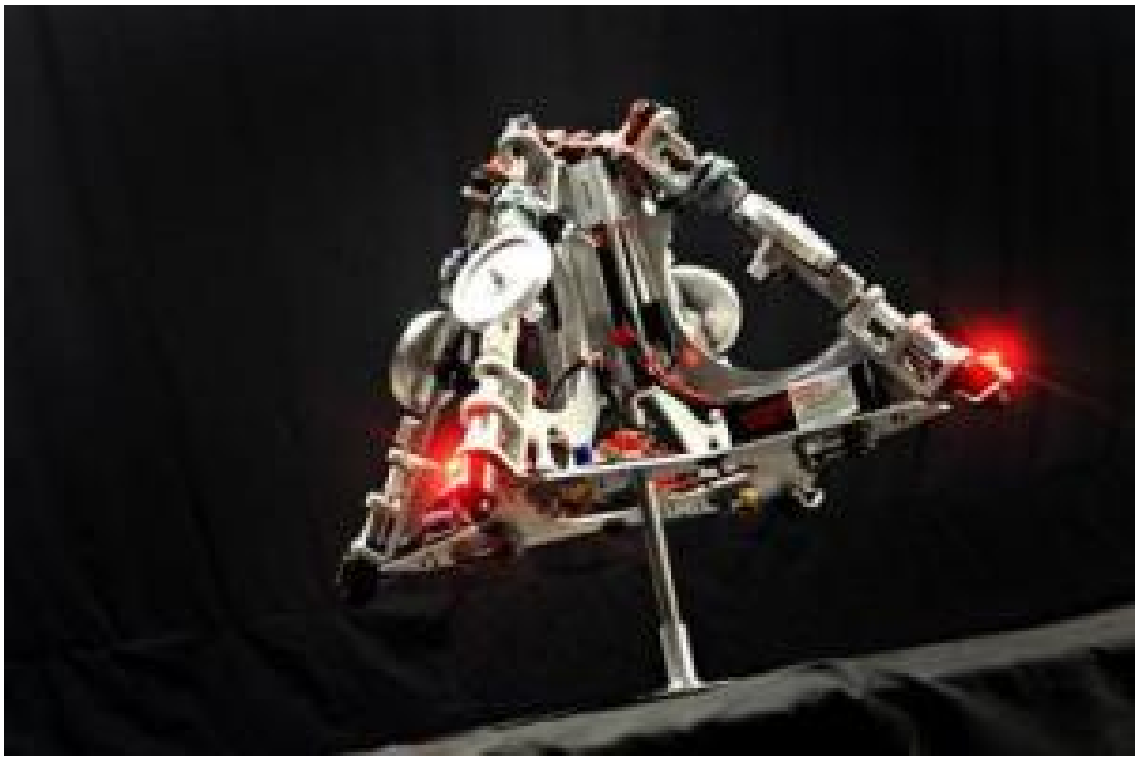
While McCormick said it is premature to say how exactly NSSE 2.0 will look, he said the survey is already beginning to make a difference in the higher education community.

"What I'm aiming for is very simple," McCormick said. "I want people look beyond their average score and *U.S. News* [rankings] and show that there are better ways to focus on individual measures of success. A major focus on this is calling attention to this internal variation within institutions."

— David Moltz

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/10/nsse.

To Widen Path To Outer Space, Engineers Build Small Satellite



This is a prototype of a "pico satellite" being designed and built in a mechanical and aerospace engineering laboratory at the University of Florida on Thursday, Nov. 6, 2008. Far smaller than a standard satellite, the pico satellite is intended to test new techniques to control very small satellites in outer space. The overall goal of Associate Professor Norman Fitz-Coy's research program is to boost the role of tiny satellites, which could be designed, produced and launched far more cheaply and easily than standard satellites. The completed pico satellite, expected to be launched in 2009, will be about the size of a softball. This prototype is slightly larger than a basketball. (Credit: Kristin Nichols/University of Florida News Bureau)

ScienceDaily (Nov. 16, 2008) — It's not much bigger than a softball and weighs just 2 pounds.

But the "pico satellite" being designed and built in a University of Florida aerospace engineering laboratory may hold a key to a future of easy access to outer space — one where sending satellites into orbit is as routine and inexpensive as shipping goods around the world.

"Right now, the way satellites are built, they're all large, one-of-a-kind and very expensive," says Norman Fitz-Coy, an associate professor of mechanical and aerospace engineering and the lead investigator on the project. "Our idea is that you could mass produce these small satellites and launch 10 or 20 from a single launch vehicle."

The satellite is the first ever built at UF and may be the first orbiting spacecraft to be built in Florida, said Peggy Evanich, director of space research programs at UF.

Fifty-one years ago, the former Soviet Union inaugurated the space race with the launch of Sputnik. Since then, satellites have transformed communications, navigation and climatology, as well as science and the military. But satellites remain large, ranging in size from basketball to school bus proportions; expensive,

with costs typically in the hundreds of millions to billions of dollars; and slowly hand-built as one-of-a-kind devices, rather than speedily mass produced, Fitz-Coy said.

Scientists and engineers now hope to change that legacy.

"There is a national push to make satellites smaller so that you can provide cheaper and more frequent access to space," he said.

As part of that push, the National Science Foundation this fall created the Advanced Space Technologies Research and Engineering Center at the UF College of Engineering. Headed by Fitz-Coy, the center will seek to develop "pico- and nano-class small satellites" that can be built and launched for as little as $100,000 to $500,000, according to the NSF. The UF center will receive NSF funding for five years for the research.

Fitz-Coy said small satellites are not anticipated to totally replace larger ones, but rather to complement them by adding new capabilities. For example, he said, "swarms" of small satellites could take multiple, distributed measurements or observations of weather phenomena, or the Earth's magnetic fields, providing a more comprehensive assessment than is possible with a single satellite.

"People are looking toward these to not totally replace the big satellites but to supplement what the big satellites are doing," he said.

He said the main impediment to designing small satellites is control: The smaller the satellite, the harder it is to manage its flight path and attitude, or orientation in space – for example, which directions its instruments point, a critical parameter in spacecraft design.

"It's similar to you driving an SUV down the road or a sub-compact," Fitz-Coy said, explaining that while inertia helps large satellites, it is not enough to keep small satellites on track and properly oriented. "The SUV is a lot more stable than the sub-compact."

The goal of the UF satellite, nicknamed SwampSAT, is to test a new system designed to improve small satellites' attitude control. Having precise control is particularly important for such satellites because they have to fly relatively close to Earth so that their weak communications signals can reach their targets, he said. Because of their proximity to Earth, their instruments must be precisely aimed.

"They need to be able to control their orientation and re-orient rapidly," he said.

Fitz-Coy and about 12 undergraduate and graduate students began the project last year and hope to complete SwampSAT late this year or early next year, he said.

The cost is anticipated to be about $100,000, with a launch in 2009 – likely aboard an unmanned NASA rocket carrying other payloads as well. The satellite will fly at an altitude of between 600 and 650 kilometers, or from 373 to 404 miles, and will remain in orbit for several years, Fitz-Coy said.

A container that could be standardized for use in transporting the small satellites aboard the rocket also is being developed. As with the satellites themselves, the goal is mass production – to be able to transport satellites to outer space much the same way that ships and trucks transport goods around the terrestrial world now, Fitz-Coy said.

Adapted from materials provided by University of Florida.

http://www.sciencedaily.com/releases/2008/11/081113181312.htm

Why Shar Pei Dogs Have So Many Wrinkles

Shar-pei dog with mucinosis. (Credit: Image courtesy of Universitat Autònoma de Barcelona)

ScienceDaily (Nov. 16, 2008) — A group of researchers at Universitat Autònoma de Barcelona (UAB) have discovered the origin of the mucinosis present in Shar Pei dogs, a hereditary disorder responsible for the characteristic wrinkles found in this breed.

The research report appears in the journals Veterinary Dermatology and Journal of Heredity. The report details the genetic alteration in this breed which multiplies the activity of an enzyme responsible for an excessive production of hyaluronic acid, a substance which gathers under the skin and produces wrinkles. Understanding this molecular mechanism will give way to new reproduction programmes aimed at improving the health of these animals. It also will be used to learn more about human disorders such as Familial Mediterranean Fever (FMF) or mucinosis, and to gain more knowledge on the ageing process.

Shar Pei dogs have unique characteristics. The breed originated in the south of China more than two thousand years ago with the Han dynasty and was used as guard dogs and shepherds. After the communist revolution of Mao Tse-Tung the Shar Pei breed almost disappeared. However, at the beginning of the 1970s a breeder from Hong Kong, Matgo-Law, sent a number of Shar Peis to the United States and there began the process of recovering the breed, which is considered to be the rarest in the world.

Shar Peis became a popular breed in Europe and the United States at the beginning of the 1990s. During the recovery process, the characteristic wrinkles of the first Shar Pei dogs were enhanced and the offspring of these appeared with thicker skin and a greater number of wrinkles. This increase in thickness and the formation of excessive wrinkles are the cause of the inherited skin disorder cutaneous mucinosis, in which there is a build-up of mucin in the layers of the skin. The mechanism which produces this excess of mucin was unknown of until now.

A group of researchers at UAB, led by professors Lluís Ferrer and Anna Bassols, have discovered the mechanisms of this disorder. Mucinosis in Shar Peis is due to an accumulation of hyaluronic acid (one of

the main components found in the space between tissue cells) in cutaneous structures. This causes them to present high levels of hyaluronic acid in their bloodstream as well. Research with fibroblast cell cultures isolated from the Shar Pei's skin have allowed scientists to demonstrate that synthesis of hyaluronic acid is produced in abnormally high amounts due to an excess in the activity (overexpression) of the HAS2 enzyme, one of the three enzymes responsible for the synthesis of acid in mammals. Now researchers are working to find the exact location of the genetic mutation causing this metabolic alteration, in a collaboration project between Armand Sánchez and Olga Francino from the UAB Department of Animal and Food Science, and Mia Olson and Kerstin Lindblah-Tod from the University of Uppsala, Sweden.

The results of the research contain many practical applications for the future. Due to the high level of inbreeding, the Shar Pei breed is afflicted with numerous disorders, and many of them are hereditary. Knowledge of the genetic and hereditary bases of mucinosis will be used to design reproduction programmes aimed at improving the health of these animals. This breed is also a valuable model for the study of human disorders such as FMF or hereditary mucinosis and research results could lead to applications which could cure these disorders. In addition, understanding the molecular mechanisms of mucinosis will shed more light on the biology of the tissues surrounding cells, the extracellular matrix, and will help to understand processes such as cell recognition and ageing.

The research was carried out by researchers Lluís Ferrer, Giordana Zanna, Dolors Fondevila, Anna Bassols and Maria José Docampo from the UAB Department of Animal Medicine and Surgery, and the Department of Biochemistry and Molecular Biology. The results have been published in the journals Veterinary Dermatology and Journal of Heredity and will be presented at the World Congress of Veterinary Dermatology (WCVD6) which will take place in Hong Kong on 19 November 2008.

Adapted from materials provided by Universitat Autònoma de Barcelona.

http://www.sciencedaily.com/releases/2008/11/081111163123.htm

Physicists Test Theory That Explains Why Universe Is Made Of Matter

Soeren Prell, an Iowa State University associate professor of physics and astronomy, is helping to analyze the data coming from the BaBar particle detector in California. (Credit: Photo by Bob Elbert)

ScienceDaily (Nov. 16, 2008) — Soeren Prell and a team of Iowa State University researchers are part of an international research team testing a theory that led to a share of the 2008 Nobel Prize in Physics for Japanese researchers Makoto Kobayashi and Toshihide Maskawa.

Prell, an Iowa State University associate professor of physics and astronomy, is part of the BaBar experiment at the U.S. Department of Energy's SLAC National Accelerator Laboratory in Menlo Park, Calif. Prell returned to Iowa State this summer after a year in California as BaBar's physics analysis coordinator.

The experiment is the work of nearly 500 collaborating physicists from 74 institutions and 10 countries. Other Iowa State researchers who have been part of the BaBar research team are James Cochran, an associate professor of physics and astronomy; H. Bert Crawley, a professor of physics and astronomy; W. Thomas Meyer, an adjunct research professor; and Eli Rosenberg, a professor of physics and astronomy who's currently on assignment with the U.S. Department of Energy.

"The central focus of the BaBar experiment is to study the differences between matter and antimatter," Prell said. "One of the big questions of the universe is, "Why is it made out of matter?"

At the time of the big bang, physicists say the explosion of energy should have created equal amounts of matter and antimatter. And they say whenever particles of matter and antimatter would have met they would have annihilated each other.

But the universe wasn't annihilated and it's full of matter. So how did matter come out so far ahead?

Physicists believe a small imbalance of matter over antimatter -- something like an extra particle of matter for every 10 billion antimatter particles -- led to our world. They call that imbalance an asymmetry.

In 1964 physicists discovered an asymmetry between matter and antimatter -- it's also known as a charge-parity violation -- in subatomic particles called kaons. Nobel-winners Kobayashi and Maskawa in 1972 developed a theory that attempted to explain those symmetry violations. Their idea called for the addition of three quarks to the Standard Model of particle physics, a theory that explains how subatomic particles interact via forces. Other researchers theorized that studies of B mesons (very short-lived subatomic particles) would help explain these broken symmetries.

The BaBar experiment in California, which completed operations earlier this year, has been called a "B factory" because the electron-positron collisions it produces are capable of creating more than a million B mesons every day. Since 1999 researchers have been studying the decay of those subatomic particles to confirm the Kobayashi-Maskawa theory.

They did and the presenters of the Nobel Prize took notice: "As late as 2001, the two particle detectors BaBar at Stanford, USA, and Belle at Tsukuba, Japan, both detected broken symmetries independently of each other," says the press release announcing the Nobel Prize in Physics. "The results were exactly as Kobayashi and Maskawa had predicted almost three decades earlier."

"We found a particle/anti-particle asymmetry," Prell said. "We found that B mesons and anti-B mesons behave differently."

But, Prell said the Kobayashi-Maskawa theory doesn't fully explain the existence of the universe. So, once data analysis of the BaBar experiment is concluded and another 100 or so scientific papers written (that's in addition to the 375 already written), Prell and other physicists will be moving to the higher-energy experiments made possible by the Large Hadron Collider at CERN, the European Organization for Nuclear Research near Geneva, Switzerland.

And what do these theories and tests of the subatomic world do for all of us?

"We're not solving the financial crisis or the energy crisis," Prell said. "But this will help us all to understand a little bit better where we come from. There are big questions behind this such as, 'Why is there a universe made of matter?'"

Adapted from materials provided by Iowa State University.

http://www.sciencedaily.com/releases/2008/11/081113181325.htm

Maelstrom Over Metadata

A debate is carrying on in the undercurrents of the academic Web, pitting those who defend libraries' core mission of open access against the membership organization that collects and operates a massive online catalog on which many of them rely.

Early this month, the OCLC (for Online Computer Library Center) announced the first significant change in its policies governing how libraries use and share bibliographic records since 1987 — years before the World Wide Web existed. Some of those rules were considered overly vague or out of touch, representing an era before Google searches and online catalogs transformed the way students and researchers use library databases.

A major part of libraries' evolution since then has been a demand for more openness and the ability to search for materials that might exist at any number of institutions worldwide, driven by the ubiquity of search engines and an increasing commitment to digitizing texts. But those trends place them on a collision course with OCLC, which was originally founded by libraries to collect and store records of their holdings so that they wouldn't have to be created anew with each acquisition.

That partnership has grown into the large, member-supported organization today that owns WorldCat, which holds tens of millions of online records that members can use, relieving individual libraries of laboriously typing up so-called metadata — information about individual holdings like the title, author and publisher, and plenty more — and, in the process, standardizing the catalogs they use for their books and reference works.

In an attempt to protect WorldCat and the resources needed to keep it running, while making it sufficiently accessible to its members, OCLC announced a policy change that would have placed a notice in each record to the effect that it is governed by the WorldCat terms contained in an accompanying Web address — terms that could presumably change over time. Libraries would also be encouraged to add the text to a specific field within each of their own records that originated from WorldCat.

Some bloggers interpreted the change as a power grab, an attempt to block libraries from using records for purposes that could conflict with OCLC's goals. For example, some libraries are considering using their records to generate revenue to support their own growing operations, and that could fall into OCLC's "commercial use" prohibition. Print-on-demand services, which make use of WorldCat records, could be affected; so could planned "discovery" interfaces that span dozens of libraries.

"From [OCLC's] perspective, it makes a lot of sense for them to want to assert and be overt about their rights to this material because WorldCat really represents ... a major portion of their revenue, and it also ... supports essential services for libraries such as resources sharing," said Anne R. Kenney, the Carl A. Kroch University Librarian at Cornell University.

Debates over who owns the rights to the records — and whether it's possible to copyright them at all — aren't new and have led to open-source alternatives, such as OpenLibrary, whose database can be updated by contributors and is free and available for any purpose.

In any case, the initial reaction to the policy change was swift, complete with an online petition.

"Not satisfied with controlling the world's largest source of book information, it wants to take over all the smaller ones as well," wrote Aaron Swartz, one of the founders of OpenLibrary and a widely read Internet thinker, on his blog Thursday. "It's now demanding that every library that uses WorldCat give the copyright to all its catalog records to OCLC. It literally is asking libraries to put an OCLC copyright notice on every book record in their catalog. It wants to own every library."

By the time news of the policy, which is to take effect in February, spread across the blogosphere, OCLC posted a new draft softening some of its requirements — for example, by making it optional to use or keep the text referring to WorldCat's policies and clarifying that non-commercial use of the

records was generally protected, except in cases where it could interfere with OCLC's mission. And while the shift signals some openness to members' concerns, some still aren't satisfied, especially with the way the initial decision was made.

"They saved individual libraries a lot of money over time by collective resource sharing and cataloging. But having said that, I think part of the problem is that in their need to assert their rights, they did not broadly consult ahead of time of the release of this policy," Kenney said.

Terry Reese, the Gray Chair for Innovative Library Services at Oregon State University Libraries, said in an e-mail that it is partially a philosophical issue: "At its core, libraries have always been about providing access to our information and our metadata. We don't make value judgments as to why people may want/need to use our materials — but that's essentially what OCLC is doing now (whether intentional or not)."

He continued, "As OCLC is oft to bring up, WorldCat is a member created resource — yet, OCLC seems to be the only organization that is allowed to have unfettered access to that data. There are many ways to protect the membership's investment in the data that has been created."

But for OCLC, the issue is one of adapting to a Google-oriented world without sacrificing the value of WorldCat. In a blog post acknowledging the criticism, Karen Calhoun, OCLC's vice president for WorldCat and metadata services, wrote: "To play the role it is now playing on behalf of libraries, OCLC needs to be a player on the Web, and not just any player, but an influential one. It therefore needs to be a Web company, with data sharing policies and practices appropriate to the Web."

— Andy Guess

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/14/worldcat.

Dirty Brown Clouds Impact Glaciers, Agriculture And The Monsoon

Pollution in Bangkok. The cities of Bangkok, Beijing, Cairo, Dhaka, Karachi, Kolkata, Lagos, Mumbai, New Delhi, Seoul, Shanghai, Shenzhen and Tehran were found to have very high soot levels. (Credit: iStockphoto)

ScienceDaily (Nov. 16, 2008) — Cities from Beijing to New Delhi are getting darker, glaciers in ranges like the Himalayas are melting faster and weather systems becoming more extreme, in part, due to the combined effects of man-made Atmospheric Brown Clouds (ABCs) and greenhouse gases in the atmosphere.

These are among the conclusions of scientists studying a more than three km-thick layer of soot and other manmade particles that stretches from the Arabian Peninsula to China and the western Pacific Ocean.

The team has just announced their latest and most detailed assessment of the phenomenon, drawn from research centres in Asia including China and India, Europe and the United States.

The brown clouds, the result of burning of fossil fuels and biomass, are in some cases and regions aggravating the impacts of greenhouse gas-induced climate change, says the report.

This is because ABCs lead to the formation of particles like black carbon and soot that absorb sunlight and heat the air; and gases such as ozone which enhance the greenhouse effect of CO_2.

Globally however brown clouds may be countering or 'masking' the warming impacts of climate change by between 20 and up to 80 per cent the researchers suggest.

This is because of particles such as sulfates and some organics which reflect sunlight and cool the surface.

The cloud is also having impacts on air quality and agriculture in Asia increasing risks to human health and food production for three billion people.

Achim Steiner, UN Under-Secretary General and Executive Director, UN Environment Programme (UNEP) said: "One of UNEP's central mandates is science-based early warning of serious and significant environmental challenges. I expect the Atmospheric Brown Cloud to be now firmly on the international community's radar as a result of today's report".

The phenomenon has been most intensively studied over Asia. This is in part because of the region's already highly variable climate including the formation of the annual Monsoon, the fact that the region is undergoing massive growth and is home to around half the world's population.

But the scientists today made clear that there are also brown clouds elsewhere including over parts of North America, Europe, southern Africa and the Amazon Basin which also require urgent and detailed research.

"Combating rising CO_2 levels and climate change is the challenge of this generation but it is also the best bet the world has for Green Growth including new jobs and new enterprises from a booming solar and wind industry to more fuel efficient, vehicles, homes and workplaces. Developed countries must not only act first but also assist developing economies with the finance and clean technology needed to green energy generation and economic growth," said Mr Steiner.

"In doing so, they can not only lift the threat of climate change but also turn off the soot- stream that is feeding the formation of atmospheric brown clouds in many of the world's regions. This is because the source of greenhouse gases and soot are often one and the same - unsustainable burning of fossil fuels, inefficient combustion of biomass and deforestation," he added.

"One of the most serious problems highlighted in the report is the documented retreat of the Hind Kush-Himalayan-Tibetan glaciers, which provide the head-waters for most Asian rivers, and thus have serious implications for the water and food security of Asia," Veerabhadran Ramanathan, head of the UNEP scientific panel which is carrying out the research, said.

Highlights from Atmospheric Brown Clouds: Regional Assessment Report with Focus on Asia

Five regional hotspots for ABCs have been identified. These are:

1. East Asia, covering eastern China;
2. The Indo-Gangetic plains in South Asia from the northwest and northeast regions of eastern Pakistan across India to Bangladesh and Myanmar;
3. Southeast Asia, covering Cambodia, Indonesia, Thailand, and Vietnam;
4. Southern Africa extending southwards from sub-Saharan Africa into Angola, Zambia and Zimbabwe; and
5. The Amazon Basin in South America.

There are hotspots too in North America over the eastern seaboard and in Europe - but winter precipitation tends to remove them and reduce their impact.

Cities and 'Dimming'

Around 13 megacities have so far been identified as ABC hotpots.

Bangkok, Beijing, Cairo, Dhaka, Karachi, Kolkata, Lagos, Mumbai, New Delhi, Seoul, Shanghai, Shenzhen and Tehran where soot levels are 10 per cent of the total mass of all human-made particles.

ABCs can reduce sunlight hitting the Earth's surface in two ways.

Some of the particles such as sulphates, linked with burning coal and other fossil fuels, reflect and scatter rays back into space.

Others, also linked with fossil fuel and biomass burning, in particular black carbon in soot, absorb sunlight before it reaches the ground. The overall effect is to make 'hot spot' cities darker or dimmer.

- 'Dimming' of between 10-25 per cent is occurring over cities such as Karachi, Beijing, Shanghai and New Delhi
- Guangzhou is among several cities that have recorded a more than 20 per cent reduction in sunlight since the 1970s
- For India as a whole, the dimming trend has been running at about two per cent per decade between 1960 and 2000 - more than doubling between 1980 and 2004.
- "In China the observed dimming trend from the 1950s to the 1990s was about 3-4 per cent per decade, with the larger trends after the 1970s," says the report.

Impact on Cloud Formation and a Further Dimming Effect

- Regions with large concentrations of ABCs may be getting cloudier which can also contribute to dimming but data are not sufficient to quantify this effect.
- Particles and aerosols in the ABCs may act to inhibit the formation of rain drops and rainfall. "The net effect is an extension of cloud life-times," says the report.

Masking the Impacts of Climate Change

ABCs shield the surface from sunlight by reflecting solar radiation back to space and by absorbing heat in the atmosphere.

These two dimming phenomena can act to artificially cool the Earth's surface especially during dry seasons. The pollution can also be transported around the world via winds in the upper troposphere (above 5 km in altitude).

- As a result global temperature rises - linked with greenhouse gas emissions - may currently be between 20 per cent and 80 per cent less as a result of brown clouds around the world says the report.
- If brown clouds were eliminated overnight, this could trigger a rapid global temperature rise of as much as to 2 degrees C.
- Added to the 0.75 degrees C rise of the 20th century, this could push global temperatures well above 2 degrees C - considered by many scientists to be a crucial and dangerous threshold.
- Thus simply tackling the pollution linked with brown cloud formation without simultaneously delivering big cuts in greenhouse gases could have a potentially disastrous effect.

Complex Regional Impacts on Temperature

The science of ABCs, woven with the science of greenhouse gases, is not simple and may be behind some highly complex warming and cooling patterns witnessed on Continents and in different regions of specific countries.

- The masking of greenhouse warming by ABCs may in part be the explanation for the lack of a strong warming trend over India since the 1950s during the dry season which runs from January to May.
- ABCs may explain in part why the warming trend in India's night time temperatures is much larger than the trend in day time temperatures.

- Annual mean temperatures in mainland China have risen by over one degree C in the past half century.
- However the trends have not been uniform with the Tibetan Plateau and the North, Northeast and Northwest of China experiencing the highest temperature rises.
- Conversely Southwest and central Eastern China has experienced a strong cooling trend of between 0.1 to 0.3 degrees C per decade.
- "The combined effects of greenhouse gases, ABCs and rapid urbanization are required to explain the complex pattern of warming and cooling trends in China," says the report.

Impacts on Weather Patterns Including the East Asian Monsoon

The large heating and cooling effects of ABCs respectively in the atmosphere and at the surface, combined with the impacts of greenhouse gases, may be also triggering sharp shifts in weather patterns.

This is being aggravated by dimming over the Northern Indian Ocean versus the relatively clean Southern Indian Ocean setting up new gradients in surface sea temperatures and surface sea evaporation rates.

ABCs, along with the global warming may thus be acting to trigger significant drying in northern China and increased risk of flooding in southern China while in part also triggering other environmental and economic effects.

- Overall decrease in monsoon precipitation over India and Southeast Asia by between five and seven per cent since the 1950s.
- Since the 1950s the Indian summer monsoon is not only weakening but shrinking with a decrease in early and late season rainfall and a decline in the number of rainy days.
- In both China and India extreme rain events of more than 100 mm a day have increased.
- In both India and China very heavy rainfall of more than 150 mm a day have nearly doubled.

Impact on Glaciers

The Hindu Kush-Himalaya-Tibetan glaciers provide the head-waters for the major river systems including the Ganges, Brahmaputra, Mekong and Yangtze rivers.

The Ganges basin is home to over 400 million people and holds 40 per cent of India's irrigated croplands.

The Chinese Academy of Sciences estimates that the glaciers have shrunk five per cent since the 1950s and the volume of China's nearly 47,000 glaciers has fallen by 3,000 square km over the past quarter century.

Glaciers in India such as the Siachen, Gangotri and Chhota Shigiri glaciers are retreating at rates of between 10 and 25 metres a year. The retreat has accelerated in the past three and-a-half decades.

The Gangotri glacier alone provides up to 70 per cent of the water in the Ganges.

- ABC solar heating of the atmosphere, due to the absorption of soot and black carbon pollution "is suggested to be as important as greenhouse gas warming in accounting for the anomalously large warming trend observed in the elevated regions" such as the Himalayan-Tibetan region says the report.
- Decreased reflection of solar radiation by snow and ice due to increasing deposits of black carbon is emerging as another major contributor to the melting of ice and snow.

- Elevated regions of the Himalayas within 100 km of Mount Everest experience large black carbon concentrations ranging from a few hundred to a few thousand nano grammes per cubic metre.

Impacts on Agriculture

Impacts of ABCs on food production and farmers' livelihoods may be many.

However there remains a great deal more research to undertake in terms of crops at risk and the precise role various ABC-linked effects - separately or in combination with those of greenhouse gases - may or may not be having.

Possible effects may include:

- Damage to crops as a result of increased ground level ozone. In Europe a threshold concentration at which damage can occur is deemed to be 40 parts per billion
- The report says that in parts of Asia ground level ozone can reach 50 parts per billion during February to June and peaking again between September and November at 40 parts per billion
- The studies suggest that growing season mean ozone concentrations in the range 30 - 45 parts per billion could see crop yield losses in the region of 10 - 40 per cent for sensitive cultivars of important Asian crops such as wheat rice and legumes
- A recent study translated such impacts on yield into annual economic losses estimating that for four key crops - wheat, rice, corn and soya bean - these may amount to around $5 billion a year across China, the Republic of Korea and Japan
- Other effects may include damage linked with the various acidic and toxic particles from brown clouds depositing on plants from the atmosphere
- Reduced levels of photosynthesis and thus crop production due to 'dimming'

Health Impacts of ABCs

Brown clouds contain a variety of toxic aerosols, carcinogens and particles including particulate matter (PM) of less than 2.5 microns in width. These have been linked with a variety of health effects from respiratory disease and cardio-vascular problems.

- Outdoor exposure - Increases in concentrations of PM 2.5 of 20 microgrammes per cubic metre could lead to about 340,000 excess deaths per year in China and India
- Indoor exposure - the World Health Organization estimates that over 780,000 deaths in the two countries can be linked to solid fuel use in the home
- Economic losses due to outdoor exposure to ABC-related PM2.5 has been crudely estimated at 3.6 per cent of GDP in China and 2.2 per cent of GDP in India

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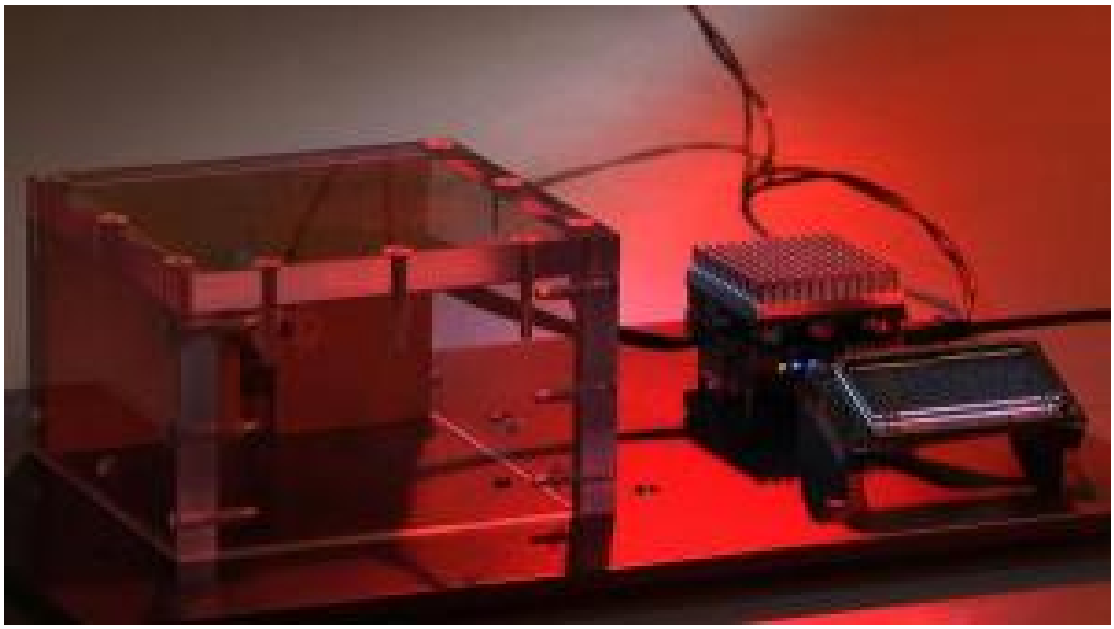
Adapted from materials provided by United Nations Environment Program.

http://www.sciencedaily.com/releases/2008/11/081114191911.htm

Electrical Drive Systems: World Record Of One Million Revolutions Per Minute Set



World record speed of an electrical drive system set -- one million revolutions per minute. (Credit: Image courtesy of ETH Zuerich)

ScienceDaily (Nov. 16, 2008) — In future it can be expected that the drill used in material processing will become even faster and the compressor used for vehicles and airplanes even more compact. In order to drive these rotary applications directly, efficiently and in a controlled fashion, there must be electrical drive systems with the appropriate rpm and engine power.

Up to now, industrially-deployed motors have normally reached 250,000 revolutions per minute. Now, however, researchers from ETH Zurich's Department of Power Electronics have developed a drive system in cooperation with its industrial partners that can achieve over 1,000,000 rpm.

Small, low-loss and highly efficient

The new drive system generates an output of 100 watts and is barely bigger than a matchbox. The rotor construction has a titanium shell that is able to withstand extreme centrifugal forces and the ball bearings are optimized for extremely high speeds. Until now, it has been the case that the higher the rotational speed, the more losses there are. But the researchers from ETH Zurich have now managed to solve the problem with an especially low-loss stator.

Ultra-thin copper wire is used for the windings which are inserted in a cylinder made of special iron previously unused for machines. In addition, the machine is fed by electronics specifically designed for such engine speeds. "Our aim of breaking the million barrier was clear but the breakthrough was only possible thanks to the new technology," explains Christof Zwyssig, a post-graduate student from the Department of Power Electronics at ETH Zurich.

The recipe for success

The drive system was brought to fruition in collaboration with industry. The machine was manufactured by the German company, ATE GmbH, which specializes in the development of highly efficient electrical drives. The ball bearings came from the company, myonic, which is also based in Germany and has been manufacturing high precision miniature ball bearings for over 70 years. The construction of the whole

system, the development of the electronics and the regulation of the drive system, however, was developed at ETH Zurich's Department of Power Electronics.

The right turn for smaller cell phones

Based upon the results of this research, Christof Zwyssig and Martin Bartholet, also a post-graduate in the same department, founded the spin-off company, Celeroton, in August 2008. It will make the lab partners industrially viable with a view to providing ultra-high revolution electrical drive systems for different branches of industry and areas of application. Celeroton is set to become a supplier for manufacturers of, for example, fast-spinning drill or milling machines.

The trend towards increasingly smaller cell phones and other electrical appliances means that increasingly smaller holes have to be drilled for the electronics. This is only possible using a drive system that boasts a high rotational speed. "In my view, a spin-off company is the most direct way of transferring research results to industry. Our findings will rapidly be converted into concrete applications and products," explains Johann Kolar, Head of the Department of Power Electronics.

Adapted from materials provided by ETH Zuerich.

http://www.sciencedaily.com/releases/2008/11/081114081213.htm

As Economy Wavers, Online Enrollments Climb

Researchers who study online education tend to believe that the staggering growth in enrollments seen over the past several years can't continue apace forever. According to a study released Wednesday, they'll have to wait at least another year for the predicted flattening.

In fall 2007, the study reports, some 3.94 million students enrolled in at least one online course, an increase of 12.9 percent over the previous year. That falls between the 9.7 percent growth for fall 2006 and the 19.7 compound annual rate since fall 2002. In comparison, total student enrollments increased 1.2 percent in the year leading up to last fall, while the compound annual rate for all enrollments since 2002 was 1.6 percent.

"Clearly there will be a limit on the growth of online enrollments; however the current data show that this limit has not yet been reached, as double-digit growth rates continue for yet another year," says the report, part of an annual survey by the Sloan Consortium, which tracks online learning trends.

And the growth might continue thanks to a stagnating economy, according to most of the survey's respondents, which would align with previous experience in which a deteriorating job market leads to more enrollments. The trend also reinforces reports earlier this year that community colleges, especially, were encouraging students to take courses online to save on commuting costs. The study, "Staying the Course: Online Education in the United States, 2008," was produced with the College Board and the Babson Survey Research Group at Babson College. The results were compiled from an annual College Board survey with over 2,500 responses, a response rate of 57.4 percent.

"I'm continually surprised that the growth doesn't seem to slow down or stop," said Jeff Seaman, the report's co-author and co-director of the Babson Survey Research Group. He said most academic leaders believe that the correlation between economic troubles and higher enrollments is carrying over into online education. Earlier in the year, when the price of a barrel of oil hovered around or above the $120 mark, a number of colleges reported shifting their course schedules or encouraging students to take courses on the Internet as a way to save money. While the survey's questions about the impact of the economy spanned the past month or so — when prices were wobbling back down to 2007 levels — they still capture some of that imperative, Seaman said.

Illustrating the rapid growth of enrollments over the past decade, over a fifth of all American students in higher education took at least one online course in fall 2007. At the same time, the report found what may be a plateau in the percentage of institutions that see online education as critical to their long-term strategy. In fall 2007, the institutions that most strongly agreed that online education is "critical" were public universities (70.7 percent), compared with four-year colleges (35.4 percent). For two-year colleges, the figure was 66.5 percent.

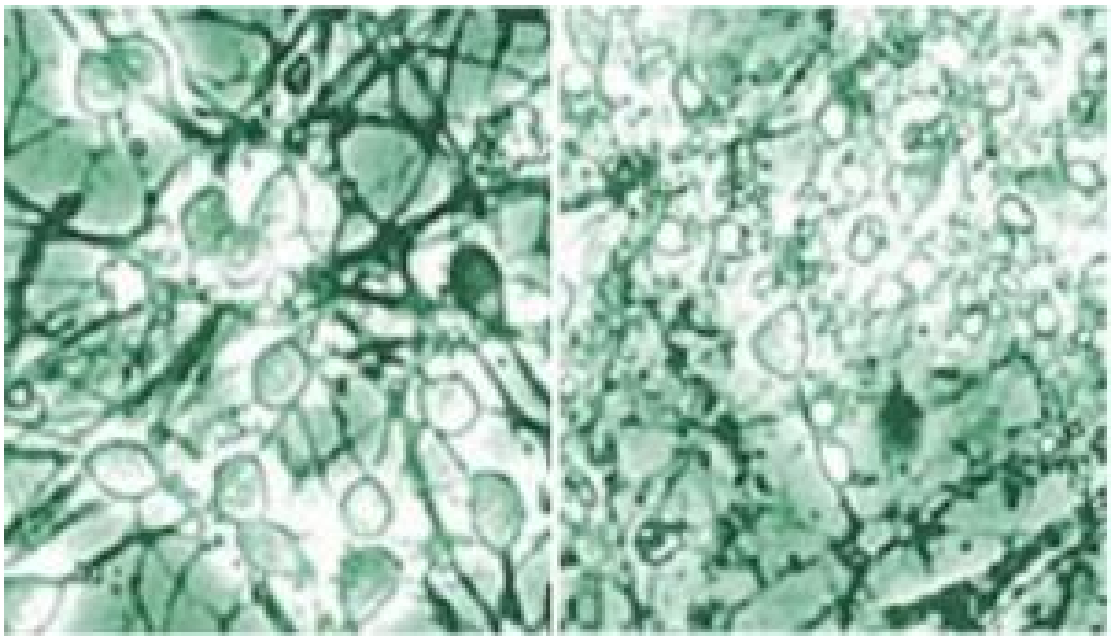
With a consensus emerging about the importance and continued growth of online education, the report highlighted what institutions (almost 70 percent of them) see as an inevitable byproduct: competition. Even students who take online courses at their own traditional campuses don't have to enroll at their home institutions anymore; it's just as easy to sign up for a class based halfway across the world. "As discussed elsewhere, this competition may be leading schools to increase their geographic reach and to concentrate on non-degree, non-traditional students," the report says.

Finally, the study looked at the prevalence of courses online by discipline and found no significant barriers or differences — except one. "We found that is not the case with the single exception of engineering," Seaman said.

— Andy Guess

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/13/sloan.

Protecting Neurons Could Halt Alzheimer's, Parkinson's Diseases



Left: The image shows healthy neurons cultured from rats from a part of the brain called the cerebellum. Right: In degenerating neurons, the oval and bulbous cell bodies shrivel up and fragment, impeding connections with other neurons.

ScienceDaily (Nov. 15, 2008) — Researchers at Southern Methodist University (SMU) and The University of Texas at Dallas (UTD) have identified a group of chemical compounds that slow the degeneration of neurons, a condition behind old-age diseases like Alzheimer's, Parkinson's and amyotrophic lateral sclerosis (ALS).Their findings are featured in the November 2008 edition of Experimental Biology and Medicine. SMU Chemistry Professor Edward R. Biehl and UTD Biology Professor Santosh D'Mello teamed to test 45 chemical compounds. Four were found to be the most potent protectors of neurons, the cells that are core components of the human brain, spinal cord and peripheral nerves.

The most common cause of neurodegenerative disease is aging. Current medications only alleviate the symptoms but do not affect the underlying cause – degeneration of neurons. The identification of compounds that inhibit neuronal death is of urgent and critical importance.The synthesized chemicals identified by Biehl and D'Mello, called "3-substituted indolin-2-one compounds" are derivatives of another compound called GW5074 which was shown to prevent neurodegeneration in a past report published by the D'Mello lab. While effective at protecting neurons from decay or death, GW5074 is toxic to cells at slightly elevated doses, which makes it unsuitable for clinical testing in patients.

The newly identified, second generation compounds maintain the protective feature of GW5074 but are not toxic – even at very high doses – and hold promise in halting the steady march of neurodegenerative diseases like Alzheimer's and Parkinson's."Sadly, neurodegenerative diseases are a challenge for our elderly population," D'Mello said. "People are living longer and are more impacted by diseases like Alzheimer's, Parkinson's and Amyotrophic Lateral Sclerosis (ALS) than ever before — which means we need to aggressively look for drugs that treat diseases. But most exciting now are our efforts to stop the effects of brain disease right in its tracks. Although the newly discovered compounds have only been tested in cultured neurons and mice, they do offer hope."

Adapted from materials provided by Southern Methodist University.
http://www.sciencedaily.com/releases/2008/11/081113181430.htm

With GPS, They Know Where You Are

ScienceDaily (Nov. 15, 2008) — How can we keep our personal location private in a society where GPS-enabled devices and internet-connected computing is ubiquitous? That is the question posed in the current issue of the International Journal of Electronic Business by a computing and legal specialist in Belgium.

Mobile phones, personal digital assistants, Wi-Fi hotspots, web-connected mp3 players, SatNav devices, even washing machines that connect to the internet-…the list of gadgets with an inbuilt computer continues to grow. With this growth, the idea of ubiquitous computing will soon become a reality. But, Maya Gadzheva of the Interdisciplinary Centre for Law and ICT, at the Catholic University of Leuven, in Belgium, warns that we should take care of our privacy.

It is now possible to obtain the precise geographical location of any mobile phone user at any time, explains Gadzheva. However, she points out that with the advent of internet-capable devices and global positioning systems (GPS) the number and type of mobile devices that can reveal an individual's whereabouts is increasing rapidly. This will not necessarily be destructive, but it does require consideration in terms of the legal and societal implications.

GPS-enabled devices offer us many benefits. The most obvious application is providing map and route information to drivers and others. Such devices can also offer restaurant, theatre, and other entertainment recommendations based on your whereabouts. They can allow parents to keep track of their children for the sake of safety. They can track stolen goods and help in their retrieval. They can also be the enabler in networked games and events.

Researchers active in the area of ubiquitous computing envisage a society where every user will interact with hundreds or thousands of embedded or mobile computing devices. These devices will, and do, perform actions based on the context of their users and location information.

According to Gadzheva there is a serious downside to ubiquitous computing that has to be taken into account as society begins to use such devices and systems more widely. "Ubiquitous access to information anywhere and anytime and the ever faster, smaller and omnipresent computing devices will enable the constant collection and transmission of personal data without it being apparent to the user." This, she says, means that maintaining privacy in a future ubiquitous computing society will become increasingly complex if not impossible.

"The fact that the citizens are aware of their rights and that they use them is one of the most vital conditions to ensure effective privacy protection," she says. "What is still missing is a convincing approach for the development of ubiquitous computing environment that could guarantee acceptable levels of personal privacy in the future."

Journal reference:

1. . **Location privacy in a ubiquitous computing society**. *Int. J. Electronic Business*, 2008, 6, 450-461

Adapted from materials provided by Inderscience.

http://www.sciencedaily.com/releases/2008/11/081110071243.htm

With Students Flocking Online, Will Faculty Follow?

The current model of higher education was several centuries in the making. That leaves colleges adapting to online learning, a viable option for only about a decade, with a monumental game of catch-up.

As online courses' popularity continues to rise, many administrators are struggling with a steep learning curve, one whose ultimate end point is far from being determined. Questions such as how such courses should be taught (by adjuncts or full-time faculty?) often depend on institutions' missions (expand access or generate extra revenue?) and can lead to clashes and tensions between proponents of online learning and those who remain wedded to the traditional classroom.

But it's often the existing campus faculty that administrators rely on to develop and teach online courses, a reality that informs their approaches to determining who should teach the courses and how they should be compensated. In many cases, the models are relics of outdated distance programs that gradually became the basis for courses offered over the Internet. No two models are exactly alike, but as colleges experiment with ways to keep their faculty happy and their courses high in quality, evidence of some common practices is emerging.

The University of Iowa recently learned the hard way how not to compensate faculty who teach online. Its model, carried over from decades of offering correspondence courses by mail, compensated professors for each extra class given per semester, and in the case of those taught online, pay was determined on a per-student basis.

The result, as reported by *The Des Moines Register* earlier this month, was that a handful of professors taught an unusually large number of extra courses beyond the regular two per semester, some online and some traditional, that left the university with an eye-catching bill. One professor, for example, taught eight online and two traditional courses last year — in addition to his two usual per semester — racking up a bonus of over $120,000, more than his base salary.

Usually, said Wallace Loh, the university's provost, he has the opposite problem — trying to persuade faculty members to give time and effort to develop and teach online courses. He's now considering ways to make those incentives work, starting with instituting rules that will limit so-called overload pay by allowing only one extra course (online or not) per semester and capping enrollment in online courses to 36.

