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HARVARD MAGAZINE

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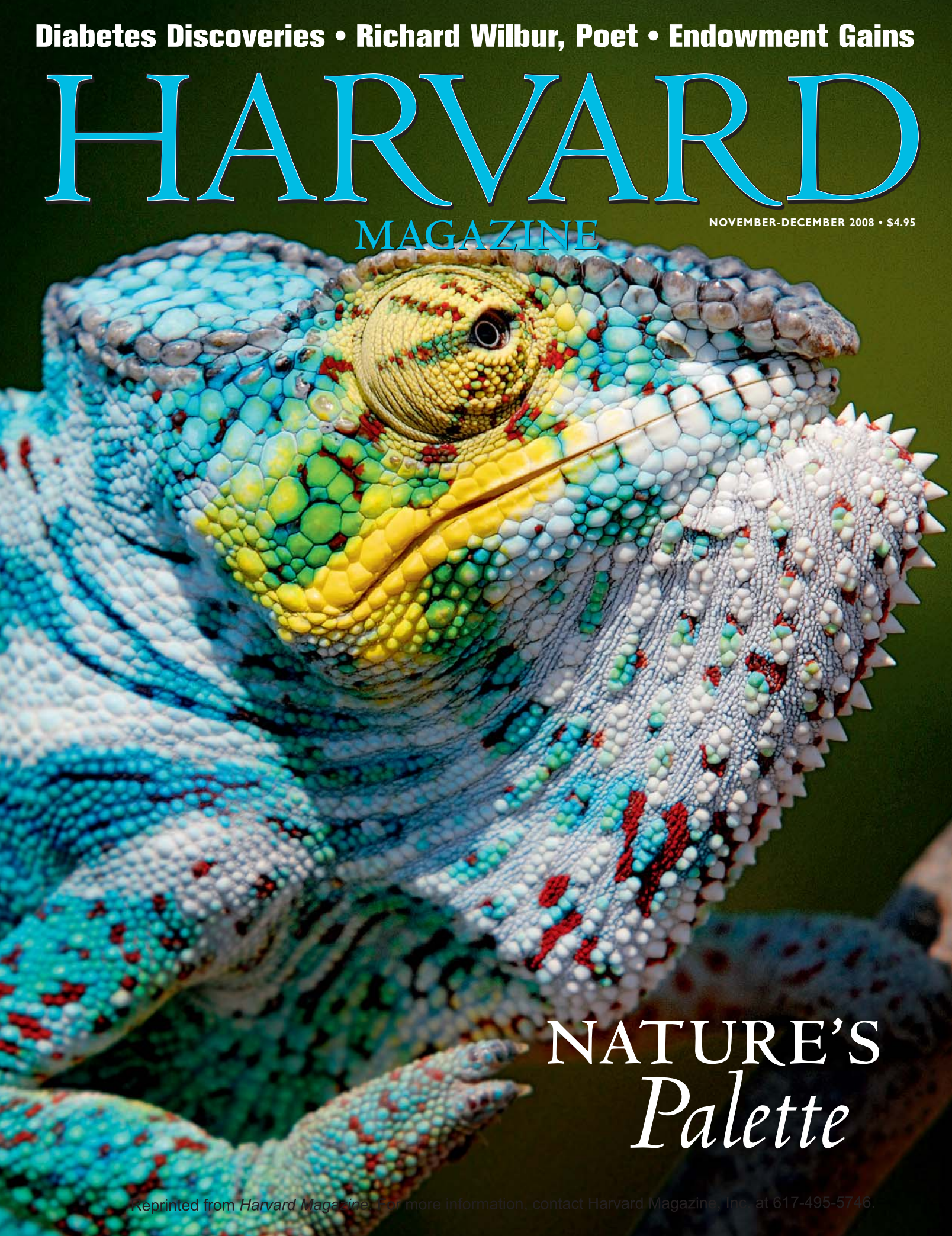

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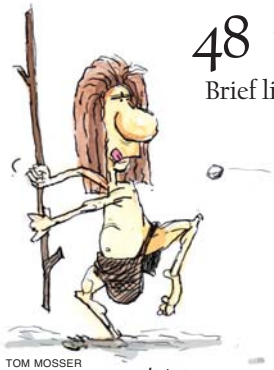

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On the cover: The panther chameleon, Furcifer pardalis; for a view of its tail, see pages 42-43. Photograph by Paul Bratescu