"I don't think you can do justice to your students and your classes if you're teaching that much, even if your sections have a relatively few number of students," he said.

Until the past few years, when growth in online enrollments started skyrocketing, Loh said, the costs were relatively low and the compensation structure for courses taught via the Internet remained the same as for those once taught via snail mail. Those days are now past, due in part to the well-documented rise in the enrollment of non-traditional students, those older than the typical on-campus undergraduate, often working part time or looking for mid-career training.

Yet at least 40 percent of the online enrollments at the university, Loh continued, come from right under his nose: traditional college-age students attending classes on the campus. Part of the explanation comes from simple scheduling conflicts, he noted, or mere convenience. Since online courses don't operate on as strict a timeline as those given on the semester system, it's also harder to count how many students are enrolled in each course; some could be finishing work from a previous year, for example.

"Our problem is we have to go around imploring people to teach additional classes," he explained. "Teaching an online class is far, far more complicated than teaching a regular class because, first of all, they have to ... totally restructure their class, [because] they have to be online."

That leaves two basic approaches: either support individual faculty members with the resources, pay and time they need to develop online courses that they can teach online, or invest in a centralized course

creation department that would then outsource its teaching to adjuncts — essentially a "high-quality assembly line," as Loh called it, akin to the for-profit University of Phoenix model.

But, like Iowa, many public institutions have the more modest goal of increasing access for their students and for residents of their states. And in that case, nudging faculty to teach online makes sense, even as the mechanisms for supporting them continue to be developed and as colleges balance growth with quality, financial resources with expanded enrollments.

When asked if he had settled on the right solution, Loh laughed. "I wish I did," he sighed.

Converging Models?

But as other colleges feel their way through the world of online education, at least some similarities are becoming apparent.

"I really think the key to all of this will be, how do you support the faculty member?" said Jeff Seaman, co-director of the Babson Survey Research Group.

The group, based at Babson College, is in the process of sifting through almost 9,000 faculty responses for a forthcoming survey on their views of online education. "Faculty uniformly believe that it does take more effort to develop an online course than it does to develop a face-to-face course," and to deliver it, Seaman said. "What we heard is that, 'I've not done this before, it's a different way of thinking about the course, it involves different skills....' "

Another recent Babson study, supported by the Sloan Consortium, found that about one in five students last year had taken an online course, up from virtually nil a decade ago. That demand is beginning to be felt at institutions with growing online enrollments, whether or not their faculty are willing to go along for the ride. "[E]ither they have enough of a subset of their faculty who do believe in it, or they're moving outside their institutions" to staff online courses, he said.

There are not enough data yet to tell which option colleges are choosing, or if it's a mix, but it's likely that such a decision would be at least partially determined by the kind of mission intended for online education, whether that of broad access or a more profit-centered, outsourced model.

Underlying these considerations is students' gradual acceptance of online classes as a legitimate and substantive alternative to those taught in person, and the increasing tendency of students to pick and choose their courses without regard for medium.

"How do you mainstream, if you will, this online learning and do it in a way that is reasonable and defensible and fair to everybody who's involved?" said Janet K. Poley, president of the American Distance Education Consortium, which is collaborating on the ongoing study with Babson. "I don't think in the long term you want to say, well, because you're located in a living unit on campus or an apartment near campus and would normally be considered a residential student, that you can't take online learning."

Part of that transition is ensuring that faculty members are compensated properly for their work, regardless of whether they're teaching online or face to face.

"My biggest concern is frankly ... that faculty who are teaching in the online environment are treated fairly. And I think there shouldn't be any huge difference between people who are teaching in the online environment and people who are teaching, period," Poley said. That would preclude such occurrences of "gaming the system" like those reported at Iowa, she added.

"My view in terms of where the future is headed and how fast it gets there and at which institutions," she said, is that "we are without question moving toward an era where a credit hour is a credit hour, a course is a course, whether it's taught face to face, whether it's taught in the online environment, whether it's taught in a blended environment."

Faculty unions agree that faculty members should be treated similarly when they teach online, both in terms of compensation and in terms of academic freedom and control of the curriculum. The American Federation of Teachers, for example, argues that "distance ed ought to be treated pretty much like all other courses and not as attached to quote-unquote 'normal' classes," said Craig Smith, associate director of the union's higher education department.

Poley said that some colleges, in the rush to adapt, offered faculty incentives in cash, even though what many professors want isn't necessarily more pay but release time, support services for course development or money for their home department or school.

Models that work, she continued, tend to include support for instructional design as well as "monetary return to the unit that is doing the work," so that compensation doesn't just feed back into the "tuition cloud."

"One of the models that was discussed ... is one where there is some overload pay or release time to faculty in the department for two or three years when they're mounting a new online offering, when they're going from a face-to-face to getting a course up, because it's really the design, development part that I think is harder than actual teaching ... and then there's some reward to faculty for doing that," Poley said.

And after a course has been sufficiently developed and "mainstreamed," the additional resources for development are no longer needed.

Faculty Incentives

The unique Indiana Partnership for Statewide Education consists of about 20 public and private institutions in the state that work together to offer courses from a central repository.

"We're constantly working to incentivize faculty to provide their own courses in our online format, because students are demanding it nowadays," said Mark Pagano, dean of continuing education and conferences at Purdue University, where he said most students have at least one online course on their record by the time they graduate.

The university is in the process of putting together a task force to evaluate its current model for distance education. But for now, Pagano said, it has worked fairly well. His office coordinates incentives, which can be "what makes sense" for a particular situation: for example, paying a faculty member "over and above" his or her salary for developing an online course, with dean and departmental approval. That can also include support for the home department.

Other cases are more routine. For courses with dozens of sections, for example, faculty members might teach one or two of those sections online without any need for additional incentives.

At Ohio State University, said Bobby Moser, its vice president for outreach, a portion of revenue from online courses is set aside to "stimulate new ideas in course work," an approach that allows for a couple years of support for faculty members and keeps the process competitive — not every professor's proposal is accepted.

The process is more specific at Oregon State University, which has what David A. King, associate provost, called a "80/10/10″ system. For any given online course, 80 percent of the revenue goes directly to the faculty member's college, and much of it may end up at his or her specific department for the development of additional courses. Ten percent goes to the administration, and the rest is sent to Extended Campus, the central entity that offers and supports the courses.

"For the most part, it's a business model that is very enticing and motivating for faculty to step up and try to develop courses," he said, adding that in many cases it is release time, not necessarily money, that attracts professors.

For each professor teaching an online course, the course development fund provides $1,000 to $4,000 directly, in addition to release time and support in instructional design and multimedia work. Some colleges, such as the College of Agricultural Sciences, even match the dollar amount.

The university offered 51,000 credit hours online last year, King said, with annual increases of 14 to 20 percent. Some colleges and departments are adding more graduate students to staff and teach the courses, he said, a possible way to avoid having to hire adjuncts. And so far, the challenge is to get existing faculty interested in teaching online, rather than preventing them from exceeding some course limit.

"If there is [a limit], we haven't found it."

— Andy Guess

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/18/online.

America's Mental Health (Care) Is Getting Worse

Despite the unanimity that the system is broken, few agree on what will fix it.

- By: Marcia Meier | November 14, 2008

When David Eldridge was finishing his senior year of high school, one of his teachers said to his mom, Ann: "He is bright, but his mind is disorganized."

Looking back, Ann Eldridge wishes she had paid closer attention. She was a psychiatric nurse at the time; still she didn't see the warning signs. Now, 32 years later, she watches her son struggle with severe schizophrenia and wonders if things would be different if they had been able to diagnose him sooner.

Even with all of today's medical advances, recognizing, diagnosing and treating the severely mentally ill in this country takes an average of 10 years, experts say. Almost without exception, they are 10 years of heartache and frustration for the mentally ill and their families. Add to that lack of funding for adequate care and treatment of the mentally ill, nearly a quarter of whom end up in the criminal justice system, and you have a recipe for disaster.

"Since 1990, I don't know of a single state that's doing a better job now than before," said Dr. E. Fuller Torrey, likely the nation's foremost expert on severe mental illness and a tireless advocate for improved services. Twenty years ago, he said, several states were leading the nation in the services they provided, notably New Hampshire and Wisconsin.

Now, Torrey is more discouraged than ever. The latest of his 11 books on severe mental illness, *The Insanity Offense*, details what he calls a disgraceful lack of care nationwide for the mentally ill. The book, published in June, claims society as a whole is endangered by this lack of care.

"Certainly there are some nice programs, for example in Ohio, because it has excellent leadership committed to doing something for the seriously mentally ill," said Torrey, who directs the Stanley Medical Research Institute, the largest privately funded center for research on mental illness. Torrey also founded the national nonprofit Treatment Advocacy Center, which fights for changes in mental health laws to improve services to the mentally ill.

No Traction for Reform

According to a 2003 national report by the president's New Freedom Commission on Mental Health, mental illnesses rank first among illnesses that cause disability in the United States, Canada and Western Europe. In any given year, between 5 and 7 percent of adults suffer from a severe mental illness. Additionally, one of the preventable consequences of untreated mental illness is suicide, which causes more deaths each year than homicide or war, according to the World Health Organization.

The annual estimated cost of treating mental illness in the United States is $79 billion, of which $63 billion is due to lost productivity. Indirectly, mental illness costs $12 billion in lost productivity due to premature deaths and $4 billion in productivity losses for those in jails and prisons and for the time of family members who care for their mentally ill loved ones.

Nearly everyone involved in the mental health system in this country agrees it's broken. Few agree on how to fix it. The issues are myriad and complex. Diagnosis is difficult, and even with a relatively accurate assessment, finding the right combination of drugs and psychotherapy for each individual is a matter of trial and error over a long period of time. Many of those who suffer from mental illness refuse to accept they are ill, so getting them to agree to treatment is iffy, at best. Many live on the streets, unable to cope with or stay in "normal" housing.

After 40 years of "reform" legislation, many of the severely mentally ill are in prisons and jails — by most estimates about 10 percent of more than 2 million people incarcerated. Federal and state funding for services through county mental health departments has declined as the prison and jail budgets have grown. Small glimmers of hope offered by a handful of successful programs are eclipsed by the haphazard and bureaucratic way in which services are doled out by individual counties.

David Eldridge's story is typical. When he was 16, his parents began to notice shifts in his behavior. "It was so subtle. We said, 'Oh, it's just adolescent stuff,'" Ann Eldridge said. "At the very end of his senior year, I knew something was wrong."

A social kid involved with his high school wrestling team, he started to withdraw. David was having trouble listening and processing information. He started to mistrust authority. And he would talk to himself and laugh at inappropriate times, his mom said. They discovered he was smoking a lot of marijuana. Today, studies show a strong connection between schizophrenia and pot smoking. The drug masks the symptoms, particularly the voices that many sufferers hear in their heads. The latest research indicates a possible causal connection — that smoking marijuana may actually increase risk of developing schizophrenia.

"By the time he was 18, his schooling had really suffered a lot," said Eldridge, a member of the Santa Barbara County (California) Mental Health Commission. She has also been active for many years with the nonprofit Santa Barbara Mental Health Association board and with the National Alliance on Mental Illness. David graduated from high school "by the skin of his teeth" and even looked into attending

community college. But he didn't make it through registration. Instead, he enlisted into the service. He made it through boot camp in Missouri, but within months he was honorably discharged.

Then he ended up in jail — five times. "The first time or two he was in jail, we didn't even know about it," Eldridge said. Finally, he ended up in the county psychiatric health facility. David was shopping in a department store one day and couldn't decide what to buy. After several hours, a security guard threw him out of the store and told him not to come back. Agitated, he went to the local hospital, but they wouldn't see him. So he walked back uptown, and at the intersection of a busy highway, David flung himself onto the hood of a woman's car.

Now 50, David lives alone in an apartment. He walks to the 7-Eleven every day to buy his dinner. He has no friends. People shy away from him, like he's a pariah, Eldridge said. He took medication for a brief time, while he was on probation for one of his infractions. But it's been years since then, so he manages, day-by-day, alone with his voices and his psychoses.

When the Ill Resist Treatment

In a perfect world, David would be in a stable, supportive, community-based program. But he's resistant to treatment, which is at the root of much of the disagreement in how to treat the mentally ill.

Laws passed in the late 1960s and early '70s in California — and emulated in states across the country — forced the closure of the state mental institutions but also promised state funding for community-based mental health programs (the Lanterman-Petris-Short Act). Much of that funding never materialized, and counties were slow to implement programs to serve the mentally ill who were suddenly thrown into communities without support.

At the same time, new laws in many states gave the mentally ill the right to refuse treatment. Based on stories of mistreatment in the mental hospitals, advocates argued that patients deserved to have input into their own treatment and that they shouldn't be compelled to take medications that may or may not, in the long run, be good for them.

While psychotropic medications have improved over the years, early renditions had terrible side effects. They dulled the senses and caused serious weight gain; some over time created an irreversible condition called tardive dyskinesia, involuntary tics that are almost as off-putting to a stranger as some of the symptoms of mental illness. Many patients wouldn't take the medications. Or, if they found a drug that worked — that calmed the voices — they would decide they were cured and quit taking it. After several weeks they would spiral — once again — into serious psychosis.

The stigma attached to mental illness also prevents many people from being diagnosed and treated.

"We assume people choose their actions," said Jan Winter, whose son was diagnosed in his 20s with schizophrenia. That someone may be acting a certain way because of a brain dysfunction, a chemical imbalance, is hard for people to accept, she explained. So when someone acts erratically, we assume it is deliberate. If it is contingent with illegal behavior, the immediate reaction is from law enforcement, not the health care system.

Also, for family members, it's hard to accept that someone they love may be mentally ill, and there's shame involved.
Often there are warning signs, but no one pays attention. That was the case with Seung-Hui Cho, who in April 2007 killed 32 students and professors and wounded many others at Virginia Tech University, before killing himself. Cho had a long history of mental instability and was known to health care and university officials. But no one took steps to do something about his threats until it was too late.

Virginia, like most states, changed its laws in the 1960s to prevent the forced commitment and treatment of the mentally ill. Essentially, someone has to be considered a threat to him- or herself or others to be involuntarily committed. That law contributed to reluctance on the part of Virginia Tech officials to act with regard to Cho. After the shootings, a state-convened panel said Virginia Tech's mental health services had failed miserably and that officials had incorrectly interpreted privacy laws. It also said Virginia's mental health laws were "flawed" and its mental health services "inadequate."

"For years, the risk of misdiagnosing was what kept people from moving to do something," said Annmarie Cameron, executive director of the Santa Barbara Mental Health Association. The nonprofit group provides housing and programs for the mentally ill, as well as support services for families.

The Mental Health Association has watched funding levels fluctuate wildly over the past 30 years in California. After the Lanterman-Petris-Short Act, there was a period of confusion. Counties struggled to set up the community-based programs that were supposed to replace the mental hospitals, said Caryl Willard, a former mental health official and consultant to California agencies and counties on mental health fiscal issues.

Then, in 1978, Californians rolled back property taxes through Proposition 13, and funding for mental health programs began to dry up. By the mid-1990s, state money that might have supported effective mental health prevention and treatment programs was being funneled into the criminal justice system to deal with an influx of mentally ill inmates. Many more mentally ill people ended up on the streets, homeless and destitute. As estimated 25 percent of the nation's 500,000 homeless men and women are mentally ill.

Cautious Good News

In California, there is cautious good news. Voters approved Proposition 63 — The Mental Health Services Act — in 2004, which created a 1 percent tax on the wealthy to provide funding for unmet mental health needs.

Counties have finally begun receiving money from Proposition 63, and it holds the promise of substantial dollars in coming years. For example, in Santa Barbara County, the 2007 allocation of Proposition 63 funding was a little more than $5.5 million.

"I expect the next decade for mental health to be a very exciting decade," Willard said. But it will require the state to focus on outcomes-based results. "It's going to take a long-term effort."

The bulk of funding for mental health services comes from state and federal funding.

"The counties pay very little in the way of funding, but they decide where the state and federal dollars go," Willard explained.

Santa Barbara County became a state pilot-program county with the passage of Senate Bill 900 in 1984. Essentially, it means the county negotiates with the state for the amount of dollars it will receive for mental health services each year.

That has meant improved services, generally, for Santa Barbara County. But mental health professionals and families say it's still inadequate.

Programs are structured in such a way that there is a "silo" effect. If one is mentally ill, there is one pot of money and thus specific programs for that. And there are programs for drug and alcohol abuse. But if one has alcohol or drug problems in addition to mental illness — what is commonly called "dual diagnosis" — there are no programs that treat both, even though studies repeatedly link the two.

"Locally, I would say that only in the past four or five years has there been a movement toward integrated services, and it is far from complete, even though it is generally acknowledged," Winter said. "I think that evidence-based practices require integration. I have sometimes felt on the mental health side, in particular, many clinicians believe that the problems of substance abuse in persons with mental illness are too intractable, to the point of not being creative and innovative in developing programming for this or even referring to and helping clients establish a good connection with such programs."

In the end, helping the mentally ill needs to be seen as a public health problem, Cameron said. People with mental illness tend to have more physical health problems. They live on average 25 years fewer than their peers, Cameron said. Because of limited access to health care, the mentally ill suffer an increased rate of cancer, lung disease and other illnesses. They lose their teeth from poor hygiene.

And they fall through the cracks.

In New Hampshire earlier this year, 52-year-old Linda Bishop died of starvation in an abandoned farmhouse. According to the Treatment Advocacy Center, her daily journal indicated that in her last days she had eaten only apples from a nearby orchard and melted snow.

Bishop, who had a long history of severe mental illness, had been treated for bipolar disorder and psychotic episodes at a New Hampshire hospital for almost a year and then was released into the community. She took up residence in the farmhouse and died three months later. Her family says she managed well when she was taking her medication but deteriorated rapidly when she went off it. During her final hospitalization, TAC reported, a judge denied a request to have a guardian monitor and help her take her medication.

There are some bright spots. A few innovative programs around the country are showing promise. A handful of states, notably Ohio, have made great strides in improving services to the mentally ill, according to NAMI. Ohio's success is largely due to strong leadership at the legislative and judicial levels of state government. Additionally, families and those who have mental illness have been powerful advocates for change.

Internationally, countries like Australia and New Zealand have revamped their health care systems to put into place preventive programs that are beginning to pay off. The mentally ill are being identified sooner and are receiving treatment quicker.

In recent weeks, two long-hoped-for developments in this country buoyed mental health advocates: First, the House passed legislation that restores portions of the Americans With Disabilities Act guaranteeing equal access to housing for the mentally ill that were thrown out in earlier court challenges. That bill now moves to the Senate. Then, last week, a new law was approved that will force health insurers to offer coverage of mental illnesses equal to that offered for physical illnesses. The so-called parity legislation had been in the works for more than 20 years and benefited from being in the right place at the right time. Lawmakers needed a bill to which the historic economic bailout measure could be attached, and the parity bill was chosen.

Still, care and treatment of the mentally ill in the United States remains an embarrassment. Resolving these problems will take the combined efforts of the medical and social services communities, family members and, most important, politicians, advocates say.

http://www.miller-mccune.com/article/america%E2%80%99s-mental-health-care-is-getting-worse

Vigilante Justice on Plagiarism

Faculty members complain constantly about plagiarism and trade stories about strategies to combat it. Loye Young thought he had a solution. On his syllabus at Texas A&M International University this fall, he wrote: "No form of dishonesty is acceptable. I will promptly and publicly fail and humiliate anyone caught lying, cheating, or stealing. That includes academic dishonesty, copyright violations, software piracy, or any other form of dishonesty."

Many professors use the syllabus to warn students about enforcing plagiarism rules, but few promise public humiliation. Young, who owns a computer business in Laredo and doesn't depend on a teaching job for his livelihood, thinks humiliation is part of the justice system. He noted in an interview Wednesday that "there's a reason that trials are in public."

When he caught six students in his management information systems course cheating, he wrote about it on his course blog (which he maintained on his business's Web site), naming the students and telling the world that he had caught them and that they would receive an F for the course and be reported to university officials.

"Plagiarism is manifestly unfair and disrespectful to your classmates," Young wrote on his blog. "There are students taking the course who are working very, very hard to learn a subject that in many cases is foreign to them. A plagiarizer is implicitly treating the honest, hard-working student as a dupe. Of course, the plagiarizer is the dupe or else would not need to plagiarize."

When university administrators realized that Young had followed through on his threat to fail and publicly humiliate the students, they put the failing grades on hold — the cases are now being referred to an honors council for consideration and the F's may or may not stand. But action against Young was quick: He was fired. The university says he violated the Family Educational Rights and Privacy Act, a federal law known widely as the Buckley Amendment or FERPA, which generally bars the release of educational records about students without their permission.

Young says that FERPA is being used to cover up the real reason the university wanted him out: that it was facing an instructor unwilling to stay quiet about students' academic dishonesty. "People here are told that students should be babied and that we need to keep 'em in to get enrollment and state funding," he said. "Well, I want students — when they complete my course — to actually know something, and they can't if they plagiarize everything."

That his actions distressed many at the university as much as the plagiarism, he said, shows the extent of the problem. "This beehive needed whacking," he said.

Adding to the buzz has been an e-mail message sent to department chairs by someone in the administration (the provost denies knowing anything about it, and an article Wednesday in the *Laredo Morning Times* attributed it to deans) in which the chairs were reminded to tell faculty members that any F grades for plagiarism should be reviewed by the honors council and that professors need to always think about students' due process rights before seeking to punish them.

Several faculty members, speaking privately because they didn't want to anger administrators, said that they were taken aback by the way the university appeared to be viewing plagiarism as an issue requiring more due process for students, not more support for professors. For the university to follow the dismissal of an adjunct with this reminder, they said, left them feeling that they couldn't bring plagiarism charges. Further, many said that they believed it was a professor's right to award an F to a plagiarizer and that this should not require an honors council review.

Several e-mail messages are circulating among faculty members, expressing concern that their right to assure academic integrity is being undercut. Despite how widespread a problem plagiarism is among students, these e-mail messages say, the university is looking the other way and sending a public message to students that they are the victims when a professor takes plagiarism seriously.

Young said that the plagiarism in his course was easy to detect. He said that the essays he found to be copied didn't read like student writing and seemed to be an odd combination of sources. He said he just put some of the essays into Google to find the sources, on Wikipedia, in the archives of term paper companies, and so forth.

"If students don't know that they will be prosecuted, this will not stop," he said. "You need to have a deterrent, and it needs to be public."

Not all faculty members share that view. Some who don't like the way the university is dealing with situation still think Young crossed a line by going public with the names of students. Robert Haynes, an associate professor of English and president of the Faculty Senate, said Young was "not adequately prepared to deal with the challenge of students he perceived as cheating." Haynes acknowledged that Young's dismissal, followed by the memo now in circulation, has left many professors worried. He said that the events are "subject to the interpretation" that the university isn't interested in tough enforcement of rules against plagiarism, but he said he didn't think that was true.

"We are interested in combining rigor and compassion. and we don't want to compromise on either," he said.

It's important, Haynes said, that professors not "be subject to second guessing for ordinary decisions," he said, and that includes grades. At the same time, he said, it was important for students to know their appeal rights.

Pablo Arenaz, provost at the university, said he was distressed that some faculty members are concerned about the university's commitment to academic integrity. Asked whether a professor has the right to award an F to someone caught copying, Arenaz said that was "up to interpretation." He said it was important that everyone respect students' due process rights when plagiarism is suspected.

He stressed, however, that the reason Young was dismissed was because he violated students' privacy rights. Asked if university policy states that violating FERPA is grounds for dismissal, Arenaz said he didn't know.

"The university believes in academic integrity and upholds academic integrity," he said.

Arenaz, asked if he thought plagiarism was a major problem at the university, noted that he has only been there for a few months, and said he wasn't sure. "I don't have a feel for it at all. If I put five faculty in a room, I would get different interpretations of what it is."

— Scott Jaschik

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/13/tamiu.

Funerary Monument Reveals Iron Age Belief That The Soul Lived In The Stone

A funerary monument recovered in southeastern Turkey reveals that people who lived in an important Iron Age city there believed the soul was separate from the body. They also believed the soul lived in the funerary slab. (Credit: Photo by Eudora Struble, University of Chicago)

ScienceDaily (Nov. 19, 2008) — Archaeologists in southeastern Turkey have discovered an Iron Age chiseled stone slab that provides the first written evidence in the region that people believed the soul was separate from the body.

University of Chicago researchers will describe the discovery, a testimony created by an Iron Age official that includes an incised image of the man, on Nov. 22-23 at conferences of biblical and Middle Eastern archaeological scholars in Boston.

The Neubauer Expedition of the Oriental Institute at the University of Chicago found the 800-pound basalt stele, 3 feet tall and 2 feet wide, at Zincirli (pronounced "Zin-jeer-lee"), the site of the ancient city of Sam'al. Once the capital of a prosperous kingdom, it is now one of the most important Iron Age sites under excavation.

The stele is the first of its kind to be found intact in its original location, enabling scholars to learn about funerary customs and life in the eighth century B.C. At the time, vast empires emerged in the ancient Middle East, and cultures such as the Israelites and Phoenicians became part of a vibrant mix.

The man featured on the stele was probably cremated, a practice that Jewish and other cultures shun because of a belief in the unity of body and soul. According to the inscription, the soul of the deceased resided in the stele.

"The stele is in almost pristine condition. It is unique in its combination of pictorial and textual features and thus provides an important addition to our knowledge of ancient language and culture," said David Schloen, Associate Professor at the Oriental Institute and Director of the University's Neubauer Expedition to Zincirli.

Schloen will present the Kuttamuwa stele to a scholarly audience at the meeting of the American Schools of Oriental Research on Nov. 22 in Boston, the major annual conference for Middle Eastern archaeology. Dennis Pardee, Professor of Near Eastern Languages and Civilization at the University of Chicago, will present his translation of the stele's 13-line inscription the following day at the annual meeting of the Society of Biblical Literature, also in Boston, in a session on "Paleographical Studies in the Near East."

German archaeologists first excavated the 100-acre site in the 1890s and unearthed massive city walls, gates and palaces. A number of royal inscriptions and other finds are now on display in museums in Istanbul and Berlin. Schloen and his team from the University of Chicago have excavated Zincirli for two months annually since 2006.

"Zincirli is a remarkable site," said Gil Stein, Director of the Oriental Institute. "Because no other cities were built on top of it, we have excellent Iron Age materials right under the surface. It is rare also in having written evidence together with artistic and archaeological evidence from the Iron Age. Having all of that information helps an archaeologist study the ethnicity of the inhabitants, trade and migration, as well as the relationships of the groups who lived there."

The stele was discovered last summer in a small room that had been converted into a mortuary shrine for the royal official Kuttamuwa, self-described in the inscription as a "servant" of King Panamuwa of the eighth century B.C. It was found in the outer part of the walled city in a domestic area—most likely the house of Kuttamuwa himself—far from the royal palaces, where inscriptions had previously been found.

The inscription reads in part: "I, Kuttamuwa, servant of Panamuwa, am the one who oversaw the production of this stele for myself while still living. I placed it in an eternal chamber(?) and established a feast at this chamber(?): a bull for [the storm-god] Hadad, ... a ram for [the sun-god] Shamash, ... and a ram for my soul that is in this stele. …" It was written in a script derived from the Phoenician alphabet and in a local West Semitic dialect similar to Aramaic and Hebrew. It is of keen interest to linguists as well as biblical scholars and religious historians because it comes from a kingdom contemporary with ancient Israel that shared a similar language and cultural features.

The finding sheds a striking new light on Iron Age beliefs about the afterlife. In this case, it was the belief that the enduring identity or "soul" of the deceased inhabited the monument on which his image was carved and on which his final words were recorded.

The stele was set against a stone wall in the corner of the small room, with its protruding tenon or "tab" still inserted into a slot in a flagstone platform. A handsome, bearded figure, Kuttamuwa wore a tasseled cap and fringed cloak and raised a cup of wine in his right hand. He was seated on a chair in front of a table laden with food, symbolizing the pleasant afterlife he expected to enjoy. Beside him is his inscription, elegantly carved in raised relief, enjoining upon his descendants the regular duty of bringing food for his soul. Indeed, in front of the stele were remains of food offerings and fragments of polished stone bowls of the type depicted on Kuttamuwa's table.

According to Schloen, the stele vividly demonstrates that Iron Age Sam'al, located in the border zone between Anatolia and Syria, inherited both Semitic and Indo-European cultural traditions. Kuttamuwa

and his king, Panamuwa, had non-Semitic names, reflecting the migration of Indo-European speakers into the region centuries earlier under the Hittite Empire based in central Anatolia (modern Turkey), which had conquered the region.

But by the eighth century B.C., they were speaking the local West Semitic dialect and were fully integrated into local culture. Kuttumuwa's inscription shows a fascinating mixture of non-Semitic and Semitic cultural elements, including a belief in the enduring human soul—which did not inhabit the bones of the deceased, as in traditional Semitic thought, but inhabited his stone monument, possibly because the remains of the deceased were cremated. Cremation was considered to be abhorrent in the Old Testament and in traditional West Semitic culture, but there is archaeological evidence for Indo-European-style cremation in neighboring Iron Age sites, although not yet at Zincirli itself.

In future excavation campaigns, the Neubauer Expedition, under Schloen's direction, plans to excavate large areas of the site in order to understand the social and economic organization of the city and its cultural development over the centuries. Schloen hopes to illuminate Iron Age culture more widely, of which Zincirli provides a richly documented example.

Adapted from materials provided by University of Chicago.
http://www.sciencedaily.com/releases/2008/11/081118071136.htm

Antibiotics Can Cause Pervasive, Persistent Changes To Microbiota In Human Gut

ScienceDaily (Nov. 19, 2008) — Using a novel technique developed by Mitchell Sogin of the Marine Biological Laboratory (MBL) to identify different types of bacteria, scientists have completed the most precise survey to date of how microbial communities in the human gut respond to antibiotic treatment.

Sogin, director of the MBL's Josephine Bay Paul Center, and Susan Huse of the MBL, along with David Relman and Les Dethlefsen of Stanford University, identified pervasive changes in the gut microbial communities of three healthy humans after a five-day course of the antibiotic Ciprofloxacin. Their results are reported in the Nov. 18 issue of PloS Biology.Using very conservative criteria, the scientists identified at least 3,300 to 5,700 different taxa (genetically distinct types) of bacteria in the human distal gut, and antibiotic treatment influenced the abundance of about a third of those taxa.

"You clearly get shifts in the structure of the microbial community with antibiotic treatment," says Sogin. "Some bacteria that were in low abundance prior to treatment may become more abundant, and bacteria that were dominant may decrease in abundance. When you get these shifts, they may be persistent. Some individuals may recover quickly, and others won't recover for many months."In all the individuals tested in this study, the bacterial community recovered and closely resembled its pre-treatment state within four weeks after the antibiotic course ended, but several bacterial taxa failed to recover within six months.

This raises questions about the health effects of perturbations to the human-microbial symbiosis in the gut, such as may occur with antibiotic treatment. Because specific microbial populations mediate many chemical transformations in the gut—and previous studies have related these processes to cancer and obesity, among other conditions—changes in the composition of the gut microbiota could have important, but as yet undiscovered, health effects."When you change the microbial population structure in the gut, you may affect how that population is keeping indigenous pathogens at manageable levels," says Sogin. Bacteria that do not normally cause problems may begin to grow more rapidly, and cause disease.

The study is part of a large, international effort to fully characterize the microbiota in the human gut, which is the highest-density natural bacterial ecosystem known. Up to 100 trillion microbial cells reside in the gut, and this community plays essential roles in nutrition, development, metabolism, pathogen resistance, and regulation of immune responses.

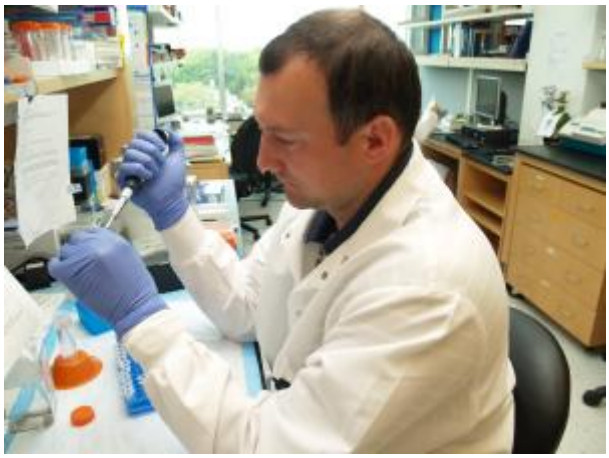
Until recently, descriptions of human-associated microbiota were constrained by techniques of cultivating (and thus identifying) bacteria. Less than 20-40% of the microbes in the human distal gut, for example, have been cultured in the laboratory. Since the late 1980s, however, cultivation-independent microbial surveys have been developed that identify community members by genetic sequencing. Sogin's technique, for example, which was used in this study, characterizes microbial populations by pyrosequencing short, hypervariable regions of one gene common to all microbes, the 16S rRNA gene. This technique reveals greater taxonomic richness in microbial samples at a fraction of the cost of traditional sequencing technologies.

Journal reference:

1. Dethlefsen et al. **The Pervasive Effects of an Antibiotic on the Human Gut Microbiota, as Revealed by Deep 16S rRNA Sequencing**. *PLoS Biology*, 2008; 6 (11): e280 DOI: 10.1371/journal.pbio.0060280

Adapted from materials provided by Marine Biological Laboratory.
http://www.sciencedaily.com/releases/2008/11/081118121941.htm

Battling Bacteria In The Blood: Mathematical Models Help In Tackling Deadly Infections



University of Michigan scientists and their colleagues are tackling the problem of sepsis and bacteremia at its most basic level. (Credit: Image courtesy of University of Michigan Health System)

ScienceDaily (Nov. 19, 2008) — It's a leading cause of death, but no one knows for sure how and why it happens. It's a major source of health care costs, adding days or weeks to the hospital stays and lost work time of millions of people. But no one fully understands how best to fight it.

"It" is bacterial infection in the blood, also called bacteremia, and it's a major part of the very serious illness called sepsis.

It's an infection that will turn deadly in some people, especially cancer patients and others with weak immune systems — while being easily treated in others. It doesn't get much public attention, although it affects ten times more Americans than breast cancer. Hospitals struggle mightily, but often futilely, to prevent and treat it every day.

Now, new research by a University of Michigan team and their colleagues is tackling the problem at its most basic level, in hopes of finding new and more effective ways to treat bacteremia and sepsis.

In a research paper published in the November issue of the journal Shock, and recent papers in the journals Bulletin of Mathematical Biology and Academic Emergency Medicine, the team describes new computer-based models of bloodstream infection that may help guide the development of new treatments.

The models use complex mathematical techniques, but have been validated by laboratory experiments in mice and in engineered bloodstream models.

The new findings give more information than ever before about how bacteria act within the blood vessels of the body, and how they might be filtered out of the blood and into organs where the immune system can attack and kill them.

Now, this model of how bacteremia occurs in "real world" of the fast-moving bloodstream – rather than a placid Petri dish or test tube – can be put to work to study how best to combat or prevent bacteria in the blood.

John Younger, M.D., M.S., an associate professor of emergency medicine at the U-M Medical School, leads the team, which includes members with training in medicine, mathematics, and chemical engineering. He says the team's model reveals that a bacterial bloodstream infection can be thought of a high-speed police chase in heavy traffic.

"The bacteria are each a micron across – a thousandth of a millimeter – and they're traveling at the same fast speeds – up to three feet per second -- as other cells in the bloodstream, like red and white blood cells and platelets," he explains. "The white blood cells, which are the police of the body, are stuck in the same flow and can't 'change lanes' in the fast-moving traffic to capture and kill them."

That means the bacteria have to stick to the wall of a blood vessel before they can get caught, he says. And they're most likely to do that in the small blood vessels, or capillaries, within our organs or extremities.

Antibiotic drugs have been the standard treatment for these conditions since the drugs were developed in the mid-20th century. But because common bacteria have evolved to evade those drugs, antibiotics are becoming less and less effective against bloodstream infections.

Better treatment for bacteremia and sepsis, then, might include strategies that can help the body filter bacteria out of the bloodstream and into these areas.

In the paper published in Shock, Younger and his team describe their new model of bacterial infection of the blood and organs, which they validated through experiments in mice.

The model combines the physiology of a blood vessel, the fluid dynamics of blood, and math-based models of how bacteria multiply and move between the bloodstream and organs. It also allows the researchers to better understand different conditions – including a low-immunity state such as what a cancer patient might experience, and a higher-than-usual blood flow rate that is often seen in patients who are fighting off a severe bloodstream infection.

"Bloodstream infections are infections that typically begin in a local part of the body, say in the bladder or the lung or the skin. But then the bacteria that cause these infections manage to break free from the usual local defenses and make it into the bloodstream, giving them an opportunity to go essentially anywhere they want," Younger explains. "Once in the bloodstream they can travel to distant organs; they can travel to the lung; they can travel to the heart. They're basically 'horses out of the barn'."

While creating the model, the researchers tested it by seeing how well it matched real-life mouse infections. Using bacteria that had been modified to give off a weak light signal that can be detected from outside the body, and other bacteria that could be detected through blood tests, they could see where the bacteria concentrated in the body during different stages of the infection, and how quickly they were killed and cleared from the body.

The liver, lung and spleen had the highest concentrations, and the lung appeared to have the most effective bacteria-killing system.

Some of the mice were given a chemotherapy drug that is often used in cancer patients – one that kills white blood cells. Cancer patients and intensive-care unit patients are especially prone to bloodstream infections not only because of their weakened immune systems, but also because they often have long-term intravenous catheters that allow medicines to be given directly into the bloodstream.

While this helps patients avoid repeated intravenous needles, it also gives bacteria an easy pathway straight into the blood.

Indeed, the mice that received the chemo drug and an injection of bacteria all died of an out-of-control bacterial infection, while mice that didn't receive the drug were able to clear the infection from their bloodstream. The model successfully showed the same outcome.

An important part of bloodstream infections associated with catheters is the clumping-together of bacteria on surfaces – which is also seen in urinary catheters that cause many thousands of infections each year. But clumping that occurs within the bloodstream itself is also important since it may help bacteria become more vulnerable to immune system response.

The paper in the Bulletin of Mathematical Biology describes a model of this process -- known as flocculation – and sets the stage for further study of treatments that might accelerate clumping or make the clumps more stable. That, in turn, might help the body fight off infection more effectively.

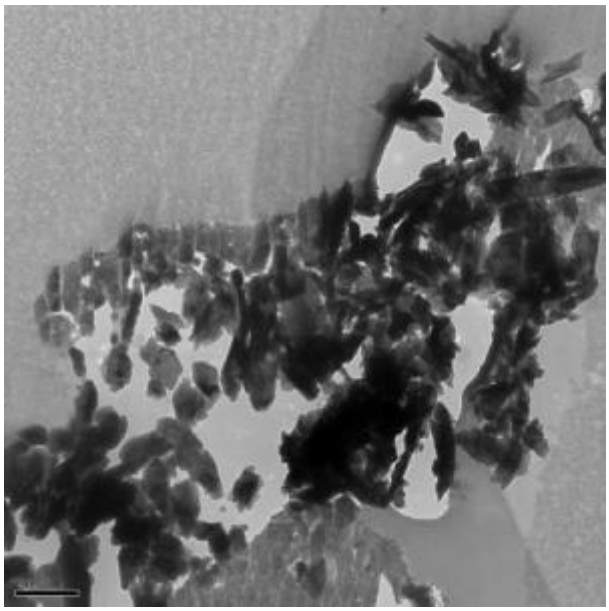
Younger and his team have more research to do before their models yield results that might affect human treatment. But already, they are seeing the potential for how to improve the models and use them to simulate different aspects of human bacteremia and sepsis.

"We're trying to understand the rules for how bacteria traffic in the bloodstream -- and if you understand the timing of those events you might be able to better understand how best to detect the bloodstream infection when it's present," he says. "We're also working on ways to fundamentally change the rules of engagement between the bacteria and the host. There are mechanical features at play in terms of getting these bacteria in flowing blood out. If we can change the mechanics of that interaction, then we can potentially have a therapy that the bacteria don't really have an opportunity to defend against or develop resistance against. And that could be a useful therapy."

The research is funded by the National Institutes of Health and the U-M Center for Computational Medicine and Biology.

Adapted from materials provided by University of Michigan Health System.
http://www.sciencedaily.com/releases/2008/11/081111102806.htm

Comet Particles Provide Glimpse Of Solar System's Birth Spasms



A transmission electron microscope image (magnified 5,000 times) of a slice of the Inti particle, which NASA's Stardust spacecraft collected in 2004 and returned to Earth two years later. Preparation of the sample caused some breakage. Scale bar is one micron, or one millionth of a meter. (Credit: Image courtesy University of Chicago)

ScienceDaily (Nov. 19, 2008) — Scientists are tracking the violent convulsions in the giant cloud of gas and dust that gave birth to the solar system 4.5 billion years ago via a few tiny particles from comet Wild 2.

These convulsions flung primordial material billions of miles from the hot, inner regions of the gas cloud that later collapsed to form the sun, out into the cold, nether regions of the solar system, where they became incorporated into an icy comet.

"If you take a gas of solar composition and let it cool down, the very first minerals to solidify are calcium and aluminum-rich," said Steven Simon, Senior Research Associate in Geophysical Sciences at the University of Chicago. And comet Wild 2 does contain these and other minerals formed at high temperatures. "That's an indication of transport from the inner solar system to the outer solar system, where comets are thought to have formed," he said.

Simon presents his data in the November 2008 issue (expected to be published early next year) of Meteoritics and Planetary Science. His 11 co-authors include Lawrence Grossman, Professor in Geophysical Sciences at the University of Chicago.

Either turbulence within the nebula, or a phenomenon called bipolar outflow from the early sun could account for the long-distance transport of cometary material, according to Simon and his Meteoritics co-authors.

Bipolar outflow results when the rotating disks that surround developing new stars jet gas from their polar regions, which astronomers have observed telescopically. "That's part of the so-called X-wind model, which is somewhat controversial," Simon said.

The controversial aspect of the X-wind model is the claim that the process would produce the kind of granules that Simon and his colleagues have now identified in comet Wild 2. Another less likely possibility: The cometary material in question may have formed around another star of composition similar to the sun, then drifted into the outer reaches of the solar system. There it became incorporated into comet Wild 2.

The extraterrestrial dust particles that Simon and his colleagues examined were among thousands that NASA's Stardust spacecraft collected from comet Wild 2 in January 2004. Two years later, Stardust became the first mission to return samples of a comet to Earth.

Simon, Grossman and collaborators identified all three particles described in the Meteoritics study as pieces of a shattered refractory inclusion, one of the most unusual and informative materials discovered in early analyses of the Wild 2 samples. Such inclusions, found in some meteorites, formed by condensation from the gas in the solar nebula at temperatures of more than 2,500 degrees Fahrenheit early in the history of the solar system.

The three particles were named Inti, Inti-B and Inti-C, after the Incan sun god. The original, unbroken particle would have measured no more than 30 microns across, much narrower than a human hair.

As Simon, Grossman and a team of colleagues reported in 2006, Inti contains a suite of minerals that likely were forged in fiery conditions found deep inside the cloud of gas and dust that formed the sun, Earth and the planets. And yet comets probably formed in the outer reaches of the solar system, far beyond Neptune.

Contributing to an array of scientific analyses in the Meteoritics article were co-authors David Joswiak, Donald Brownlee and Graciela Matrajt of the University of Washington; Hope Ishii, John Bradley, Miaofang Chi, Jerome Aléon, Stewart Fallon and Ian Hutcheon of Lawrence Livermore National Laboratory in California; and Kevin McKeegan of the University of California, Los Angeles.

Most of this team, including Simon and Grossman, were among the 75 co-authors who published the first analysis of the comet Wild 2 particles in the Dec. 15, 2006, issue of the journal Science. A striking aspect of the Science and Meteoritics studies is the similarity in chemical composition between the Wild 2 samples and particles from carbonaceous chondrite meteorites. These meteorites contain material that has been unaltered since the birth of the solar system 4.5 billion years ago.

Equally striking is the complete lack of any water-bearing minerals in the cometary grains. Carbonaceous chondrites are rich in hydrated silicates, clay-like minerals that emit water when heated, "but there's no hydrated silicate in the comet sample," Grossman said.Scientists organized the Stardust mission with the expectation that Wild 2's samples would reveal a bonanza of exotic minerals, including debris from stars that had met their demise long before the birth of the sun. They may need to rethink how comets formed, according to Grossman.

"Because they're loaded with ices we've always thought that these are outer solar system objects," he said. "But maybe cometary ices formed much closer in, after the inner part of the solar nebula cooled off, and incorporated the high-temperature stuff that formed earlier."

The Stardust mission was scientifically important because comets are usually out of reach, Grossman said. And yet aside from the sun, they may be the most abundant material in the solar system. "There may be more stuff in the comets than in all the planets put together," he said.

Adapted from materials provided by University of Chicago.
http://www.sciencedaily.com/releases/2008/11/081117091627.htm

Pollinator Decline Not Reducing Crop Yields Just Yet

There is as yet no evidence that global pollinator decline is limiting global food production. (Credit: Image credit Sujaya Rao, CSIRO)

ScienceDaily (Nov. 19, 2008) — The well-documented worldwide decline in the number of bees and other pollinators is not, at this stage, limiting global crop yields, according to a new study.

Co-author, CSIRO Entomology's Dr Saul Cunningham, says however that the study detected warning signs that demand for pollinators is still growing and some highly pollinator-dependant crops are suffering.

"The research team scored crops on how much they depend on pollinators for maximum production," Dr Cunningham says. "Depending on the crop, this dependence ranges from zero to 100 per cent. For example, cereal crops like wheat don't need to be pollinated but at the other end of the scale, unpollinated almond trees produce no nuts."