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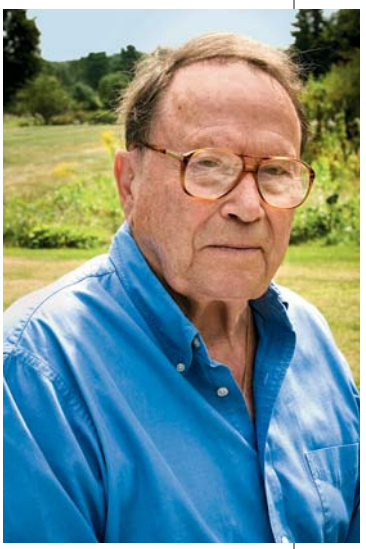

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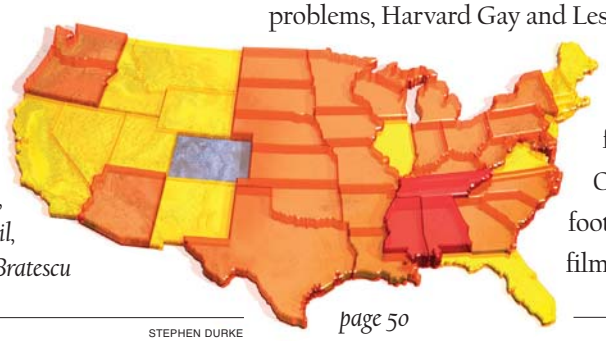


STEPHEN DURKE

page 50

Cambridge 02138

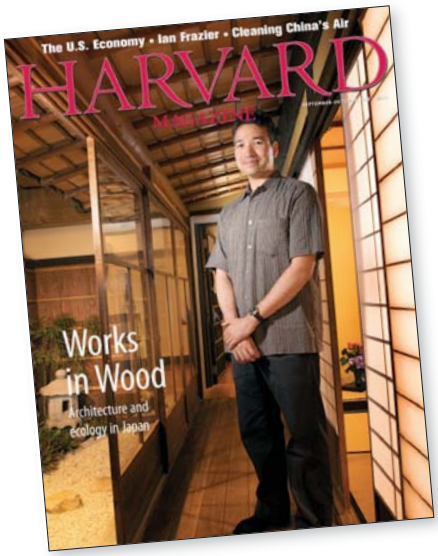
Enron echoes, air pollution, enlightened engineering

THE ECONOMIC AGENDA

I was pleased to see Professor Summers ("The Economic Agenda," September-October, page 27) draw the connection between the long-term income stagnation of the bulk of the U.S. population and the growing competition with a global labor market. It is clear that the laws of supply and demand have deprived most U.S. employees of market power, a phenomenon that started with the ranks of the unskilled and under-educated but that has moved up scale as developing nations have produced a flood of new college graduates. This has predictably led to the rich getting richer, since they are no longer compelled to share. It is unfortunate that Summers then goes on to propose a destructive and impractical solution to one of the primary accelerators of that phenomenon.

It is clear that the U.S. corporate tax system, which provides an incentive of up to 35 percent for locating high-value operations outside of our borders, has done much to drive away the high-value jobs that were supposed to remain here. Summers proposes that we address that problem by conspiring with all foreign nations to impose a 35 percent tax on all corporations everywhere. Given that countries such as Singapore, Ireland, and Switzerland have produced extremely prosperous middle-class populations by keeping corporate rates low, it seems hardly likely that they would agree. Further, both left- and right-wing economists agree that the corporate tax is an extremely distorting and inefficient way to collect revenue. Instead, the U.S. could unilaterally enact a corporate dividends-paid deduction, offsetting the revenue loss by eliminating capital-gains preferences (another huge and regressive distortion) and imposing a 7.5 percent incremental levy on individual income over $500,000. This would restore employee market power while substantially improving the efficiency of our economy.

Matt Lykken, J.D. '85
Wheaton, Ill.



Am I the only one who thinks that spending a trillion dollars a year on the military-industrial-spy-torture complex is a factor in determining the economy's trajectory, when we could get by with a paltry $500 billion or so? Larry Summers certainly doesn't seem to. Amid all his financial mumbo-jumbo, not one word. I mean, I made only a B in Ec 1, yet that seems kind of obvious to me.

Rudolf Dankwort '62
Phoenix, Ariz.

Summers makes some excellent points in his article, particularly regarding the advantages of global trade and trade agreements. After all, most of our manufacturing jobs have disappeared due to

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CAD/CAM, "snap together" rather than "screw together," and plastic replacing metal—not because of "outsourcing." Some "outsourcing" is due to a lack of highly qualified Americans.

His otherwise objective assessment loses me when he accepts global warming theories and fails to accept that any expensive programs we adopt will be overcome by emissions from China, India, Russia, and Africa. Except for France (80 percent of electricity from nuclear power), Europe and Canada have not come close to meeting their Kyoto commitments.

Most distressing, Summers seems to advocate more taxes to support a bigger role for government and seems to think it will be feasible for poor countries to sign trade agreements requiring them to adopt "international standards for capitalization of financial institutions, for corporate-income taxation, and for labor standards and organizing" with costs similar to those in the U.S. We should be encouraging Americans to become skilled professionals or artisans and to work hard, but we must not encourage an "entitlement" mentality.

Robert C. Armour, M.B.A. '67
Virginia Beach, Va.

I'm a long-time admirer of former President Summers, but one point in his "economic agenda" article is a perfect example of what's wrong with the center-left consensus characterizing so much Harvard thinking. He says, "I have been emphasizing healthcare as a moral imperative," then identifies the main problem with U.S. healthcare as "costs consistently growing far more rapidly than GDP."

The view of healthcare as a "moral imperative," and hence an entitlement, is the direct cause of costs consistently growing more rapidly than GDP. We need a reasonably healthy workforce to compete in the world. We already have that.

Marguerite Gerstell '66, A.M. '91
Stonington, Me.

ONLINE ENHANCEMENTS

Harvard Magazine's website, **www.harvardmagazine.com**, has breaking University news (and news of alumni) and multimedia material complementing articles in each issue. Hear poet Richard Wilbur (page 36) read from his work, and cellist Matt Haimovitz (page 25) perform. Find out more about your risk for diabetes (page 50). And learn what Harvard experts think about the unfolding financial crisis (page 69)—a different kind of risk.

ENRON ECHOES

Paul M. Barrett sounds several alarms in his review of Professor Salter's book on the Enron collapse ("Felonious Mayhem," September-October, page 20). Most shockingly, Barrett reminds us of the failure of our universities. He asks how many business schools would dispute the assertion of Enron's Ken Lay: "all that matters is money." My conclusion is that today's universities are chiefly trade schools and the most prestigious "trade" is making money. We have come a long way from John Henry Newman's 1852 idea that the "practical end" of a university must be "training good members of society." Barrett reminds us also of the need for capable and principled watchdogs to protect us from ever-present economic predators. We had our corporate malefactors when I was a schoolboy. But public accountants (auditors) were then viewed as a secular priesthood, albeit too often unheeded, like their churchly counterparts. Then came the Depression and New Deal, when principled journalists like Marquis Childs and regulators like Thurman Arnold were heroes in my collegiate circles. During World War II, soldiers like me relied on businessmen like Paul Hoffman and HBS professors like Colonel Doriot to keep us supplied. Like Paul Barrett, I long for a return to days when money was a measure, not an end.

John M. Pickering, M.B.A. '43
Albuquerque, N.M.

LET 'EM EAT AIR POLLUTION

The article about China's growth correctly describes a serious pollution problem ("Greening China," September-October, page 32), but the question whether 750,000 or 710,000 die of pollution is meaningless without considering the saving of lives resulting from taking workers out of bitter, inefficient subsistence farming, with pandemic liver fluke and other diseases of poverty, into relatively less dangerous (and better fed) industrial work (even if not under optimal conditions). Without diminishing the

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imperative for China to reduce pollution, the short-term perspective must include whether the lifespan and life quality of the Chinese were improved on a net basis by the environmentally insensitive growth.

James Kardon '71
Scarsdale, N.Y.

ENLIGHTENED ENGINEERING

As a degreed engineer with a contemporaneous degree in philosophy, I read with interest your piece on Venky Narayanamurti ("The Liberal Art of Engineering," September-October, page 59). As it happens, my undergraduate degrees are from the University of Notre Dame, which offers a standardized five-year engineering/arts and letters dual-degree program and has done so at least since I attended the university in the late 1970s. I have always felt that the broadened perspective the program afforded me has been crucial to any subsequent professional or personal success I have had, and more importantly, to the joy I am able to experience whether I'm approaching a new subject in the sciences or in the arts. Venky is definitely onto something, but at the risk of committing some great heresy, I will suggest that Harvard explore the possibility that another fine institution of higher learning has trod this ground before and come up with a superb solution, one that Harvard might profitably adopt.