The team found that between 1961 and 2006 the yields of most crops have consistently grown at about 1.5 per cent a year because of improvements in agriculture. There was also no difference in yield growth between crops that require pollinators and those that do not.

"While this is a positive finding, the interaction between yields and pollination is a hugely complex issue which needs to be teased-out further," Dr Cunningham says. "Global summaries can also hide local stories. In some places, local pollinator shortages are affecting local production. While these don't threaten overall global food supplies, they can have very significant impacts on local communities and their economies."

The researchers were surprised to discover that there has been a global increase in the growing of pollinator-dependent crops, particularly in the developing world.

"The fact that, while pollinators are declining in various parts of the world, global agricultural systems are becoming more dependent on pollinators, could create serious problems in the future," Dr Cunningham says.

When the group looked at pollinated crops in more detail, they found that pollinator shortages might be beginning to affect crops that rely heavily on pollination because their yield growth was lower than for crops that were less dependent.

Dr Cunningham says they now want to examine how declining pollinator supply might be increasing the costs of production. Increased yields are usually the result of increasing farm inputs such as fertiliser, labour and water. For some crops, this increasingly intensive management may have, for now, overcome any losses in pollinator service, but it also increases production costs.

There is also evidence that one response to lower yield growth for highly pollinator dependent crops is a growing demand for land.

Journal reference:

1. Aizen Marcelo A, Garibaldi Lucas A, Cunningham, Saul A & Klein Alexandra M. **Long-Term Global Trends in Crop Yield and Production Reveal No Current Pollination Shortage but Increasing Pollinator Dependency**. *Current Biology*, 18: 1-4

Adapted from materials provided by CSIRO Australia.
http://www.sciencedaily.com/releases/2008/11/081111102826.htm

Clue To Stopping Breast-cancer Metastasis Discovered

ScienceDaily (Nov. 18, 2008) — If scientists knew exactly what a breast cancer cell needs to spread, then they could stop the most deadly part of the disease: metastasis. New research from the University of North Carolina at Chapel Hill School of Medicine takes a step in that direction.

Carol Otey, Ph.D. and UNC colleagues reduced the ability of breast cancer cells to migrate by knocking down the expression of a protein called palladin.

They also found higher levels of palladin in four invasive breast cancer cell lines compared to four non-invasive cell lines."This study shows that palladin may play an important role in the metastasis of breast cancer cells as they move out of the tumor and into the blood vessels and lymphatics to spread throughout the body," said Otey, associate professor of cell and molecular physiology.

To conduct the study, the researchers grew breast cancer cells in an "invasion chamber," in which human tumor cells are placed in a plastic well that is inserted into a larger well. Cells will attempt to move to the bottom of the chamber because it's baited with growth factors that cells find attractive. But first the cells have to migrate through a filter coated with a layer of artificial connective tissue. "The cells have to migrate through that and have to degrade it," Otey said. "It's a useful model system that mimics what happens in the body."

The study results appeared in the Nov. 3, 2008, online edition of the journal Oncogene.

Most women would never die from breast cancer if the cancer cells couldn't metastasize to the brain and bone marrow, Otey said. "To really make breast cancer a treatable disease, we have to be able to find a way to prevent or reduce the amount of metastasis.""Now that we see palladin is expressed mostly in invasive cells, it raises the question as to whether it might be useful as a prognostic marker," Otey said. "Maybe someday doctors could test for the presence of palladin to identify patients who have the most aggressive tumors, then give those patients personalized, more aggressive treatment."

The study benefited from the collaboration between Otey's cell and molecular physiology lab and Dr. Hong Jin ("H.J.") Kim's surgical oncology lab. "I learned a lot from H.J. about the challenges that clinicians face as they try to optimize the treatment of each breast cancer patient," Otey said.

Otey has been investigating palladin's role in cell movement since she discovered and named it in 2000.

Next she will examine a variety of samples of human tumors from a UNC tumor bank, to find out if the tumors from patients who had worse outcomes and more aggressive cancers contain higher levels of palladin.

In addition to Otey and Kim, the study co-authors – all from UNC – are Silvia M Goicoechea, Ph.D., research instructor, and Hannah Prentice-Dunn, undergraduate student, both of the department of cell and molecular physiology; Brian Bednarski M.D., assistant professor of surgery; and Rafael García-Mata, Ph.D., research assistant professor in the department of cell and developmental biology.

The work was funded by the National Institutes of Health.

Adapted from materials provided by University of North Carolina School of Medicine, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2008/11/081117153230.htm

Study Helps Identify Beachgoers At Increased Risk Of Skin Cancer

Skin cancer incidence and death attributable to outdoor exposure to UV radiation (UVR) has increased rapidly in the past three decades in the United States. (Credit: iStockphoto/Alessandro Oliva)

ScienceDaily (Nov. 18, 2008) — Identifying the sun-protection practices and risk profiles of beachgoers may help determine those who would benefit from targeted interventions intended to reduce the risk of skin cancer, according to a study in the November issue of Archives of Dermatology, one of the JAMA/Archives journals.

In the U.S., skin cancer incidence and death attributable to outdoor exposure to UV radiation (UVR) has increased rapidly in the past three decades, according to background information in the article. Recommendations to reduce the risk of skin cancer include limiting time spent in the sun, using sunscreen and wearing protective clothing. "Adults and adolescents are particularly at risk for intense, episodic sun exposure while on vacation or in 'high-risk' environments such as beaches," the authors write.

David L. O'Riordan, Ph.D., of the University of Queensland, Brisbane, Australia, and colleagues conducted a study examining the levels of UVR exposure and the range of sun protection behaviors of vacationers at a popular beach in Honolulu, Hawaii. The study, conducted in February and March 2004, included 88 participants who completed a sun habits survey prior to entry to the beach and an exit survey on leaving regarding their sun protection practices while at the beach. UVR was measured daily.

The researchers found that the participants spent an average of three hours at the beach, during which most were exposed to levels of UVR equivalent to five times the UVR dose required to result in sunburn among unprotected fair-skinned populations. Approximately 70 percent of the participants went to the beach with an intention to tan, despite 40 percent reporting they had obtained a sunburn in the previous 48 hours. Almost 23 percent of participants reported attending a tanning salon in the past 30 days.

Analysis identified three groups with distinct characteristics and sun protection behaviors:

- Class 1 - Unconcerned and at lower risk, who used the least amount of sunscreen and less clothing, used shade the least, intended to tan, and had the fewest members with a high risk of developing skin cancer.

- Class 2 – Tan seekers, highest number who reported that they sunburn easily, used the most sunscreen coverage and the least clothing coverage, had the most tanning salon use.
- Class 3 – Were concerned about UVR and were protected, the most careful group with the most clothing coverage and shade use and had the lowest proportion with an intention to tan.

"Findings from this study indicate that the beach is an ideal setting to initiate a program aimed at promoting sun-safe practices while enjoying the many activities that a day at the beach has to offer. Collaborative efforts with key stakeholders such as local government, the tourist industry, local business and community representatives should examine a broad range of strategies—not just targeting individual behavior change, but also the environment—to promote the reduction of intense UVR exposures among beachgoers," the authors write.

"Specific strategies should target the subsets of the beach-going population (particularly those in group 2—the tan seekers) that intend to tan and sunburn repeatedly, taking into account their relevant personal attributes and behavior patterns. A balance should be provided between messages that focus on the immediate detrimental effects (photoaging, soreness) as well as the long-term detrimental health effects (skin cancer) of excessive UVR exposure, all the time balancing the health interests of the public with the needs of local industry."

This study was supported by Friends of the Cancer Research Center of Hawaii.

Editorial: Not All Tanners Are Created Equal

The identification of tanning subtypes should eventually improve the ability to determine appropriate health interventions, writes Sherry L. Pagoto, Ph.D., and Joel Hillhouse, Ph.D., of the University of Massachusetts Medical School, Worcester, Mass., in an accompanying editorial.

"The advantages of the development of a tanning typology will not be fully realized until brief assessments that can accurately classify patients are developed and empirically verified. We believe that the latent class analysis used by O'Riordan et al to identify and define their subtypes is an important step in this process. Such assessments, together with messages tailored to each subtype, will give clinicians a way to identify those patients in greatest need as well as the most effective messages to deliver to specific patients. Given the time constraints of the typical patient-clinician interaction, such systems may very well maximize the efficiency of delivering UV safety information. Public health skin cancer prevention programs may also benefit from the improved accuracy of risk identification as well as the ability to tailor messages to various tanning subtypes, perhaps using interactive online intervention programs."

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Adapted from materials provided by JAMA and Archives Journals.
http://www.sciencedaily.com/releases/2008/11/081117192906.htm

Calcium May Only Protect Against Colorectal Cancer In Presence Of Magnesium

ScienceDaily (Nov. 18, 2008) — High magnesium intake has been associated with low risk of colorectal cancer. Americans have similar average magnesium intake as East Asian populations. If that were all that were involved, observers might expect both groups to have similar risk for colorectal cancer.

However, the United States has seen a much higher colorectal cancer incidence rate than East Asian populations. Furthermore, when East Asians immigrated to the United States, their incidence rates for colorectal cancer increased. This led researchers at Vanderbilt University to suspect there was something else at work.

Calcium supplementation has been shown to inhibit colorectal carcinogenesis although high calcium may simultaneously be preventing the body from absorbing magnesium. United States patients have a higher calcium intake and higher colorectal cancer incidence. "If calcium levels were involved alone, you'd expect the opposite direction. There may be something about these two factors combined – the ratio of one to the other – that might be at play", said Qi Dai, M.D., Ph.D., assistant professor of medicine at Vanderbilt University.

Dai and colleagues examined this hypothesis in a large clinical trial and found indeed that supplementation of calcium only reduced the risk of adenoma recurrence if the ratio of calcium to magnesium was low and remained low during treatment. "The risk of colorectal cancer adenoma recurrence was reduced by 32 percent among those with baseline calcium to magnesium ratio below the median in comparison to no reduction for those above the median," said Qi.

The implications for prevention of adenoma recurrence or reduced risk of primary colorectal cancer is that designing a personalized diet/supplementation regimen that takes the ratio of both nutrients into account may be better than supplementing with one or the other alone.

About one in eighteen individuals will develop colorectal cancer in their lifetime and 40 percent will die within five years of diagnosis, mainly due to diagnosis at a late stage. The understanding of how dietary factors affect colorectal cancer may lead to the prevention of cancer recurrence and possibly prevention of the initial cancer.

Adapted from materials provided by American Association for Cancer Research.
http://www.sciencedaily.com/releases/2008/11/081116142324.htm

Astronomers Detect Matter Torn Apart By Black Hole

Left image: Colour composite image of the central region of our Milky Way galaxy, about 26 000 light years from Earth. Giant clouds of gas and dust are shown in blue. Right images: This series of three images shows an artist's impression of a bright "blob" of gas in the disk of material surrounding the black hole in the centre of our Galaxy, Sagittarius A. This blob of material is responsible for the flares detected by the researchers. (Credit: ESO/APEX/2MASS/A. Eckart et al. , ESO/L. Calçada)*

ScienceDaily (Nov. 18, 2008) — Astronomers have used two different telescopes simultaneously to study the violent flares from the supermassive black hole in the centre of the Milky Way. They have detected outbursts from this region, known as Sagittarius A*, which reveal material being stretched out as it orbits in the intense gravity close to the central black hole.

The team of European and US astronomers used ESO's Very Large Telescope (VLT) and the Atacama Pathfinder Experiment (APEX) telescope, both in Chile, to study light from Sagittarius A* at near-infrared wavelengths and the longer submillimetre wavelengths respectively. This is the first time that astronomers have caught a flare with these telescopes simultaneously. The telescopes' location in the southern hemisphere provides the best vantage point for studying the Galactic Centre.

"Observations like this, over a range of wavelengths, are really the only way to understand what's going on close to the black hole," says Andreas Eckart of the University of Cologne, who led the team.

Sagittarius A* is located at the centre of our own Milky Way Galaxy at a distance from Earth of about 26 000 light-years. It is a supermassive black hole with a mass of about four million times that of the Sun. Most, if not all, galaxies are thought to have a supermassive black hole in their centre.

"Sagittarius A* is unique, because it is the nearest of these monster black holes, lying within our own galaxy," explains team member Frederick K. Baganoff of the Massachusetts Institute of Technology (MIT) in Cambridge, USA. "Only for this one object can our current telescopes detect these relatively faint flares from material orbiting just outside the event horizon."

The emission from Sagittarius A* is thought to come from gas thrown off by stars, which then orbits and falls into the black hole.

Making the simultaneous observations required careful planning between teams at the two telescopes. After several nights waiting at the two observatory sites, they struck lucky.

"At the VLT, as soon as we pointed the telescope at Sagittarius A* we saw it was active, and getting brighter by the minute. We immediately picked up the phone and alerted our colleagues at the APEX telescope," says Gunther Witzel, a PhD student from the University of Cologne.

Macarena García-Marín, also from Cologne, was waiting at APEX, where the observatory team had made a special effort to keep the instrument on standby. "As soon as we got the call we were very excited and had to work really fast so as not to lose crucial data from Sagittarius A*. We took over from the regular observations, and were in time to catch the flares," she explains.

Over the next six hours, the team detected violently variable infrared emission, with four major flares from Sagittarius A* . The submillimetre-wavelength results also showed flares, but, crucially, this occurred about one and a half hours after the infrared flares.The researchers explain that this time delay is probably caused by the rapid expansion, at speeds of about 5 million km/h, of the clouds of gas that are emitting the flares. This expansion causes changes in the character of the emission over time, and hence the time delay between the infrared and submillimetre flares.

Although speeds of 5 million km/h may seem fast, this is only 0.5% of the speed of light. To escape from the very strong gravity so close to the black hole, the gas would have to be travelling at half the speed of light – 100 times faster than detected – and so the researchers believe that the gas cannot be streaming out in a jet. Instead, they suspect that a blob of gas orbiting close to the black hole is being stretched out, like dough in a mixing bowl, and this is causing the expansion.

The simultaneous combination of the VLT and APEX telescopes has proved to be a powerful way to study the flares at multiple wavelengths. The team hope that future observations will let them prove their proposed model, and discover more about this mysterious region at the centre of our Galaxy.

About Sagittarius A

Sagittarius A is a compact object located at the centre of our own Milky Way Galaxy, at a distance of about 26 000 light-years from Earth. In recent years, observations of stars orbiting in its strong gravitational grip have convincingly proven that Sagittarius A* must be a supermassive black hole with a mass of about four million times that of the Sun.

The 12 m Atacama Pathfinder Experiment (APEX) telescope is located on the 5000 m high plateau of Chajnantor in the Chilean Atacama desert. APEX is a collaboration between the Max-Planck-Institute for Radio Astronomy (MPIfR), the Onsala Space Observatory (OSO) and ESO. The telescope is based on a prototype antenna constructed for the ALMA project. Operation of APEX at Chajnantor is entrusted to ESO. For this project, the researchers used the LABOCA bolometer camera on APEX.

The Very Large Telescope (VLT) at the 2600 m high Cerro Paranal is ESO's premier site for observations in visible and infrared light. The VLT has four "Unit Telescopes", 8.2 m in diameter, operating with a large collection of instruments. For this project, the researchers used the NACO adaptive optics instrument on the fourth Unit Telescope, "Yepun".

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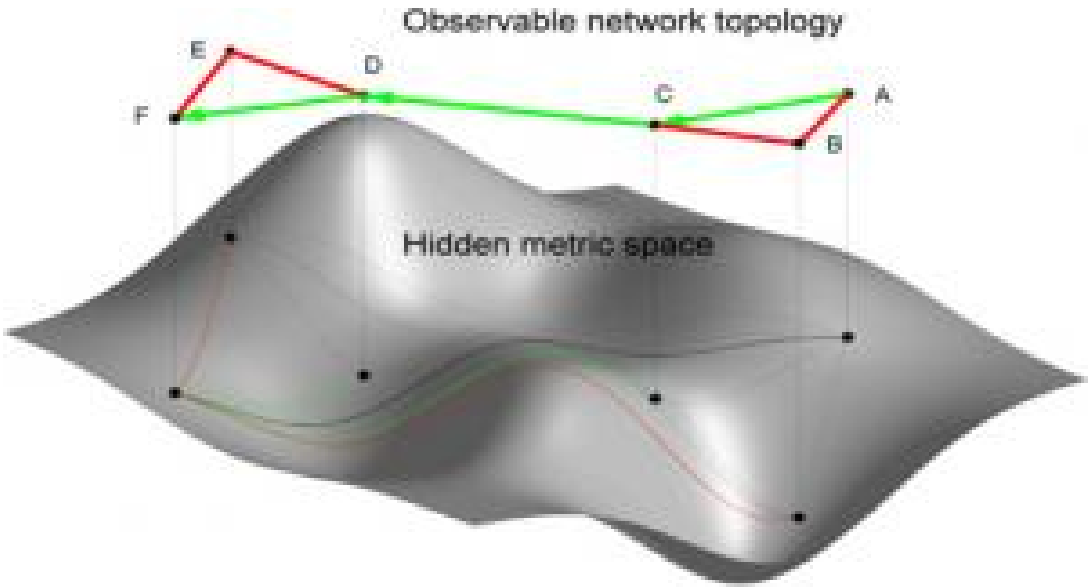
Adapted from materials provided by ESO.
http://www.sciencedaily.com/releases/2008/11/081118095852.htm

'Six Degrees Of Kevin Bacon' Game Provides Clue To Efficiency Of Complex Networks



How the hidden metric space guides communication. If node A wants to reach node F, it checks the hidden distances between F and its two neighbors B and C. Distance CF (green dashed line) is smaller than BF (red dashed line), therefore A forwards information to C. Node C then performs similar calculations and selects its neighbor D as the next hop on the path to F. Node D is directly connected to F. The result is path ACDF shown by green edges in the observable topology. (Credit: CAIDA, San Diego Supercomputer Center, UC San Diego)

ScienceDaily (Nov. 18, 2008) — As the global population continues to grow exponentially, our social connections to one another remain relatively small, as if we're all protagonists in the Kevin Bacon game inspired by "Six Degrees of Separation," a Broadway play and Hollywood feature that were popular in the 1990s.

In fact, classic studies show that if we were to route a letter to an unknown person using only friends or acquaintances who we thought might know the intended recipient, it would take five or six intermediary acquaintances before the letter reaches its intended destination.

The underlying success of this phenomenon called the "small-world paradigm," discovered in the 1960s by sociologist Stanley Milgram, recently provided a source of inspiration for researchers studying the Internet as a global complex network.

The result, a study by Marián Boguñá, Dmitri Krioukov, and Kimberly Claffy, published in Nature Physics on November 16, reveals a previously unknown mathematical model called "hidden metric space" that may explain the "small-world phenomenon" and its relationship to both man-made and natural networks such as human language, as well as gene regulation or neural networks that connect neurons to organs and muscles within our bodies.

For these researchers, the concept of an underlying "hidden space" may also be relevant to their professional interests: how to remove mounting bottlenecks within the Internet that threaten the smooth passage of digital information around the globe.

"Internet experts are worried that the existing Internet routing architecture may not sustain even another decade," said Krioukov, the study's principal investigator with the Cooperative Association for Internet Data Analysis (CAIDA), based at the San Diego Supercomputer Center at the University of California,

San Diego. "Routing in the existing Internet has already reached its scalability limits; black holes are appearing everywhere."

"Discovery of such a metric space hidden beneath the Internet could point toward architectural innovations that would remove this bottleneck," added Claffy, director of CAIDA and adjunct professor of computer science at UC San Diego. "Although quite prevalent in the natural world, the idea of routing using only local rather than global knowledge of network connectivity represents a revolutionary change in how to think about engineering communications networks. It's clear that the Internet's current architectural requirements are incompatible with the overwhelming amount of information that's being transmitted through this now critical global infrastructure."

According to the researchers, natural networks appear to transmit signals or messages with a high degree of efficiency, even though no single node – whether it's an individual person in a social network or a single neuron in a neural network – can visualize the global structure of the entire network.

How is this possible? By constructing a mathematical model of geometry underlying the topology of these networks, the researchers discovered that many complex networks shared a similar characteristic – their global topological structure (or shape) maximizes their communication efficiency.

"A vast majority of very different complex networks have similar shapes," said Krioukov. "They have similar shapes not just for fun, but perhaps because they all evolved toward structures and shapes that maximize efficiency according to their main common function, and that function is communication."

Take, for example, the "small-world phenomenon" described earlier. In this case, the only information people possessed to make their routing decisions was a set of descriptive attributes of the destined recipient – his or her home base and occupations. People then determined who among their contacts was "socially closest" to the target. For aficionados of the Kevin Bacon game, the goal was to connect any actor in Hollywood to Bacon through the films he made.

"The success of Milgram's experiment indicates that social distances among individuals – although they may be difficult to define mathematically – have a role in shaping the network, and may also be essential for efficient navigation," said Claffy.

Added Krioukov: "When you know the network topology, you merely know the basic layout of a network. But when you discover its underlying geometry, or hidden space, you may know how this complex network really functions."

Likewise, neural networks in the body would not function as well if they could not route specific signals to appropriate organs or muscles in the body, although no neuron has a full view of global inter-neuronal connectivity in the brain. The same can be said for the regulation of genes, which are turned on and off by regulator genes to manufacture proteins.

So, what accounts for this inherent communication efficiency of complex networks? The study suggests the existence of an underlying geometric framework that contains all the nodes of the network, shapes its topology and guides routing decisions: a "hidden metric space." Distances in this space are akin to social distances in the "small-world phenomenon." They measure similarity between people. The more similar the two persons, the closer they are in the "social space," and the more likely they are friends, connected in the acquaintance network. To route a message, a person forwards it to the friend socially closest to the message destination, as illustrated in Figure 1 (below).

"Such routing allows networks to efficiently find intended communication targets even though they do not have a global view of the system," said Claffy.

The primary motivation for this study, according to Krioukov, was the constantly increasing size and dynamics of the Internet, leading to increasing incidences of routing bottlenecks. Discovery of the Internet's "hidden metric space" would allow messages to be forwarded to destinations based on local measurements of similarities between nodes, their positions in the "hidden space," rather than on their positions in the network, which requires global measurements of its structure.

Krioukov also suggests that reconstruction of hidden metric spaces underlying a variety of real complex networks may have other practical applications. For example, hidden spaces in social or communications networks could yield new, efficient strategies for searching for specific individuals or content. The metric spaces hidden under some biological networks also could lead to powerful tools for studying the structure of information or signal flows in these networks.

"This could be applied to cancer research, for example, whose studies rely heavily on gene regulation," he said. "Suppose you were able to find the hidden space here. One could then figure out what drives gene regulation networks and what drives them to failure. This would be an important contribution to the field."

The research was supported in part by DGES grant FIS2007-66485-C02-02, Generalitat de Catalunya grant No. SGR00889, the Ramón y Cajal program of the Spanish Ministry of Science, by NSF CNS-0434996 and CNS-0722070, by DHS N66001-08-C-2029 and by Cisco Systems.

Adapted from materials provided by University of California - San Diego.
http://www.sciencedaily.com/releases/2008/11/081117153207.htm

Thank Journalist, Rather Than Pilgrims, For Thanksgiving Feast

ScienceDaily (Nov. 18, 2008) — Anne Blue Wills, assistant professor of religion at Davidson, explains that the current version of Thanksgiving was created by a journalistic crusader, and would have been unrecognizable to the Pilgrims it supposedly honors.

The holiday came about through fifty years of relentless promotion by Sarah Hale, editor of Godey's Lady's Book and Magazine. She promoted it in columns and stories in her magazine until President Abraham Lincoln finally bestowed it national recognition.

Wills emphasized that Thanksgiving was never a regular ritualized holiday during the Pilgrim era. Instead, it was an occasional event declared as needed by clergy to thank God for good fortune. Likewise, clergy also called parishioners to church for fasting days in response to adverse events. "Puritans emphasized that you should never presume on the will of God, so they never would have scheduled Thanksgivings," she said.

What we now recognize as "the first Thanksgiving," therefore, was simply an occasion for the Pilgrims to express their thanks to God for allowing them to kill enough game and gather enough harvest to survive the winter. True to Puritan character, the Pilgrims would have spent all day not in feasting, but in church contemplating the mercies of God's covenantal love.

Hale was a New Hampshire widow struggling to support five children by her writing when, in the late 1820s, she came to the attention of Louis Godey, who had plans to launch a women's magazine. Godey hired Hale in 1827 to edit the publication, and she did so for fifty years until retirement in 1877. From the beginning, Wills explained, Hale was a crusading type. "She freely used her magazine to promote causes like women's education, and to raise a monument to honor those who fought and died at Bunker Hill. And Thanksgiving was another of her big concerns."

Hale was concerned over increasing factionalism in American society, and envisioned Thanksgiving as a commonly-celebrated, patriotic holiday that would unite Americans in common purpose and values. She viewed those values as rooted in domesticity, and rural simplicity over urban sophistication.

The magazine, whose circulation peaked in 1860 at 150,000 per month, gave Hale tremendous access and influence to achieve her dream.

Through a monthly column that focused each November on Thanksgiving, Hale featured the celebration as a pious, patriotic holiday that lived on in the memory as a check against temptation, or as a comfort in times of trial. Hale and Godey's led the way in creating a standardized celebration, which in turn created a standardized celebrant—a standardized and true American.

Her umbrella vision of Americans included social classes not generally given that credit by the nation's white Protestant elite, to which Hale belonged. The stories in Godey's depicted black servants, Roman Catholics, and Southerners celebrating Thanksgiving, and becoming more American by doing so.

Her Thanksgiving also showcased American values to the outside world. It demonstrated national traits of piety, attachment to the land, recognition of heritage, and dedication to hard work to Europeans, whom she considered decadent and urbanized.

In addition to her column, she promoted the holiday in more circumspect fashion through the fictional stories that the magazine published. "A lot of those stories made the reader assume that everyone spent the fourth Thursday in November celebrating Thanksgiving," Will said.

The stories told about how Thanksgiving changed people's lives, and put them in touch with the virtues that Hale believed the country represented. Wills cited as an example one story of a young, spoiled city girl who cared for little beyond her finery and personal appearance until she spent the Thanksgiving holiday on her aunt's farm. That experience showed her that rural people enjoy a more grounded lifestyle, and that there are more important things in life than dances and stylish shoes. "The message is that the simple, pure, honest rural life, away from the temptations of the city, puts you in touch with true values," said Will. "If we can just travel back to the old home place once a year we'll be protected from temptations and evil."

Hale's vision of Thanksgiving also showcased the talents of women as nurturers and cooks. Wills said the reason Hale selected Thursday for the celebration was so that women would have time to prepare a substantial meal for the holiday, and enough time afterward to prepare the traditional Sunday meal. However, Hale never associated turkey with the holiday, favoring instead chicken and oysters.

Hale early on began calling on the president and Congress to declare Thanksgiving as a nation-wide event, and she pushed harder and harder each year as the rift between north and south became more threatening to the national unity she cherished.

She urged readers to lobby their representatives, and to write to her about their Thanksgiving experiences. They did, and Hale kept count each year of the growing number of celebrants.

Godey's was the major women's magazine of its day, and Hale's campaign eventually had its desired influence. In 1863 Abraham Lincoln made the first declaration for a national day of Thanksgiving to be celebrated on the fourth Thursday in November.

Hale became wealthy through the Godey's, and the magazine's Thanksgiving began to take on more commercial overtones. As the century unfolded and transportation improved, the wider variety of foods available was showcased in the magazine's Thanksgiving meals, and stories discussed the type of clothing and decorations appropriate for the holiday.

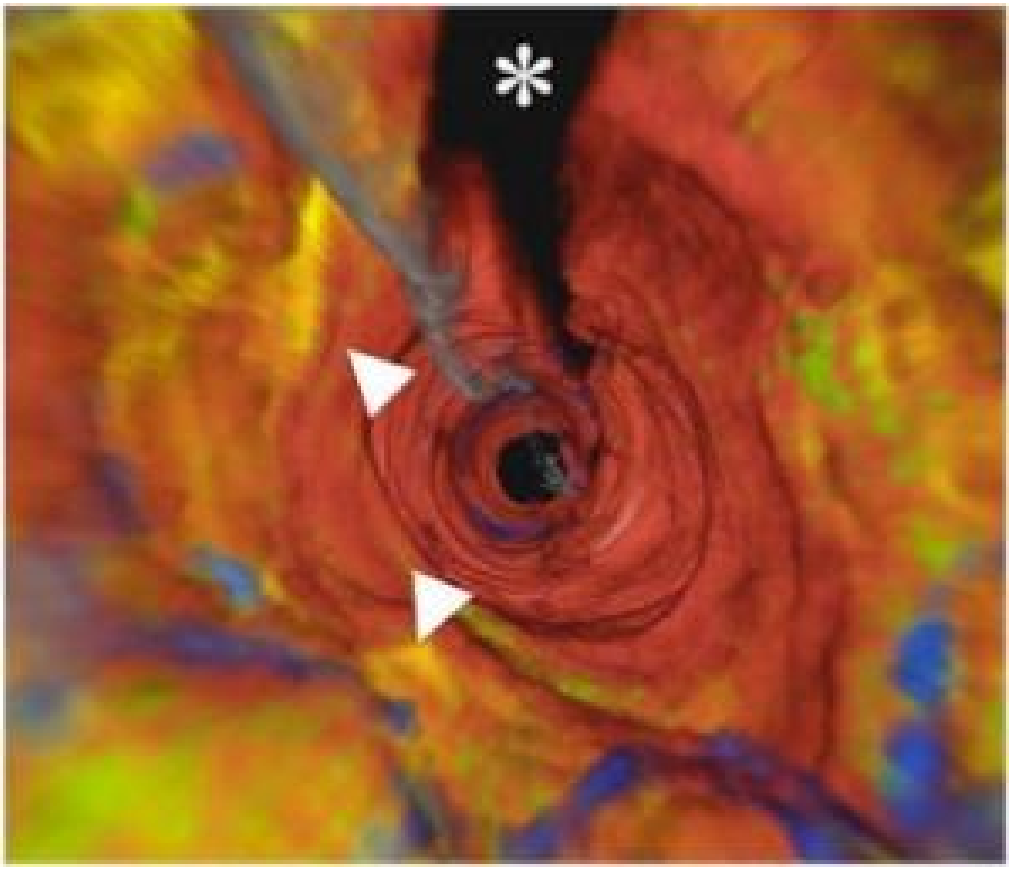
While Wills credits Hale for originating the way we celebrate Thanksgiving today, she pointed out that further developments have led to current traditions that Hale could never have imagined. "For instance, I don't think football games and making the day after Thanksgiving the biggest shopping day of the year ever crossed her mind," Wills said.

Wills said her research hasn't spoiled the magic of the occasion. "In some ways, it makes it more enjoyable because I can see where it's come from," she said.

Wills also gained a respect for Hale. She explained, "I do admire her. I don't know if I would have liked her, but I admire her tenacity and vision. On some level she understood that a nation, a community, needs a festival, a symbolic event to renew people, and remind them of their values."

Adapted from materials provided by Davidson College, via Newswise.
http://www.sciencedaily.com/releases/2008/11/081117220543.htm

Technology Gives 3-D View Of Human Coronary Arteries



OFDI fly-through view of same patient's right coronary artery, white arrowheads indicate area of white dotted line in image at right. (Credit: Massachusetts General Hospital)

ScienceDaily (Nov. 18, 2008) — For the first time researchers are getting a detailed look at the interior of human coronary arteries, using an optical imaging technique developed at the Wellman Center for Photomedicine at Massachusetts General Hospital (MGH). In their report in the journal JACC: Cardiovascular Imaging, the research team describes how optical frequency-domain imaging (OFDI) gives three-dimensional, microscopic views of significant segments of patients' coronary arteries, visualizing areas of inflammation and plaque deposits.

"This is the first human demonstration of a technique that has the potential to change how cardiologists look at coronary arteries," says Gary Tearney, MD, PhD, of the MGH Pathology Department and the Wellman Center for Photomedicine at MGH, the study's lead author. "The wealth of information that we can now obtain will undoubtedly improve our ability to understand coronary artery disease and may allow cardiologists to diagnose and treat plaque before it leads to serious problems."

OFDI is an advance over optical coherence tomography (OCT), another imaging technology developed by the MGH investigators. While OCT examines tissues one point at a time, OFDI can look at over 1,000 points simultaneously using a device developed at MGH-Wellman. Inside a fiberoptic probe, a constantly rotating laser tip emits a light beam with an ever-changing wavelength. As the probe moves through the structure to be imaged, measuring how each wavelength is reflected back allows rapid acquisition of the data required to create the detailed microscopic images. Besides providing three-dimensional images of an artery's microstructure in seconds, the increased speed also reduces signal interference from blood, which had plagued the first-generation technology. In 2006 members of the MGH-Wellman team reported the successful use of OFDI to image the esophagus and coronary arteries of pigs.

The current study enrolled three patients scheduled to have stents placed in their coronary arteries at the Lahey Clinic in Burlington, Mass. After the completion of stent placement, OFDI was used to image 3- to 7-centimeter-long segments of the patients' coronary arteries including the stented areas. OFDI provided detailed images along the length of the arteries – visualizing lipid or calcium deposits, immune cells that could indicate inflammation, and the stents – and dramatic "fly-through" views looking down the artery's interior. More detailed, cross-sectional images of narrowed vascular segments revealed features associated with the type of atherosclerotic plaques that are likely to rupture and cause a heart attack.

Tearney and his colleagues note that these findings need to be duplicated in a larger group of patients, and the time required to process the "fly-through" images – currently several hours – needs to be reduced to provide the real-time information most useful for clinical applications. Combining OFDI with intravascular ultrasound might help with another of the technique's limitations, the inability to penetrate deep into tissues.

"While more work remains, the technology is advancing at a rapid pace. We expect to see commercial devices available in a one- to two-year time frame," says Brett Bouma, PhD, of the Wellman Center, senior author of the report. "Our goal now is to help put the pieces in place to ensure that this technique will be widely available to interventional cardiologists." Bouma is an associate professor of Dermatology, and Tearney an associate professor of Pathology at Harvard Medical School.

Additional co-authors of the JACC: Cardiovascular Imaging report are Milen Shishkov, PhD, Ben Vakoc, PhD, Melissa Suter, PhD, Adrien Desjardins, PhD, Wang-Yul Oh, PhD, Lisa Bartlett and Mireille Rosenberg, PhD, MGH-Wellman; and Sergio Waxman, MD, and Mark Freilich, MBBS, Lahey Clinic. The MGH has licensed cardiovascular applications of OFDI to Terumo Corporation, which has supported nonclinical OFDI studies by Tearney and Bouma. The current study was supported by a grant from the National Institutes of Health.

Adapted from materials provided by Massachusetts General Hospital.
http://mail.google.com/mail/?hl=es&shva=1#inbox/11db44b4c8c70f66

Mathematics Students Make Prime Discovery

ScienceDaily (Nov. 18, 2008) — Westfield State College senior mathematics majors Jeffrey P. Vanasse and Michael E. Guenette, working under the direction of Mathematics Department faculty members Marcus Jaiclin and Julian F. Fleron, have made a significant new discovery in the mathematical field of number theory. They have discovered the first known example of a 3 by 3 by 3 generalized arithmetic progression (GAP).

Most easily thought of as a 3 by 3 by 3 cube (similar to a Rubik's cube puzzle) made up of 27 primes, their discovery begins with 929 as its smallest prime ends with 27917 as its largest prime. The intervening 25 primes are constructed by adding combinations of the numbers 2904, 3150, and 7440 in an appropriately structured method.

"Such an object was known to exist and its approximate size had been loosely estimated," Fleron said. "However, a blind search would require checking more cases than can be feasibly checked by all existing modern computers each running for the next million years. Instead, the group used knowledge of the structural relationships between the potential candidates to greatly reduce the potential candidates to be checked."

An algorithm to check the necessary cases – still easily hundreds of trillions of cases – was programmed using a Linux version of the computer language C++.

"This breakthrough is another indication that our Mathematics Department is working on a world-class level," said Evan S. Dobelle, president of Westfield State College. "The college is very proud of these students and their professors for taking the initiative to practice cutting-edge mathematics."

"We were worried that it might take months to run based on our estimates," Guenette said. "Yet initial tests showed the algorithm running at a hopeful speed."

"We were always optimistic, but the first tests got us really excited that our method would be successful," Vanasse said.

The team broke the search up into groups of cases for each of the researchers to run on separate computers. Within days the first known example of a 3 by 3 by 3 GAP was found – one with largest prime of 197,957.

Having succeeded in finding the first known example, and now having a strict bound on the size of the largest prime, the group set to work finding other 3 by 3 by 3 GAPs – in particular, the smallest such. They were successful, showing there are exactly three 3 by 3 by 3 GAPs of primes with largest prime less than 50,000, the smallest example being that described above.

The students and faculty members are hopeful that their work will aid number theorists who continue to work on elusive patterns that lurk within the mystery of the prime numbers.

With estimates for the largest prime in a 4 by 4 by 4 or 3 by 3 by 3 by 3 GAP being near 5 quadrillion (that's a 5 followed by 15 zeroes) the group is fairly certain that their record for finding the highest dimensional GAP will stand for quite some time, Fleron said.

Guenette of Easthampton, Mass., and Vanasse of Chicopee, Mass., both plan on attending graduate school in mathematics following graduation. Their work on this problem has provided them with a valuable introduction to the efforts of a working research mathematician.

For Jaiclin and Fleron, and the rest of the Westfield State Mathematics Department, it is another opportunity to share with and involve undergraduates what they love best: doing significant mathematics and advancing the frontier of human knowledge.

Fleron said the team's work was inspired by the recent discoveries of the young Australian mathematician Terence Chi-Shen Tao, now a professor at the University of California, Los Angeles. "Many prominent number theorists are working simply to understand the implications of these discoveries," he said. "Now Westfield State College students are playing a role, as well."

British mathematician Andrew Granville, now on the faculty of the Université de Montréal, also inspired the group. Granville's paper, "Prime Number Patterns," was published in the April edition of American Mathematical Monthly.

Ironically, Granville just gave a lecture on "Patterns in the Primes" as part of the Distinguished Lecture Series of the Mathematical Association of America (MAA). This series, sponsored by the National Security Agency, took place at the MAA Carriage House Conference Center in Washington D.C. on Thursday, Nov. 13. This was the day before the Westfield State group's discovery.

Adapted from materials provided by Westfield State College, via Newswise.
http://www.sciencedaily.com/releases/2008/11/081117220257.htm

Billions Of Particles Of Anti-matter Created In Laboratory

Physicist Hui Chen sets up targets for the anti-matter experiment at the Jupiter laser facility. (Credit: Image courtesy of DOE/Lawrence Livermore National Laboratory)

ScienceDaily (Nov. 18, 2008) — Take a gold sample the size of the head of a push pin, shoot a laser through it, and suddenly more than 100 billion particles of anti-matter appear. The anti-matter, also known as positrons, shoots out of the target in a cone-shaped plasma "jet."

This new ability to create a large number of positrons in a small laboratory opens the door to several fresh avenues of anti-matter research, including an understanding of the physics underlying various astrophysical phenomena such as black holes and gamma ray bursts.

Anti-matter research also could reveal why more matter than anti-matter survived the Big Bang at the start of the universe.

"We've detected far more anti-matter than anyone else has ever measured in a laser experiment," said Hui Chen, a Livermore researcher who led the experiment. "We've demonstrated the creation of a significant number of positrons using a short-pulse laser."

Chen and her colleagues used a short, ultra-intense laser to irradiate a millimeter-thick gold target. "Previously, we concentrated on making positrons using paper-thin targets," said Scott Wilks, who designed and modeled the experiment using computer codes. "But recent simulations showed that millimeter-thick gold would produce far more positrons. We were very excited to see so many of them."

In the experiment, the laser ionizes and accelerates electrons, which are driven right through the gold target. On their way, the electrons interact with the gold nuclei, which serve as a catalyst to create positrons. The electrons give off packets of pure energy, which decays into matter and anti-matter, following the predictions by Einstein's famous equation that relates matter and energy. By concentrating the energy in space and time, the laser produces positrons more rapidly and in greater density than ever before in the laboratory.

"By creating this much anti-matter, we can study in more detail whether anti-matter really is just like matter, and perhaps gain more clues as to why the universe we see has more matter than anti-matter," said Peter Beiersdorfer, a lead Livermore physicist working with Chen.

Particles of anti-matter are almost immediately annihilated by contact with normal matter, and converted to pure energy (gamma rays). There is considerable speculation as to why the observable universe is apparently almost entirely matter, whether other places are almost entirely anti-matter, and what might be possible if anti-matter could be harnessed. Normal matter and anti-matter are thought to have been in balance in the very early universe, but due to an "asymmetry" the anti-matter decayed or was annihilated, and today very little anti-matter is seen.

Over the years, physicists have theorized about anti-matter, but it wasn't confirmed to exist experimentally until 1932. High-energy cosmic rays impacting Earth's atmosphere produce minute quantities of anti-matter in the resulting jets, and physicists have learned to produce modest amounts of anti-matter using traditional particle accelerators. Anti-matter similarly may be produced in regions like the center of the Milky Way and other galaxies, where very energetic celestial events occur. The presence of the resulting anti-matter is detectable by the gamma rays produced when positrons are destroyed when they come into contact with nearby matter.

Laser production of anti-matter isn't entirely new either. Livermore researchers detected anti-matter about 10 years ago in experiments on the since-decommissioned Nova "petawatt" laser – about 100 particles. But with a better target and a more sensitive detector, this year's experiments directly detected more than 1 million particles. From that sample, the scientists infer that around 100 billion positron particles were produced in total.

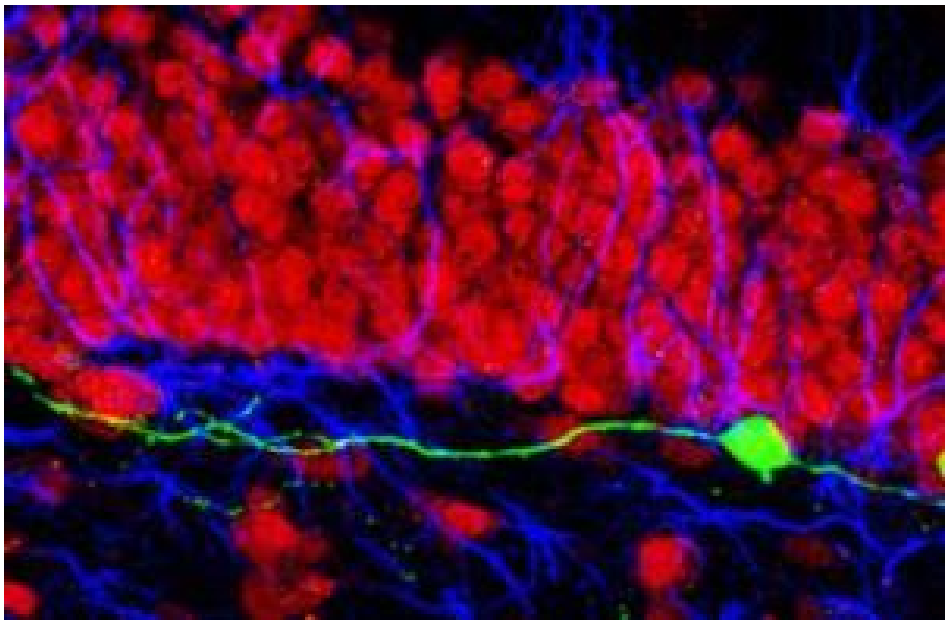
Until they annihilate, positrons (anti-electrons) behave much like electrons (just with an opposite charge), and that's how Chen and her colleagues detected them. They took a normal electron detector (a spectrometer) and equipped it to detect particles with opposite polarity as well.

"We've entered a new era," Beiersdorfer said. "Now, that we've looked for it, it's almost like it hit us right on the head. We envision a center for antimatter research, using lasers as cheaper anti-matter factories."

Chen will present her work at the American Physical Society's Division of Plasma Physics meeting Nov. 17-21 at the Hyatt Regency Reunion in Dallas. S.C. Wilks, E. Liang, J. Myatt, K. Cone ,L. Elberson, D.D. Meyerhofer, M. Schneider, R. Shepherd, D. Stafford, R. Tommasini, P. Beiersdorfer are the collaborators on this project.

Adapted from materials provided by DOE/Lawrence Livermore National Laboratory.
http://www.sciencedaily.com/releases/2008/11/081117193019.htm

Newborn Neurons In Adult Brain Can Settle In The Wrong Neighborhood



Newborn neurons lacking cdk5 (green) extend aberrant dendrites that nonetheless synaptically integrate into the pre-existing dentate circuitry containing neurons (red) and glial cells (blue). (Credit: Courtesy of Dr. Sebastian Jessberger, Federal Institute of Technology, Zurich, Switzerland.)

ScienceDaily (Nov. 18, 2008) — In a study that could have significant consequences for neural tissue transplantation strategies, researchers at the Salk Institute for Biological Studies report that inactivating a specific gene in adult neural stem cells makes nerve cells emerging from those precursors form connections in the wrong part of the adult brain.

Researchers, led by Fred H. Gage, Ph.D., professor in the Laboratory of Genetics, discovered that a protein called cdk5 is necessary for both correct elaboration of highly branched and complex antennae, known as dendrites, which are extended by neurons, and the proper migration of cells bearing those antennae.

Previously described functions of cdk5 are manifold, among them neuronal migration and dendritic pathfinding of neurons born during embryonic development. "The surprising element was that the dendrites of newborn granule cells in the adult hippocampus lacking cdk5 stretched in the wrong direction and actually formed synapses with the wrong cells," explains Gage. Synapses are the specialized contact points where dendrites receive input from the long processes, or axons, of neighboring neurons.

These findings offer extremely valuable, although unanticipated, input for investigators whose goal is to develop transplantation strategies to treat brain injuries or neurodegeneration.