Michael Hogan, M.B.A. '88
Boston

INEQUALITY, CONTINUED

When I read the article on income inequality ("Unequal America," July-August, page 22), I expected to see in response some outraged letters from people who are shocked and offended that anyone would wish to set any limits on runaway greed and its attendant wanton disregard for the suffering of others. [See letters, September-October, pages 2-7, 80.] I was not disappointed.

Peter Rees, Ed.D. '64
Trenton, Me.

I read with interest the article "Unequal America" and the letters responding to it. Perhaps I might just add a footnote. The story is told of how a man once came up to Lord Rothschild and berated him for having an unfair share of the world's wealth. Lord Rothschild called over his secretary. "Hoskins," he said,

"give this man his share of my wealth. Give him seven pence."

STEFAN SCHREIER, GP '67
Spokane, Wash.

JAPANESE ARCHITECTURE

"WORKS AND WOODS," by Paul Gleason (September-October, page 44), offered fresh insight into the use of wood in traditional Japanese architecture through a glimpse of the work of associate professor Yukio Lippit. A brilliant example of the *sukiya* style of Japanese architecture is seen on page 48 in the photograph of the seventeenth-century Katsura Villa; the author remarks that Katsura was "built for the friends of the imperial family." Certainly, Katsura was a courtly gathering-place: this villa was in fact built for Prince Toshihito (1579-1629) during the reign of his nephew, Emperor Gomizunoo.

The facing, interior view on page 49, also in the *sukiya* style, is not that of Katsura Villa as the caption suggests. This is, rather, the Kyaku-den, from the middle villa of Shugakuin Villa, built after Katsura for Emperor Gomizunoo.

Thank you for including images of these beautiful spaces in your article.

MURRAY BARSKY
Administrative Coordinator for Harvard College Library Technical Services
Cambridge

Paul Gleason replies: Thank you to Murray Barsky for this careful review of the article. The top picture on page 49 was incorrectly identified as Katsura Villa. Although Corbis, the agency from which we bought the rights to use the image, had labeled it "Katsura Rikyu Imperial Villa," it was in fact a photograph of Shugakuin Villa, built years later; we are glad to have the error corrected. Professor Lippit concurs with my characterization of Toshihito as more a friend of the imperial family than an actual part of it, even though he had the title of "prince."

SPEAK UP, PLEASE

Harvard Magazine welcomes letters on its contents. Please write to "Letters," *Harvard Magazine*, 7 Ware Street, Cambridge 02138, send comments by e-mail to yourturn@harvard.edu, use our website, www.harvardmagazine.com, or fax us at 617-495-0324. Letters may be edited to fit the available space.

ROTC, CONTINUED

I was commissioned into the U.S. Navy from NROTC at Harvard almost 50 years ago. I write these lines on August 28, the forty-fifth anniversary of Martin Luther King Jr.'s immortal speech; I was present in Washington because I had left active duty in Norfolk, Virginia, the day before for that very purpose. I last wore the uniform, as a Reserve officer, upon graduating from Michigan Law in 1966.

But every day of a legal and business career as well as a long career of civic life—local, national, and international—I have been governed by John Paul Jones's "Code of a Naval Officer" that was presented to me and my brother officers when we were commissioned in June 1959; it is framed outside my office. That code charges an officer to be—and I quote the archaism of the eighteenth century—"a gentleman of liberal education, refined manner, punctilious courtesy, and the nicest sense of personal honor." Only Harvard and later Michigan can claim to have endowed me with the first. The next two are in the eye of the beholder. The "nicest sense of personal honor" I claim and will defend to the end of my days.

I didn't get that from Hollis Hall or Adams House, from the history, government, or English departments, or from WHRB. I got it from NROTC and from many a senior, peer, and subordinate sailor, soldier, and Marine on high seas and landing beaches in what Marines call "many a clime and place."

None of these virtues is "military" in the standard civilian understanding of that term. But they go to the very essence of what Harvard used to instill in its young, and what Presidents Summers and Faust have wanted to instill again. [See "Principles We Must Strive to Extend," excerpted from President Drew Faust's June 4 remarks at the ROTC commissioning ceremony, July-August, page 53, and letters, September-October, pages 81-82.] They are the virtues of an honorable private and public citizen and leader, and of an honorable member of family and community. "Liberal education, refined manner, punctilious courtesy, and the nicest sense of personal honor" is what we are or should be all about.