"Our data shows that cells that fail to find their 'right spot' might actually become integrated into the brain and possibly interfere with normal information processing," says the study's lead author Sebastian Jessberger, M.D., a former postdoc in the Gage lab and now an assistant professor at the Swiss Federal Institute of Technology in Zurich, Switzerland.

Gage agrees that this is a possibility, noting that therapeutic targeting of new tissue—which would presumably be derived from stem cells—to the brain or spinal cord may demand extreme accuracy. "Our findings reflect the need for therapeutic approaches that will assure that cells used in regenerative

medicine are strategically placed so that they will make appropriate rather than promiscuous connections."

In the study investigators first injected retroviruses into part of the adult mouse brain known as the hippocampus, which is required for memory formation, to tag and knock out cdk5 activity in newborn granule cell neurons. Over time they observed that newborn neurons not only failed to move to their correct position in the brain but also sported stunted, mistargeted dendrites.

Jessberger explains that one might have predicted the opposite: that if immature neurons in the adult brain accidentally oriented their antennae in the wrong direction, they might fail to connect with cells in that network, or possibly even die. That they formed synaptic contact points was highly unanticipated. "We found that dendrites of cells lacking cdk5 seemed to integrate into the brain no matter what direction they grew in," he says.In fact, the inappropriate synaptic connections made by cdk5-deficient cells persisted for months after the treatment with cdk5-antagonizing retroviruses. "One might have predicted that aberrant maturing nerve cells would get kicked out of the circuitry later on," reports Jessberger, who followed the behavior of newborn granule cells in treated mice long after cdk5 activity was eliminated. "Even after one year, some of those cells remained in the wrong part of the hippocampus."

The PLoS Biology paper is part of an extensive body of work contributed by the Gage lab to the field of adult neurogenesis. A decade ago Gage became one of the first investigators in the world to demonstrate the emergence of new neurons in brains of adult mammals, including humans. The current study specifically extends a 2005 PNAS study in which the lab searched the whole genome for chromosomal hot spots associated with adult neurogenesis.

That study, which was initiated by former postdoctoral fellow Gerd Kempermann, M.D, a co-author on the PLoS Biology paper and currently professor at the Center for Regenerative Therapies in Dresden (CRTD), had identified a large region of mouse chromosome 5 as an area of interest, and cdk5 was a gene embedded within that locus.

"The nice part of this story is that it emerged from a systems genetics approach," says Gage. "It continues our effort to apply genetic analysis to find chromosomal regions harboring genes that may play a critical role in neurogenesis."

Also contributing to the study from the Gage lab were Stefan Aigner, Ph.D., Gregory D. Clemenson, Jr., Nicolas Toni, Ph.D., and D. Chichung Lie, M.D. Özlem Karalay of ETH and Rupert Overall of CRTD also were authors on the paper.

The study was supported by the Swiss National Science Foundation and the Deutsche Forschungsgemeinschaft and grants from the National Institutes of Health, the Lookout Fund, the Christopher and Dana Reeve Foundation, the Picower Foundation, the James S. McDonnell Foundation, and the Damon Runyon Cancer Research Foundation.

Journal reference:

1. Jessberger S, Aigner S, Clemenson GD Jr, Toni N, Lie DC, et al. **Cdk5 regulates accurate maturation of newborn granule cells in the adult hippocampus**. *PLoS Biol*, November 11, 2008, 6(11): e272 DOI: 10.1371/journal.pbio.0060272

Adapted from materials provided by Salk Institute.
http://www.sciencedaily.com/releases/2008/11/081110223326.htm

World's Earliest Nuclear Family Found

Group burial of a 4,600-year-old nuclear family, with the children (a boy of 8-9 and a boy of 5-4 years) buried facing their parents (Credit: Image courtesy of the Johannes Gutenberg University Mainz)

ScienceDaily (Nov. 18, 2008) — The earliest evidence of a nuclear family, dating back to the Stone Age, has been uncovered by an international team of researchers, including experts from the University of Bristol. The researchers dated remains from four multiple burials discovered in Germany in 2005.The 4,600-year-old graves contained groups of adults and children buried facing each other – an unusual practice in Neolithic culture.

One of the graves was found to contain a female, a male and two children. Using DNA analysis, the researchers established that the group consisted of a mother, father and their two sons aged 8-9 and 4-5 years: the oldest molecular genetic evidence of a nuclear family in the world (so far).

The burials, discovered and excavated at Eulau, Saxony-Anhalt, were also unusual for the great care taken in the treatment of the dead. The remains of thirteen individuals were found in total, all of whom had been interned simultaneously.

Intriguingly, the arrangement of the dead seemed to mirror their relations in life. Several pairs of individuals were buried face-to-face with arms and hands interlinked in many cases. All the burials contained children ranging from newborns up to 10 years of age and adults of around 30 years or older. Interestingly, there were no adolescents or young adults.

Many showed injuries that indicated they were the victims of a violent raid. One female was found to have a stone projectile point embedded in one of her vertebra and another had skull fractures. Several bodies also had defence injuries to the forearms and hands.

The researchers reconstruct this Stone Age tragedy using state-of-the-art genetics and isotope techniques, physical anthropology and archaeology.

Lead author Dr Wolfgang Haak of the University of Adelaide said: "By establishing the genetic links between the two adults and two children buried together in one grave, we have established the presence of the classic nuclear family in a prehistoric context in Central Europe – to our knowledge the oldest authentic molecular genetic evidence so far. Their unity in death suggests a unity in life. However, this

does not establish the elemental family to be a universal model or the most ancient institution of human communities."

As well as establishing the biological relationships of the people buried at Eulau, the researchers were also able to shed light on their social organisation using strontium isotope analysis.

Hylke de Jong, a PhD student working on the Eulau graves at the University of Bristol said: "We measured strontium isotopes in their teeth to give us an indication of where these people spent their childhood. Strontium from the food you eat is incorporated into your teeth as they grow. We can relate the proportion of different strontium isotopes back to regions with different geology and identify the area where a person grew up."

Dr Alistair Pike, Head of Archaeology at the University of Bristol and co-Director of the project, continued: "The strontium analysis showed that the females spent their childhood in a different region from the males and children. This is an indication of exogamy (marrying out) and patrilocality (the females moving to the location of the males). Such traditions would have been important to avoid inbreeding and to forge kinship networks with other communities."

The burials described in detail in the article are now on permanent display in the newly renovated Landesmuseum Sachsen-Anhalt in Germany.

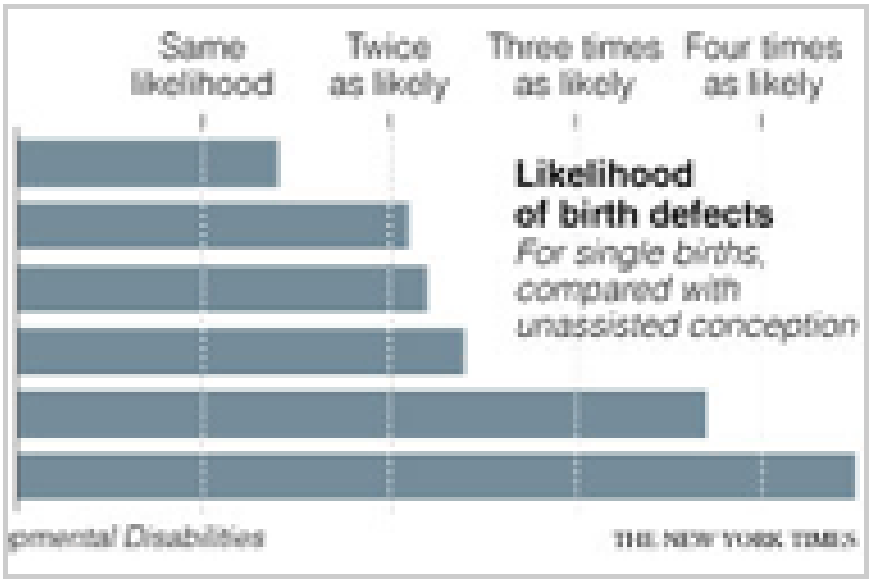
Journal reference:

1. Wolfgang Haak, Guido Brandt, Hylke N. de Jong, Christian Meyer, Robert Ganslmeier, Volker Heyd, Chris Hawkesworth, Alistair W. G. Pike, Harald Meller, and Kurt W. Alt. **Ancient DNA, Strontium isotopes, and osteological analyses shed light on social and kinship organization of the Later Stone Age**. *Proceedings of the National Academy of Sciences*, Nov 17, 2008; 18226-18231 vol105 no.47

Adapted from materials provided by University of Bristol.
http://www.sciencedaily.com/releases/2008/11/081117192915.htm

Birth Defects Tied to Fertility Techniques

By DENISE GRADY



Infants conceived with techniques commonly used in fertility clinics are two to four times more likely to have certain birth defects than are infants conceived naturally, a new study has found.

The findings applied to single births only, not to twins or other multiples. The defects included heart problems, cleft lip, cleft palate and abnormalities in the esophagus or rectum. But those conditions are rare to begin with, generally occurring no more than once in 700 births, so the overall risk was still low, even after the fertility treatments. Cleft lip, for instance, typically occurs in 1 in 950 births in the United States, and the study found that the risk about doubled, to approximately 1 in 425, among infants conceived with the fertility treatments.

The procedures that increased the risk were so-called assisted reproductive techniques, like in vitro fertilization, which require doctors and technicians to work with eggs and sperm outside the body. The study did not include women who only took fertility drugs and did not have procedures performed.

"I think it is important for couples to consider the fact that there may be a risk for birth defects," said Jennita Reefhuis, an epidemiologist at the Centers for Disease Control and Prevention, and the first author of the study, which was published online on Sunday by the journal Human Reproduction.

But Dr. Reefhuis (pronounced REEF-house) also said that although her study linked fertility procedures to birth defects, it did not prove the connection or explain it. If the connection is real, it is not known whether the procedures increase the risk for birth defects, or whether infertility itself raises the risk.

Fertility doctors, she said, "may not believe my findings."

Dr. James A. Grifo, director of the fertility clinic at New York University Medical Center, said, "The good news is that the risk is low."

Dr. Grifo said more research was needed to test the findings, because the study included only 281 women who had fertility procedures. He said that if the association with birth defects was real, the underlying cause was more likely related to the patients' infertility than to the treatments.

"The results are concerning, but with this small a sample of patients, a bigger study would need to be done," Dr. Grifo said. "And the fact that they see it in singletons, not in twins, makes it hard for me to think this is a direct relationship."

Twins and other multiple births have a higher risk of birth defects than single births and whether infertility treatment adds to that risk is unknown.

Dr. Alan R. Fleischman, vice president and medical director of the March of Dimes, said: "I think it's an important study. It's confirmatory of the direction we have been concerned about, an increase in some structural birth defects in babies born with assisted reproductive techniques compared to those born without such. And yet the numbers are still small, the risks are low."

Women considering fertility treatment should be informed that there might be a risk of birth defects, Dr. Fleischman said, but they need not be "overly concerned."

In 2005, about 52,000 infants were born in the United States as a result of in vitro fertilization and related techniques, according to the disease centers. The number doubled from 1996 to 2004; currently, about 12 percent of women ages 15 to 44 in this country seek fertility treatments.

The researchers used information already collected by a large project paid for by the government, the National Birth Defects Prevention study. Dr. Reefhuis and her colleagues compared 9,584 women who had children with birth defects, and 4,792 control women whose children were born without defects. In the control group, 1.1 percent of the women (51) had undergone fertility procedures; in those whose children had birth defects, the figure was 2.4 percent (230). The increased risk among those who had the procedures was not related to their age, income, the number of children they had or to whether or not their babies were born prematurely.

Dr. Fleischman acknowledged that the number of women who had fertility procedures was small, but, he said, "These are very well-studied populations, and they're just about as good data as we have."

The study included information from 281 births conceived with fertility techniques and 14,095 without.

http://www.nytimes.com/2008/11/18/health/research/18birth.html?nl=8hlth&emc=hltha2

If a Baby Has a Fever, Treatment All Depends

By PERRI KLASS, M.D

The baby didn't look sick, as he lay in his mother's arms and looked around the room at the clinic. He wasn't screaming inconsolably, wasn't limp and listless.

But his mother had told the nurse that he seemed fussy and wasn't nursing quite as vigorously as usual. And he felt warm to the touch. So the nurse took his temperature: 100.4, less than two degrees above normal.

Pediatricians often need to reassure parents when their toddler or preschooler has a high fever. Yes, we say, your daughter has a temperature of 103, but she looks good; it's probably just a virus. No need for antibiotics, no need for anything except liquids and an over-the-counter medicine like acetaminophen or ibuprofen.

Yet in this robust baby boy, not quite 2 months old, 100.4 was reason for worry.

Newborns don't handle infection very well. Their immature immune systems leave them vulnerable to severe infections that can rage out of control. In the worst cases, bacteria get into the bloodstream, from a urinary infection or a skin infection for example, and cause bacterial sepsis. Or even worse, the bacteria leak from the bloodstream through the barrier that is supposed to separate blood and brain, causing meningitis. So if fever occurs in a very young baby, the advice to parents is always to call the doctor right away. But almost two months old is no longer a newborn.

Twenty years ago, when I was in pediatric training, the definition of "very young" was under 3 months. For any fever in that age group, we took samples of blood, urine and spinal fluid and sent them to be cultured for bacteria. While we waited for the results we put the baby in the hospital and treated with intravenous antibiotics.

But in most cases, the aggressive treatment was unnecessary, because the cultures yielded no bacteria. Fortunately, there has been good epidemiologic research in recent years to help predict which babies really need to be hospitalized.

Nowadays, anyone under 1 month old who develops any fever still tends to end up in the hospital. For babies older than 3 months, we now use our clinical judgment: if they appear well, we might order a blood or urine test, but they can go home, as long as we stay in touch with the parents.

Between 1 and 3 months is still a gray zone. And in this case, there were a few other subtle shades of gray, notably the fussiness and reluctance to nurse: after all, an infant with a serious infection has a limited repertory of signals to say, "Hey, Mom, something's wrong."

Did his temperature really constitute a fever? As it happened, it fell on the cutoff for "real" fever — 38 degrees Celsius, or 100.4 Fahrenheit.

So age right on the borderline, fever right on the borderline, and story right on the borderline. Here were the doctor's options:

A. Examine the baby carefully, and if he looks good and the temperature isn't climbing and the mother seems comfortable and competent, send them home and tell the mother to watch carefully.

B. Get a blood count to check for serious infection, and maybe a urine test to be sure there's no evidence of a urinary infection. If there's no evidence of infection on these relatively rapid tests, proceed to A.

C. Send blood and urine to be cultured for bacterial infection, which will take two days. Send the baby home but consider giving him a shot of antibiotics to "cover" him.

D. If the baby looks sick, send him to the emergency room for a spinal tap and a full sepsis workup and admit him to the hospital for intravenous antibiotics while waiting to see if any of the cultures are positive for bacteria.

Each of these responses would have been reasonable and defensible and explainable.

"Pediatricians really wrestle with this issue," said Dr. William V. Raszka, professor of pediatrics at the University of Vermont College of Medicine and director of the Pediatric Infectious Diseases Service at Vermont Children's Hospital. He added that "there's a tremendous amount of conflicting data" about which babies need which tests and treatments.

"The incidence of serious bacterial illness in children who look well between 1 and 3 months of age is really, really low" as long as a urine test is negative, Dr. Raszka said. But on the other hand, if the baby is not completely well, "if mother is sure this is not the normal child, I would be more aggressive in working up the baby."

In this case, the baby looked pretty good. His fever wasn't going up; his patient mother was nursing him and he was drinking, while his less patient brother dismantled the exam room. He probably did not have a serious bacterial infection.

We did check a blood count — it looked normal — and we got some urine to be cultured. On the other hand, the mother continued to feel strongly that the baby was not quite "himself." I couldn't find anything wrong on his exam, but she knew him better. And because I got my pediatric training in the days when he would have been automatically admitted to the hospital, I'm probably more conservative than younger doctors.

In the end, we did give him a shot of antibiotics, his cultures went to the lab, and he and his mother went home with a thermometer. The next day he was himself again, his mother reported — less fussy, more alert and happy, nursing well. Nothing grew in his cultures. Maybe he had a mild viral illness, which caused the fever and the fussing, and he fought it off.

From a certain point of view, he was unlucky: he was right on the borderlines of both temperature and age. And from another point of view, he lucked out: 20 years ago, he would have had to spend three days in the hospital.

In either case, the next time he comes into the clinic with fever, he will, I hope, have aged out of the gray zone, out of the high-risk age, and we can concentrate on treating an infection, if we find one, and reassuring his mother that fever by itself is nothing to worry about.

Perri Klass is a professor of journalism and pediatrics at New York University. Her most recent book is the novel "The Mercy Rule."

http://www.nytimes.com/2008/11/18/health/18feve.html?nl=8hlth&emc=hltha1

Kidney Disease Takes a Growing Toll

By DAVID TULLER

In February 2005, Rita Miller, a party organizer in Chesapeake, Va., felt exhausted from what she thought was the flu. She was stunned to learn that persistent high blood pressure had caused such severe kidney damage that her body could no longer filter waste products from her blood.

"The doctor walked over to my bed and said, 'You have kidney failure — your kidneys are like dried-up peas,' " recalled Ms. Miller, now 65, who had not been to a doctor or had her blood pressure checked for years.

"The doctor said, 'Get your family here right away,' " she said. "They were telling me I might not make it. I was in shock. I started dialysis the next day."

Ms. Miller, who has since moved to Connecticut to be with her children, was one of the millions of Americans unaware that they are suffering from chronic kidney disease, which is caused in most cases by uncontrolled hypertension (as in her case) or diabetes, and is often asymptomatic until its later stages. The number of people with the disease — often abbreviated C.K.D. — has been rising at a significant pace, thanks in large part to increased obesity and the aging of the population.

An analysis of federal health data published last November in The Journal of the American Medical Association found that 13 percent of American adults — about 26 million people — have chronic kidney disease, up from 10 percent, or about 20 million people, a decade earlier.

"We've had a marked increase in chronic kidney disease in the last 10 years, and that continues with the baby boomers coming into retirement age," said Dr. Frederick J. Kaskel, director of pediatric nephrology at the Children's Hospital at Montefiore in the Bronx. "The burden on the health care system is enormous, and it's going to get worse.

"We won't have enough units to dialyze these patients."

Concerned about the emerging picture, federal health officials have started pilot programs to bolster public awareness, increase epidemiologic surveillance and expand efforts to screen those most at risk — people with high blood pressure, diabetes or a family history of kidney disease.

Those people, and those who already have the disease, can often be helped by the same kinds of medicine and lifestyle changes used in hypertension and diabetes. They are urged to quit smoking, lose weight, exercise regularly, restrict their diets and, if necessary, control their blood pressure and diabetes with medication. But such efforts cannot restore kidney function that has been lost.

The trouble is that most people know very little about chronic kidney disease and rarely ask their doctors about kidney function. And many of those who have it feel relatively well until late in the illness, although they may experience nonspecific symptoms like muscle cramps, loss of energy and poor concentration.

"When most people think of kidney disease, they think of dialysis or transplantation," said Dr. Joseph A. Vassalotti, chief medical officer for the National Kidney Foundation, a major education and advocacy group. "They don't understand that it encompasses a spectrum, and that the majority of patients are unaware they have the condition."

Chronic kidney disease progresses over the course of years, with its phases determined according to two criteria: the presence of protein in the urine, known as proteinuria, and how effectively the kidneys are processing waste products.

Patients get dialysis or a kidney transplant only when they are in the final stage of the disease, also known as kidney failure or end-stage renal disease. But the path to kidney failure can take years. "Only a tiny percentage of patients with kidney disease need dialysis," said Dr. Stephen Fadem, a Houston nephrologist and vice president of the American Association of Kidney Patients.

Chronic kidney disease itself can damage the cardiovascular system and lead to other serious medical conditions, like anemia, vitamin D deficiencies and bone disorders. Patients are far more likely to die from heart disease than to suffer kidney failure.

Because African-Americans, Latinos and other minority communities suffer disproportionately from hypertension and diabetes, they experience higher rates of kidney disease and kidney failure. Other cases are caused by genetic disorders, autoimmune ailments like systemic lupus erythematosis, prolonged use of certain medications like anti-inflammatory drugs, and a kidney inflammation called glomerulonephritis.

In 2005, more than 485,000 people were living on dialysis or with a transplant, at a total cost of $32 billion. Medicare pays for much of that, because it provides coverage for patients needing dialysis or transplant even if they are not yet 65. In fact, kidney disease and kidney failure account for more than a quarter of Medicare's annual expenditures.

The National Kidney Foundation, with an annual budget of $85 million, plays a major role in education, policy, research and treatment. The organization provides free screening for adults at risk for kidney disease, publishes a leading journal in the field, lobbies on treatment and policy issues, and conducts extensive public education and outreach.

But it has come under criticism on several fronts, in particular its close financial ties to the pharmaceutical industry. The agency greatly influences clinical care through the development of guidelines to advise doctors on various aspects of the illness. Critics say the guidelines have benefited drug makers, who are major contributors to the foundation.

"These practice guidelines are widely disseminated and heavily influenced by industry, and they come down on the side of recommending higher levels of treatment," said Dr. Richard Amerling, director of outpatient dialysis at Beth Israel Medical Center in New York.

In 2006, the organization published new guidelines for treating anemia associated with chronic kidney disease. The guidelines were underwritten with support from Amgen, which markets a drug for anemia, and some members of the panel that developed the guidelines had financial ties to the industry.

The kidney foundation guidelines called for raising red blood cell counts to levels higher than those recommended by the Food and Drug Administration, and many nephrologists criticized the guidelines as biased in favor of industry. After new clinical trials suggested that more aggressive treatment could cause an increase in deaths and heart problems, the foundation revised the guidelines.

Ellie Schlam, a spokeswoman for the foundation, said the organization was vigilant "to ensure that no sponsorship funds contributed to the N.K.F." would influence the content of any guidelines.

The organization has also been criticized by advocates who support financial compensation for organ donors, which the foundation firmly opposes as unethical and unlikely to increase the availability of organs. (In contrast, the American Association of Kidney Patients supports research into how financial incentives would affect organ donation.)

Even the foundation's classification of chronic kidney disease into five distinct stages, a framework that has been widely accepted, has come under some challenge.

In 2002, the organization published clinical criteria for determining each stage of the disease. But some experts say those guidelines have the effect of overstating the problem by classifying many elderly patients as having the disease when they actually have standard age-related kidney decline. The foundation replies that a reduced kidney function among the elderly should not be accepted as normal just because it is common.

Because of Medicare's role in paying for dialysis and transplantation, the federal government knows far more about the epidemiology and costs of end-stage renal disease than about chronic kidney disease over all. In recent years, Congress has directed the Centers for Disease Control and Prevention to fill some of these knowledge gaps.

In particular, the centers are seeking to develop a comprehensive surveillance system for the disease, organizing pilot screening projects for people at high risk in California, Florida, Minnesota and New York. The agency is also studying the financial implications of the disease and the cost-effectiveness of various interventions.

The National Kidney Foundation, which has worked closely with the C.D.C. and the National Institutes of Health on initiatives related to chronic kidney disease, has also focused on education and screening, particularly in minority communities. Terri Smith, the urban outreach director at the foundation's Connecticut affiliate, says she spends a lot of her time going to black churches and community centers to talk about kidney disease, and has been surprised that so few people know anything about it.

"They're very aware of hypertension and diabetes, but it was a revelation to me that people didn't get the connection to kidney disease," she said. "People have no idea they should eat less than a teaspoon of salt a day. I teach them how to read labels; I give them questions they should be asking the doctor."

In Michigan, the local N.K.F. affiliate reaches out to hair stylists and other salon workers in minority communities, training them in talking to their clients about getting screened. Several years ago, after

Mary Hawkins, 61, a nurse who lives in Grand Rapids, received a warning about kidney disease from a masseuse at her local salon, she made an appointment to see her doctor.

Although she did not have kidney disease, she learned that her blood pressure was high. Now she takes three medications to keep it under control, exercises three times a week, takes tai chi classes, no longer smokes and attends a dance class at the same salon.

"I knew kidney disease existed, but I wasn't in tune with the risk," she said. "You get so caught up in your own life that the last thing you think about is your health — even though it should be the first thing."

http://www.nytimes.com/2008/11/18/health/18kidneydisease.html?nl=8hlth&emc=hltha1

A Cascade of Influences Shaping Violent Teens

By RONI CARYN RABIN

A long-term study of 750 children followed from pre-school through high school suggests that neither nature nor nurture alone explain why some grow up to be violent teenagers. Instead, the authors suggest, an interplay between behavior and environment during childhood create a cascade of influences that shape the teenager's character.

"None of these children is highly violent as a four-year-old," said Kenneth Dodge, director of the Center for Child and Family Policy at Duke University in Durham, N.C., and lead author of the study, published in the journal Child Development. "The question is: how is it that some four-year-olds, who display only minor behavioral problems but are otherwise cute and cuddly, still grow into violent teenagers?"

Researchers who followed the children periodically interviewed parents, the children themselves, teachers and peers. The researchers collected school records and observed children on the playground, and as the children matured the investigators also interviewed romantic partners and best friends, and collected arrest records.

"What we found is that small problems cumulate into more serious problems. There's not one single factor," Dr. Dodge said.

The study found that children who were slightly impulsive and had mild behavioral problems in pre-school often faced harsh disciplinary action from parents and teachers. Instead of having the desired effect, these actions further alienated the children, often making the child more aggressive and preventing him or her from learning important social and cognitive skills.

As a result, these young children were unprepared for school and often developed social problems; punishments like being sent to the principal's office meant losing more class time and falling further behind.

By the time the children were in their teens, their parents spent less and less time with them, possibly in order to avoid conflict. With the parents providing less supervision, the children gravitated to similarly estranged peers, Dr. Dodge said.

"It's not that they are super-predators or biologically destined to life as a criminal," Dr. Dodge said of the children. "It's also not the story the liberal folks tell: that it's entirely a bad environment. It's a combination of an impulsive, temperamentally difficult child, who elicits problems from the environment that propel the child toward a violent adolescence."

The study was funded by the National Institute on Drug Abuse and the National Institute of Mental Health.

http://www.nytimes.com/2008/11/18/health/research/17teens.html?nl=8hlth&emc=hltha2

In Psychiatry, Can a Punch Line Be a Lifeline?

By BENJAMIN BRODY, M.D

"Has anything changed since the treatments began?" I ask the patient, as he lies down on a stretcher in the ECT suite. The anesthesiologist places an IV line in his arm and checks his vital signs. My attending psychiatrist adjusts the machine that delivers the electric stimulus. I'm a psychiatry intern, and this is my electroconvulsive therapy rotation. I'm here to watch and learn.

"My cellphone always has a great charge," the patient deadpans.

If this were a friend or colleague, I would laugh easily. But this is a patient I barely know. He has bipolar disorder, a previous suicide attempt and a history of bizarre, impulsive behavior. In that context, his joke just feels inappropriate and overly familiar.

I'm taken aback. Is it O.K. to laugh, I wonder? An intern, with years of experience being inexperienced, I quickly glance around to take stock of the room.

The nursing assistant laughs and the anesthesiologist grins broadly. The attending psychiatrist remains stone-faced, and says, "Clearly he's improving." As the anesthesiologist injects a sedative, a telephone rings. Everyone's hands are occupied; the ringing continues. Just as the patient starts to drift off, he looks over at me and says: "Can you get that? It might be the governor calling to stay my execution."

A moment later, he's out. The attending hands me the leads, and I feel slightly uncomfortable as I bring them to the patient's head. The nurses are still laughing as he begins to convulse.

When I was an intern on the medical service, I often joked with my patients. It's how I naturally relate, and carefully joking with a frightened patient is a powerful way to establish rapport.

But when I left the internal medicine floors for psychiatry, the humor stopped. On the advice of the attending doctors, I tried to be more concrete and matter of fact with psychotic patients, more empathetic with depressed patients and more authoritarian while working in a volatile emergency room. Not since adolescence had I spent so much time worrying about how I come across.

I had a vague sense that prompting a patient to laugh could sometimes be therapeutic. But when is it safe — let alone useful — to joke with a psychiatric patient? At least in the hospital, the patients seemed to have enough trouble relating to me without having to decode the nuance of humor. It seemed too risky, too ripe for misunderstanding.

Still, there were patients who insisted on joking with me.

Leading a community meeting on the inpatient unit, I asked the patients and staff members to introduce themselves and say something about who they are. "I'm a social work intern!" a staff member said brightly, followed by a patient, who declared, "I'm a chronic bipolar patient."

This wasn't what I had in mind; I'd imagined some type of biographical detail, not a recitation of titles and diagnostic labels. I grew uneasy as the patients started describing their personal pathology to the group.

Just as I was getting uncomfortable, one of the patients acknowledged the tension. "I'm a nursing student," he said, with mock authority. The next patient, someone who had trouble relating to others and often missed social cues, said, "I'm the nursing manager."

The entire group, myself included, erupted with laughter. The moment was a striking contrast to the unit's usual sober atmosphere. Not for the first time, I wondered whether it might ever be appropriate for *me* to lighten up and initiate a joke.

At the end of my internship, I got my answer. I was on call at 1 a.m. on a Thursday, admitting my last patient of the evening. She was a woman in her 60s, brought in by the police for disruptive behavior in her apartment building. After being involuntarily admitted, she hid in her room and refused to talk to the nurses.

When I tried to interview her, she buried her head under a pillow, exclaiming, "I refuse all psychiatric care!" But beneath her refusal, I noticed something playful in her tone.

"That's O.K.," I said. "We're good at treating people who refuse psychiatric care."

That got a little laugh.

"Can you tell me how you got here?" No response.

Maybe I should try something more concrete? Given her age and the story I got from the senior resident in the E.R., it dawned on me that she might be cognitively impaired. "Who's running for president right now?" I asked.

That got a response. Three people, she replied, using an epithet I can't repeat here.

What are their names? I shot back, using the same epithet.

"Clinton, Obama and McCain," she said. She was looking at me now.

"O.K., so what's a nice lady like you doing in a place like this?" I asked.

Suddenly, I was in. She started telling me about her paranoid delusions about her landlord and neighbors. I sat down and started writing.

"Tell me more," I said.

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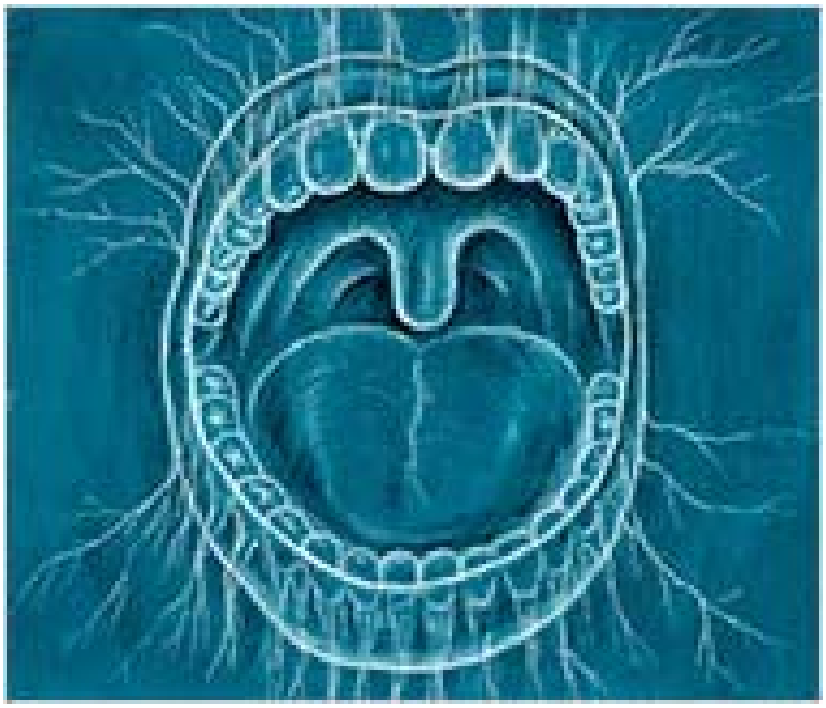
http://www.nytimes.com/2008/11/18/health/views/18mind.html?nl=8hlth&emc=hltha8

To Treat Properly, First Deal With the Fear

By GEORGE D. RESKAKIS



It was the first time I had met Cynthia. She was dressed impeccably in a blue suit with an understated brooch on the collar — a woman who clearly took care of herself. So I was surprised when she complained of bad breath.

She said she just wanted a teeth cleaning and was in my office because she needed a change from the dentist she had been seeing regularly for 10 years.

As part of the standard conversation with new patients, I asked several questions and explained the need for a proper evaluation, including X-rays.

She was unequivocal, as I recall: “X-rays! No way.”

In 28 years in general practice, I have seen the full range of reactions to the dentist’s chair. Personal experience plays a part. So do the stories of friends and family, and “I’d rather have a root canal” jokes. The Internet can give people enough knowledge to be dangerous, as the cliché goes, and the irrational fear that often accompanies a trip to the dentist gives people the motivation to be insistent, even demanding, regarding care that might not be appropriate.

If I do what they want, I risk missing something or making poor treatment decisions. If I do what is right, I risk losing a patient who needs help.

I explained to Cynthia my belief that for a dentist seeing a new patient, a thorough examination and a set of good X-rays are the foundation of good care. I told her that under current guidelines from the American Dental Association, healthy adults without evidence of tooth decay or additional risk factors should have films taken every couple of years; panoramic films should be taken every five years. I asked her when she had last had dental X-rays.

She looked at me suspiciously and said, "I remember it perfectly because it was the day before Sept. 11."

"Three years ago!" I exclaimed. "I think you're due."

That wasn't enough for Cynthia. We talked for 15 minutes more about X-rays — the modern, digital systems, the minimal amount of radiation she would be exposed to, the quick and painless nature of the whole thing.

"I just want my teeth cleaned," she pleaded.

It was puzzling, really. Here was an educated, successful professional who knew she had a problem and wouldn't even consider the most basic level of care.

I did not want to lose her as a patient, but I could not give in.

I told her I couldn't ignore the possibility of underlying disease. I needed X-rays if I was going to treat her.

"Fine," she said finally. "Take your stupid X-rays."

As it turned out, her bad breath was caused by decay between two teeth — to such an extent that she would need root canals on both teeth in addition to gum surgery, two posts and two crowns, or she would have to have the teeth extracted and replaced with implants.

For many adults, decay of this magnitude can be painless, until infection sets in or the teeth are beyond saving. In the end, Cynthia had the teeth extracted and replaced.

It wasn't until after we completed her treatment that Cynthia confided the reason she had fought so hard against X-rays. Her mother, she said, had died of cancer that was caused by radiation treatment as a child.

We talked again about radiation, and the difference between diagnostic radiation doses and therapeutic doses. In the early 1950s, I told her, the doses were hundreds of thousands of times what is used today; there was not enough evidence yet of radiation's harmfulness.

Cynthia came around to the idea that X-rays are a safe and useful medical tool.

And I was reminded that in a profession where anxiety is often the starting point of a doctor-patient relationship, the standard patient questionnaire will never go deep enough. Asking about flossing habits won't lead to fears that trace to events 60 years ago. In our armchair-psychology way, we hope to get to that level of trust eventually. In the meantime, we clean and drill, and insist on X-rays.

George D. Reskakis is a dentist in Manhattan.

http://www.nytimes.com/2008/11/18/health/views/18case.html?nl=8hlth&emc=hltha8

'Orphan' Genes Play An Important Role In Evolution

Jellyfish. Every group of animals possesses a small proportion of genes which are extremely variable among closely related species or even unique. (Credit: iStockphoto/Klaas Lingbeek- van Kranen)

ScienceDaily (Nov. 18, 2008) — Closely related animal species share most of their genes and look almost identical. However, minor morphological differences allow us to tell them apart. What is the genetic basis for these differences? Often, the explanation is provided by minor changes in spatial and temporal activity of transcription factors - "regulator" genes which are conserved throughout the animal kingdom.

However, every group of animals also possesses a small proportion of genes which are, in contrary, extremely variable among closely related species or even unique. For example, a gene may be present in one species or animal group, but not in any other. Such genes are referred to as "novel," "orphan" or "taxonomically restricted". Their function and origin are often obscure. What are these genes needed for?

A new paper explores this question in the freshwater polyp Hydra, which belongs to the same branch of the evolutionary tree as jelly fish. These animals are small (several mm long), predatory creatures, with a tube like body-form that ends in a mouth surrounded by mobile tentacles. They are of particular interest to scientists for their regenerative properties, and because they appear to be biologically immortal; not undergoing the aging process that affects all other known animals.

In this paper, a team of scientists from the Christian-Albrechts-Universität zu Kiel in Germany, used transgenic polyps to uncover the role of "orphan" genes in these morphologically-simple animals. The work, led by Thomas Bosch reports that a family of "novel" genes is responsible for morphological differences between two closely related species of fresh water polyps called Hydra. Their most

remarkable finding is that a secreted protein, encoded by "novel" gene Hym301, controls the pattern in which the tentacles in Hydra develop.

"We knew that these genes were important, but it was in no sense simple to demonstrate that," says Konstantin Khalturin, first author of the PLoS Biology paper.

In one species, Hydra oligactis, emergence of its tentacles during bud formation is not synchronised; in Hydra vulgaris all five tentacles develop simultaneously and symmetrically; in Hydra vulgaris polyps genetically altered to produce large amounts of protein from the 'orphan gene' Hym301, tentacles are formed in an irregular and asymmetric pattern.

The data indicate that "novel" genes are involved in generation of novel morphological features that characterise different species, thus pointing the way to a new, more complete understanding of how evolution works at the level of a particular group of animals. Emergence of "novel" genes may reflect evolutionary processes which allow animals to adapt in the best way to changing environmental conditions and new habitats.

Journal reference:

1. Khalturin et al. **A Novel Gene Family Controls Species-Specific Morphological Traits in Hydra**. *PLoS Biology*, 2008; 6 (11): e278 DOI: 10.1371/journal.pbio.0060278

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

http://www.sciencedaily.com/releases/2008/11/081117203837.htm

A Life Split in Two

By GEORGE PACKER

THE WORLD IS WHAT IT IS

The Authorized Biography of V. S. Naipaul

By Patrick French

Illustrated. 554 pp. Alfred A. Knopf. $30

A great writer requires a great biography, and a great biography must tell the truth. V. S. Naipaul wanted his monument built while he was still alive, and, sticking to his own ruthless literary code, he was willing to pay the full price. Approached around the time of Naipaul's Nobel Prize in 2001, the writer Patrick French insisted on complete access to the Naipaul archives at the University of Tulsa, which include his correspondence, his journals and the diaries of his wife, Pat (who died in 1996), never read by Naipaul. French also wanted his subject to sit many hours over many years for unrestricted interviews. In the end, this most difficult and fastidious of writers didn't ask French to change a single word. Naipaul's scrupulous compliance with all of his biographer's demands, French writes, was "at once an act of narcissism and humility."

Now Naipaul has his monument. "The World Is What It Is" (the severe opening words of "A Bend in the River") is fully worthy of its subject, with all the dramatic pacing, the insight and the pathos of a first-rate novel. It is a magnificent tribute to the painful and unlikely struggle by which the grandson of indentured

Indian workers, born in the small island colony of Trinidad, made himself into the greatest English novelist of the past half century. It is also a portrait of the artist as a monster. How these two judgments can be simultaneously true is one of this book's central questions. Whether Naipaul himself understands the enormity of the story to which he contributed so much candor is another.

Naipaul was born in 1932, into a large extended family that mingled Hindu caste pride, small-time political power and material poverty. It was a rougher, more chaotic world than one would surmise from Naipaul's autobiographical writings — at times there wasn't enough to eat — and it helps to explain the affliction that one of his characters calls "colonial rage," as well as Naipaul's less-noticed sympathy for the oppressed and blighted of the earth.

His mother Droapatie's kin were local potentates; his father, Seepersad, was a sensitive, psychologically unstable newspaperman, a failed writer who endured constant humiliation by his overbearing in-laws. The result in young Vidia was soaring ambition and unquenchable anger — a sense of destiny shared with his father, along with consuming resentments of his homeland, his family, the world's injustice and indifference. French shows that, though Naipaul has always identified himself with his noble, tragic father — to the exclusion of the many Naipaul women — it was his mother who gave her son the means to force his way in the world: "Ma's bright, certain, robust, slightly mocking tone of voice would be inherited by Vido; without the impetus of Ma and her family, his later achievements would have been impossible."

In French's rich narrative, there are two turning points, two moments of truth that might have crippled or destroyed Naipaul, but that instead made him, for better and worse, the writer and the man he became. After receiving a coveted scholarship to Oxford and graduating, he found himself, in the early 1950s, alone in London, racially marginalized, with no job or prospects, unable to get his first attempts at fiction published, desperately homesick, but unwilling to admit failure and return to Trinidad, even after his father's death. This crisis plunged Naipaul into what he later called "a great depression verging on madness" that continued for 18 months. In his later writing he would return to the panic of this period of his life obsessively — in fiction, where he projects himself into the despair of various young male characters, or more directly in autobiographical work. But he always left out one crucial thing.

After he had become an internationally famous writer with the whole world as his subject, Naipaul liked to claim that he was a man without commitments or entanglements, free to observe and tell the truth as other, more sentimental souls were not — "to present himself not as a person but as solely 'the writer,' " French says. But at the darkest moment of his life, he attached himself to a quiet, intelligent, self-effacing young Englishwoman from an unhappy lower-middle-class familynamed Patricia Hale; and she kept him from drowning. Excerpts from their letters reveal how desperately Naipaul clung to her: "You saved me once, and it is from that rescue that I have been able to keep going — from Feb. 9 to today. I love you, and I need you. Please don't let me down. Please forgive my occasional lapses. At heart I am the worthiest man I know."

The relationship began with Pat in the position of strength. Once they married and Naipaul began to publish his early books, the balance of power shifted decisively to him. Pat became his indispensable literary helper, his maid and cook, his mother, the object of his irritations, the traveling companion who never appears in any of his nonfiction. They had met as two highly repressed and untutored virgins of their benighted time, and a true sexual connection never formed. French places Naipaul's tormented sexuality at the center of his creative efforts, revealed in detail through various sources, above all Naipaul himself, without ever sinking into voyeurism or what Joyce Carol Oates called "pathography."

Over the years, as Naipaul's fame grew along with his irascibility, the marriage desiccated. If Pat overcooked the fish, he berated her and she berated herself. The couple wanted children but Pat was apparently infertile; in her passivity and shame she never pursued the possible remedies. Naipaul frequented prostitutes, which brought no satisfaction. The Naipauls moved from place to place all over the world, dislocation becoming his great theme — not as adventurers, but as a harried, chronically

dissatisfied couple. By the early 1970s, age 40 and with a dozen books already behind him, Naipaul had reached an impasse in his life and work. He told Pat that they had destroyed each other.

The second turning point — the moment at which "The World Is What It Is" becomes impossible to put down — comes when Naipaul, on a writing trip to Buenos Aires in early 1972, meets an Anglo-Argentine woman named Margarita, or Margaret Gooding. She was 30, unhappily married with three children, and Pat's opposite — "tempestuous, cynical and sexy." Naipaul and Margaret began an affair that set free all of his desires and fantasies. When his editor and friend Diana Athill scolded him, he replied, "I am having carnal pleasure for the first time in my life, are you saying I must give it up?" Carnal pleasure meant violence — in fact it was inextricable from beating Margaret up, degrading her in bed, turning the great man's penis into an object of worship. How do we know these things? Because Naipaul tells them to his authorized biographer. "I was very violent with her for two days with my hand; my hand began to hurt. . . . She didn't mind it at all. She thought of it in terms of my passion for her. Her face was bad. She couldn't appear really in public. My hand was swollen. I was utterly helpless. I have enormous sympathy for people who do strange things out of passion."

Naipaul's capacity for sympathizing with himself is large: it even extended to the moment when he revealed the affair to Pat. "She was so good: she tried to comfort me. . . . I was so full of grief myself that in a way I expected her to respond to my grief, and she did." The tenderness soon passed, and Naipaul began to hurl insults at his wronged wife: he had not enjoyed making love with her since 1967, she was the only woman he knew who had no talent, she did not behave like a writer's wife. "You behave like the wife of a clerk who has risen above her station."

The sensual release with Margaret opened up Naipaul's most creative period, in the 1970s. "And thereafter I thought if that thing hadn't occurred in my life I probably would have shriveled and died as a writer," Naipaul told French. "All the later books in a way to some extent depend on her. They stopped being dry." Compare Naipaul's two Africa novels — the taut, austere "In a Free State," published in 1971, and his full-bodied masterpiece "A Bend in the River," published in 1979 — and it's impossible to deny that having sex with Margaret (they did little else) was good for his writing. But so was living with Pat — for Naipaul didn't leave her, nor she him. Instead, he split his life in two — the cerebral and the sexual, "Mama at home, a whore in South America," in French's harsh summation — and went back and forth between them with the knowledge, if not exactly the consent, of both.

Pat acceded to the arrangement because she had no idea of any possible life without Naipaul, and because her only sense of pleasure or worth came in his continued dependence on her steadying presence and judgment. Margaret became the new traveling companion (though Naipaul usually sent her away out of pique before the trip was done), while Pat, drugging herself with Quaaludes and Valium, waited at home in Wiltshire to provide literary advice. Rough sex with Margaret would be directly rendered in key passages of "Guerrillas" and "A Bend in the River"; then Pat would listen to the write-up, flinch, leave the room, return, express admiration, make suggestions — without ever daring to "ask herself to what extent Vidia's writing is drawn from life, and specifically from his life with Margaret."

The triangle, composed of two variations on sadomasochism, lasted a quarter-century. But it was not a stable balance. "Many years later, he acknowledged that his relationship with Margaret effectively undid Pat's life," French reports. " 'I was liberated. She was destroyed. It was inevitable.' " Note the passive voice. Also note the hand of fate. Naipaul's confessions to French are like those of a man who leads an investigator to the freshly dug earth in his backyard, and even points out the pieces of human flesh and bone, without ever saying, "I killed her."