Are these virtues now instilled by the College, the Business School, the Law School, or any other of Harvard's famous centers of learning and leadership?

Terence Roche Murphy '59, O.L., O.B.E.
Ex-LT USN/USNR
Bethesda, Md.

ERRATA AND AMPLIFICATIONS: MONGOOSE AND MORE

COURTESY OF THRISHANTHA NANAYAKKARA

D. Allan Gray, M.B.A. '79, of Chicago, writes that in "Man, Mongoose, and Machine" (September-October, pag 11), on "Thrishantha Nanayakkara's work in training mongooses to detect mines [see photograph], you describe similar work with rats and add that 'Nanayakkara hopes that determining how another rodent's brain sorts smells will lead to improved training techniques that in turn will make his country [Sri Lanka] a safer place to live.' Alas, a mongoose is not 'another rodent': it is a member of the family *Viverridae* or *Herpestidae*—taxonomists differ—but in any event indisputably a carnivore, not a rodent." Attorney Thomas L. Higginson Jr. '72, writes to the same effect, observing that the mongoose "is more closely related to a walrus than to a rat." The editors can only confess that we knew the mongoose was not a rodent, but our copyediting failed to ferret out the misattribution of kinship.

In response to "Unequal America," by Elizabeth Gudrais (July-August, page 22), Katherine Yocum, Ed.M. '01, of Portland, Oregon, notes that Ethiopia "is one African nation which has never been colonized." And Mark Moody '93, corresponding from Vienna, Austria, disputes that the federal income tax "dated only to 1913 in the United States. In fact, it was under Abraham Lincoln that this misery was first inflicted upon us—on August 5, 1861, by signing the Revenue Act. Strapped for cash with which to pursue the Civil War, Lincoln and Congress had conspired to impose a 3 percent tax on annual incomes over $800. This tax was not repealed until the Grant administration, in 1872. In 1894, Congress again attempted to levy a flat tax on income, but it was ruled unconstitutional by the Supreme Court in 1895; it was this ruling that was the genesis of the Sixteenth Amendment, which empowered the government to levy taxes on individuals, irrespective of a state's population."

Right Now

The expanding Harvard universe

TALENT FOR TRANSLATION

What Makes the Human Mind?

During the past few decades, a mounting body of evidence has shown that animals possess a number of cognitive traits once thought to be uniquely human. Bees "talk" through complex dances and sounds; birds act as "social tutors," teaching song repertoires to their young; monkeys use tools and can sort abstract symbols into categories. Yet the more scientists learn about the similarities between human and animal thought, the greater the need to explain the dramatic divide. Are the human faculties associated with language simply an advanced version of capacities that are found in animals, or do they represent something that is qualitatively new?

This puzzle has drawn the attention of professor of psychology, organismic and evolutionary biology, and biological anthropology Marc Hauser, who has written widely on human and animal cognition. Drawing on a range of recent studies that link the fields of linguistics, biology, and psychology, Hauser has attempted to isolate the aspects of human thought that account for what he terms "humaniqueness." He maintains that even though human brains have inherited many of the raw abilities observed in nonhuman animal species, a divergence arises from the ways in which multiple capacities interact in humans, allowing them to convert information into myriad forms to serve infinitely diverse ends.

Hauser supports his argument with comparative examples. "Some of the capacities that are critical for language acquisition," he says, "are in fact present in other species, but used toward more specific nonlinguistic purposes." Take the concept of singular and plural. Experiments with rhesus monkeys have revealed that they always prefer "many" over "one" of a desired object, suggesting that the singular/plural distinction exists in nonhuman primates and thus likely precedes the evolution of language. But the monkeys don't distinguish among different gradations of "many"—by opting for three objects over two, or four over three, for example—unless the objects are presented sequentially. Humans, on the other hand, through their novel system of language syntax, have