When she learned about her husband's affair, Pat resumed a diary that she had kept intermittently over the years. French's access to these words raises this miserable woman above the merely pathetic and gives the book a badly needed second point of view: "Increasingly, these days, I regret the loss, the damage of Vidia's rages and quarrels. Simple losses — of the beautiful food I have cooked, happy days, days of one's life. It was my fault. . . ." The diary, French writes, "puts Patricia Naipaul on a par with other great,

tragic literary spouses such as Sonia Tolstoy, Jane Carlyle and Leonard Woolf." Pat's voice is faltering and uncertain where Naipaul's is relentlessly in command, but its small observations, evasions and sudden bolts of understanding haunt the reader up until her death of cancer, which gives this story its heartbreaking end. Naipaul, keeping a journal of his own, finally sees his wife as if for the first time: "I to her: 'Are you content?' Yes. Would you say you have had a happy life? No direct answer. 'It was perhaps my own fault.' . . . The 'patch' is working together with the Zudol tablets. She sleeps. But when she wakes up she feels 'stunned' by what she has been through. Her bad — jaundiced — color comes and goes. She is pure grace." He scatters Pat's ashes deep in the Wiltshire countryside, accompanied by the woman he had already decided to marry once Pat was dead, having jettisoned Margaret a final time.

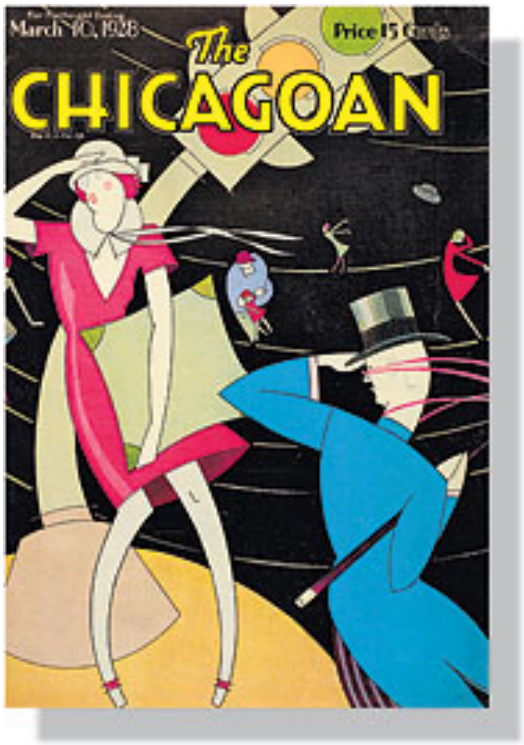
Naipaul's code of accountability lies in facing the truth, but it's a limited truth, with no sense of agency. He cannot begin to see himself as his biographer or reader sees him, for the pain of others always reverts back to his own. And yet this bottomless narcissism, together with the uncompromising intensity of his vision, holds the key to Naipaul's literary power. He had the capacity in his writing to project himself into a great variety of people and situations, allowing him to imbue his work with the sympathy and humanity that he failed to extend to those closest to him in life.

George Packer, a staff writer at The New Yorker, is the editor of a new two-volume edition of George Orwell's essays, "Facing Unpleasant Facts" and "All Art Is Propaganda."

http://www.nytimes.com/2008/11/23/books/review/Packer-t.html?8bu&emc=bua1

'The Most Zestful Spectacle'

By MATT WEILAND



The best magazines are not just the product of their editors' tastes and curiosities, but of the time and place in which they are made. Readers of The Edinburgh Review in the 19th century or The New Yorker in the 20th (and beyond) walked those cities' streets, even — especially — when the piece on the page wasn't set there. The same may be said of the young Dublin Review, founded in 2001, which feels pleasantly pickled in that city's brine.

But even magazines without a city in their name are made somewhere, after all — and the sly barmaids at the pub around the corner or the drunks stumbling behind the Dumpster out back may have as much to do with the sound and subject matter of the magazine as anything else. Take H.L. Mencken's American Mercury, which captured the gaudy, gorgeous America of the 1920s and 30s. It was edited largely from Mencken's Baltimore home and, in its taunting tone toward New York self-importance, felt that way. Or Horizon, the incomparable English magazine edited by Cyril Connolly and published throughout the Second World War. I once bought a box of moldering copies in a West Village bookshop; flipping through them at home I was pretty sure I could hear the buzzing of a V-1 bomb overhead. Or Processed World, the pioneering magazine that scathingly satirized workplace culture throughout the 1980s, documenting at ground level and in real time the enormous shift from manufacturing to a service economy. Inspired by the Situationists as well as by the environmental and women's movements, it was the sort of magazine that could be sold on the street by vendors wearing papier-mâché computer monitors on their heads. In other words, a very San Francisco magazine.

Selections from all these magazines have been published over the years in handsome, lasting book form. To their proud ranks we may now add The Chicagoan: A Lost Magazine of the Jazz Age (University of Chicago, $65), which rescues the periodical of the same name from what the historian E.P. Thompson once called the "enormous condescension of posterity." Haven't heard of the magazine before? You're not alone. It was founded in 1926 by a group of Chicagoans inflamed by the example and success of The New Yorker, which had begun the year before. It was published every two weeks,and before long Time magazine was heralding it for having the "finish and flair worthy of a national publication." But its readership began to decline as the Great Depression set in, its frequency was reduced to monthly, and in 1935 it died a quiet death. Somehow this vibrant magazine was completely forgotten until a few years ago, when the distinguished cultural historian Neil Harris came upon a set of the magazine's run in the library of the University of Chicago. It has now been brought back into print, if not to life, by the University of Chicago Press.

What a marvelous job they've done! This is a book you'll want to own, a coffee-table book nicer and better made than most coffee tables. The University of Chicago Press has swung for the fences, producing the book to the highest standards — a nearly 400-page oversize volume, designed with care and attentiveness to period detail and featuring loads of full-color images. It's a pleasure to see the ball sail into the bleachers.

The Chicagoan described its subject in an issue from 1927: "It's a crescent-shaped town, 26 miles by 15, along a great lake that's begun to weaken and recede. No wonder. An unchallenged murder record — a splendid university — hobo capital to the country — railroad ruler, corn baron, liquor king — and the finest of grand opera. Altogether the most zestful spectacle on this sphere."

Zestful was right. During its brief life span the magazine epitomized the Chicago sound, the sardonic snap of Preston Sturges or Ben Hecht that was equal parts street tough and nightclub habitué. The New Yorker may have been the immediate inspiration, but The Chicagoan tended more toward the clever, white-gloved sophistication of Vanity Fair and The Smart Set. (The Smart Set, incidentally, wins the prize for Best Magazine Slogan Ever: "One civilized reader is worth a thousand boneheads.") In the pages of The Chicagoan restaurants were categorized as Downtown, Out a Ways or 'Way Out; a play could be touted as "worth eyeing and earing"; a reader's complaint about the magazine's spelling mistakes could be met with a cocked eyebrow and wrinkled nose: "Oh, Well . . . Anybody can spell." Take that, vaunted New Yorker fact-checking department!

Well. . . . The Chicagoan was full of mistakes, and it never achieved The New Yorker's literary renown; few of the writers and artists it published are remembered today. But thumbing through the magazine's pages — as represented here by the complete issue of July 2, 1927; editorials, reviews, profiles, articles and cartoons from others; more than 80 pages of the magazine's astonishing covers; and a sampling of its advertisements for pipes, gowns, Victrolas, sack suits, deodorant — is a bit like having William Powell and Myrna Loy sweep through your living room.

The magazine may have been light and fizzy, but it could be firm and forthright in its convictions: it ballyhooed Rachmaninoff and Walt Disney, pilloried Prohibition and the mania over Charles Lindbergh. A 1929 editorial ridiculed the fact that a statue erected in Grant Park to honor American Indians had given them horses of a sort that never roamed "over the plains that are now Illinois, or anywhere else on this continent." And throughout its run the magazine took it upon itself to defend Chicago from those who claimed it was overrun by crime, it stank, its government was corrupt, its streets were wind-beaten. So went the litany at the time. "Chicago," declared one editorial, "happens to be, by common consent of the writing gentry, the Gomorrah of the moment." The magazine thundered against such calumny, defending the city's "gusto and glamour" in issue after issue.

For all this, it's not clear why the magazine failed so dramatically. Perhaps its editors never got the balance right between their passion for what Carl Sandburg had hailed as the city's "coarse and strong and cunning" soul and their obsession with its increasing glitz and refinement. While The New Yorker and other magazines tackled the Great Depression head on, The Chicagoan more or less ignored it. An editorial in December 1930 declared: "We would be the last to take serious thought of the unemployment. . . . Our talent, if any, is for lighter, gayer tasks." The magazine's talent was out of business before employment rebounded a few years later.

Chicago has bred a remarkable number of notable magazines: Poetry and The Little Review in the early part of the 20th century, Esquire and Playboy in the middle, The Baffler and Stop Smiling at its end. Thanks to Neil Harris's serendipitous discovery and the University of Chicago Press's superb effort, The Chicagoan takes its rightful place on the top shelf.

Matt Weiland has been an editor on The Paris Review, Granta and The Baffler. He is the co-editor, with Sean Wilsey, of "State by State: A Panoramic Portrait of America."

http://www.nytimes.com/2008/11/23/books/review/Weiland-t.html?8bu&emc=bub1

E Pluribus Unum

By STEVE JONES

THE SUPERORGANISM

The Beauty, Elegance, and Strangeness of Insect Societies

By Bert Hölldobler and Edward O. Wilson

Illustrated. 522 pp. W. W. Norton & Company. $55

Not long ago, I was stung by a metaphor. A gang of paper-wasps guarding their shared nest, irritated at my exposition of their habits to a bunch of students, went on the attack. The effects were unpleasant — a hot, sweaty, choking feeling and an overwhelming desire to take a cool shower (which did not help).

Those who use such creatures as parables, as so many philosophers have done, face — metaphorically speaking — the same danger. Social insects have often been co-opted as models of human society. The right uses them to celebrate the power of hierarchy, the left that of community. Bees attract the liberal and optimistic (the spirit of the beehive), ants the conservative and the anything but (the city as ant heap). Lyndon Johnson found such creatures useful in his Inaugural Address: "I do not believe the Great Society is the ordered, changeless, and sterile battalion of the ants. It is the excitement of becoming, trying, probing, falling, resting and trying again," but politicians of every flavor have turned to them for a series of useful, albeit contradictory, lessons from Nature.

This book, on the other hand, is just about wasps, bees, ants and termites. "Just" is not the mot juste, for in its 500-plus pages "The Superorganism" gives an astonishing account of the intricate and unexpected ways of the social insects. Its co-authors, Bert Hölldobler and E. O. Wilson, won a Pulitzer Prize in 1991

for their earlier book, "The Ants," but the science involved (if not the use of ants as metaphors) has made enormous strides since then.

Hölldobler and Wilson's central conceit is that a colony is a single animal raised to a higher level. Each insect is a cell, its castes are organs, its queens are its genitals, the wasps that stung me are an equivalent of an immune system. In the same way, the foragers are eyes and ears, and the colony's rules of development determine its shape and size. The hive has no brain, but the iron laws of cooperation give the impression of planning. Teamwork pays; in a survey of one piece of Amazonian rain forest, social insects accounted for 80 percent of the total biomass, with ants alone weighing four times as much as all its mammals, birds, lizards, snakes and frogs put together. The world holds as much ant flesh as it does that of humans.

Karl von Frisch, discoverer of the famous waggle dance of the honey bee, said in the 1930s that "the life of bees is like a magic well. The more you draw from it, the more there is to draw." Plenty of excellent science still springs from that source, and Wilson and Hölldobler gather some classics here. How does an ant work out how far it is back to the nest? Simple: by counting its steps. Glue stilts onto its legs as it sets out and it will pace out into the wilds; take them off and it will walk only part of the way back.

The superorganism has castes, based not on genetic differences but — like our own social classes — on the environment in which they are brought up. Sometimes, a chemical message does the job, but cold and starvation can be just as effective at condemning an individual to a humble life as a worker.

A few simple rules produce what appears to be intelligence, but is in fact entirely mindless. Individuals are automatons. An ant stumbles on a tasty item and brings a piece back to the nest, wandering as it does and leaving a trail of scent. A second ant tracks that pathway back to the source, making random swerves of its own. A third, a fourth, and so on do the same, until soon the busy creatures converge on the shortest possible route, marked by a highway of pheromones. This phenomenon has some useful applications for the social animals who study it. Computer scientists fill their machines with virtual ants and task them with finding their way through a maze, leaving a coded signal as they pass until the fastest route emerges. That same logic helps plan efficient phone networks and the best use of the gates at J.F.K. In the phone system each message leaves a digital "pheromone" as it passes through a node, and the fastest track soon emerges. Swarm intelligence does wondrous things.

Swarm sex is even more remarkable. Louis XII of France wore a surplice edged with golden bees and beehives emblazoned with the motto "Rex non utitur aculeo" (the king has no sting). He was right: the sting-less male's only job is to inseminate females, who sting and sting again in defense of their nest. The queen herself packs a punch, although most of the time she is too busy to do much damage. Among the leaf-cutter ants, "Earth's ultimate superorganisms," with their uniquely intricate societies, a single queen may produce as many as 200 million female (and sterile) offspring in her lifespan of 10 to 15 years, together with a few males, whose only job is to replenish the sperm supply (not a job that Louis XII himself did particularly well).

Researchers used to believe such behavior turned on the skewed patterns of kinship of bees and ants, in which sisters are more related to each other than they are to their mother, thanks to a strange sex-determination system in which males have a single set of genes and females two. That in turn means that female infertility (and an associated willingness to help one's mother produce more sisters) makes evolutionary sense. Unfortunately, many insects with that odd genetic pattern are solitary, while certain mammals with a more conventional sexual system, like the naked mole rat, also have a single dominant queen, a few favoured males and a cowed phalanx of workers who help her reproduce. Parental care alone, and an associated division of labor, may favour the evolution of such societies (although close relatedness does help).

The world of superorganisms varies from that of the relatively primitive "dawn ants" of Australia, which live in groups of a hundred or so separated only into sexual and asexual kinds, to the leaf-cutters, found

only in the New World, who cultivate fungal gardens and have millions of workers, divided into a diversity of castes, in a single colony. The whole place buzzes with information, passed on with chemical cues, taps and strokes, dances and displays. Such "collective wisdom" is fatally open to mathematical modeling (and there is plenty of it out there), but as Hölldobler and Wilson say, natural history — experiment and observation — is what really counts.

There is no shortage of first-rate natural history here, and although some is expressed in technical language (ergatogynes, gamergates, nanitic workers), anyone interested in what real biology — the study of life, rather than of chemistry — is up to nowadays could do no better than read this volume.

Philosophers, however, might be better advised to avoid it. Alexander Pope was well aware of the dangers of six-legged metaphors: "Thus Ants, who for a Grain employ their Cares, / Think all the Business of the Earth is theirs. / Thus Honey-combs seem Palaces to Bees, / And Mites imagine all the World a Cheese." Wilson in his earlier writings seemed to fall into that trap; to see evolution as a seamless transition from the primeval slime to the 21st century and to call in the ants (if not the mites) for evidence. "The Superorganism" is far more cautious: only in its last few paragraphs does it draw a parallel to ourselves — a once-rare species whose social skills and ability to cooperate have led, as with the bees and ants, to an extraordinary outburst of numbers. And it acknowledges that we, unlike them, are ruled by intelligence rather than mere instinct — intelligence that "has allowed us to control and destroy the global environment for short-term gain, the first time that was achieved by any species in the history of the planet."

Charles Darwin would have been delighted by this book. His own literary oeuvre was aimed at a wide audience and set out in good, plain Victorian prose. As he wrote to Thomas Henry Huxley, "I sometimes think that general and popular Treatises are almost as important for the progress of science as original work." A century and a half later, "The Superorganism" sits firmly in that distinguished tradition.

Steve Jones is professor of genetics at University College, London, and the author of "Darwin's Ghost: 'The Origin of Species' Updated."

http://www.nytimes.com/2008/11/23/books/review/Jones-t.html?8bu&emc=bua2

Little Britain

By GEOFFREY WHEATCROFT

THE DECLINE AND FALL OF THE BRITISH EMPIRE 1781-1997

By Piers Brendon

Illustrated. 786 pp. Alfred A. Knopf. $37.50

In 1764 Edward Gibbon sat “musing amid the ruins of the Capitol” in Rome, and it was there, he wrote in a haunting passage, “while the barefooted friars were singing vespers in the Temple of Jupiter, that the idea of writing the decline and fall of the city first started to my mind.” The Houses of Parliament are not yet in ruins, but the idea of writing “The Decline and Fall of the British Empire,” as Piers Brendon has now done, is tempting enough.

As he points out, the relevance of Gibbon’s great book to his own is that the British Empire was largely built and guarded by men who were steeped in the classics and consciously saw themselves as the heirs of an earlier imperial tradition. There was no need for Englishmen of the 18th and 19th centuries to ask themselves “Are We Rome?,” the title of Cullen Murphy’s recent book about modern America. They thought they were Romans, and proud of it — although also apprehensive about following the same downward path. Officials of the Raj dealing with the North-West Frontier would discuss the lessons of Roman frontier policy with an Oxford don, “haunted,” as one historian wrote, “lest the tragedy of the Roman Empire, whose extremities grew at the expense of its heart, should repeat itself.”

One might neatly date the whole story of the British Empire over exactly 500 years, from 1497 when John Cabot set foot in Newfoundland in the name of Henry VII to the hauling down of the Union Jack in Hong Kong in 1997. But Brendon begins his decline in 1781, when Lord Cornwallis surrendered to George Washington. Shortly before, Gibbon himself declined an invitation to dine with Benjamin Franklin in

Paris since he represented an enemy country. Franklin genially replied that he would like "to furnish materials to so excellent a writer for the Decline and Fall of the British Empire," so the idea isn't new.

Things looked up after the Napoleonic Wars when the empire expanded again, intentionally or otherwise. The growing realm in India was a corporate enterprise, literally so, run by "John Company," as the East India Company was known, until what Indians no longer call the Indian Mutiny. This was put down with the most horrifying brutality by the British, raising not for the first time the question of who were the "savages" and who the civilized.

At the same time white settlements were growing, of fascinatingly different character, from Canada with its fractious French, to Australia and its origins as a huge prison camp, to the model colony of New Zealand with its sturdy free farmers. In each case, the creation of what would one day be prosperous liberal democracies involved the expropriation and sometimes the extirpation of the indigenous inhabitants, a process openly welcomed by some intelligent and supposedly enlightened Englishmen in the name of progress.

Inevitably, Brendon's narrative is complex, as he moves from one land or continent to another, but it is always lucid and well informed, based on an extensive reading of the widest variety of sources, from official archives to Victorian memoirs to such unlikely publications as the Royal Automobile Club Journal for 1907. Every page is consistently readable and stimulating, although one can't say that every page is enjoyable, not when what is being described is the horror of the slave trade or the casual hunting down of Australian and African "natives" as if they were beasts.

But Brendon, the author of several histories and biographies, doesn't draw a purely bleak picture, or present a bill of indictment. He captures the nuanced relations between the English and the peoples they ruled, although in India those attitudes became harder and more race-conscious after the Mutiny. There were surely few Englishmen in India, let alone Africa, a hundred years ago who saw that decolonization would come when it did, or at what speed.

Plenty of entertaining digressions enliven the story. One of the most curious is the rise and fall of the British mustache, which Brendon suggests was "roughly coterminous with the Raj." Englishmen began growing them in India and they became compulsory for army officers until World War I. Come to think of it, Britain's two mustached prime ministers since 1945 were both former infantry officers, but there has been none for 45 years now (although Tony Blair sported one when younger). Brendon also has a nice, almost Gibbonian turn of phrase: Aden was "a lava-strewn purgatory for adulterous officers and disgraced Indian regiments."

As the empire grew under Victoria there was an unmistakable coarsening effect on the rulers, not much tempered, as is sometimes claimed, by evangelical religion. But there were always critics of empire as well. The abolition of slavery was a true popular cause, the radical politician John Bright asked what right his countrymen had to expect the loyalty of Indians whose lands they had taken by conquest, and the Queen herself was dismayed by the un-Christian ferocity with which the Mutiny was suppressed.

In any case, there were plenty of disasters as well as triumphs for these new Romans. After an envoy to Kabul was hacked to pieces by a mob, a punitive expedition set forth into Afghanistan in 1842 and was itself destroyed almost to the last man. Even that was not so much a shock as the Boer War, whose initial stages in 1899 were marked by a shameful succession of British defeats.

As Brendon says, the earlier chastening in America showed how insecure "the ramshackle imperial edifice" was, and now there was further "humiliating evidence of physical decrepitude as well as moral turpitude." The Boer War raised the question not so much of whether Afrikanerdom had any moral purpose as whether the British Empire did (some saw parallels in the Vietnam War).

It also encouraged the belief that imperialism was no more than a racket to enrich the imperialists. Brendon dismisses the view — not merely "Marxist" as he suggests — that the motive for the Boer War was gold, and he misinterprets the role of the "gold bugs," the Randlords or mining magnates. They had been divided over whether to support the Jameson Raid, which preceded the war, but all of them wanted a government friendly to their interests.

After visiting South Africa, the socialist author J. A. Hobson wrote first, a short book denouncing the war as a capitalist plot, and then his longer, highly influential "Imperialism." I suspect this book misled many people about the supposedly economic basis of all imperialism. The Witwatersrand with its gold fields really was worth owning, but very much of Africa was not. And while London politicians were forever complaining about the expense of the colonies, much of South America, notably the Argentine, was effectively and very profitably owned by the City of London, without any need for costly administration.

At any rate, the British Empire reached its apogee after one great war was won in 1918, and its dismemberment began after another ended in 1945. Churchill said during the second war that he had not become the king's first minister in order to preside over the liquidation of the British Empire, but in a sense that was a consequence of his victory.

Even then the British seemed reluctant to leave their far-flung territories until they began to see that they might be better off without so many thankless burdens. Few were more thankless than the Palestine Mandate, with its triangular conflict of Jews, Arabs and British, and by 1948 the spirit of many English people was summed up by graffiti on a Jerusalem wall. Under the Zionist slogan "Tommy Go Home," a British soldier replied that he wished he could.

There and elsewhere the last days of empire were bitter. Although neither the Mau Mau rebellion in Kenya nor its suppression was quite as bad as the awful contemporary conflict in French Algeria, more than 20,000 Mau Mau fighters died, more than a thousand Africans were hanged between 1952 and 1958, while Mau Mau terrorists killed more than 1,800 fellow Africans, as well as 32 European settlers.This is a somber story, and the attitude of too many Englishmen was summed up by one official who said that in suppressing the rising, "it is not possible to impose the civilities of Cheltenham in the foothills of Chuka."

Meanwhile, an official report in Cyprus observed that "the scaffold, which is rather antiquated, should be modernized." And yet despite sincere efforts, the empire itself could not be modernized, except out of existence. From the beginning, some Englishmen hoped, and others feared, that education and material progress would lead these distant peoples to want freedom, and so it proved.

In a speech he wrote in 1942 but never delivered, Churchill insisted that the "broad, shining, liberating and liberalizing tides of the Victorian era" had ended the "wicked and brazen" ways of old, so that "the exploitation of weaker and less well-armed peoples became odious, together with the idea of subject races." For Indians, in hindsight, he believed, British rule "might well be the age of the Antonines." Those last words echoed Gibbon, whom he had read as a young officer in India so many years before.

No doubt Churchill is easily mocked now, but then aren't broad, liberating and liberalizing tides what some Americans believed they were bringing to Iraq? Maybe it won't be long before some excellent writer undertakes "The Decline and Fall of the American Empire."

Geoffrey Wheatcroft's booksinclude "The Randlords," "The Controversy of Zion" and "The Strange Death of Tory England."

http://www.nytimes.com/2008/11/23/books/review/Wheatcroft-t.html?8bu&emc=bua2

A Fever in the Blood

By LIESL SCHILLINGER

STALIN'S CHILDREN

Three Generations of Love, War, and Survival

By Owen Matthews

Illustrated. 308 pp. Walker & Company. $26

Sometimes the best way to get to know someone is to see his words on paper. And sometimes that's the only way. When Boris Bibikov, the maternal grandfather of Owen Matthews, Newsweek's Moscow bureau chief, was a soldier in the Red Army in the 1920s, his baby daughter, Lenina — Matthews's aunt —knew her father only as a bundle of letters her mother kept in a tin box. In his resonant memoir, "Stalin's Children: Three Generations of Love, War, and Survival," Matthews writes that when his grandfather came home from military service, 2-year-old Lenina cried in fright. " No, that's not Daddy," she insisted and pointed to the box. "That's Daddy in there. " A decade later, Bibikov disappeared in Stalin's purges, never to return.

Almost 60 years after that, as long-closed K.G.B. records were opened, Matthews traveled to Ukraine to investigate the mystery of who his grandfather was. Opening a file crammed with "flimsy official onion-skin forms" and a few sheets of plain stationery on which Bibikov, under coercion, had confessed to being an enemy of the people, Matthews began to reconstruct the evidence of a life. "This stack of paper is the closest thing to Boris Bibikov's earthly remains," he writes. "He died a man without a past." In uncovering his grandfather's past, Matthews reclaimed his own.

At a recent reading in New York, Matthews explained that he began writing this book a decade ago, intending to record his adventures during Moscow's brief window of post-Soviet, pre-Putin revelry in the mid-1990s, which he characterizes as a time of "rampant, filthy raucousness" that could have come from Gogol's satires. In Russia, he found "not just another country, but a different reality."

Matthews grew up in London, the son of Mervyn Matthews, a brooding Russophile scholar, and Boris Bibikov's second daughter, Lyudmila (also known as Mila), whom he describes as a loving, high-strung "dynamo of emotional energy." He arrived in Moscow in 1995, mostly by accident, after a couple of years of "hapless wandering" in Prague, Budapest and Sarajevo. When he called his mother in London, she informed him that he'd been offered a job at an English-language newspaper, The Moscow Times, where his brief would be "trawling the lower depths of Moscow's underbelly for lurid features articles." Matthews's first language was Russian, but that seemed to him like an irrelevant, though exotic, technicality: "If languages have a color, Russian was the hot pink of my mother's '70s dresses, the warm red of an old Uzbek teapot . . . the kitschy black and gold of the painted Russian wooden spoons which hung on the wall in the kitchen." English, the language he spoke with his father, was "the muted green of his study carpet, the faded brown of his tweed jackets." But as Matthews researched his book he gained a broader understanding of his identity.

His parents, he learned, met and fell in love in Moscow in 1963, while his father was doing graduate work at Moscow State University. After they tried, unsuccessfully, to register their marriage, Mervyn was deported and sent back to England. For the next five and a half years, he sacrificed his career, his savings and his energies to a relentless campaign to rejoin Lyudmila,even as she slid into a "morbid depression." "I think," his son writes, "he had become infected by something of the irrationality and maximalism of Russia." But Matthews's mother was equally stubborn: "Both Mila and Mervyn had always refused to reconcile themselves to what others believed was reasonable." On Oct. 30, 1969, their tireless suit finally succeeded. "If I have realized anything in writing this book," Matthews notes, "it is that my father is a deeply honorable man. He had promised to marry Mila, and he would keep his word." On paper and in life, their son came to see that his blended heritage was more significant than he had appreciated. "All of us," he writes, "even me, who grew up in England — still carry something of Russia inside ourselves, infecting our blood like a fever."

Matthews's family saga unfolds during four historic epochs: the Stalin era, World War II, the cold war and the collapse of the Soviet Union. Reading his account of the privations suffered by his mother's generation — his grandmother left her sister to die on a train platform to save her own life; his mother, crippled from tuberculosis and weakened by hunger, spent her childhood in Stalinist orphanages after her mother was sent to the gulag — you find echoes of Pasternak and Solzhenitsyn, and of the filmmakers Mikhail Kalatozov, Nikita Mikhalkov and Grigory Chukhrai. In Chukhrai's classic war film, "Ballad of a Soldier," a young man travels by train across his war-ravaged country, encountering scenes of joy and hardship that showcase the Russian soul. In one of the most memorable, a soldier who has lost a leg tells him he doesn't want to return to his wife, fearing she will shun him. And yet, spotting her husband across the crowded platform, the wife runs to embrace him. A similar drama occurred in the life of Matthews's Aunt Lenina when her fiancé lost a leg after his car hit an antitank mine. When he broke off the engagement on a pretext, she flew to his side. "She was 19," Matthews writes, "he was 26. Strangely, after a marriage that lasted nearly four decades, Lenina cannot now remember which leg he had lost."

When Matthews's maternal grandmother was released from the gulag in 1948, her reaction to the sight of 14-year-old Lyudmila, whom she'd last seen as a healthy toddler, was less heartwarming: "The first glimpse Martha had of her younger daughter was a crippled silhouette at the end of the hall. Martha called out Lyudmila's name, and howled as the little girl ran lopsidedly towards her. Lyudmila remembered that awful wail all her life." And yet, Matthews learned, his mother's afflictions were part of what had drawn his father to her, just as his troubles attracted her. Like Mila, Mervyn was hospitalized in his adolescence, in his case for a crippled hip and pelvis. "I was very moved when she told me about what she'd been through, her childhood, the war," he told his son. "She'd had such a miserable life I wanted to give her a decent deal." For her part, Mila had pitied her fiancé for his "joyless, nasty, humiliated childhood." She wanted, she wrote, "to make your life rich and happy."

In the Victorian terraced home in London where Matthews grew up, amid family tensions that occasionally "crackled like frost," he saw little evidence of the passion his parents once had for each other. But in the attic, he found proof: love letters they wrote during their years apart, stacked in an old steamer trunk. "At some moments," Matthews writes, "their epistolary conversation is so intimate that reading the letters feels like a violation. At others the pain of separation is so intense that the paper seems to tremble with it. . . . The letters are charged with loss, and loneliness, and with a love so great, my mother wrote, 'that it can move mountains and turn the world on its axis.' "

Call it irrationality, call it Russian maximalism, but the letters, papers and confidences Matthews inhabits in "Stalin's Children" rehabilitate all the generations they touch — including his own — showing how their times shaped their choices. When Matthews found his own Russian bride at the end of the '90s, he didn't need to set off a diplomatic barrage to win her. "Neuzheli dozhili," a friend of his mother's wrote to her when Soviet Communism died. "Can it be that we have lived to see this day?" Some lived, some didn't. Matthews's book reminds his readers to mark the difference, to remember and to acknowledge how quickly luck can change — for a family or a country. h

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http://www.nytimes.com/2008/11/23/books/review/Schillinger-t.html?8bu&emc=bua2

Little Bites of Horror

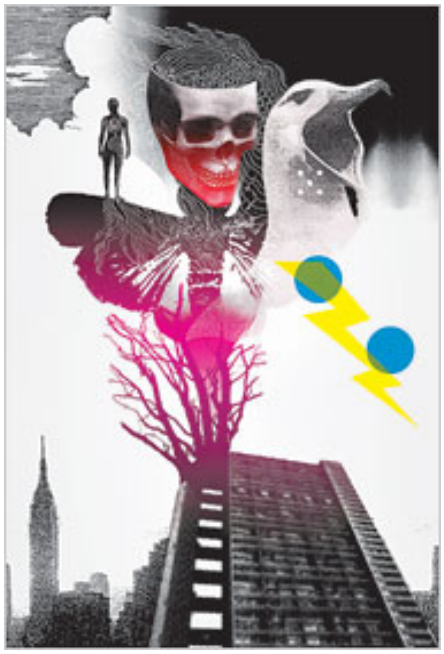
By CHARLES TAYLOR

JUST AFTER SUNSET

Stories

By Stephen King

367 pp. Scribner. $28



If the prospect of a collection of stories by Stephen King isn't as inviting as a new King novel, it's not just because the writer's recent novels — "Duma Key," "Lisey's Story" and especially "Cell" and "From a Buick 8" — have been so good. It's because King continues to be dedicated to giving his readers a luxuriant experience, the basic pleasure of getting lost in a book.

In his introduction to the new collection "Just After Sunset," King explains that as a young almost-poor schoolteacher trying to get a writing career started, stories, many of them published in men's magazines like Dude and Cavalier, were a way to a much needed check when the car needed a muffler or his wife's birthday was coming up. King says the stories simply came out, and he wasn't too concerned with learning what constituted good structure. "I was flying entirely by the seat of my pants," he writes, "running on nothing but intuition and a kid's self-confidence."

King goes on to say that getting a chance to edit the 2007 edition of "The Best American Short Stories" gave him an excuse to read a bunch of stories. It also, he says, inspired him to try to recapture the knack for writing stories that, along the way, had given way to the more expansive pursuit of writing novels.

"Just After Sunset" suggests why. It's an uneven collection, in both tone and execution, and it often reminds you of how King's writing has moved beyond its genre roots. That's not to affirm the critics who've reduced King's writing to penny dreadfuls that have no bearing on the real world. Good writing of the fantastic and the macabre is always based in recognizable emotion. Noting the detail and empathy that have long made him one of the most observant chroniclers of American middle-class life, the critic Laura Miller shrewdly observed that King should accurately be judged "a realist."

In "Just After Sunset," there are only flashes of the kind of recognition that King the novelist provides, and the short-story form does not allow him the space to turn his plot devices into metaphors. For me, that was most apparent in "N." The tale has a tricky story-within-a-story structure. A woman whose psychiatrist brother has committed suicide forwards his notes to a boyhood friend who is now a television doctor. The notes tell of the shrink's sessions with a patient who has come upon an odd patch of Maine woods where something evil and powerful lurks. The story showcases King's almost unholy talent for making the natural world seem like something not of this world. But just when you're ready for whatever is lurking in those woods to fully reveal itself and the power it wields, the story ends — granted, on an

unsettling and clever note. But King seems to be just warming up, and the story feels like a sketch for one of his novel-length freakouts.

Other stories range from the delirious bad taste of "The Cat From Hell" to the just plain bad taste of "A Very Tight Place," from the gloppily inspirational "Ayana" to the botched brilliance of "The Things They Left Behind." I have a special fondness for "The Cat From Hell." Little furry creatures are often the victims in horror stories. King's tale is revenge for every fictional house pet ever perfunctorily slaughtered in the name of thrills. It's disgusting, and I mean that as a compliment.

"The Things They Left Behind" proceeds to a tidy, too heartwarming ending. Imperfect though it is, it's also the most affecting and scary story here. The narrator is an office worker who, in order to savor a late-summer day, called in sick on Sept. 11. About a year later, artifacts that belonged to his murdered co-workers begin turning up in his apartment. And that's not all. At night, they begin whispering to each other, often in the voices of their dead owners.

So much hand-wringing has already been expended over the question of how art should deal with 9/11. No fiction that has attempted the subject has, to my mind, been as effective (or as affecting) as King's "From a Buick 8" and "Cell." Both novels were direct and oblique, not mentioning 9/11 but addressing the question of how you retain your humanity after the unthinkable has entered your life. (In "Cell," the characters' reaction to the numbers 9-1-1 determines whether they remain human or become monsters.) There's nothing oblique in "The Things They Left Behind." King employs a simple, unnerving device to address the way the presence of the dead was palpable in the city following 9/11.

Despite the disappointments of "Just After Sunset," and the sense that these stories remain, at some level, an exercise, a stopgap for the next full-fledged King project, the book also feels like the work of a writer who, even in less than top form, wouldn't dream of breaking faith with his readers.

Part of what I respect about Stephen King — and I suspect it's part of what drives some of his fellow writers and some critics crazy — is the honesty of that admission, in this book's introduction, that he churned out stories for money. There's no pretense that he was "honing his craft" or "perfecting the form," no attempt to disguise the fact that any writer who is honest enough admits to doing some time on Grub Street. Which is why, in books like "The Dark Half" and "The Shining," King has been so witheringly accurate about the vanity and pettiness of writers.

King's critical reputation has by now had more corrections than the Dow. He has been both Horror Hack and Underrated Littérateur. Every few years, usually in the name of what Terry Southern called the "quality lit game," somebody decides he's taken too seriously and needs to be put back in the drugstore racks where they think he belongs. And any critical defense of King is usually good for a round of claims that said critic is decrying literature or assuming that book sales equal quality.

So let's be clear. King isn't good because he's popular. But any critic who puts King's popularity down to the dreadful taste of the masses (cue Harold Bloom) has failed to do the basic work of a critic, which is to understand and probe and not simply to judge. King gets to readers because he renders everyday life so exactly and because he understands it is always ready to rupture.

The literary critic Leslie Fiedler, in an interview given a few weeks before he died, recalled telling a group of postmodern fiction writers, "Look, let's be frank with each other: When all of us are forgotten, people will still be remembering Stephen King." Anyone who claims to be interested in contemporary American literature needs to understand what he'll be remembered for.

Charles Taylor is a columnist for The Newark Star-Ledger and Bloomberg News.

http://www.nytimes.com/2008/11/23/books/review/Taylor-t.html?8bu&emc=bua2

Disaster Reel

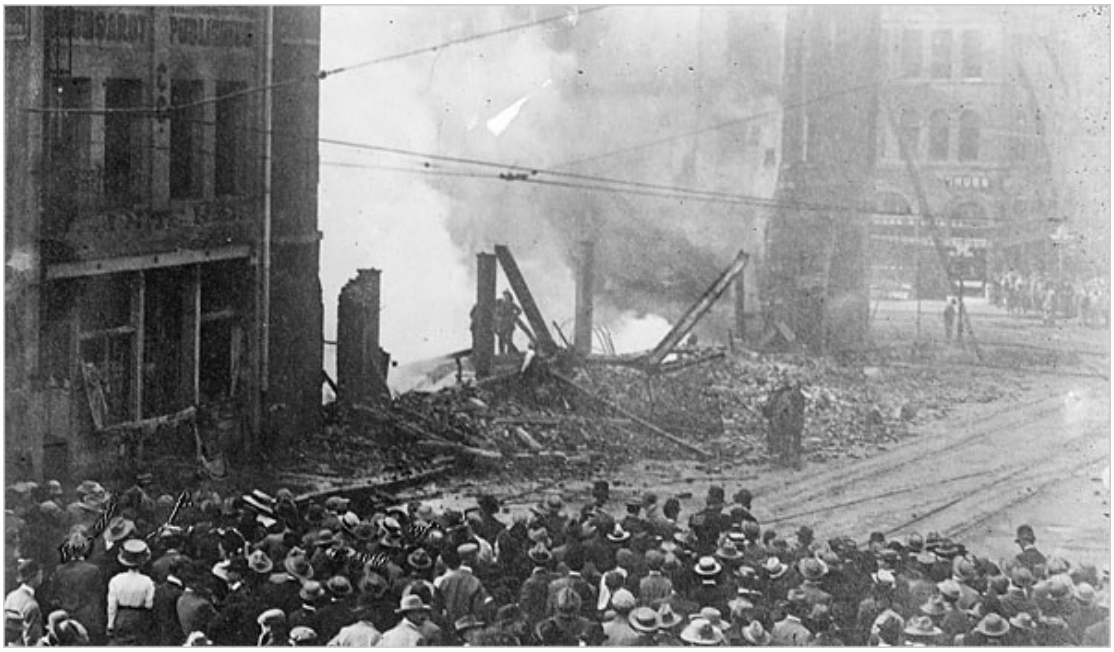
By DAVID OSHINSKY

AMERICAN LIGHTNING

Terror, Mystery, Movie-Making, and the Crime of the Century

By Howard Blum

Illustrated. 339 pp. Crown Publishers. $24.95



In the early-morning hours of Oct. 1, 1910, a huge explosion rocked the headquarters of The Los Angeles Times, killing 21 people and leaving the building in ruins. It soon became apparent that this was the work of a bomber, not the result of a match struck carelessly near leaking gas, and a national manhunt began. What followed — the arrests, the trial, the confessions — would grab headlines intermittently before sliding into the memory hole of history.

The more sensational press accounts from that era portrayed the bombing as “the crime of the century,” even though the century still had 90 years to run. Since that time, authors and headline writers have claimed this title for a host of other crimes (and trials) — think of Leopold and Loeb, Sacco and Vanzetti, the Scottsboro boys, the Lindbergh baby kidnapper, Alger Hiss, Julius and Ethel Rosenberg, Lee Harvey Oswald, James Earl Ray, the Manson family, the Watergate crowd and O. J. Simpson. “American Lightning” is the latest entry in this bloated field, and Howard Blum, a contributing editor at Vanity Fair, isn’t shy about stretching the relevance of his story. The 1910 bombing was a watershed event in our nation’s history, he insists, with dire consequences for the 20th century and a dark warning for the 21st.

Blum tells the story through the intersecting lives of three characters: Billy Burns, the detective who tracked down the bombers; Clarence Darrow, the lawyer who defended them; and D. W. Griffith, the filmmaker who had assisted the detective on an earlier murder case. Burns had built his career in the United States Secret Service, battling mobsters and corrupt politicians. By 1910, the year he formed his own detective agency, he was already a legend in the popular press, which called him “the American

Sherlock Holmes."With a knack for solving mysteries that baffled lesser men, Burns was hired by the mayor of Los Angeles to find the culprits.

The motive for the bombing seemed apparent from the start. The Los Angeles Times was a "fiercely conservative" newspaper, Blum says, and its publisher, an "unpleasant mountain of a man" named Harrison Gray Otis, had vowed to turn Los Angeles into "a bustling, nonunion metropolis." Employing his army of detectives, Burns traced the conspiracy, as well as other terrorist acts, to the Indianapolis headquarters of the Structural Iron Workers union and its secretary-treasurer, John J. McNamara, whose accomplices included his brother Jim. Business leaders praised Burns for saving capitalism from the clutches of working-class thuggery. Even former President Theodore Roosevelt, who had fought hard to break up big corporations, congratulated the detective for his "signal service" to the nation. But the union movement rushed to the McNamara brothers' defense. "I have investigated the whole case," said Samuel Gompers, president of the American Federation of Labor. "Burns has lied!" Some went further, maintaining that the charges, if true, showed the desperation of working people in the face of capitalist greed: "Justifiable dynamiting," the muckraking journalist Lincoln Steffens cried. With aid from the growing Socialist Party, organized labor raised the war chest needed to give the McNamara brothers the finest defense. Enter Clarence Darrow.

Blum spends more time on Darrow's romantic failings than on his courtroom successes, though he does note that Darrow had previously defended labor leaders accused of violent acts. What made the Los Angeles case different, he adds, was the prosecution's airtight case: the evidence against the McNamaras was overwhelming. So Darrow, attorney for the common man, seems to have taken part in a conspiracy to pay off a potential juror. (Charged with bribery after the trial, Darrow won himself an acquittal by delivering one of the more disingenuous summations of his career.) Meanwhile, Billy Burns was busily using the latest technology to illegally bug the jailhouse conversations of the defendants. In the end, the brothers pleaded guilty to murder in return for long sentences that spared their lives. Burns emerged as the hero, Darrow the beaten man. The blustering Harrison Gray Otis saw it all as further proof of organized labor's villainy. Poor Samuel Gompers ran for cover, claiming to "have been cruelly deceived."

And what of D. W. Griffith? In Blum's hands he remains a transient figure, shoehorned into the story, one suspects, to tie the McNamara trial to the sexy culture of Hollywood. We learn a bit about Griffith's moviemaking skills, his sympathy for the downtrodden and his influence on an awful two-reel film about the McNamara case, "A Martyr to His Cause," which, Blum admits, had little "relation to reality." But we also learn about Griffith's weakness for teenage girls, especially the actress Mary Pickford, whose relationship with the filmmaker is described in turgid detail. ("D. W. . . . had left Mary seething with emotion. . . . His thoughts remained unarticulated, yet they were a torment. They pounded through his consciousness with the force of a compulsion.") "In the end," Blum says, "the book I've written is more a narrative, an expansive and hopefully dramatic and resonating story about the past, than a historian's narrow, fact-laden tome." Fair enough. But the best stories are still the ones that go beyond the nuts-and-bolts narrative, no matter how dramatic, to explore larger meanings and ideas. Although Blum makes repeated claims for the importance of the Los Angeles Times bombing and casually compares it to the terrorist attacks of 9/11, he adds no historical bedrock to support either assertion. What's missing from the book is both a feeling for the pulse of everyday life in Los Angeles in 1910 and an understanding of the enormous industrial, technological and demographic changes that had ignited the violent impasse between labor and capital in California, and beyond.

For Americans a century ago, the bombing offered a brief whiff of Armageddon — a society on the brink. This alone makes it a memorable story, one that still begs to be told.

David Oshinsky holds the Jack S. Blanton chair in history at the University of Texas and is a distinguished scholar in residence at New York University.

http://www.nytimes.com/2008/11/23/books/review/Oshinsky-t.html?8bu&emc=bua2

Turf Wars

By JONATHAN CHAIT

WAR AS THEY KNEW IT

Woody Hayes, Bo Schembechler, and America in a Time of Unrest

By Michael Rosenberg

Illustrated. 374 pp. Grand Central Publishing.
$26.99

In 1993, the second semester of my junior year at the University of Michigan, I enrolled in a highly unusual course called Theory, Strategy and Practice of Football. The class was taught in Schembechler Hall, the headquarters of the football team, and the professors were the coaches. On the first day, I raced to Schembechler Hall and entered a different world, one where the Socratic method of inquiry was not exactly embraced. Our "professor" addressed us sternly, saying we would be treated like football players. That meant no baseball caps, feet on the floor at all times, eyes forward. And absolutely no more tardiness: class would begin at noon sharp, with any stragglers dismissed immediately.

A fellow student raised his hand and offered that classes ended at the top of the hour and began at 10 minutes past, so that students could make it from one course to the next. Starting at the exact moment the previous classes let out, he meekly explained, would be "a physical impossibil- "

The coach cut him off. All he knew was that his class was supposed to start at noon, and we were starting at noon, period. We all nodded. The football program, unlike the poli sci program, was still run by Schembechler's dictum: "We are not going to debate this." And so, two days a week, I'd position myself next to the door in Constitutional Law and sprint for the exit 10 minutes before class ended. If there was an exam, I just had to write extra-fast.

How exactly a left-leaning university could coexist with the militaristic culture of a football program is the subject of Michael Rosenberg's "War as They Knew It," an absorbing account that describes the rivalry between a pair of larger-than-life coaches, Bo Schembechler of Michigan and Woody Hayes of Ohio State, within the social and political context of its time, 1969 through 1978.

The football was titanic — two powerhouses that spent the entire off-season obsessing about each other, and then the entire fall trampling the competition as a warm-up for their cataclysmic showdown. But Rosenberg, a columnist for The Detroit Free Press, also subtly portrays the social fault lines that ran both

within and between the two campuses. (He and I briefly overlapped at The Michigan Daily, the college paper, but I spoke with him only once, while canvassing for votes during the second of my two unsuccessful campaigns for editorial page editor.) In Ann Arbor, left-wing politics managed to thrive alongside growing football fervor. At halftime of the 1970 Rose Bowl, the Michigan marching band formed a peace sign. In 1971, two-thirds of the football team signed an antiwar petition. The theme for the homecoming parade that year was "Bring All the Troops Home Now"; at halftime, the P.A. announcer called for a full withdrawal of American troops and an end to aid for Vietnam.

The defensive lineman Pete Newell skipped the momentous 1969 antiwar rally in Washington to make a road game in Iowa. Afterward, Schembechler praised him before the players for being "out there in Iowa City with the rest of the team, and not in Washington with the damn hippies where he really wanted to be."

To Woody Hayes, hippies were not merely a distraction but an existential threat. A longtime friend of Richard Nixon, Hayes began a coaches' meeting every morning with a Rush Limbaugh-style rant about current events. He once wrote scathingly about the permissive marijuana laws in a city that was home to "one Big Ten university." As Rosenberg writes, "the town, of course, was Ann Arbor."

Hayes was less a conventional right-winger than a fanatical proponent of social order. He inspired his players to pursue their education and even lectured them on military history, of which he was an autodidact. He had no interest in money, regularly declining raises and leaving some paychecks uncashed. News of gasoline shortages prompted him to walk almost three miles to work daily.

An amusing running joke in the book centers on his assistant coaches' struggle to find the team Friday night pregame movies that didn't subvert traditional values. (The years 1969-78 did not constitute a Hayes-friendly era in American film.) One assistant was relieved of this duty after picking "Easy Rider," which he thought was about a motorcycle race. The mention of lesbianism in "Slap Shot" prompted Hayes to shout, "This is TRASH!," berate the theater manager and storm back to the hotel.

Hayes's tantrums came to define him publicly, just as Watergate defined his friend Nixon. Schembechler had played for and coached with Hayes, and learned the strategic value of tirades. But Hayes genuinely lost control of his faculties — tearing up first-down markers, shoving photographers and, in his final game, slugging an opposing player. (After the last incident, Ohio State fired Hayes, though his team's three straight losses to Michigan probably contributed to his dismissal.)

In Rosenberg's most evocative passage, players from Hayes's 1968 national championship squad return to campus for a 10th-anniversary reunion, and are shocked at the lack of respect the current team shows the man they once feared. The decline of authority had finally brought down Woody Hayes, along with so many other institutions of the time. In this sense, he was ultimately prescient.

Jonathan Chait is a senior editor at The New Republic.

http://www.nytimes.com/2008/11/23/books/review/Chait-t.html?8bu&emc=bua2

Mammoth's genome pieced together

By Paul Rincon
Science Reporter, BBC News

A US-Russian team of researchers has pieced together most of the genome of a woolly mammoth, Nature journal reports.

The experts extracted DNA from samples of mammoth hair to reconstruct the genetic sequence of this Ice Age beast.

Though some stretches are missing, the researchers estimate that the genome is roughly 80% complete.

The work could provide insights into the extinction of the mammoth and also resurrects questions about the viability of cloning long-dead species.

The scientists were aided in their task by the fact that several deep-frozen carcasses of woolly mammoths have been dug out of the permafrost in Siberia.

These conditions are ideal for the preservation of hair, which is a preferred source for the extraction of ancient DNA.

Hair today

If genetic material survives in a sample of hair, most of it will belong to the animal that hair is from.

By contrast, when researchers try to extract ancient DNA from bone, it is often swamped with DNA from fungi and bacteria.

The researchers used hair samples from two mammoth specimens recovered from the permafrost.

Once the researchers had extracted the DNA, they had to estimate how much of it actually came from the mammoth. So they mapped their genome sequence on to that of an African elephant - the mammoth's close relative.

Analysis of the draft sequence revealed that the genome of a mammoth differs from that of an African elephant by just 0.6%.

This is about half the difference between the genomes of a human and a chimpanzee.

It is a curious observation, given that the evolutionary split between the African elephant and the mammoth happened even earlier than the break between the human and chimpanzee lineages.

This seems to suggest that genomes evolve more slowly in elephants (including mammoths) than in humans and great apes. Why this should be the case, though, is still a mystery.

The results also show that the mammoth - along with the African elephant - had a larger genome than is typical for placental mammals. The total mammoth sequence is estimated to be about 1.4 times bigger than the human genome.

Back for good?

Enthusiasts have long dreamt of using ancient DNA to bring extinct species back from the dead. But most scientists are doubtful this could ever be achieved.

The changes that creep into an animal's genetic sequence after its death pose a significant challenge.

"It's a bit like trying to build a car with only 80% of the parts and knowing that some of the parts are already broken," said Jeremy Austin, deputy director of the Australian Centre for Ancient DNA at the University of Adelaide.

"Even if we did have the genome in its entirety, we still have the problem of knowing what is a real mutation versus what is [a] sequencing error or DNA damage. At a genome scale, this in itself is an almost insurmountable problem.

"After this we have the issues of how to construct artificial chromosomes."

Hendrik Poinar, a geneticist from McMaster University in Ontario, Canada, commented: "We have no idea - yet - how many chromosomes mammoths had."

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7738062.stm

Published: 2008/11/19 18:34:56 GMT

Anthropologists Consider Notions of 'Community' in Education

SAN FRANCISCO – If there's one thing that unites an education "community," it just might be the use of the word "community" – and, not surprisingly, "the notion of community is drawn upon frequently in educational research," said Doris S. Warriner, of Arizona State University.

"However," Warriner continued, "the concept of community is often used to convey common experiences" — where significant diversity of experience in fact exists.

Warriner chaired a session Wednesday at the American Anthropological Association's annual meeting on "The Problem with 'Community': Rethinking Participation, Contestation, and Imagination in Spaces of Teaching and Learning." Among the guiding questions she offered up for consideration: "How useful is the notion of community for conceptualizing and investigating questions about participation, engagement, inclusion or marginalization?"

"In what ways do shared experiences, histories, practices, understandings or trajectories define a community?" And, "What alternatives are there for describing practices and processes that are shared but not unifying or community-building?"

Presenters considered complexities of "community" in a number of different educational settings, including among educators themselves, within networks of educators dedicated to educational reform, and also among adult English language learners. Mindi Rhoades, of Ohio State University, described her research of a free, university-run summer program designed to foster an interest in technology among middle and high school girls, as an antidote of sorts to the gender gap in computer science. Originally, Rhoades said, "I put the program down as an unqualified success."

She subsequently realized she was seeing the Ohio State program, and its participants, too monolithically, in part because of the all-female atmosphere. "Women! Women in technology. They're not men, they're women!"

"You saw girls who looked similar on the surface but they came into it with really different histories and desires," Rhoades said.

For instance, in breaking down the data, she found that the girls who were least satisfied with the program were those whose racial groups weren't represented among the program's mentors. At the same time, some of the girls who got the most out of it likewise didn't have a mentor of the same race to look up to. As for the mentors, "Is it enough for them to be women, or do [girls] need to see a woman that looks like them, or do some of them need that?" Rhoades asked.

Also, while the program, on digital animation, focused on a more artistic approach to learning some computer science basics, "Not all women have a problem with the male, individual, objective, rational, STEM aspect of these things," Rhoades said. (STEM is the common acronym for science, technology, engineering and mathematics.)

Meanwhile, another session Wednesday dealt with anthropological perspectives on online and hybrid "educational communities." Wesley R. Shumar, of Drexel University, described an effort to inject the culture of an online math forum into teacher training programs at Drexel. The Math Forum is a long-standing Drexel initiative known for offering "Problems of the Week" that K-12 students solve, and explain how they solve. "They argue that people get better at math if they a) solve problems and b) talk about it," said Shumar.

Originally, Shumar said, teacher education students served as online mentors to K-12 students in the Math Forum. However, Shumar said it quickly became clear that many students in math education courses aren't very good at math (or even really "stink" at it), and likewise could benefit from the kind of can-do problem solving culture that the Math Forum encourages.

Shumar described the subsequent development of three online modules for math education classes: one mathematical thinking module that asks college students to do math problems and talk about them (like

the K-12 students do), another that focuses on diagnosing what K-12 students were thinking as they solved their problems, and a third based on the original mentoring model. “Pre-service teachers, I think they’re actually willing to engage in this game of, ‘Let’s do math and let’s talk about it,’ but you first have to tell them what the game is,” Shumar said.

In a talk on teaching cultural anthropology in 3-D virtual worlds (like Second Life), S.A. Mousalimas, of the University of Maryland University College Europe, described the challenge not of replicating an online community’s values, but of counteracting or challenging them. Credibility, he said, is “the most important issue for me currently.”

“Virtual worlds were originally for role playing. Educators came in after that.”

The annual meeting of anthropologists continues in San Francisco through Sunday.

— Elizabeth Redden

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/20/anthro.

Microsoft to offer free security

In a surprise move, Microsoft has announced it will offer a free anti-virus and security solution from the second half of next year.

It will stop selling OneCare, its all-in-one security and PC management service, from the end of June 2009.

The new software, code-named Morro, will be a no-frills program suited to smaller and less powerful computers.

The software will be free to download and will support Windows XP, Vista and Windows 7.

The move comes as sales of the OneCare subscription service are flagging - reportedly because the anti-virus marketplace is already flooded with big-name players such as Symantec and McAfee.

Since its launch in May 2006, OneCare has garnered less than 2% of the security software market share.

In a statement, Microsoft said that Morro would be designed specifically to be a small-footprint program that uses fewer system resources. This, it said, would be ideal for users with low-bandwidth connections or computers without much processing power.

That will be of particular interest to consumers buying comparatively low-powered "netbook" computers.

Amy Barzdukas, senior director of product management in the online services division at Microsoft, said: "This new, no-cost offering will give us the ability to protect an even greater number of consumers, especially in markets where the growth of new PC purchases is outpaced only by the growth of malware."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7737520.stm

Published: 2008/11/19 13:35:14 GMT

Rapid care 'cuts baby's HIV risk'

Rapid drug treatment of babies with HIV dramatically cuts their risk of death and debilitating disease, international research shows.

The study prompted the World Health Organization to change its guidelines, which had recommended delaying therapy until symptoms became apparent.

It found giving antiretroviral therapy (ART) straight after diagnosis cut the risk of death from Aids by 76%.

The study appears in the New England Journal of Medicine.

It is to be hoped that this will save countless babies across the world
Professor Mark Cotton
Comprehensive International Program of Research on Aids

The study, of 377 HIV-positive South African babies, found that babies given treatment immediately after they were diagnosed with HIV cut their risk of dying from the infection to just 4%.

In comparison, the risk of death for those whose treatment was delayed until their levels of key immune system CD4 cells began to fall, or other symptoms emerged, was 16%.

Immediate treatment also cut the chance of disease progressing measurably by 75%, from 26% to 6%.

The findings were so conclusive that treatment for all babies was re-assessed at the preliminary stage of the trial.

Unexpected findings

Professor Diana Gibb, from the Medical Research Council clinical trials unit worked on the study.

She said: "We did not expect to see differences so soon between the infants receiving early treatment and those in the group where treatment started only when immunity was falling or symptoms developed."

Lead researcher Dr Avy Violari, from the Comprehensive International Program of Research on Aids (CIPRA-SA) said: "Our results reinforce the view that there are no reliable predictors for small infants as to how their disease is progressing.

"CD4 counts do not tell us with enough accuracy if babies under a year of age are becoming sick.

"What was alarming was the speed of disease progression; some infants could seem fine in the morning and get sick and die by nightfall. Some did not even make it to the hospital.

"When these early data were analysed, it became clear that treating all infants at the earliest opportunity after diagnosis was the best course of action."

Saving lives

Her CIPRA-SA colleague Professor Mark Cotton, who also played a key role in the study, said he was delighted that the study had led to changes in the WHO guidelines.

He said: "It is to be hoped that this will save countless babies across the world, especially in low-income countries where mother-to-child transmission is still common.

"However, in order to start ART early, it is important to undertake HIV viral diagnosis very early in life which does require a programme with both manpower and resources."

Professor Gibb also stressed that avoiding mother-to-child transmission in the first place was the top priority.

She said: "These drug regimens are no picnic for these babies and even with improved outcomes in early life, there is still no cure for Aids."

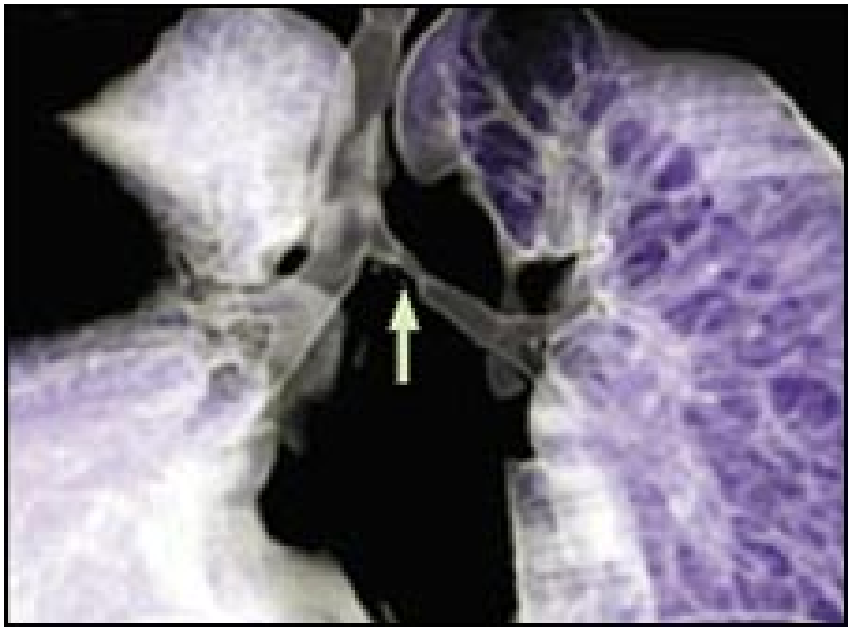
The WHO issued a statement in which it confirmed the study had been instrumental in its decision to revise its guidelines.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7736120.stm

Published: 2008/11/19 23:59:49 GMT

Windpipe transplant breakthrough

By Michelle Roberts
Health reporter, BBC News



Medical Correspondent Fergus Walsh explains the procedure (Graphics: Universitat de Barcelona)

Surgeons in Spain have carried out the world's first tissue-engineered whole organ transplant - using a windpipe made with the patient's own stem cells.

The groundbreaking technology also means for the first time tissue transplants can be carried out without the need for anti-rejection drugs.

Five months on the patient, 30-year-old mother-of-two Claudia Castillo, is in perfect health, The Lancet reports.

She needed the transplant to save a lung after contracting tuberculosis.

The Colombian woman's airways had been damaged by the disease.

Scientists from Bristol helped grow the cells for the transplant and the European team believes such tailor-made organs could become the norm.

To make the new airway, the doctors took a donor windpipe, or trachea, from a patient who had recently died.

Then they used strong chemicals and enzymes to wash away all of the cells from the donor trachea, leaving only a tissue scaffold made of the fibrous protein collagen.

This gave them a structure to repopulate with cells from Ms Castillo herself, which could then be used in an operation to repair her damaged left bronchus - a branch of the windpipe.

By using Ms Castillo's own cells the doctors were able to trick her body into thinking the donated trachea was part of it, thus avoiding rejection.

Two types of cell were taken from Ms Castillo: cells lining her windpipe, and adult stem cells - very immature cells from the bone marrow - which could be encouraged to grow into the cells that normally surround the windpipe.

I was very much afraid. Before this, we had been doing this work only in pigs

Surgeon Professor Paolo Macchiarini of the Hospital Clínic of Barcelona, Spain

After four days of growth in the lab in a special rotating bioreactor, the newly-coated donor windpipe was ready to be transplanted into Ms Castillo.

Her surgeon, Professor Paolo Macchiarini of the Hospital Clínic of Barcelona, Spain, carried out the operation in June

He said: "I was very much afraid. Before this, we had been doing this work only on pigs.

"But as soon as the donor trachea came out of the bioreactor it was a very positive surprise."

He said it looked and behaved identically to a normal human donor trachea.

The operation was a great success and just four days after transplantation the hybrid windpipe was almost indistinguishable from adjacent normal airways.

After a month, a biopsy of the site proved that the transplant had developed its own blood supply.

And with no signs of rejection four months on, Professor Macchiarini says the future chance of rejection is practically zero.

"We are terribly excited by these results," he said.

"She is enjoying a normal life, which for us clinicians is the most beautiful gift."

Today Ms Castillo is living an active, normal life, and once again able to look after her children Johan, 15, and Isabella, four. She can walk up two flights of stairs without getting breathless.

I was a sick woman, now I will be able to live a normal life
Claudia Castillo

Professor Martin Birchall, professor of surgery at the University of Bristol who helped grow the cells for the transplant, said: "This will represent a huge step change in surgery.

"Surgeons can now start to see and understand the potential for adult stem cells and tissue engineering to radically improve their ability to treat patients with serious diseases."

He said that in 20 years time, virtually any transplant organ could be made in this way.

US scientists have already successfully implanted bladder patches grown in the laboratory from patients' own cells into people with bladder disease.

The European research team, which also includes experts from the University of Padua and the Polytechnic of Milan in Italy, is applying for funding to do windpipe and voice box transplants in cancer patients.

Clinical trials could begin five years from now, they said.

Between 50,000 and 60,000 people are diagnosed with cancer of the larynx each year in Europe, and scientists say about half them may be suitable candidates for tissue engineering transplants.

WINDPIPE TRANSPLANT
1 Trachea is removed from dead donor patient
2 It is flushed with chemicals to remove all existing cells
3 Donor trachea "scaffold" coated with stem cells from the patient's hip bone marrow. Cells from the airway lining added
4 Once cells have grown (after about four days) donor trachea is inserted into patient's bronchus

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7735696.stm

Published: 2008/11/19 01:28:49 GMT

Technology to eradicate malaria

Emerging technologies could boost supplies of essential plant-based drugs to combat and ultimately help eradicate malaria, says a report.

In the face of increasing parasite resistance to anti-malarial drugs there is now great reliance on artemisinin combination therapies to treat malaria.

But ACTs are expensive and demand threatens to outstrip supply.

Plant breeding, new drugs and clever ways to make artemisinin in the lab are the answer, according to world experts.

The report is based on the conclusions of the Artemisinin Enterprise Conference 2008, which was sponsored by the Bill and Melinda Gates Foundation and the Roll Back Malaria Partnership and hosted by the University of York.

Combating malaria

It assesses a portfolio of new technologies, collectively known as The Artemisinin Enterprise.

Around 100 million ACTs were sold in 2006, but forecasters say that demand will at least double over the next four years, potentially growing to over 300 million doses annually.

This is partly due to a recent decision by the global malaria community to subsidise the cost of ACTs.

Our goal is to create a stable, second source of artemisinin to supplement existing natural sources

Dr Philippe Desjeux of the Insitute for One World Health

There is already expected to be a shortage in 2010 owing to a lack of the Artemisia annua wormwood plant plant, the raw material for ACTs, being grown.

Malaria experts say three emerging technologies have the potential to fill this gap.

The Centre for Novel Agricultural Products at the University of York is using fast-track plant breeding to create crops that produce higher yields of artemisinin.

The centre has decided against using GM crops because of time delay that would be incurred to overcome the associated regulatory hurdles.

The non-profit organisation Medicines for Malaria Venture is developing synthetic artemisinin-like drugs. These experimental drugs have been shown to cure malaria in mice in just one dose.

Clinical trials in humans will begin in February or March 2009.

Meanwhile, the nonprofit pharmaceutical company Institute for One World Health is using fermentation combined with innovative synthetic chemistry to produce artemisinin.

Dr Philippe Desjeux of the Insitute for One World Health said: "Our goal is to create a stable, second source of artemisinin to supplement existing natural sources.

"It is hoped that this source of semi-synthetic artemisinin will be more affordable for drug manufacturers. In turn, this will help reduce the price of ACTs, making them more accessible to people in malaria afflicted countries."

He said commercial production should begin by 2011 or 2012.

In 2006 there were between 189 and 327 million cases of malaria with over 880,000 deaths - largely children in Sub-Saharan Africa.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7735858.stm

Published: 2008/11/19 08:40:01 GMT

Motor neurone disease clue found

Scientists have identified a molecule which could be key to understanding the cause of motor neurone disease (MND) and other neurodegenerative disorders.

The Proceedings of the National Academy of Sciences study raises the hope of new treatments being developed.

The London-based team showed the molecule, Wnt3, plays a key role in establishing connections between nerve cells and the muscles they control.

These connections become progressively weaker in MND patients.

> **If we can build up a thorough picture to show how synapses are normally formed between nerves and muscles we can start to look for any elements that aren't working properly in people with MND**
> Professor Patricia Salinas
> University College London

Without properly-formed connections - or synapses - the muscle cannot receive the nerve signal that tells it to contract.

This results in the muscle weakness that is typical of MND.

However, scientists have not been clear how synapses are formed in normal circumstances and this has made it very difficult to pin down what goes wrong in MND.

The researchers, from University College London and King's College London, identified Wnt3 as key to the process.

It assists a second molecule, called Agrin, which co-ordinates construction of the connection - or synapse.

Lead researcher Professor Patricia Salinas said: "The work we are publishing today puts an important piece of the puzzle in place and offers up a new possibility for developing drugs to treat MND and other neurodegenerative diseases.

"If we can build up a thorough picture to show how synapses are normally formed between nerves and muscles we can start to look for any elements that aren't working properly in people with MND.

"This might also lead to strategies for nerve repair after an injury."

Animal studies

The team of researchers looked at the function of Wnt signals in chickens, mice and in cells.

In all three cases, it was shown to enhance the effectiveness of Agrin.

Professor Salinas added: "Chickens that don't have the Wnt signal in their developing wings have all of the muscle tissue that we would expect to see, but they don't make strong connections between nerves and muscles.

"So we know that Wnt is definitely affecting synapse formation rather than anything else to do with muscles.

"Now that we understand the role Wnt plays we can begin to explore any role it plays in MND and whether it could be a good target for treating this type of neurodegenerative disease."

Dr Belinda Cupid, of the MND Association, said: "We know from recent research that signs of motor neurone damage, on a cellular level, in models of MND occur very much earlier than the symptoms appear, so any new knowledge of how healthy motor neurones and muscles interact will give us new clues about what might be going wrong in those people affected by this cruel disease."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7733202.stm

Published: 2008/11/18 00:09:57 GMT

Never Forget. You're Reminded.

By A. O. SCOTT

THIS holiday season the multiplexes, the art houses and the glossy for-your-consideration ads in publications like Variety and The Hollywood Reporter will be overrun with Nazis. A minor incursion of this sort is an annual Oscar-season tradition, but 2008 offers an abundance of peaked caps and riding breeches, lightning-bolt collar pins and swastika armbands, as an unusually large cadre of prominent actors assumes the burden of embodying the most profound and consequential evil of the recent past.

David Thewlis, playing a death camp commandant in "The Boy in the Striped Pajamas," will be joined by Willem Dafoe, who takes on a similar role in "Adam Resurrected," Paul Schrader's new film. In "The Reader," directed by Stephen Daldry and based on Bernhard Schlink's best-selling novel of the same name, Kate Winslet plays a former concentration camp guard tried for war crimes. Tom Cruise, the star of Bryan Singer's "Valkyrie," wears the uniform of the Third Reich though his character, Col. Claus von Stauffenberg, was not a true-believing Nazi but rather a patriotic German military officer involved in a plot to assassinate Hitler.

And of course there will be plenty of room on screen for the victims and survivors of Hitler's regime. Adam, the title character in "Adam Resurrected," is a Berlin nightclub performer, played by Jeff Goldblum, who finds himself, after enduring the camps, confined to an Israeli asylum somewhere between "One Flew Over the Cuckoo's Nest" and "King of Hearts." And in Edward Zwick's "Defiance," Daniel Craig transmutes his James Bond action-heroism into the moral heroism of Tuvia Bielski, the real-life leader of a group of Jewish partisans who fought the Germans in the forests of Belarus. Meanwhile the wave of European cinema dealing with Nazism and the Holocaust — most prominently represented on American screens in recent years by "The Counterfeiters," which won the Academy Award for best foreign-language film back in February, and earlier aspirants like "Downfall" and "Black Book" — continued this fall with the American releases of "A Secret" and "One Day You'll Understand," two quiet, powerful French-language films exploring themes of memory and its suppression.

The near-simultaneous appearance of all these movies is to some degree a coincidence, but it throws into relief the curious fact that early 21st-century culture, in Europe and America, on screen and in books, is intensely, perhaps morbidly preoccupied with the great political trauma of the mid-20th century.

The number of Holocaust-related memoirs, novels, documentaries and feature films in the past decade or so seems to defy quantification, and their proliferation raises some uncomfortable questions. Why are there so many? Why now? And more queasily, could there be too many?

The moral imperatives imposed by the slaughter of European Jews are Never Again and Never Forget, which mean, logically, that the story of the Holocaust must be repeated again and again. But the sheer scale of the atrocity — the six million extinguished lives and the millions more that were indelibly scarred, damaged and disrupted — suggests that the research, documentation and imaginative reconstruction, the building of memorials and museums, the writing of books and scripts, no matter how scrupulous and exhaustive, will necessarily be partial, inadequate and belated. And this tragic foreknowledge of insufficiency, which might be inhibiting, turns out, on the contrary, to spur the creation of more and more material.

Shortly after the war the German critic T. W. Adorno declared that "to write poetry after Auschwitz is barbaric." This observation has frequently been interpreted, aphoristically, as a fiat of silence, a prohibition against the use of the ordinary tools of culture to address the extraordinary, inassimilable fact of genocide. But those tools, however crude, are what we have to work with. And if Adorno intended a warning against representations of the Holocaust, it has been more quoted than heeded.

The perception that this catastrophe overwhelms conventional aesthetic strategies and traditions has led to the creation of a remarkable range of formally innovative work, including the lyric poetry of Paul Celan, the early prose works of Elie Wiesel, Claude Lanzmann's epic documentary "Shoah," Art Spiegelman's "Maus" and Peter Eisenmann's Berlin memorial to the Jewish victims of Nazism.

To describe these as masterpieces is not especially controversial, but it is also, as Adorno perhaps anticipated, somehow unseemly. If the Holocaust can inspire a great work of art, then it can also incubate the ambition to achieve such greatness, and thus open itself up, like everything else, to exploitation, pretense and vulgarity. Worse, the aura that still surrounds this topic — the sense that it must be treated with a special measure of tact and awe — can be appropriated by clumsy, sentimental and meretricious films or books, which protect themselves from criticism by a cloak of seriousness and piety. Thus the immodest indecency of a movie like Roberto Benigni's Oscar-winning "Life Is Beautiful" was, during its initial period of triumph, deflected onto those with the temerity to criticize it. Those who resisted its manipulative juxtaposition of sweet, childlike innocence with barbarity were accused of lacking the gravity and sensitivity that Mr. Benigni's travesty required.

And a similar defense is invoked, explicitly or implicitly, so routinely that it calls forth cynicism. Why do opportunistic, clever young novelists — I won't name any names — gravitate toward magic-realist depictions of the decidedly unmagical reality of the Shoah? For the same reason that actors shave their heads and starve themselves, or preen and leer in jackboots and epaulets. For the same reason that filmmakers commission concrete barracks and instruct their cinematographers and lab technicians to filter out bright, saturated colors. To win prizes of course.

Ms. Winslet said as much on an episode of "Extras": "I've noticed that if you do a film about the Holocaust, you're guaranteed an Oscar." She was joking, of course, though her appearance in "The Reader" suggests that the joke is funny because it's often true. Why else do you suppose all the movies listed at the beginning of this article, including "The Reader," are coming out in November and December? Not because Hanukkah is coming.

Of course the line between kitsch and art is notoriously blurry, and in any case kitsch has its uses. The television miniseries "Holocaust" is nobody's idea of a masterpiece, but its broadcast, in 1979, on West German state television was a decisive event in that nation's reckoning with its culpability. It is estimated that more than half of the adult German population watched the series.

Subsequently, according to the historian Tony Judt, "Germans would be among the best-informed Europeans on the subject of the Shoah and at the forefront of all efforts to maintain public awareness of their country's singular crime." The French conscience may have been stirred by superior movies — "The Sorrow and the Pity," "Shoah" — but France was much slower to acknowledge the full measure of its complicity.

And in this country "Schindler's List" in 1993 was a similar watershed. Though the Holocaust was not a central event in American history, "Schindler's List," even more than "Holocaust," made it into one by turning it into the basis of a Hollywood epic. Buying a ticket was treated almost a moral duty — "You have to see it. You have to!" nagged Jerry Seinfeld's sitcom parents — and its Oscar-night triumph was staged as a grand collective catharsis.

"Schindler's List" undoubtedly gave rise to a new pedagogical and commemorative impulse. It also, however, helped to domesticate the Holocaust by making it a fixture of American middlebrow popular culture. Which I don't mean entirely as a criticism, since that culture is better than a lot of the alternatives. But Hollywood trades in optimism, redemption and healing, and its rendering of even the most appalling realities inevitably converts their dire facts into its own shiny currency.

Thus "Schindler's List," for all its unsparing and powerful re-creations of the horror of the Krakow ghetto, is a story of heroism, resilience and survival. And a great many of the mainstream Holocaust

movies that have followed, including documentaries and some foreign films, have emphasized hope and overcoming rather than despair and destruction. When death dominates these films — as it does in "The Boy in the Striped Pajamas," an apt successor to "Life Is Beautiful" — it is spiritualized and rendered aesthetically palatable by an overlay of maudlin sentiment.

More often the reality of mass death gives way to yet another affirmation of life, and even faithfully rendered true stories are bent into conformity with familiar patterns, themes and conventions: forbidden love; noble sacrifice; victory against the odds. The Holocaust is more accessible than ever, and more entertaining.

At the same time it is receding from living memory, which may by itself explain the recent burst of cinematic and literary interest. The movies I find most interesting, most authentic, either address this painful process directly, measuring the distance between our time and the 1930s and '40s rather than recreating that era faithfully in every detail, or else cleave to the particulars of a single story. Thus Roman Polanski's "Pianist" and Lajos Koltai's "Fateless," though both tales of survival, register the absurdity and abnormality of survival in the manner of the first-person literary works on which they are based.

"A Secret" and "One Day You'll Understand" are meditations on what it means to remember. It is no coincidence that both take place in France, where the habit and policy of forgetting endured until quite recently. In those films, full of unresolved feelings of grief, tenderness and bewilderment, French Jews born after World War II try to figure out what the annihilation of their parents' world means to them. In both cases the past is both painfully pressing and, mercifully but maddeningly, out of reach.

And in both cases the filmmakers explore not only strong feelings but also complicated ideas. The sensations associated with the Holocaust have become perhaps too easy to evoke, given the power of cinema to dispense fear, pity, sorrow and relief through sound, image and pageantry.

This has been the route taken by most English-language films about the Holocaust, and also some of their slick European counterparts, like "Black Book" and "The Counterfeiters." But "A Secret" and "One Day You'll Understand" represent another strain in European and Israeli film, one that may reflect a deeper cultural difference. In the United States the Holocaust is a mystery, a puzzle, and the obsessive interest in it testifies to its intrinsic strangeness. In France, in Germany and in Eastern Europe it remains an urgent problem that needs to be worked out — in art, in politics and in the society as a whole.

It seems right that movies about a difficult subject should themselves be difficult. But the fate of difficult movies with subtitles, usually, is to slip in and out of American theaters without leaving much of a trace. The big Holocaust movies of the big movie season will make more of an impression, allowing audiences vicarious immersion in a history that they nonetheless keep at a safe, mediated difference, even as they risk bathos and overreach in the process. We don't have to ask what the Holocaust means to us since the movies answer that question for us.

For American audiences a Holocaust movie is now more or less equivalent to a western or a combat picture or a sword-and-sandals epic — part of a genre that has less to do with history than with the perceived expectations of moviegoers. This may be the only, or at least the most widely available, way of keeping the past alive in memory, but it is also a kind of forgetting.

http://www.nytimes.com/2008/11/23/movies/23scot.html?_r=1&th&emc=th

The Online Search Party: A Way to Share the Load

By ANNE EISENBERG

OPPORTUNITIES for social networking abound on the Internet, but not when it comes to one standard job: using a browser and search engine to comb the Web for information. That task is still typically done solo, because browser displays and search procedures have traditionally been designed for a single user.

Now tools are being developed by Microsoft and other companies that let people at different computers search as a team, dividing responsibilities and pooling results and recommendations in a shared Web space on the browser display as they plan a family vacation, for instance, or research a medical problem.

Meredith Ringel Morris, a computer scientist at Microsoft Research in Redmond, Wash., has created one of these collaborative tools, SearchTogether, now available in a test version as a free download at http://research.microsoft.com/searchtogether. The program is designed to work within the Internet Explorer 7 browser.

“Web search is usually considered a solitary activity,” Dr. Morris said. “But many tasks can benefit from joint searching.”

She notes that people have always collaborated informally in searches, watching over a friend’s shoulder and suggesting alternative search words, for instance, or dividing tasks and then e-mailing the most promising Web sites to one another, along with comments. “But these joint search behaviors aren’t directly supported by standard tools,” she said.

SearchTogether, by contrast, actively supports a group search, said Michael Twidale, an associate professor at the graduate school of library and information science at the University of Illinois at Urbana-Champaign, who studies people’s strategies for conducting research jointly.

“SearchTogether addresses a real need,” he said. “People searching for information often want to interact with other people. But most of our information retrieval systems fail to recognize this.”

People who want to try SearchTogether must first sign up for Microsoft's free Windows Live ID program, which lets them chat online or send instant messages to one another. Then anyone with Live ID on a user's list of contacts or "buddy list" can be invited to collaborate on a search.

"You could invite your husband and mother to join you" for a trial run, Dr. Morris said — to work, for instance, on investigating topics like puppies for adoption, hybrid cars, or cooking tips for people with diabetes.

People doing a joint search can divide the chores, sending half of the top results of a query to one team member and half to another, for example, to avoid duplicating work. When you sign on, a drop-down menu shows your current collaborations. Click on a topic and you'll find automatic summaries of the team's searches, as well as links to the pages, comments and recommendations.

Team members can work synchronously, with everyone online at the same time, exchanging chat messages that are shown at the bottom of the browser page. They can also work on their own. "A group member can log in at any time," Dr. Morris said. "Because of the automatic storing of group information in a shared repository, you can see what everyone has done while you were offline. The data base is always available."

The system also has a "peek and follow" feature that lets a group member watch another member search. This could be especially helpful for novice users who want to track the searches of more experienced users before diving in themselves. Once a privacy setting is adjusted within SearchTogether to give access to trusted people, Dr. Morris said, "others can see what you are seeing on your browser."

Dr. Twidale of the University of Illinois particularly admires SearchTogether's educational features like "peek and follow." "These can help participants think of new ways to reformulate their queries," he said. "Seeing the vocabulary and syntax other people are using might help a person be a more successful searcher."

The system also lets users share their search results with others in the future; all the results are automatically saved.

"If someone has a medical problem," Dr. Morris said, "and wants to know what you learned on your search months ago, that person can be added to the group," free to view the stored search history.

THE Microsoft program is one of a number of collaborative tools in the works that will add a new dimension to searching, said Gary Marchionini, a professor of information science at the University of North Carolina, Chapel Hill. "Right now I have my screen and I search," he said. "My colleague does the same thing, and we have clumsy ways for sharing the results."

But that could change. "Why shouldn't we collaborate on a search from the get-go?" he asked. "We can partition the job out, have a place to put joint results and then annotate them" in summary sections. "So we can say not only 'this is what I found,' but 'these are the most salient things about it.' That will make us more productive."

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http://www.nytimes.com/2008/11/23/business/23novelties.html?th&emc=th

IBM to build brain-like computers

By Jason Palmer
Science and technology reporter, BBC News

IBM has announced it will lead a US government-funded collaboration to make electronic circuits that mimic brains.

Part of a field called "cognitive computing", the research will bring together neurobiologists, computer and materials scientists and psychologists.

As a first step in its research the project has been granted $4.9m (£3.27m) from US defence agency Darpa.

The resulting technology could be used for large-scale data analysis, decision making or even image recognition.

"The mind has an amazing ability to integrate ambiguous information across the senses, and it can effortlessly create the categories of time, space, object, and interrelationship from the sensory data," says Dharmendra Modha, the IBM scientist who is heading the collaboration.

"There are no computers that can even remotely approach the remarkable feats the mind performs," he said.

"The key idea of cognitive computing is to engineer mind-like intelligent machines by reverse engineering the structure, dynamics, function and behaviour of the brain."

'Perfect storm'

IBM will join five US universities in an ambitious effort to integrate what is known from real biological systems with the results of supercomputer simulations of neurons. The team will then aim to produce for the first time an electronic system that behaves as the simulations do.

The longer-term goal is to create a system with the level of complexity of a cat's brain.

Prof Modha says that the time is right for such a cross-disciplinary project because three disparate pursuits are coming together in what he calls a "perfect storm".

> **We are going not just for a homerun, but for a homerun with the bases loaded**
> Dharmendra Modha
> IBM Almaden Research Center

Neuroscientists working with simple animals have learned much about the inner workings of neurons and the synapses that connect them, resulting in "wiring diagrams" for simple brains.

Supercomputing, in turn, can simulate brains up to the complexity of small mammals, using the knowledge from the biological research. Modha led a team that last year used the BlueGene supercomputer to simulate a mouse's brain, comprising 55m neurons and some half a trillion synapses.

"But the real challenge is then to manifest what will be learned from future simulations into real electronic devices - nanotechnology," Prof Modha said.

Technology has only recently reached a stage in which structures can be produced that match the density of neurons and synapses from real brains - around 10 billion in each square centimetre.

Networking

Researchers have been using bits of computer code called neural networks that seek to represent connections of neurons. They can be programmed to solve a particular problem - behaviour that appears to be the same as learning.

But this approach is fundamentally different.

"The issue with neural networks and artificial intelligence is that they seek to engineer limited cognitive functionalities one at a time. They start with an objective and devise an algorithm to achieve it," Prof Modha says.

"We are attempting a 180 degree shift in perspective: seeking an algorithm first, problems second. We are investigating core micro- and macro-circuits of the brain that can be used for a wide variety of functionalities."

The problem is not in the organisation of existing neuron-like circuitry, however; the adaptability of brains lies in their ability to tune synapses, the connections between the neurons.

Synaptic connections form, break, and are strengthened or weakened depending on the signals that pass through them. Making a nano-scale material that can fit that description is one of the major goals of the project.

"The brain is much less a neural network than a synaptic network," Modha says.

First thought

The fundamental shift toward putting the problem-solving before the problem makes the potential applications for such devices practically limitless.

Free from the constraints of explicitly programmed function, computers could gather together disparate information, weigh it based on experience, form memory independently and arguably begin to solve problems in a way that has so far been the preserve of what we call "thinking".

"It's an interesting effort, and modelling computers after the human brain is promising," says Christian Keysers, director of the neuroimaging centre at University Medical Centre Groningen. However, he warns that the funding so far is likely to be inadequate for such an large-scale project.

That the effort requires the expertise of such a variety of disciplines means that the project is unprecedented in its scope, and Dr Modha admits that the goals are more than ambitious.

"We are going not just for a homerun, but for a homerun with the bases loaded," he says.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7740484.stm

Published: 2008/11/21 14:52:33 GMT

Light-wave implant hope for deaf

An implant which works by firing infrared light into the inner ear is being investigated by US researchers.

Nerves in the ear can be stimulated by light as well as sound and the team from Northwestern University, Illinois, is aiming to harness this.

Infrared light shone onto guinea pig nerve cells produced better results than standard cochlear implants, a report in New Scientist magazine said.

But UK charity RNID said a device for human use might take years to develop.

For some profoundly deaf patients, the development of cochlear implants in recent years has been an important change.

The system works by placing approximately 20 electrodes to directly stimulate the nerves in the inner ear, but it has its limitations, with users finding it hard to appreciate music or communicate in a noisy environment.

This is because there are as many as 3,000 "hair cells" in a healthy ear, contributing to a far more detailed interpretation of sound than the implant can provide.

Frequency maps

Dr Claus-Peter Richter from Northwestern believes that an effect discovered by chance could hold the key to a better implant.

Surgeons who used lasers to perform a surgical procedure in the ear discovered that they were able to stimulate the nerve cells there to send an electrical message back to the brain.

Exactly why this happens is unclear, although Dr Richter believes that the heat that accompanies the light may be responsible.

> **This could be a major breakthrough, but we have to remember that even if that true, the time between demonstrating this and developing a device will be quite significant**
> RNID spokesman

However, the narrow beam possible using light rather than an electrode offers the possibility of a far more precise targeting of these neurons.

He shone infrared light into the neurons of deaf guinea pigs, while measuring electrical activity in a nerve "relay" between the inner ear and the brain.

The frequency "maps" produced this way are a good indication of the quality of information reaching the brain.

Sharp sound

While the "maps" produced by cochlear implants were less detailed, those produced after infrared stimulation were as sharp as those produced by sound in hearing guinea pigs.

Dr Richter is now working on ways to produce fibre optic devices which could target light within the inner ear.

A spokesman for the UK charity RNID said that cochlear implants had "transformed the lives" of many people and, in theory, this research might offer a way to improve the technology.

"One of the things that is really interesting - if it does work - is that the specificity from a laser is really quite exciting. One of the big problems with cochlear implants is their lack of specificity.

"This could be a major breakthrough, but we have to remember that even if that true, the time between demonstrating this and developing a device will be quite significant, perhaps as much as 10 years."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7737307.stm

Published: 2008/11/22 00:01:19 GMT

Google unveils customised search

By Maggie Shiels
Technology reporter, BBC News, Silicon Valley

Google has unveiled a tool that will allow users to customise and refine their search queries.

The company's SearchWiki lets users re-order, remove or add specific web search results.

This means the next time they perform the same search, the personalised version will pop up.

"I would call this revolutionary. It's a huge step, not a baby step in the world of search," Google's product manager, Cedric Dupont, told the BBC.

"This is part of an obvious movement of the web to become more participatory, so Google search is adapting to this movement," he said.

"The SearchWiki is about giving users more control over their search results and increasing user happiness," Mr Dupont added.

But industry watchers predict one huge problem with the effort.

"Most people are not going to engage with it and think about where the results should be - if it's above this one or below that one," said Greg Sterling, an editor with SearchEngineLand.com.

"This is really for a motivated or elite core of user who really wants to participate in the process."

"Social search"

As well as ranking results, SearchWiki allows users who have logged in to their Google account to write comments which will have a dialogue balloon next to the result when they return for any further searches.

These will also be public so that others using SearchWiki can view them and get feedback on a website.

Mr Dupont stressed that SearchWiki would not affect the way websites were ranked by Google.

At the bottom of the page, there will be a link to take users to a page showing what search results others have re-ranked, deleted or added.

Mr Sterling said that if Google managed to get a great number of people re-ranking results, it could improve the overall search experience.

"Lots of people have tried so-called 'social search', combining algorithmic search with human editorial input, because the perception is that humans have the ability to craft a better result in any given situation because they can make distinctions machines can't," he said.

"So this could be quite dramatic if they get a lot of people participating because it could improve the algorithms of the process and serve up better search results."

Matthew Humphries of geek.com would like to see the tool available to the public at large and not just to account holders. He said that even among SearchWiki users, search would be improved.

"You always see posts on forums for different subjects asking for the best resources to help with X. With SearchWiki the responses won't be a bunch of links, they will be a single link to an annotated Google search page," he added.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7740815.stm

Published: 2008/11/20 21:09:43 GMT

Hairspray linked to birth defect

Boys born to women exposed to hairspray in the workplace may have a higher risk of being born with a genital defect.

Imperial College London scientists talked to women who had babies with hypospadias, where the urinary tract is found away from the penis.

They reported that hairspray exposure more than doubled the risk.

The study in the journal Environmental Health Perspectives, said it was too early to say for certain that hairspray was the cause.

> **Pregnant women will need to make their own choices about whether or not to avoid these kind of exposures**
> Professor Paul Elliott
> Imperial College London

The incidence of hypospadias has risen sharply in recent decades, and some experts have pointed the finger of suspicion at chemicals called phthalates, found in some plastics, including those found in hairspray.

Phthalates have the ability to disrupt hormones, and have been banned in toys in the EU for some years.

Certain phthalates have also been banned from hairsprays and other cosmetic products since January 2005.

However, no study has found a convincing link between women exposed to them and problems in their children.

The latest study looks not at personal use of hairsprays, but at their use, potentially in higher doses, by workers such as hairdressers and beauty therapists.

A total of 471 women whose babies had been born with hypospadias were interviewed, as were a similar number of women with unaffected children. The women gave birth in 1997 and 1998 and were interviewed between 2000 and 2003.

Roughly double the number of women in the "hypospadias" group revealed that they had been exposed to hairspray through their job compared with those with unaffected babies.

No proof

However, Professor Paul Elliott, who led the study, said that the finding did not prove that hairspray - or any phthalates it contained - was the cause of this.

He said: "Women shouldn't be alarmed. This study adds a bit more evidence to the general picture about these chemicals, but more research will be needed to demonstrate that the link exists.

"Pregnant women will need to make their own choices about whether or not to avoid these kind of exposures." Professor Andreas Kortenkamp, the head of the Centre for Toxicology at the School of Pharmacy, University of London, said that it was "important research"

He said that the UK government should consider taking the approach used by the Danish authorities, which has issued advice to women about the evidence linking phthalates to health problems.

He said: "I don't think we can continue to leave women alone to make decisions about these things - they need a bit of guidance, to know where these chemicals are. "Certainly, if this was the mother of my children who was pregnant, I would strongly advise her to stay away from these."

Leap of faith

Professor Richard Sharpe, from Edinburgh University, said it was a "big leap of faith" to conclude phthalates were to blame for birth defects. He said research had shown phthalates could suppress production of the male sex hormone testosterone - which plays a role in penis development - in some animals, but evidence that it had the same effect in humans was inconclusive.

"My advice has long been that women who are planning a pregnancy should avoid (or at least minimise) use of cosmetics, body creams/lotions etc, especially in the first three months of pregnancy.

"This is not because we know that the ingredients can do harm to the baby, but because it can only do good for the baby to avoid unnecessary chemical exposures."

Another finding of the study provides further backing of the government's recommendation that pregnant women should take extra folate to prevent similar defects to hypospadias, which arise early in pregnancy.

Women who took folic acid in the first three months of pregnancy were a third less likely to have a baby with hypospadias, according to the study.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7741998.stm

Published: 2008/11/21 13:38:38 GMT

'Superglue' brain op for toddler

By Martin Hutchinson

The parents of a 17-month-old girl have told how surgeons used glue to seal tiny brain blood vessels that were threatening her life.

Laura and Ryan Honeyman, from Horsford in Norfolk, first took their daughter Ella-Grace to France, then to the US to improve her survival chances.

They had initially been told by doctors that her problem was inoperable.

She faces even more challenging and expensive surgery, which the family hope to raise funds to finance.

Ella-Grace was born with a rare condition called Vein of Galen Malformation, in which blood vessels supplying the brain are wrongly connected to the veins which drain blood away, leading to problems with excess blood pressure in some of them.

This can cause a swelling of the vessel called an aneurysm, which can burst with fatal consequences, and too much fluid in the brain, which can lead to developmental delay and even seizures.

> **We knew that something could always go wrong - but if you know we have put her in the best hands you won't question whether there is something else you could have done."**

Mother Laura Honeyman

Ella-Grace underwent the eight-hour operation in New York last Wednesday - but is already back home playing.

The surgical team inserted a tiny tube into her groin, then passed it up through blood vessels all the way to the brain.

There, drops of glue were used to block some of the malformed blood vessels which were causing the problem. This has partly relieved the extra pressure, but not wholly corrected the problem.

Laura described her journey from diagnosis to last week's operation as a "rollercoaster".

She said: "People used to say that we would never be able to have a day without thinking about her condition, but we have to get back to normality.

"We are just thankful that the operation went well and Ella-Grace is developing and is normal at this point."

Success rates

In fact there are two centres which carry out the delicate operation in the UK, but they have only been doing this in recent years, and, with the prospect of lower success rates, Ella-Grace's parents turned instead to the operation's pioneers, first in a Parisien hospital.

Laura said: "We felt that they had more experience, and we just wanted to get the best treatment we could for her."

However, just days after the first in a series of procedures, the surgeon involved died suddenly, and they were forced to go to his New York collaborator, Dr Alejandro Berenstein, from the Beth Israel Medical Center.

This also meant the costs rose - last week's operation cost approximately $61,500 (£41,000), paid for by fundraising in the local community.

"We knew that something could always go wrong," said Laura, "But if you know we have put her in the best hands you won't question whether there is something else you could have done."

More complex

A second US operation could happen as soon as next spring, although Ella-Grace's brain blood vessels will never function in a completely normal way, and could need further operations as she grows. Laura said that the next operation will focus on the smallest capillary blood vessels, and is likely to be the most delicate so far.

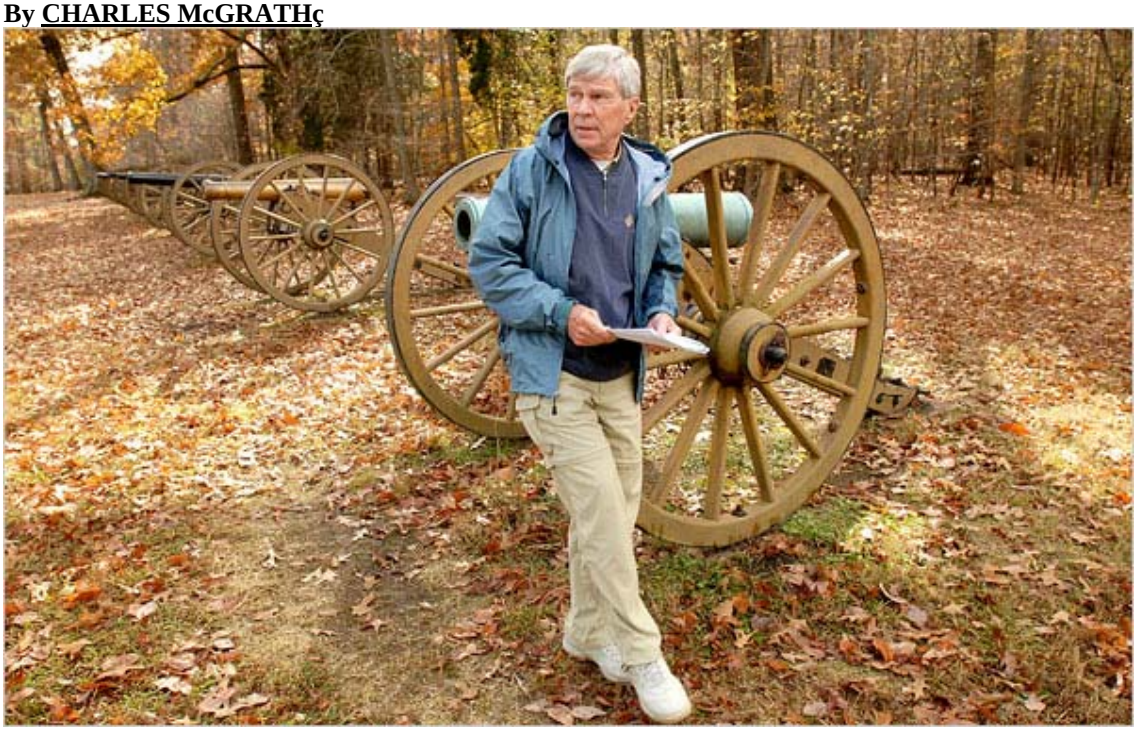
"So far the surgeons have dealt with the motorways, and the 'A' roads - now they tell us they are moving onto the country lanes."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7741714.stm

Published: 2008/11/21 13:13:50 GMT

Looking at Lincoln Through a Prism of War

By CHARLES McGRATHç



SHILOH, Tenn. — James M. McPherson probably knows more about the Civil War than anyone who was actually there. He talks about people like Leonidas Polk, the Episcopal bishop turned not very effective Confederate general, as if they were old acquaintances. This is partly because Mr. McPherson, who won the Pulitzer Prize in 1988 for "Battle Cry of Freedom," his one-volume history of the war, has spent most of his career studying that conflict, and partly because, as he remarked recently at the site of the famous battle here in southern Tennessee, strategies on both sides tended to break down, and battles quickly took on a logic, or illogic, of their own, with most units unaware of what was going on elsewhere. Moving armies at Shiloh was a little like herding cats, he said.

Mr. McPherson, 72, retired from Princeton 4 years ago after 42 years of teaching there. He continues to lecture and to write, and over the years has also acquired a reputation as a highly accomplished tactician and commander in chief of Civil War battlefield tours. Last week he led an expedition here that was far better equipped than either the Union or Confederate Armies or, for that matter, than some woebegone Boy Scouts who were straggling through Shiloh's woods and clearings in weather that was considerably worse than on April 6, 1862, when the fighting broke out. It rained off and on all day; the wind stripped the trees of leaves; and twice in the afternoon there was a barrage, a meteorological Gatling burst, of hail. The scouts shivered and donned makeshift ponchos hacked from plastic bags.

Mr. McPherson's troops, all members or spouses of members of the Princeton Class of 1972, which has more or less adopted him as its official historian, traveled in a chartered bus that, in anticipation of supply-line difficulties, had been provisioned with some $2,000 worth of wine, beer and single-malt Scotch. The troops were issued official Class of '72 hats, polo shirts and windshirts, but Mr. McPherson explained that both armies at that stage in the war were pretty casual about uniforms. So battlefield wear also included L. L. Bean duckboots, Patagonia slickers, J. Peterman dusters or waxed-cotton Barbour jackets. One guy had apparently raided his golf bag for a rainsuit and a pair of spiked FootJoys.

From 10 a.m. to 5 p.m. the Princeton contingent tirelessly followed an unflagging Mr. McPherson from Fraley Field, where the battle began, to the Hornet's Nest, where some 2,000 Union troops eventually

surrendered, to Bloody Pond, to the bluffs above Pittsburg Landing, where at the end of the first day Grant drew up his troops and bivouacked. Primed by an extensive reading list, the group peppered their leader with questions, all of which he fielded expertly: How fast could a rifleman fire? How much did Grant really drink? Could the Confederates have prevailed if they had attacked Grant's line at the top of the bluff?

"They've really done their homework," Mr. McPherson said, smiling. "Probably better than they did it 35 years ago."

Though it wasn't on the list, several on the tour had read Mr. McPherson's newest book, "Tried by War: Abraham Lincoln as Commander in Chief" (The Penguin Press) which is one of a dam-breaching surge of books already spilling down the sluiceway in advance of Lincoln's 200th birthday in February.

Among them are some that consider, or reconsider, Lincoln generally, and others that examine some smaller aspect of his presidency or personality. "Lincoln: President-Elect," by Harold Holzer, devotes some 600 pages just to the winter of 1860-61, before Lincoln took office. As the title suggests, Fred Kaplan's "Lincoln: the Biography of a Writer" looks to the evolution of his prose for clues about the man who wrote it. "Tried by War" confines itself to Lincoln's role as commander in chief.

But this turned out to be an even bigger theme than Mr. McPherson imagined, for military matters took up more of Lincoln's time than anything else, and in many ways they defined his presidency.

"Without winning the war, the rest couldn't have happened," Mr. McPherson said. As the book demonstrates, Lincoln quickly discovered that he had to more or less take over the running of the war himself. He gave himself a crash course in tactics, field-tested new rifles in the White House yard, spent hours in the nearby War Department reading and composing telegraphs, and was forever goading his generals, the cautious and recalcitrant George B. McClellan especially, to take more aggressive action.

"I think this surprised Lincoln," Mr. McPherson said. "He realized he had no military experience or qualification, but he was forced into hands-on control of the Army by default, when one after another his generals let him down. First there was the celebrated Winfield Scott, but Lincoln quickly realized that Scott was too old. And then there was the Young Napoleon, McClellan, who had the 'slows,' Lincoln said."

"I think there was a culture of risk-aversion," Mr. McPherson went on. "And Lincoln realized that any successful general would have to be a risk-taker. That's what he admired about Grant and even Lee. The problem was that the generals in Washington were operating in such a fishbowl. There was the president, the Congress and the press, all watching, and the generals just sort of slunk into a shell. They would rather do nothing than risk a defeat."

The Lincoln presidency has been so well documented and well studied that there are very few scoops anymore. To write "Tried by War," Mr. McPherson relied on the usual sources and archives, but he said he was surprised at how often Lincoln seemed frustrated or on the brink of losing his temper.

"He would write letters but not send them," he explained. "Or he would unburden himself to his private secretary, John Hay, or to Orville Browning, a senator from Illinois who was one of his confidants." He added: "One's image of Lincoln doesn't usually include expressions of frustration and temper, but they make him seem more human."

Shiloh does not figure hugely in "Tried by War."

"At the time, Lincoln was mostly preoccupied with McClellan and the Virginia theater," Mr. McPherson said at the end of the day, when his command had retreated to a hotel and was strategizing about cocktails

and dinner. “Shiloh was important because after Grant’s tactics and conduct were criticized, Lincoln intervened right away to support him, and not for the last time. It’s probably apocryphal, but he supposedly said: ‘I can’t spare this man; he fights.’ ”

And Shiloh was important because it was the biggest battle of the war so far, with a total of 24,000 casualties on both sides. There is an enormous Union cemetery by the river, with many of the graves identified merely by numbers, and monuments, stones and plinths dot the enormous battlefield, identifying where various units fought and fell. Even on a nice day, an air of melancholy hangs over the landscape.

“I think he felt every death,” Mr. McPherson said of Lincoln. “That’s why if you look at the photographs you can see him age. He aged 40 years in those four.” He went on to talk about how, by the summer of 1864, Lincoln had fallen into deep despair but then rebounded, as did the mood of the entire Union, after Sherman’s victory at Atlanta.

“I just came away admiring him even more,” Mr. McPherson said. “When you think of all the problems he faced, the people he had to deal with, and that he managed to overcome all that — it’s a story that only increases your appreciation for his qualities and his leadership.”

http://www.nytimes.com/2008/11/22/books/22linc.html?th&emc=th

Renovating the U.N., With Hints of Green

By NEIL MACFARQUHAR

UNITED NATIONS — Michael Adlerstein, the man leading the complex project to restore the United Nations headquarters, stood in the visitors' lobby recently explaining why it is considered one of the building's signature rooms.

Those unadorned gold columns along the front entrance? A stark design that was considered outrageously simple when it was unveiled around 1950, along with the streamlined concrete balconies and industrial bridge supporting the wide staircase. The columns faintly echo parliament buildings all over the world, which in turn hark back to classical temples.

The visible air-conditioning ducts at neck-craning distance overhead, the blue paint peeling and drifting like snowflakes to the lobby floor? Their exposure is also a Modern touch that has since become commonplace.

That long brown abstract rendering that dominates one 50-foot stretch of white wall? Not another piece of bad art foisted on the organization by one of its member states, something of a hallowed United Nations tradition, but an unsightly water stain from a leak.

Beginning early next year, all 5,000 people working in the United Nations Secretariat will start shifting to scattered temporary offices, mostly in Midtown, while the headquarters in the Turtle Bay neighborhood of Manhattan undergoes a five-year, nearly $2 billion renovation. After it is emptied, the building, one of the most visited in New York City, will be gutted.

Planning for the reconstruction included deciding which parts of the 39-story building's art and architecture were worth preserving, the benchmark being what the world identifies with the United Nations. The basic plan is to strip the building down to the pure, flat surfaces that made it innovative when it opened, while replacing the outdated innards like air-conditioning, lighting, wiring and plumbing.

"What we are going to straighten out with this renovation are the accretions of 60 years of the building being used without the right discipline," said Mr. Adlerstein, a Brooklyn-born architect who has

previously tackled historic sites like Ellis Island and the Statue of Liberty. “We will bring out some of the details that were lost.”

As he walked around the first four floors of the building, the most public spaces, he pointed out materials — brushed stainless steel, vinyl, Formica — considered magically new when the Secretariat was inaugurated in 1952.

The steel elevator banks with the call-button panels featuring the United Nations logo will stay, albeit spruced up, as will the vinyl seats around the Security Council table, with their baby blue color signaling that they are for members.

“There are wonderful little things that get into people’s minds that we will respect,” Mr. Adlerstein said. “It’s an old hat that everyone puts on every day. It feels right.”

Other things that should not have penetrated people’s minds and bodies will be stripped out, namely asbestos. The building is infested with the stuff, used behind nearly every wall as insulation and fireproofing. “They spread it around like mayonnaise,” Mr. Adlerstein said of the original builders.

Another goal of the renovation is to make the building far more green, reducing its energy consumption by 44 percent. For example, the famous outer wall, a glass curtain, was considered wildly modern for its time, with all the superstructure hidden behind it. Now, even with the windows firmly shut, the interior curtains flutter in the breeze from the East River.

The new glass will not only be more efficient — interspersed with photovoltaic cells that will turn sunlight into energy — but also more secure. The windows will no longer open. An impermeable wall of the latest glass can bend as much as 10 inches in the face of a large explosion — a feature considered a must in an era when some United Nations offices around the world have been targets of suicide bombers.

Basically there are three different levels of renovation. The first includes those character-defining elements of the building that will not change physically at all, like the General Assembly and the Security Council chamber. But they will get better, energy-efficient lighting and an air-conditioning system that will pump air out of the floor instead of the ceiling, again making the space more efficient and cheaper.

Then there are design elements that will stay, like the curved interior walls designed by Oscar Niemeyer of Brazil, which echo his trademark glazed-exterior wall of the General Assembly facing First Avenue. (Legend has it that he also wanted a simple curved roof, but the Vermont senator serving as the first chief of the United States Mission said that Congress would approve the budget much faster if he put a dome on it so American legislators could easily recognize it as an assembly hall.)

The most radical renovations will take place in the upper stories, which the public never sees. Most of the office walls will be ripped out and the floors re-created using an open pod system, which will be much easier to reconfigure, given the constant shifting of employees. The various buildings on the campus will be tackled in stages.

Wallace Harrison, the architect for the Rockefellers, did much of the final design, based on concepts envisioned by an international dream team of architects, including Le Corbusier and Mr. Niemeyer. Le Corbusier conceived what many architects consider the building’s best-known element: the thin slab towering over the river, all the more striking than most New York skyscrapers because it stood so alone.

“It is really a monument,” said Jean-Louis Cohen, a French architect who teaches architectural history at New York University’s Institute of Fine Arts. Not that it didn’t have detractors. Writing in The New Yorker, the critic Lewis Mumford called it “a climax of formal purity and functional inadequacy.”

The organization has always struggled with a lack of space. The complex was designed to accommodate 75 member states and 700 conferences each year, but it has grown to 192 members and stages some 8,000 meetings annually.

Aside from the physical building, the restoration project also involves the art, much of which will be used to spruce up the prefabricated three-story structure rising on the north lawn that will house the secretary general and his staff. Because tourists will not be allowed into the main building during reconstruction, the art is supposed to serve as the substitute attraction.

Some donations are considered eyesores, some minor embarrassments — like the priapic sculpture of a bull elephant near the north fence, his majestic anatomy safely hidden by a thick hedge the height of his stomach. There has been a moratorium on new gifts during the renovation.

Large items affixed to the walls of the Secretariat will be encased in their own structures with heating and air-conditioning while the rest of the interior is exposed to the elements. These include a third-century mosaic floor from Tunisia and two large murals by the Cubist artist Fernand Léger, who was eventually barred from the United States for his association with the Communist Party. President Truman, on first spotting the murals, is said to have commented that one looked like a bunny coming out of a hat, and another a fried egg.

Like many United Nations projects, the renovation has been dogged by escalating costs and whiffs of scandal over some contractors. The estimated price tag has risen to $1.9 billion, from $1.1 billion, as the project has faced repeated delays since being approved in 2002. Member countries are being assessed a fee that matches the percentage of their annual contribution to the operating budget.

The renovation can only bring so much change. Knowing that members have been haggling over expanding the Security Council beyond its 5 permanent and 10 rotating members, Mr. Adlerstein wondered if he should perhaps create a bigger table with more seats.

The idea was rejected — architecture will not drive policy, officials said. He added that he was told that the room would just have to be renovated again if the members ever reach an agreement.

http://www.nytimes.com/2008/11/22/arts/design/22nati.html?th&emc=th

'Grape' is key to fossil puzzle

A single-celled ball about the size of a grape may provide an explanation for one of the mysteries of fossil history.

Writing in Current Biology, researchers say the creature leaves tracks on the seabed which mirror fossilised tracks left up to 1.8 billion years ago.

Many palaeontologists believe only multi-celled organisms could have made these tracks.

This has been difficult to confirm as no multi-cellular fossils of such an age have ever been found.

Covered in mud

The discovery was made by marine biologists monitoring the sea bed in the Bahamas. They noticed a great deal of tracks made by grape-shaped creatures called protists. Dr Mikhail "Misha" Matz from the University of Texas at Austin, US, led the research.

"We were looking for pretty animals that have eyes, are coloured, or glow in the dark; instead, the most interesting find was the organism that was blind, brainless, and completely covered in mud," he said.

The researchers say the 3cm-wide, single-celled protists propel themselves using tiny protruding legs called pseudopodia. A number of openings all over the body act as mouths and outlets for waste.

The protists move very slowly, taking weeks or even months to make a track of a few centimetres. As the sea bed currents where they were observed are very slight, their tracks are not washed away.

Worm casts

The protist tracks look very similar to fossil tracks found in the pre-Cambrian era more than 500 million years ago.

Perhaps the most famous are the "worm casts" found in the Stirling Ranges in Western Australia. In 2002, these were dated to at least 1.2 billion years old.

This dating presented a problem for palaeontologists; they assumed multi-cellular organisms with bilateral symmetry, where two halves of their bodies are approximate mirror images of each other, had to be responsible for such tracks, but there is no fossil evidence for the existence of such creatures until several million years later.

Fossil experts believe bilateral symmetry is what gave the organism the ability to make the tracks, with the impressions being produced when the organism moved its weight from one side to another.

Dr Matz believes protists provide an explanation of how the tracks could have been made without the need for organisms with bilateral symmetry. "We used to think that it takes bilateral symmetry to move in one direction across the seafloor and thereby leave a track," he explains.

"You had to have a belly and a backside and a front and back end. Now, we show that protists can leave traces of comparable complexity and with a very similar profile."

Cambrian explosion

Bilateral symmetry appeared in the Cambrian era about about 542 million years ago, early creatures quickly diversified into all of the major animal groups of today. Quite how or why this rapid diversification, known as the Cambrian explosion, occurred is still one of the biggest questions in animal evolution. Very few fossils exist of organisms that could be the pre-Cambrian ancestors of bilateral animals, and even those are highly controversial. Fossil traces, such as these tracks are the most accepted evidence of the existence of these proto-animals.

We now have to rethink the fossil record

Dr Mikhail 'Misha' Matz,

University of Texas at Austin

Dr Matz says all tracks which predate the rapid evolution of life seen in the Cambrian explosion - could come from protists. "Pretty much anything within the Precambrian fossil record can in principle be attributed to large protozoans, from the earliest traces and fossils of the Stirling formation," he says.

The researchers say forms described as "globular or bulbous collapsible bodies" which were found fossilised together with the Stirling formation's worm trails are probably the remains of creatures very similar to the protists they found at the bottom of the sea.

Genetic analysis shows this moving protist from the Bahamas is broadly the same as a stationary type found in the Arabian sea. The researchers are now beginning a project which they call "deep-sea palaeontology" to create a catalogue of tracks produced by a variety of present-day underwater animals for comparison with the fossil record.

Dr Matz says the giant protists' bubble-like structure is probably one of the planet's oldest body designs, and may have existed for 1.8 billion years.

"Our guys may be the ultimate living fossils of the macroscopic world," he says.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7739703.stm

Published: 2008/11/21 09:29:20 GMT

Online time 'is good for teens'

By Maggie Shiels
Technology reporter, BBC News, Silicon Valley

Surfing the internet, playing games and hanging out on social networks are important for teen development, a large study of online use has revealed.

The report counters the stereotypical view held by many parents and teachers that such activity is a waste of time.

More than 800 teenagers and parents took part in the three-year US project.

"They are learning the technological skills and literacy needed for the contemporary world," said the report's author, Dr Mimi Ito.

"They are learning how to communicate online, craft a public identity, create a home page, post links.

"All these things were regarded as sophisticated 10 years ago but young people today take them for granted," Dr Ito told the BBC.

'Geeking out'

The study, sponsored by the MacArthur Foundation, was part of a $50m (£31m) project on digital media and learning.

Over the period of the study, researchers observed users for more than 5,000 hours.

The aim of the Digital Youth Project was to provide an "ethnographical view of how children use social media to socialise, learn and relax".

Dr Ito said that connecting online with friends via social networks such as MySpace and Facebook was where teens now "hang out", compared to the usual public places like shopping malls, the street and parks.

She also said the internet provided a core group of teens the opportunity to explore their own creativity and "take a deep dive into a subject".

The report referred to this behaviour as "geeking out".

"In one of my own case studies around fans of Japanese animations, some kids got involved in different video production groups or online discussion groups.

"They picked up things like the Japanese language or some fairly esoteric knowledge around video, or coding or editing," explained Dr Ito, also a research scientist at the department of informatics at the University of California, Irvine.

Digital gap

The researchers discovered a digital divide between those who have access to the web and those who do not.

"The quality of access is what matters for some kids who have to just rely on the library and school to go online. It is often limited, has blocks put on access to certain sites and is only available when these institutions are open," said Dr Ito.

As for parents and teachers, she urged them to get up to speed with what children are doing on the internet, as the rapid pace of change presents challenges ranging from stranger danger to teenagers spending too long online.

"While most parents know very little about what their kids are doing online, they are struggling to give real guidance and help.

"At the more social 'hanging out' layer, young people don't want their parents or teachers on their MySpace or Facebook page. But in the interest-driven side, there is a more productive role for parents and teachers to play that will help them connect with kids and their lives, " said Dr Ito.

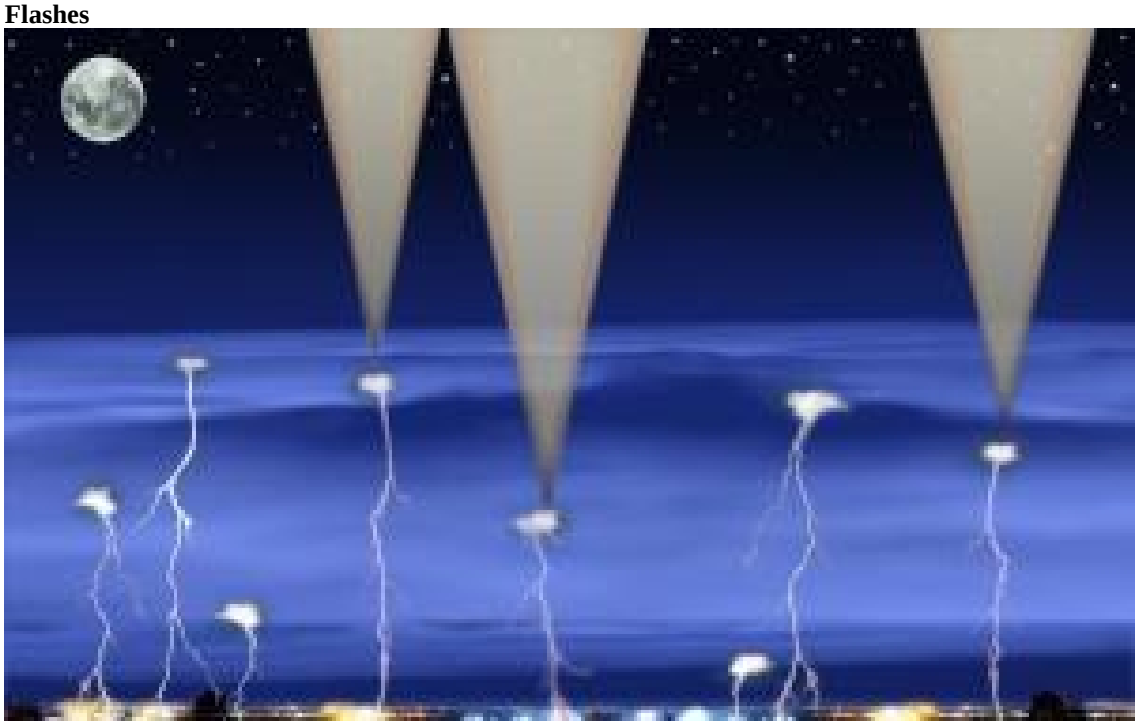
The MacArthur Foundation's education director, Connie Yowell, concluded that the work creates a new way to look at how young people are being taught.

"Learning today is becoming increasingly peer-based and networked, and this is important to consider as we begin to re-imagine education in the 21st century," she said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7740895.stm

Published: 2008/11/21 03:40:43 GMT

New Nano Satellite Mission To Examine Link Between Lightning And Terrestrial Gamma Ray Flashes



Scientists theorize that TGFs are linked to lightning and result when high-energy electrons are accelerated upward over thunder storms. (Credit: NASA/Robert Kilgore)

ScienceDaily (Nov. 22, 2008) — Massive energy releases occur every day in the upper reaches of Earth's atmosphere. Lightning may give rise to these bursts of radiation. However, unlike the well-known flashes of light and peals of thunder familiar to Earth-dwellers, these energy releases are channeled upward and can be detected only from space. Our atmosphere protects us from the effects of this radiation, but the mechanisms at work can impact Earth's upper atmosphere and its space environment.

A new nano satellite mission, called 'Firefly,' sponsored by the National Science Foundation (NSF) and led by NASA's Goddard Space Flight Center in Greenbelt, Md. will explore the relationship between lightning and these sudden bursts, called Terrestrial Gamma Ray Flashes (TGFs).

NASA's Compton Gamma Ray Observatory (CGRO) first discovered TGFs in the 1990s. Designed to look outward at cosmic sources of gamma rays, CGRO also caught rare but tantalizing glimpses of gamma rays coming from Earth.

TGFs are likely produced by beams of very energetic electrons, which are accelerated in the intense electric fields generated by large thunderstorm systems. Before CGRO, many scientists thought these very energetic types of radiation could be generated only near the Sun, or in black holes, large galaxies, or neutron stars.

"These electron beams are more powerful than any produced in near-Earth space, and understanding their acceleration mechanisms will shed light on a physical process that may occur on other planets, or in astrophysical environments, as well as in the sun's corona," said Doug Rowland, principal investigator for the Firefly mission at NASA Goddard's Space Weather Laboratory.

Firefly will explore which types of lightning produce these electron beams and associated TGFs. In addition, Firefly will explore the occurrence rate of TGFs that are weaker than any previously been

studied. The result with be a better understanding of the effect that the millions of lightning flashes that occur worldwide each day have on the Earth's upper atmosphere and near-Earth space environment.

"This mission could provide the first direct evidence for the relationship between lightning and TGFs, and addresses an important research question in atmospheric electricity," said Anne-Marie Schmoltner, head of NSF's Atmospheric Sciences Division's Lower Atmosphere Research Section. "Identifying the source of terrestrial gamma ray flashes would be a great step toward fully understanding the physics behind lightning and its effect on the Earth's atmosphere."

The NSF CubeSat program represents a new "low cost access to space" approach to performing high-quality, targeted science on a smaller budget than is typical of larger satellite projects, which have price tags starting at $100 million. In contrast, the CubeSat Firefly will carry out its science mission in a much smaller package and at a considerably lower cost. The nano satellite is about the size of a football (4 by 4 by 12 inches). The cost to develop, launch, and operate Firefly for three years during its science mission is expected to be less than $1 million.

The Firefly mission also emphasizes student involvement as part of the ongoing effort to train the next generation of scientists and engineers. Students at Siena College, in Loudonville, N.Y., and the University of Maryland Eastern Shore, in Princess Anne, Md., will be involved in all phases of the Firefly mission.

"Integrating innovative and creative educational efforts with front-line research is what NSF is all about," said NSF Deputy Director Kathie L. Olsen. "The new CubeSat program uses the transformational technology of CubeSats to do just that. The Firefly mission is a terrific example of a program that will pursue scientific discovery, while providing unique and inspiring educational opportunities."

Firefly is funded and managed by the National Science Foundation, and will be developed as a collaborative effort by NASA Goddard Space Flight Center, Universities Space Research Association (USRA), Columbia, Md.; Siena College; University of Maryland Eastern Shore, Princess Anne, Md.; and the Hawk Institute for Space Sciences, in Pocomoke City, Md.

NASA Goddard, USRA, and Siena College will provide the instrument payload, while the Hawk Institute will build the CubeSat. NASA's Wallops Flight Facility on Wallops Island, Va., will provide technical oversight for the integration of Firefly to the launch vehicle.

Firefly's launch date is likely to be in 2010 or 2011. The micro satellite will fly as a secondary payload inside a Poly-Picosatellite Orbital Deployer (P-POD) provided by California Polytechnic State University, San Luis Obispo, Calif. Firefly will utilize the excess room and lift capacity not required by the primary mission payload.

Adapted from materials provided by NASA/Goddard Space Flight Center.

http://www.sciencedaily.com/releases/2008/11/081117131715.htm

Blood Component That Turns Anthrax Bacteria Virulent Identified

ScienceDaily (Nov. 22, 2008) — Scientists from the Scripps Research Institute have discovered the key chemical that signals Bacillus anthracis, the bacterium that causes anthrax, to become lethal. This finding opens up new avenues of exploration for the development of treatments for bacterial infections.

The study was published in the November 21 edition of the journal PLoS Pathogens.

The Scripps Research scientists identified bicarbonate, a chemical found in all body fluids and organs that plays a major role in maintaining pH balance in cells, as providing the signal for Bacillus anthracis to unleash virulence factors. Without the presence of the bicarbonate transporter in the bloodstream, the scientists found, the bacteria do not become virulent.

Scientists have known for some time that bicarbonate is implicated in many diseases, but controversy has existed about whether bicarbonate, carbon dioxide, or some combination of these two molecules are responsible for triggering bacterial pathogenesis. This study confirms, for the first time, that it is indeed bicarbonate, rather than carbon dioxide, that signals the gram-positive B. anthracis to become virulent. This finding also is significant because other pathogenic bacteria such as Streptococcus pyogenes, Escherichia coli, Borrelia burgdorferi, and Vibrio cholera have bicarbonate transport pathways similar to B. anthracis and thus are likely to have similar virulence triggering mechanisms.

Gram-positive bacteria are the major culprits driving the increase of community and hospital acquired bacterial infections. The Centers for Disease Control and Prevention estimates that as many as 10 percent of all patients, or about 2 million people, contract hospital acquired infections each year. These bacteria are often resistant to multiple antibiotics, making the problem a growing public health concern and the need for new antibacterial treatment more urgent. Now, the bicarbonate transporter pathway may be investigated as a potential new target for drug intervention.

"How a bacterium recognizes signals in the host that trigger pathogenesis mechanisms, and the nature of the mechanisms necessary to develop pathogenesis, remain poorly understood," said Scripps Research Associate Professor Marta Perego, Ph.D., who conducted the study with Scripps Research postdoctoral fellow Adam Wilson, Ph.D., and colleagues. "We have identified an essential component for the induction of virulence gene expression in response to host bicarbonate levels and have used this finding to learn more about the extracellular and intracellular signals controlling virulence."

Theory Confirmed

Perego's latest discovery builds on her lab's expertise in the study of bacterial virulence signaling and in the regulatory networks responsible for pathogenicity in other gram-positive bacteria. Her interest in bicarbonate transport pathways as bacteria virulence signaling mechanisms grew out of an early observation that growth of B. anthracis in carbon dioxide and sodium bicarbonate strongly induced toxin production in the laboratory setting. The mechanism behind this observation, however, was never uncovered.

"It was observed that the best medium for toxin production was one that people believed mimicked conditions found in the blood of a human or animal host, where anthrax bacteria would find both carbon dioxide and bicarbonate. But we've never known which of these two molecules was the more important for bacterial pathogenesis, and whether this belief was correct," Perego said. "Now, we know that it is bicarbonate and that the growth in the presence of bicarbonate really mimics the host growth conditions."

In their current study, the Perego lab identified a previously unknown ATP-binding cassette transporter (ABC-transporter)—which is identified by the gene number BAS2714-12—that was shown to be essential to transporting bicarbonate. As a group, ABC-transporters use the energy of ATP hydrolysis to

transport various substrates across cellular membranes. In this case, when the genes that code for the BAS2714-12 ABC transporter were deleted, the rate of bicarbonate uptake inside the cell greatly decreased, induction of toxin gene expression did not occur, and virulence in an animal model of infection was abolished. Elimination of carbon dioxide production within the bacterial cell had no effect on toxin production, suggesting that CO2 activity is not essential to virulence factor induction and that bicarbonate, not CO2, is the signal essential for virulence induction.

"In light of these findings, investigation of bicarbonate regulation and transport should be of much greater significance to a large number of pathogenic organisms," Perego said.

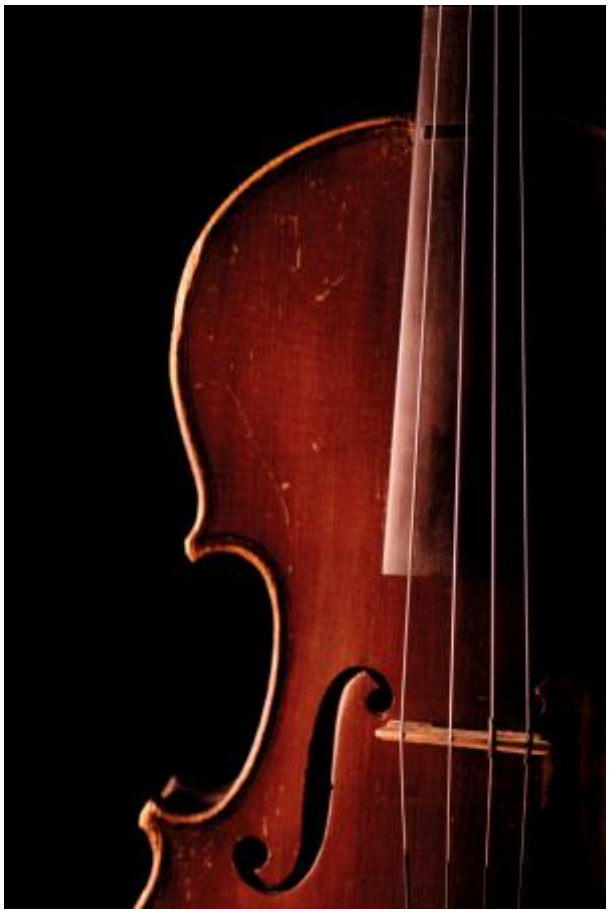
In addition to Perego and Wilson, the other authors of "The bicarbonate transporter is essential for Bacillus anthracis lethality" were Magali Soyer and James Hoch, Ph.D., head of the Division of Cellular Biology and Professor in the Department of Molecular and Experimental Medicine at The Scripps Research Institute.

This study was supported by the National Institute of Allergy and Infectious Diseases, the National Institute of General Medical Sciences, the National Institutes of Health, and the Stein Beneficial Trust.

Adapted from materials provided by Scripps Research Institute.

http://www.sciencedaily.com/releases/2008/11/081121151721.htm

Is A Stradivarius Violin Better Than Other Violins?



Is a stradivarius violin better than other violins? (Credit: iStockphoto/Chris Fertnig)

ScienceDaily (Nov. 22, 2008) — Some sell for more than $3.5 million. Only 700 of them exist, and they're stored in vaults, frequently stolen and often counterfeited.

The object in question? Stradivarius violins, constructed by famed Italian instrument-maker Antonio Stradivari between 1680 and 1720. Treasured for possessing sublime acoustic properties, these rare instruments have spawned dozens of theories attempting to explain their legendary tone, and luthiers, makers of stringed instruments, are still trying to reproduce it.

The question remains: Are Stradivarius violins worth all the fuss?

There's no objective answer, said James Lyon, Penn State professor of music in violin. When Stradivari was crafting violins, most musicians performed in churches and courts. Rulers and the wealthy sponsored artists to enhance their prestige. As music moved away from this patronage system in the first half of the 19th century, Lyon explained, musicians' careers became dependent on fitting more people into concert halls. Thus, although they were originally built for much smaller venues, almost every Strad still around today has been altered to sound best in a large concert hall setting.

The violin world frequently stages blind tests of modern and vintage violins, including Stradivari's, Lyon noted, and as often as not the audience prefers the sound of the modern instruments. But many musicians and luthiers argue that these tests are virtually meaningless. For one thing, the player usually knows

which violin is the Stradivarius and could unintentionally bias the results by playing the fabled instrument differently. For another, even trained musicians can't reliably pick out the sound of a Strad, he said.

Asking people to choose between modern and vintage violins, said Lyon, is like asking their favorite ice cream flavor. You never get complete agreement because people like different things. In addition, it takes a while to get to know an instrument, and the testing format doesn't allow for this. Sometimes half a year after purchasing an instrument, Lyon explained, the player "is still learning how it wants to be played."

Still, luthiers since Stradivari's time have tried to reproduce the classic "Strad" sound. Some claim the secret lies in the craftsmanship, others the varnish, others the wood. Virtually every aspect of the violin has been touted as the key. Scientists, too, have tackled the question from various angles.

Some chemical analyses suggest that the smooth, mellifluous tones may have resulted, in part, from an application of an oxidizing mineral such as borax, often used in Stradivari's day to prevent woodworm infestation. Dendrochronology, the study of annual growth rings in trees, suggests that the wood Stradivari used grew largely during the Little Ice Age that prevailed in Europe from the mid-1400s to the mid-1800s. Long winters and cool summers produced very dense wood with outstanding resonance qualities, the thinking goes. The dense wood also helps the instruments stand up over hundreds of years of use.

In light of the dozens of theories put forth to explain the Stradivarius reputation, Lyon can't choose just one. "I think there's likely no magic bullet here. Stradivari was just an incredibly consistent craftsman, and he was a real groundbreaker." But given technological advances over the last 300 years, he added, it seems crazy to assume that the old luthiers knew everything there was to know about their trade.

The mystique remains, however. Asked if putting aside the monetary value of the instrument, he would like to have a Stradivarius to play, Lyon said, "Yes, I can't imagine anyone who wouldn't. Partly it's the history that goes with them."

Adapted from materials provided by Penn State University.

http://www.sciencedaily.com/releases/2008/11/081108164152.htm

Isolated Breast Cancer Cells In Sentinel Lymph Node Associated With Non-Sentinel Lymph Node Metastases

ScienceDaily (Nov. 22, 2008) — Women who are found to have isolated breast cancer cells upon sentinel lymph node biopsy have a risk of having metastases in other lymph nodes.

Numerous studies have examined the risk of metastatic tumors in other lymph nodes associated with isolated tumor cells in a sentinel lymph node. However, the results from those studies have been inconsistent, and no standard recommendations regarding the use of axillary lymph node dissection have been made.

To better understand the relationship between isolated tumor cells in the sentinel lymph node and the likelihood of disease spread to other lymph nodes, Paul van Diest, M.D., Ph.D., of the University Medical Center Utrecht in The Netherlands and colleagues reviewed 29 published studies that included 836 patients.

The overall pooled risk estimate was 12.3 percent. The pooled risk was marginally higher than the risk of a false-negative sentinel lymph node biopsy but marginally lower than the risk of non-sentinel lymph node metastases in patients with micrometastases, who are currently eligible for axillary lymph node dissection. Not all of the original studies provided information on the size of the non-sentinel lymph node tumors, but in 10 studies that classified the non-sentinel lymph node metastases according to size, 36 of the 56 women (64 percent) with isolated tumor cells had macrometastases, greater than 2 mm in diameter.

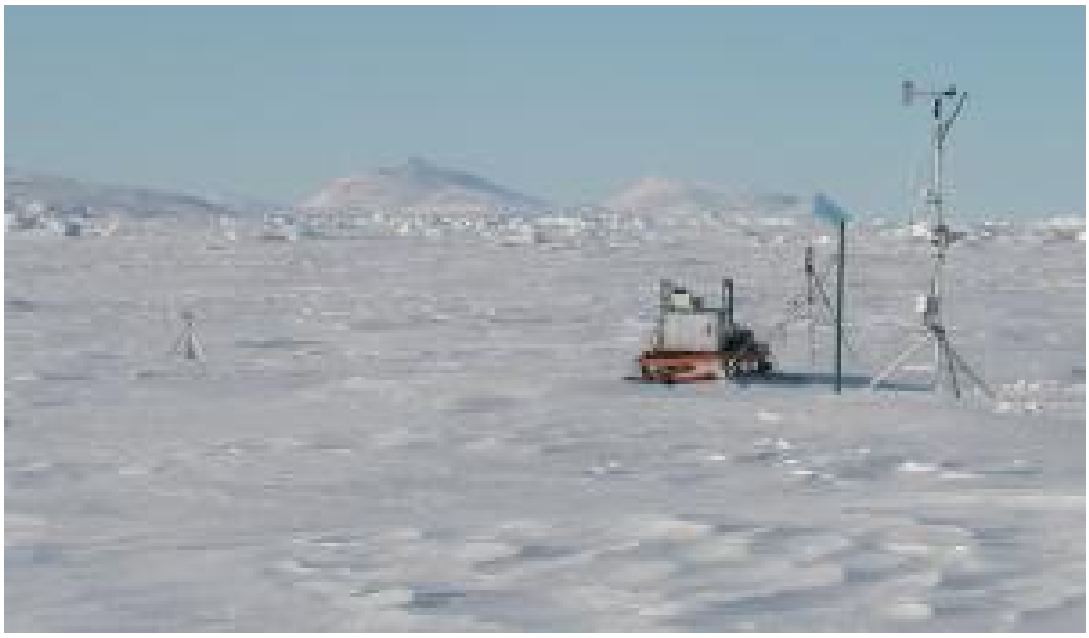
"In conclusion, results on isolated tumor cells in the sentinel lymph node are somewhat controversial, and there is still doubt about the need for axillary lymph node dissection after finding isolated tumor cells in the sentinel lymph node," the authors write. A wait-and-see approach may be appropriate for some women, while axillary lymph node dissection may be appropriate for women if they are unsure about whether to undergo adjuvant systemic therapy.

This research was published in the Journal of the National Cancer Institute November 11, 2008.

Adapted from materials provided by Journal of the National Cancer Institute, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081111200400.htm

Snow In The Arctic: An Ingredient In A Surprising Chemical Cocktail



In the Arctic in spring, the snow cover gives off nitrogen oxides. (Credit: Image courtesy of CNRS (Délégation Paris Michel-Ange))

ScienceDaily (Nov. 22, 2008) — In the Arctic in spring, the snow cover gives off nitrogen oxides. This phenomenon, the extent of which had not been previously realized, is the source of one third of the nitrates present in the Arctic atmosphere, according to researchers from CNRS, the Université Joseph Fourier and the Université Pierre et Marie Curie[1].

They made a quantitative study of the origin and evolution of nitrogen compounds in the Arctic atmosphere, in order to understand their environmental impact on this region. These findings are published in the 31 October 2008 issue of the journal Science.

In the Arctic, the snow that covers the land mass and the pack ice is a constant source of new surprises for researchers. One of the major players in climate change, it is also closely monitored by atmospheric chemists, who suspect it of being behind fundamental alterations in atmospheric composition in spring, when sunshine returns.

The researchers had already studied episodes of total destruction of ozone at the surface of the Arctic snow cover [2] as well as the role played by this cover in the dangerous mercury 'rain' that pollutes ecosystems [3]. This time they were interested in the ability of the arctic snow cover to interact with nitrogen compounds such as nitrogen oxides and atmospheric nitrate. At temperate latitudes nitrogen oxides are produced not only by natural phenomena such as lightning and forest fires, but also by human activity, such as combustion in engines and industrial activity. They are the cause of the peaks in ozone concentration observed on the outskirts of cities during episodes of high pollution. Nitrogen oxides are rapidly oxidized to nitrate, which, incorporated into atmospheric particulate matter, is transported by air currents, bringing surplus nitrogen to distant ecosystems.

In the Arctic, in autumn, winter and spring, the nitrate is deposited onto the snow cover. Then, when the snow is exposed to solar radiation, the nitrate turns into nitrogen oxides that are emitted to the atmosphere, causing disturbances in Arctic atmospheric chemistry. However, the extent of this phenomenon remained to be quantified.

By measuring the isotopic composition of the nitrogen and oxygen in the atmospheric nitrate collected in the Canadian Arctic (Alert station, Nunavut)[4], the researchers have shown that the 'recycling' of nitrate deposited on the snow of the Arctic pack ice returns nitrogen oxides to the atmosphere in substantial quantities. For instance, in spring, nearly one third of the Arctic atmospheric nitrate comes from emissions of nitrogen oxides from the snow cover, while the rest comes directly from atmospheric transport from middle latitudes. The researchers also show that there are strong chemical interactions between the nitrogen oxides emitted by the snow cover and the halogenated compounds (in particular BrO radicals) that are involved in the phenomena of ozone destruction in the lower levels of the atmosphere in spring.

This study highlights the close links between the climate system (ice surfaces, snow-covered surfaces, temperatures, and percentage of solar radiation reaching the Earth's surface) and the presence of highly reactive pollutants in the Arctic atmosphere (nitrogen oxides, ozone, and particulate matter emitted by human activity). It shows the need for a global approach to environmental problems, calling for long-term monitoring and the use of new techniques for analyzing processes.

The work was funded by CNRS's National Institute of Earth Sciences and Astronomy (INSU), the Institut Polaire - Paul Émile Victor (IPEV) and by a European Science Foundation program (EUROCORE-EuroCLIMATE).

[1] Laboratoire de glaciologie et de géologie de l'environnement (CNRS/Université Joseph Fourier), Laboratoire d'étude des transferts en hydrologie et environnement (CNRS/Université Joseph Fourier/Institut polytechnique de Grenoble), Service d'aéronomie (CNRS/Université Pierre et Marie Curie/Université Versailles Saint Quentin)

[2] http://www.insu.cnrs.fr/a2131,nouvelle-loupe-isotopique-chimie-ozone-arctique.html

[3] http://www2.cnrs.fr/presse/journal/1416.htm

[4] by the Meteorological Service of Canada (Global Atmospheric Watch program, coordinated by the World Meteorological Organization).

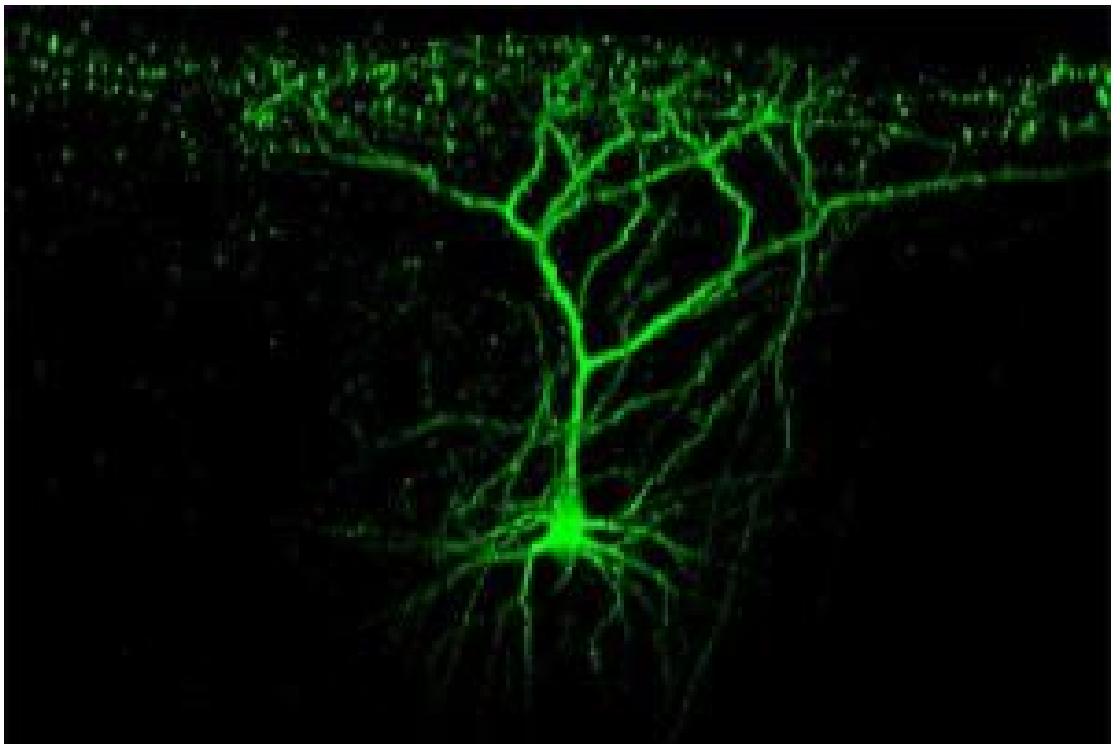
Journal reference:

1. . **Tracing sources and sinks of NOx in the Arctic atmosphere using stable isotopes in nitrate**. *Science*, November 7, 2008

Adapted from materials provided by CNRS (Délégation Paris Michel-Ange), via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/11/081107072003.htm

Forgotten But Not Gone: How The Brain Re-learns



Store room for future learning: nerve cells retain many of their newly created connections and if necessary, inactivate only transmission of the information. This makes relearning easier. (Credit: Image: Max Planck Institute of Neurobiology / Hofer)

ScienceDaily (Nov. 22, 2008) — Thanks to our ability to learn and to remember, we can perform tasks that other living things can not even dream of. However, we are only just beginning to get the gist of what really goes on in the brain when it learns or forgets something. What we do know is that changes in the contacts between nerve cells play an important role. But can these structural changes account for that well-known phenomenon that it is much easier to re-learn something that was forgotten than to learn something completely new?

Scientists at the Max Planck Institute of Neurobiology have been able to show that new cell contacts established during a learning process stay put, even when they are no longer required. The reactivation of this temporarily inactivated "stock of contacts" enables a faster learning of things forgotten.

While an insect still flings itself against the window-pane after dozens of unsuccessful attempts to gain its freedom, our brain is able to learn very complex associations and sequences of movement. This not only helps us to avoid accidents like walking into glass doors, but also enables us to acquire such diverse skills as riding a bicycle, skiing, speaking different languages or playing an instrument. Although a young brain learns more easily, we retain our ability to learn up to an advanced age. For a long time, scientists have been trying to ascertain exactly what happens in the brain while we learn or forget.

Flexible connections

To learn something, in other words, to successfully process new information, nerve cells make new connections with each other. When faced with an unprecedented piece of information, for which no processing pathway yet exists, filigree appendages begin to grow from the activated nerve cell towards its neighbours. Whenever a special point of contact, called synapse, forms at the end of the appendage,

information can be transferred from one cell to the next - and new information is learned. Once the contact breaks down, we forget what we have learned.

The subtle difference between learning and relearning

Although learning and memory were recently shown to be linked to the changes in brain structure mentioned above, many questions still remain unanswered. What happens, for example, when the brain learns something, forgets it after a while and then has to learn it again later? By way of example, we know from experience that, once we have learned to ride a bicycle, we can easily pick it up again, even if we haven't practiced for years. In other cases too, "relearning" tends to be easier than starting "from scratch". Does this subtle difference also have its origins in the structure of the nerve cells?

Cell appendages abide the saying "a bird in the hand …"

Scientists at the Max Planck Institute of Neurobiology have now managed to show that there are indeed considerable differences in the number of new cell contacts made - depending on whether a piece of information is new or is being learned second time around. Nerve cells that process visual information, for instance, produced a considerably higher number of new cell contacts if the flow of information from their "own" eye was temporarily blocked. After approximately five days, the nerve cells had rearranged themselves so as to receive and process information from the other eye - the brain had resigned itself to having only one eye at its disposal. Once information flowed freely again from the eye that had been temporarily closed, the nerve cells resumed their original function and now more or less ignored signals from the alternative eye.

"What surprised us most, however, was that the majority of the appendages which developed in response to the information blockade, continued to exist, despite the fact that the blockade was abolished ", project leader Mark Hübener explains. Everything seems to point to the fact that synapses are only disabled, but not physically removed. "Since an experience that has been made may occur again at a later point in time, the brain apparently opts to save a few appendages for a rainy day", Hübener continues. And true enough, when the same eye was later inactivated again, the nerve cells reorganized themselves much more quickly - because they could make use of the appendages that had stayed in place.

Useful reactivation

Many of the appendages that develop between nerve cells are thus maintained and facilitate later relearning. This insight is crucial to our understanding of the fundamental processes of learning and memory. And so, even after many years of abstinence, it should be no great problem if we want to have a go at skiing again this winter.

Journal reference:

1. Hofer et al. **Experience leaves a lasting structural trace in cortical circuits**. *Nature*, November 12, 2008; DOI: 10.1038/nature07487

Adapted from materials provided by Max-Planck-Gesellschaft.

http://www.sciencedaily.com/releases/2008/11/081117110834.htm

Evolution Of The Visual System Is Key To Abstract Art

Suprematism, Museum of Art, Krasnodar 1916 (Credit: Kazimir Malevich / Courtesy of Wikimedia Commons)

ScienceDaily (Nov. 22, 2008) — Famous works of abstract art achieve popularity by using shapes that resonate with the neural mechanisms in the brain linked to visual information, a psychologist at the University of Liverpool has discovered.

Humans make aesthetic judgements about shapes and forms quickly and easily, preferring certain shapes to others, even in the absence of any narrative. Dr Richard Latto, from the University's Psychology department, has discovered that these shapes resonate with the processing properties of the human visual system, which is responsible for analysing what we have seen.

Dr Latto said: "Humans inherit a basic visual system through genetics. That system provides very selective information about the world around us. It has evolved to provide only the information that we need to survive - for example, we cannot see most electromagnetic radiation or follow the leg movement of a galloping horse.

"Of course our visual systems can be influenced by social factors, like fashion and the number of abstract images that we expose ourselves to, but evolution had given us some genetically determined responses to certain shapes and forms. In popular abstract works such as Matisse's The Snail (1953), Mondrian's Composition with Red, Blue and Yellow (1921), and Malevich's Supremus No. 50 (1915), the artists start with a blank canvas and arrange shapes and colours in a way that is aesthetically pleasing, using their own brain to monitor the effect.

"We like to look at the human body or parts of the body like the face and hands, stylised representations like stick figures and organic forms of the kind incorporated into the work of Salvador Dali and Francis Bacon. Certain landscapes and horizontal and vertical lines are also popular because they resonate with our visual systems, which have been tuned by evolution and experience to respond particularly to these biologically and socially important stimuli.

"We know that neurons in the brain need to be kept active to flourish and develop, so it is important for the visual system to be stimulated and sometimes pushed to the limit to function effectively. As with other adaptive behaviours, we have evolved a mechanism for encouraging this by rewarding ourselves with good feelings. Perhaps we enjoy looking at faces, landscapes and Mondrian's work because it is good for us and good for our brains."

Dr Latto added: "Artists were experimenting with abstract shapes long before scientists began analysing our nature of perception. Through observation or trial-and-error, artists have been identifying these aesthetic primitives - critical shapes and arrangements - and have indirectly defined the nature of our visual processes. In purely abstract painting, as with much music, form is all we have. Popular works have shown that essentially we like looking at what we are good at seeing."

Adapted from materials provided by University of Liverpool.

http://www.sciencedaily.com/releases/2008/11/081117082246.htm

Methanization On The Farm: Integrating Nitrogen Treatment

In Rennes, studies are being conducted to combine livestock liquid manure methanization processes with a biological nitrogen removal process. The expected benefits are measured in terms of energy savings and preservation of river water quality. (Credit: O. Gilard)

ScienceDaily (Nov. 22, 2008) — In Rennes, studies are being conducted to combine livestock liquid manure methanization processes with a biological nitrogen removal process. The expected benefits are measured in terms of energy savings and preservation of river water quality.

The July 2006 increase in the price of electricity repurchase has given a boost to biogas production through methanization. This will delight farmers in western France (Brittany, the Loire Country, and Lower Normandy) who produce more than 50% of the country's livestock manure. However, in the zones where livestock raising is the most intensive, the priority goes to removing organic nitrogen to limit water pollution. Yet anaerobic digestion to produce methane does not affect the stocks of nitrogenous matter responsible for the eutrophication of the aquatic environment.

An ambitious project

In Rennes, within the DIGESTAERO* project, a PhD dissertation is being conducted in collaboration with Breton industry leaders to combine the processes of methanization and biological nitrogen removal by nitrification and denitrification. These processes already exist in the food processing industry (distilleries, fabrication of dairy products), but they are not used in the manure treatment context. Indeed, to limit installation costs, the digesters should be able to be integrated into biological nitrogen removal units that already exist on the farm.

Moreover, the treatment unit should take into account inputs that vary substantially in terms of type and composition. For example, an effluent's rate of biodegradable material varies from 30% to 40%.

Equip livestock breeders in 2009

First, an experimental pilot made up of two 100-liter tanks was developed to study the phenomena involved and then optimize the processes. At the same time, a numeric model was designed first to identify the important parameters and then to define the optimal industry for the process. Today, the tool provides a good response to the variations in the liquid effluent composition. A first industrial prototype should come out in 2009 so that it can be adjusted to full-size operation. This will be the last step before the industrial development of this new process.

Methanization: gains at all levels

With 300 million tons per year of animal manure from livestock breeding, France has one of the greatest potentials of agricultural biogas production in Europe. For example, the digestion of 1 m3 of pig liquid manure produces approximately 25 kWh as electricity and as much as heat. Since July 2006, each kilowatt is bought back up to 0.14 euros, instead of the 0.05 euros paid initially. These gains are also important for the environment since methanization can reduce greenhouse gas emissions from a livestock operation. Finally, odors are also reduced with manure management.

"What development model for the methanization of livestock effluents is needed in France?" This is the theme of the conference organized in Rennes by the Cemagref, INRA, the University of Southern Brittany, Valétec, and Odipure, to be held on 21 November 2008. The debate will center around the results of the DIGESTAERO project .

*DIGESTAERO, a project financed by the ANR, associates the Cemagref, the Narbonne INRA, the University of Southern Brittany, and two Breton industries: Valétec and Odipure.

Adapted from materials provided by Cemagref.

http://www.sciencedaily.com/releases/2008/11/081106122825.htm

Iconic Rings And Flares Of Galaxies Created By Violent, Intergalactic Collisions

Artist's conception of the Milky Way galaxy. The bright pinwheels and broad star sweeps iconic of disk galaxies such as the Milky Way might all be the shrapnel from massive, violent collisions with other galaxies and galaxy-size chunks of dark matter. (Credit: NASA/JPL-Caltech Image courtesy of University of Pittsburgh)

ScienceDaily (Nov. 21, 2008) — The bright pinwheels and broad star sweeps iconic of disk galaxies such as the Milky Way might all be the shrapnel from massive, violent collisions with other galaxies and galaxy-size chunks of dark matter, according to a multi-institutional project involving the University of Pittsburgh.

Published in the Nov. 20 edition of The Astrophysical Journal, the findings challenge the longstanding theory that the bright extensions and rings surrounding galaxies are the remnants of smaller star clusters that struck a larger, primary galaxy then fragmented.

The study's team consisted of Andrew Zentner, a professor of physics and astronomy in Pitt's School of Arts and Sciences; James Bullock, a physics and astronomy professor at the University of California at Irvine; Stelios Kazantzidis, a postdoctoral researcher at Ohio State University; Andrey Kravtsov, a professor of astronomy and astrophysics at the University of Chicago; and Leonidas Moustakas, a researcher at the NASA Jet Propulsion Laboratory, California Institute of Technology.

The team's computer simulations of galaxy formation suggests that disk galaxies most likely began as flat, centralized star clusters. Smaller galaxies collided with and tore through these disks billions of years ago, casting disk stars outward into the wild extensions present now; the bright center is the original formation. In addition, vast bodies of dark matter-a low-density, high-gravity invisible mass thought to occupy nearly one-quarter of the Universe-swept through these disks and further pulled stars from the main disk.

The researchers' scenario largely applies to the formation of the rings and long flares of stars that surround such galaxies as the Milky Way, Zentner said. But the model also presents a possible solution to how star spirals-the arcs of stars that radiate from the center of some disk galaxies-maintain their shape. Spirals form as a result of any disturbance to the star disk, Zentner said. However, the prolonged disturbance of a galaxy and dark matter expanse passing through a disk explains why the spirals seem to never recede.

"Our model suggests that a violent collision throws stars everywhere and continues moving through the disk, disturbing its structure," Zentner said. "It also has been known for some time that for star spirals to develop and maintain their well-known form, there must be a prolonged disturbance. We show that large masses moving through a galaxy could provide that disturbance."

The team's findings were serendipitous, Zentner explained. They were modeling disk galaxies for an unrelated astrological survey when they inadvertently discovered that stars in the main disk scattered when satellite galaxies-smaller galaxies surrounding larger ones-passed through. They shared their results with colleagues a year ago, and the results have since been replicated, Zentner said.

"One of the major advantages of these results is that we didn't set out to find them," he said. "They happened as we simulated existing galaxies."

Adapted from materials provided by University of Pittsburgh.

http://www.sciencedaily.com/releases/2008/11/081121140528.htm

New Cause Of Fatal Brain Injury From Acute Viral Meningitis

ScienceDaily (Nov. 21, 2008) — What was once thought to be the culprit responsible for fatal brain damage in acute viral meningitis has now been found to be only an accomplice, say researchers at the Scripps Research Institute.

In a November 16 advance, online publication of the journal Nature, the researchers say their discovery revamps common beliefs about how such potentially lethal infections may be ravaging the brain and suggests the possibility of new treatments.

"This is a paradigm shift in how we think about some forms of meningitis and possibly other infections," says the study's lead investigator, Dorian B. McGavern, Ph.D., an associate professor in the Department of Immunology at Scripps Research. "What we thought were the killers are actually immune cells that recruit other accessory cells that then drive the disease. If we can find ways to block recruitment of the cells that actually do the damage into the brain, we may be able to limit the impact of the virus."

Meningitis occurs when the membrane (the meninges) that covers and protects the spinal cord and brain become inflamed, usually due to a bacterial or viral infection. The condition is considered a medical emergency because it can lead to an inflammatory response that results in brain swelling, seizures, blood clotting, epilepsy, or other complications, sometimes resulting in death. Many viruses can cause meningitis.

In this study, investigators looked at what happens in the brain of mice exposed to lymphocytic choriomeningitis virus (LCMV), a virus that can also infect humans, but which does not cause a lot of damage on its own. Instead, the virus pushes an immune response that, in itself, is damaging because it results in "leaky" blood vessels in the meninges at the blood-brain border.

"We use this mild virus because all the damage produced in the brain is caused by the immune system," McGavern says. "While other viruses are more pathologic, they all produce an immune response."

The researchers developed a unique way to "watch" what happens in the brain of mice infected with LCMV by tagging immune cells known as cytotoxic T lymphocytes (CTLs)—also known as killer T cells—with proteins that shine a fluorescent green. These cells, which the researchers knew reacted to LCMV, are the immune system fighters previously thought to be responsible for battling the virus and damaging the brain in the process.

When the researchers injected the tagged killer T cells into the mice, followed one day later with a dose of the virus, then a dye to visualize blood vessels, the scientist found that they could use two-photon microscopy to see what was happening 300-400 microns below the surface of the skull in the brain. Sure enough, the scientists could see blood vessels breaking down as meningitis developed and progressed, but the tagged killer T cells did not appear to be the direct cause of the vascular damage.

"We thought the disease depended on these killer T cells, but they didn't seem to be associated with any of the damage we were seeing," McGavern says.

The researchers then tagged other populations of immune cells: monocytes, which usually clean up and repair damage, and neutrophils, which may help with antiviral immunity. To their surprise, the scientists saw that these cells flooded the brain after LCMV infection, and were associated with significant damage to blood vessels in the brain's membrane.

"The vessels just start exploding," McGavern says. "This tells us that killer T cells recruit monocytes and neutrophils that actually produce the pathology we see with meningitis. What we thought were the cells responsible actually only recruit accomplices who commit the crime."

The researchers don't know exactly why monocytes and neutrophils are called to sites of infection by killer T cells, or how they produce such damage in meningitis. They theorize that the breakdown of blood vessels may be the result of these cells' attempts to move quickly out of the blood system into tissue within the confined space of the brain.

Now, however, the scientists do have a new avenue to explore for possible treatments for the deadly disease.

Co-authors of the paper, "Myelomonocytic cell recruitment causes fatal CNS vascular injury during acute viral meningitis," include Silvia S. Kang from Scripps Research, and Jiyun V. Kim and Michael L. Dustin, from the New York University School of Medicine. The study was funded by grants from the National Institutes of Health, The Burroughs Wellcome Fund, and the Dana Foundation.

About The Scripps Research Institute

The Scripps Research Institute is one of the world's largest independent, non-profit biomedical research organizations, at the forefront of basic biomedical science that seeks to comprehend the most fundamental processes of life. Scripps Research is internationally recognized for its discoveries in immunology, molecular and cellular biology, chemistry, neurosciences, autoimmune, cardiovascular, and infectious diseases, and synthetic vaccine development. Established in its current configuration in 1961, it employs approximately 3,000 scientists, postdoctoral fellows, scientific and other technicians, doctoral degree graduate students, and administrative and technical support personnel. Scripps Research is headquartered in La Jolla, California. It also includes Scripps Florida, whose researchers focus on basic biomedical science, drug discovery, and technology development. Scripps Florida is currently in the process of moving from temporary facilities to its permanent campus in Jupiter, Florida. Dedication ceremonies for the new campus will be held in February 2009.

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

http://www.sciencedaily.com/releases/2008/11/081117131719.htm

Urgent Action On International Coral Reef Crisis Urged

The Coral Triangle. (Credit: The Nature Conservancy / Coral Geographic (Veron et al: unpublished data))

ScienceDaily (Nov. 21, 2008) — Coral reef scientists and policy makers from the world's most prominent coral reef nations are meeting in Australia this week to develop urgent action plans to rescue the world's richest centre of marine biodiversity from gradual decline.

Human pressures on the Coral Triangle have raised grave concerns about the future of its fish, corals and other sea life, leading to a proposal by Indonesian President Susilo Bambang Yudhoyono for joint action by six governments, scientists, agencies and environmental non-government organisations of the region.

Marine scientists from the Australian Research Council Centre of Excellence for Coral Reef Studies (CoECRS) at James Cook University and the Australian Institute of Marine Science (AIMS) are assisting the largest reef conservation program ever undertaken, known as the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security.

The Coral Triangle (CT) spans Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor Leste and the Solomon Islands, and has over 200 million inhabitants, a third of whom depend on the sea for food security or livelihood.

Spread over 5.7 million square kilometres, the CT has the highest diversity of marine life of any area on Earth. It contains three quarters of the world's known coral species, a third of the world's coral reefs, more than 3,000 species of fish and the world's richest mangrove forests. It generates $2.3 billion in sea products each year and is a major spawning ground for tuna and other valuable species.

These resources are under threat from a combination of over-fishing (including illegal fishing), coral bleaching and ocean acidification, pollution and sedimentation due to coastal development.

"Everyone recognises that coral reefs, and the economic and social benefits they generate, are at risk," CoECRS Director Professor Terry Hughes said. "Fish, corals and climate change don't respect national boundaries – so the need for region-wide action is paramount.

"This is a critical initiative by many countries, acting together for the first time, to sustain the livelihoods of millions of people," he said. "In developing countries, millions of local people suffer real hardship when reefs and ocean habitats are degraded. There is a social and economic imperative to protect them."

According to AIMS Acting Research Director Frank Tirendi, "Better collaboration between Coral Triangle experts and Australian experts may well be a fundamental requirement to ensure the knowledge base is in place to prevent an environmental crisis to our north and ensure longer term regional fisheries and food security".

The CTI is a partnership between the six Coral Triangle countries, other governments, aid agencies, donors, WWF, The Nature Conservancy (TNC) and Conservation International (CI).

The CTI has a current global commitment projected to be at least $US500 million and its plan of action includes:

- Developing an ecosystem approach to fisheries management across the Coral Triangle
- Building a network of Marine Protected Areas across the region
- Measures to help adaptation to climate change
- Measures to help protect threatened marine species.

From 10 to 14 November the ARC Centre of Excellence and AIMS will help present an international forum on Management and Conservation of the Coral Triangle in Townsville, hosted by Australia's Department of the Environment, Water, Heritage and the Arts.

Adapted from materials provided by ARC Centre of Excellence in Coral Reef Studies.

http://www.sciencedaily.com/releases/2008/11/081110112200.htm

DVR Fast-forwarding May Not Be Fatal To TV Advertising

Fast-forwarded advertisements with brand information located outside of screen center -- such as in this frame from a restaurant ad -- are of virtually no value, Boston College researchers report in the November edition of the Journal of Marketing. (Credit: Photo courtesy the Journal of Marketing)

ScienceDaily (Nov. 21, 2008) — While digital video recorders and products like TiVo allow television viewers to skip past commercials, Boston College researchers have found that fast-forwarding viewers actually pay more attention and can be influenced by brand images they view only for a fraction of a second.

Tracking the eye movements of viewers, Carroll School of Management Professors S. Adam Brasel and James Gips found that ads with brand information placed in the center of the screen still create brand memory despite a 95% reduction in frames viewed and complete loss of audio. Their results are reported in the November edition of the Journal of Marketing.

"In the age of DVRs, advertisers who place their brands anywhere outside the center of the viewing screen do so at their own brand peril," said Brasel, an assistant professor of marketing. "Even in fast forward, consumers can focus in on a product logo or brand and that fraction of a second can later influence their preferences."

Ads with brand information located on the periphery of the TV screen are of virtually no value, according to a new study.

Fast-forwarded commercials containing extensive central brand information can even have a positive effect on a consumer's brand attitude, behavioral intent and actual choice behavior, the researchers found.

The findings show that marketers can counteract the impact of DVRs by ensuring their ads are heavily branded and the branding is centrally located.

"Everybody is saying that TV advertising is doomed – TiVo has broken it and DVR will kill it," said Brasel. "But it's not like the advertising disappears when you use TiVo. We wanted to find out what happens when you fast-forward through these ads."

Brasel and Gips found that people who fast forward through shows actually pay more attention to the screen than those who view at regular speed. That's good news for advertisers, as long as their commercials feature their brands in the center of the screen.

When a viewer hits fast forward, he or she only sees about 1 out of every 24 frames, reducing brand ID to a little less than a third of a second out of a 30-second spot, Brasel said. But the speed of the play-back removes visual cues and motion that attract attention to brand images that lay along the periphery of the TV screen. Instead, television watchers concentrate on the center of the screen.

Curious about how attention on the central image might impact consumer behavior, the researchers created a pair of mock commercials for two British chocolate bar brands. One was heavily branded, the other lightly branded. After the research subjects had viewed the content and were preparing the leave the lab, they were invited to choose one of the candy bars. Subjects chose the heavily branded bar twice as often as the lightly branded bar.

"We created a massive shift in behavior from a commercial lasting just over one second," said Brasel. "It's clear that just because an ad is being fast-forwarded, doesn't mean it is a wasted ad."

The onus now is on brand marketers not to forsake TV advertising or to look for ways to block the increasingly popular technology. "DVRs aren't going anywhere," said Brasel. "So it's up to advertisers to work with these new technologies."

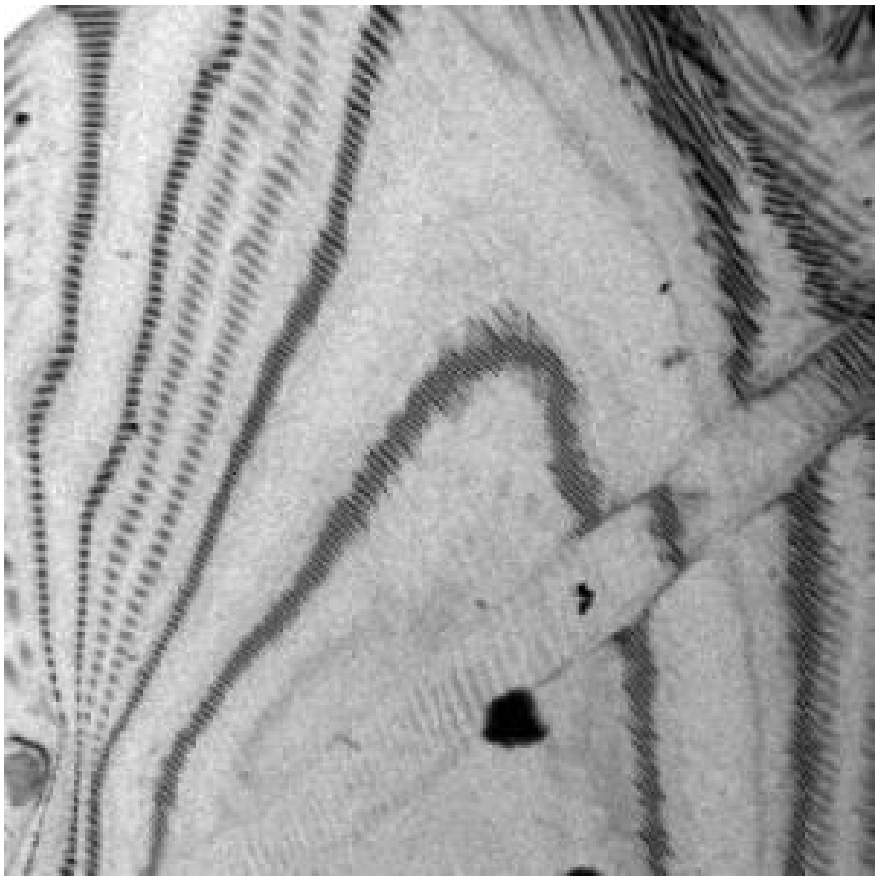
Journal reference:

1. Brasel et al. **Breaking Through Fast-Forwarding: Brand Information and Visual Attention**. *Journal of Marketing*, 2008; 72 (6): 31 DOI: 10.1509/jmkg.72.6.31

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

http://www.sciencedaily.com/releases/2008/11/081103102314.htm

'4-D' Microscope Revolutionizes The Way We Look At Nano World



Nanodrumming of graphite, visualized with 4-D electron microscopy. (Credit: Nano Letters; images produced at Caltech)

ScienceDaily (Nov. 21, 2008) — More than a century ago, the development of the earliest motion picture technology made what had been previously thought "magical" a reality: capturing and recreating the movement and dynamism of the world around us. A breakthrough technology based on new concepts has now accomplished a similar feat, but on an atomic scale--by allowing, for the first time, the real-time, real-space visualization of fleeting changes in the structure and shape of matter barely a billionth of a meter in size.

Such "movies" of atomic changes in materials of gold and graphite, obtained using the technique, are featured in a paper appearing in the November 21 issue of the journal Science. A patent on the conceptual framework of this approach was granted to the California Institute of Technology (Caltech) in 2006.

The new technique, dubbed four-dimensional (4D) electron microscopy, was developed in the Physical Biology Center for Ultrafast Science and Technology, directed by Ahmed Zewail, the Linus Pauling Professor of Chemistry and professor of physics at Caltech, and winner of the 1999 Nobel Prize in Chemistry.

Zewail was awarded the Nobel Prize for pioneering the science of femtochemistry, the use of ultrashort laser flashes to observe fundamental chemical reactions--atoms uniting into molecules, then breaking apart back into atoms--occurring at the timescale of the femtosecond, or one millionth of a billionth of a second. The work "captured atoms and molecules in motion," Zewail says, akin to the freeze-frame stills snapped by 19th-century photographer Eadweard Muybridge of a galloping horse (which proved for the

first time that a horse does indeed lift all four hooves off the ground as it gallops) and other moving objects.

Snapshots of molecules in motion "gave us the time dimension," Zewail says, "but what we didn't have was the dimensions of space, the structure. We didn't know what the horse looked like. Did it have a long tail? Beautiful eyes? My dream since 1999 was to come up with a way to look not just at time but also at the spatial domain; to see the architecture of a complex system at the atomic scale, as it changes over time, be it for physical or biological matter."

Scientists can observe the static structure of objects with a resolution that is better than a billionth of a meter in length using electron microscopes, which generate a stream of individual electrons that scatter off objects to produce an image. Electrons are used to visualize the smallest of objects, on the atomic scale, because the wavelength of the radiation source used by a microscope must be shorter than the space between the atoms. This can be accomplished using electrons, and in particular--because the wavelength of an electron shrinks as its velocity increases--by electrons that have been accelerated to dizzying speeds.

But just having electrons isn't sufficient to capture the behavior of atoms in both space and time; the electrons have to be carefully doled out, so that they arrive at the sample at specific time intervals. Zewail and his colleagues have achieved this by introducing the fourth dimension of time into high-resolution electron microscopy, in what has been termed ultrafast "single-electron" imaging, where every electron trajectory is precisely controlled in time and space.

The resulting image produced by each electron represents a femtosecond still at that moment in time. Like the frames in a film, the sequential images generated by many millions of such images can be assembled into a digital movie of motion at the atomic scale.

As reported in the Science paper, Zewail and colleagues applied their new 4D electron microscopy to observe the behavior of the atoms in superthin sheets of gold and graphite. Graphite, the material in pencils, consists of layers of carbon atoms locked into a sheet-like array. The atoms move in a unique and coherent way on the femtosecond timescale.

However, the researchers found that on a slightly longer, picosecond (one thousandth of a billionth of a second) scale, the graphite nanosheets produce sound waves. In the images, they directly visualized the elastic movements of the sheets and determined the force holding them together, which is described by a stress-strain property known as "Young's modulus." The 4D movies produced from the frames revealed the behavior in space and time.

In a second paper in the current issue of the journal Nano Letters, Zewail and his colleagues described their visualization of the changes in a nanometer-thick graphite membrane on a longer time scale, up to a thousandth of a second. The researchers first blasted the sample with a pulse of heat. The heated carbon atoms began to vibrate in a random, nonsynchronized fashion. Over time, however, the oscillations of the individual atoms became synchronized as different modes of the material locked in phase, emerging to become a heartbeat-like "drumming." Digital video, slowed down more than a billion times, illustrates this nano-drumming mechanical phenomenon, which displays a well-defined resonance that is nearly 100 times higher than can be detected by the human eardrum.

"With this 4D imaging technique, atomic-scale motions, which lead to structural, morphological, and nanomechanical phenomena, can now be visualized directly, and hopefully understood," says Zewail, who is now expanding the research to biological imaging within cells in collaboration with Grant Jensen, an associate professor of biology at Caltech.

The researchers are currently using the 4D microscope to image the components of cells, such as proteins and ribosomes, the cellular machinery that makes proteins. They have already produced images of a

stained rat cell and, more recently, of a protein crystal and cell in vitreous water. "The goal is to enhance the structural resolution in the images of these biomaterials by taking single-pulse snapshots before they move or deteriorate, and to follow their dynamics in real time," Zewail says.

In a recent commentary on the development, Sir John Thomas of Cambridge University, who is a world-renowned expert in electron microscopy, said the invention and its applications are "revolutionary." "The door is now open for myriad explorations in the physical and biological sciences," Thomas added.

"The sequences of images produced by this technique are remarkable," says David Tirrell, chair of Caltech's Division of Chemistry and Chemical Engineering. "They not only provide unprecedented insights into molecular and materials behavior--they do so in an especially satisfying fashion by allowing direct observation of complex structural changes in real space and real time. These experiments will lead us to fundamentally new ways of thinking about molecules and materials."

"Advances in imaging, concepts, and technology for visualization are fundamental to progress in diverse scientific and engineering fields," says Edward M. Stolper, Caltech's provost. "Caltech has made a commitment to leadership across the many physical and biological disciplines in which imaging plays a critical role. Ahmed's pioneering work is trailblazing new frontiers of science and technology."

Two centers supported the development of this technology: the Laboratory for Molecular Science, funded by the National Science Foundation, and the Physical Biology Center, funded by Gordon and Betty Moore Foundation. The work was also supported by grants from the Air Force Office of Scientific Research, the National Science Foundation, and the National Institutes of Health.

4D microscopy videos can be viewed at http://ust.caltech.edu/movie_gallery/.

Adapted from materials provided by California Institute of Technology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081120144234.htm

Children Of Centenarians Live Longer, Have Lower Risk Of Heart Disease, Stroke, Diabetes

ScienceDaily (Nov. 21, 2008) — A recent study appearing in the November issue of Journal of American Geriatrics Society revealed that centenarian offspring (children of parents who lived to be at least 97 years old) retain important cardiovascular advantages from their parents compared to a similarly-aged cohort. The study is the first to assess the health of centenarian offspring over time and could be important for future research, as the subjects may be used as a model of healthy aging.

The findings show that centenarian offspring have a 78 percent lower risk for heart attacks, 83 percent lower likelihood of stroke and an 86 percent lower risk of developing diabetes mellitus.

Additionally, the study found that centenarian offspring who were followed in the study were 81 percent less likely to die than the reference group of similarly-aged patients during the follow-up period. The survival rate is evidence that longevity runs in families, and the results reinforce the notion that there may be physiological and genetic reasons that longevity runs in families.

The results are consistent with previous research, which suggested that the avoidance or delay of cardiovascular disease and cardiovascular risk factors, including high blood pressure and diabetes, runs strongly in the families of centenarians, particularly amongst their children.

Dellara F. Terry, co-author of the study, points out that offspring of centenarians maintain these cardiovascular advantages throughout their lives. "These advantages persisted over the several years of the study when they are compared to a similarly-aged group whose parents did not survive to very old age," Terry said.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081120122159.htm

Research Finds Way To Double Rice Crops In Drought-stricken Areas

Researchers have discovered a way to double the output of rice crops in some of the world's poorest, most distressed areas. (Credit: iStockphoto)

ScienceDaily (Nov. 21, 2008) — University of Alberta research has yielded a way to double the output of rice crops in some of the world's poorest, most distressed areas.Jerome Bernier, a PhD student in the U of A Department of Agricultural, Food and Nutritional Science, has found a group of genes in rice that enables a yield of up to 100 per cent more in severe drought conditions. The discovery marks the first time this group of genes in rice has been identified, and could potentially bring relief to farmers in countries like India and Thailand, where rice crops are regularly faced with drought. Rice is the number one crop consumed by humans annually.The results of the study were published recently in the plant sciences journal Euphytica. Bernier's research began four years ago and focused on upland rice, which, unlike the majority of rice crops, grows in non-flooded, dry fields. "If drought hits, the yield can drop to almost nothing," Bernier said. He conducted his research at the International Rice Research Institute in the Philippines, in conjunction with scientists there and in India.He started with 126 genetic markers and narrowed his search to a group of genes that had the desired impact. In very severe drought conditions, rice strains with the new genes were shown to produce twice as those strains that did not have the genes. The new genes stimulate the rice plants to develop deeper roots, enabling it to access more of the water stored in the soil."For subsistence farmers who rely on the crop to feed their families, this extra yield can make a world of difference," said Bernier.

Less loss to drought may also mean an increased supply of rice globally, said Dean Spaner, Bernier's project supervisor and a professor of agricultural, food and nutritional science at the U of A.The research was funded in part by the Canadian International Development Agency and the Consultative Group on International Agricultural Research.

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

http://www.sciencedaily.com/releases/2008/11/081120162847.htm

Easing the Transition from High School to College

Eight years ago, Anoka Technical College in Anoka, Minn. was nearly shut down by the state college system. Its aging facilities needed updating, programs were shrinking in number and seen as failing to meet the needs of the surrounding area, and enrollment was drying up. Its fortunes, however, have changed, following the founding of a relative oddity on a two-year college's campus: a full-fledged high school.

The Anoka-Hennepin Secondary Technical Education Program (STEP) is a high school, now entering its seventh school year, located on the campus of the technical college, which is about 20 miles northwest of Minneapolis. It serves 11th and 12th grade students who take career-oriented courses while earning college credits. STEP offers programs for college credit in 20 different fields including medicine, information technology, advanced automotive, law enforcement and engineering.

Though some charter high schools are situated on the campuses of their sponsoring four-year institutions, and a growing number of community colleges are offering college-credit courses to local high school students via dual enrollment and "early colleges," STEP takes the college-preparatory model to another level. Unlike these models, STEP students integrate with college faculty and students on a daily basis while in a separate brick and mortar high school on a shared campus.

This semester, the school has about 80 full-time students — who also take all of their core academic classes such as English, math, science and social studies at the high school — and 900 part-time students from the five other high schools in its district. Since STEP's founding in fall 2002, its enrollment has grown from about 500 students a year to more than 1,400 last year. Its student population mirrors that of its school district, consisting of nearly 20 percent members of racial minority groups. Most of its students have a grade point average in the "low B" and "C" range.

"The majority of our students are kids in the middle," said Ginny Karbowski, STEP director and principal. "Most of these students would have gotten a job right out of high school but think they can go on to college. These are the students we're trying to identify. We promote this as a high school in a college setting where you can earn college credit at no cost. We expect our students to act like college students. It helps them realize the transition."

STEP has not conducted a major follow-up study of its graduates because it often cannot identify who its students are — they officially graduate from their sponsoring high school. Karbowski and others, however, point to some of the data it collected through a federal grant to illustrate the immediate success of the high school.

Not only did a review of the classes of 2004 and 2005 find that their grade point averages improved while attending STEP, it also found that its students earned more college credits (an average of 14 per student) than did their peers at other district high schools, who averaged 2.5 per student. Still, STEP's overall graduation rate mirrors that of other high schools in the district, at around 91 percent last year. Additionally, in the fall of 2004, 65 percent of its graduates reported they were attending a postsecondary institution — near the national average of 66 percent. Karbowski estimates that nearly a third of the STEP graduates who attend college immediately enroll in Anoka Technical College.

This new influx of enrollees to the two-year college has helped Anoka Tech predictably enroll students, said Anne Weyandt, Anoka's president, helping to overcome previous enrollment drops. She added that students from the college's neighboring high school turn out to be some of Anoka's best students.

"I see students that are better prepared and have a higher number of credits than most high school students," Weyandt said of those who continue on to pursue an associate degree at Anoka. "Initially, we thought we'd be running a glorified high school and that we would have to dumb down the curriculum to meet the needs of secondary learners. However, we've made good choices. We've broken down the artificial barriers that exist between high school and college."

Some of the community college's professors also teach high school students through STEP. Bob Evans, for example, teaches electronics engineering technology to college students and pre-engineering to high school students. As someone who has taught some of the same students at both levels, Evans wrote in an e-mail that STEP students tend to be more engaged and perform better than others in his college-level classes because they have been exposed to the material for a longer period of time. To try to integrate his students at both levels, Evans invites his high school students to tour his college labs and view the capstone projects his second-year college students are preparing. He also encourages his high school students to "shadow" one of his college students for part of an instructional day.

"The more often we have STEP students in our college building, the more comfortable they are, and the greater chances of them enrolling at [Anoka] upon graduation," wrote Evans in an e-mail, saying that his only complaint with the program was that scheduling often did not allow for these students to interact more often.

The high school-community college model at Anoka has attracted attention from all around the state. STEP averages about 1-2 tours of visiting educators a week during its school year, and it has received nearly $3 million in grants — between funds received by its district and the community college — over the past six years. STEP was also a founding partner of the Alliance for Successful Student Educational Transitions, a group dedicated to meeting the need of businesses for skilled workers by bridging the gap between high schools and technical colleges.

Following the model used by Anoka, Saint Paul College — a two-year institution in St. Paul, Minn. — started a high school program on its campus this fall called the Saint Paul Careers Pathway Academy. Unlike Anoka, the program does not yet have any full-time students. Instead its first cohort of 80 students, all juniors and seniors, are bused to the college in the afternoon from their home high schools to take college-credit courses toward a career path of their choosing.

The program already has a long waiting list, said Peggy Kennedy, Saint Paul College's vice president for academic affairs, adding that it hopes to double its enrollment next year. Students who successfully complete two years in the program should have at least eight college credits completed before they graduate high school.

"There are all kinds of programs for gifted and talented students and a lot of programs for students with needs, but there are often no programs for students in the middle," Kennedy said. "That's what I liked about STEP. We're excited about the process of developing our own program."

— David Moltz

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/11/21/anoka