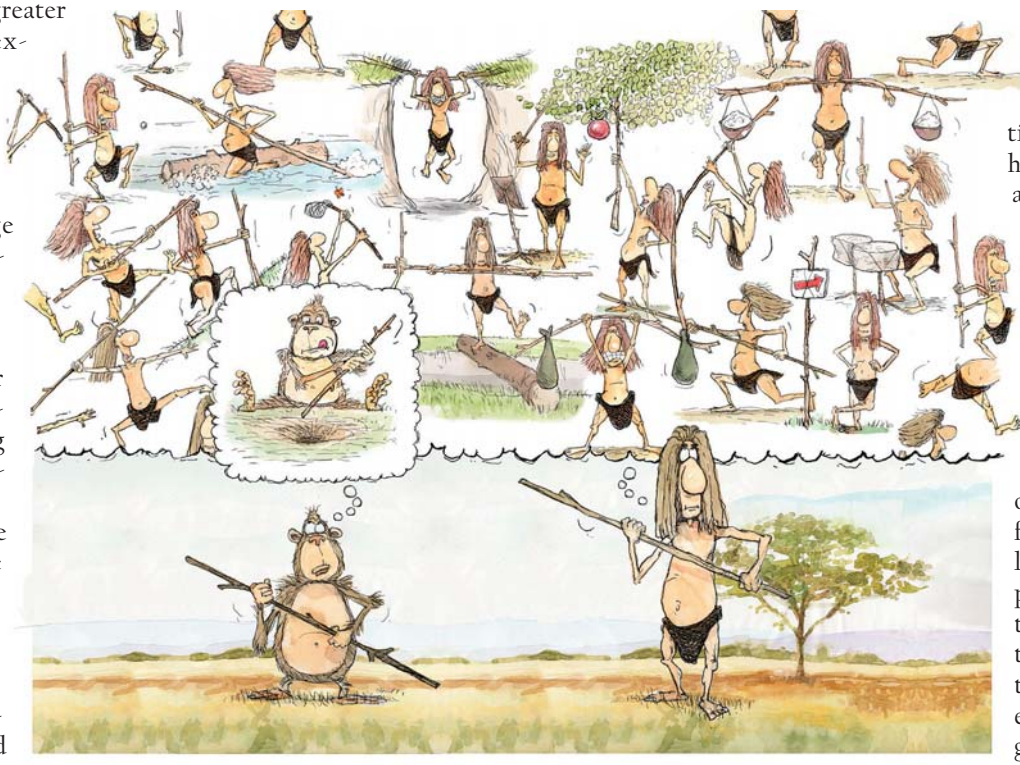

Illustration by Tom Mosser

transformed and complicated the way the primitive singular/plural relationship is thought about and represented.

Songbirds offer a further illustration of both the connection and the gap between animal and human faculties. Birds learn songs in much the same way that humans acquire language. There's a critical early window in which exposure to certain stimuli is necessary; and, as with language, bird songs consist of highly structured sounds that are combined and recombined to create new songs. Yet in the case of birds, different combinations of sounds don't change the song's message. Individual variations serve to distinguish one bird from another, like an accent, but the song means only one thing (i.e., "I'm a territorial male...if you're a female and want to mate, come find me"). "It's not that birds don't have thoughts about the world," Hauser says. "They do. But the combinatorial ability doesn't get mapped onto the ability to create meaning, the way it does with language—allowing humans to combine and recombine sounds constantly to create different words and expressions."

Hauser describes animals as having "laser-beam" intelligence, in which each cognitive capacity is locked into a specific function. Humans, by contrast, have "floodlight" intelligence, he says: they can use a single system of thought in multiple ways and can translate information from one context to another. "Animals," he elaborates, "live in a world in which the systems don't talk to each other."

Take tool use, for example. In 1960, when Jane Goodall discovered a chimpanzee using a grass stalk to catch termites, a long-held theory about human uniqueness fell apart. "But the significance of tool use doesn't lie in the *fact* of tools," Hauser explains, "but rather in how they're conceived and used." Animal tools consist of only one material and have only one functional part, while human tools have evolved over time to be made of various materials and have multiple functions. A knife can be used to cut food, open a box, or stab an intruder. Forty years of research, he reports, have not revealed any evidence that animals can use one tool for multiple purposes.

Hauser summarizes the distinguishing characteristics of human thought under four broad capacities. These include: the ability to combine and recombine different types of knowledge and information in order to gain new understanding; the ability to apply the solution for one problem to a new and different situation; the ability to create and easily understand symbolic representation of computation and sensory input; and the ability to detach modes of thought from raw sensory and perceptual input.

Across the board, Hauser says, there are signs that animal evolution passed along some capabilities "and then something dramatic happened, a huge leap that enabled humans to break away. Once symbolic representation happened, if the combinatorial capacity was there, things just took off. Precisely how and when this happened, we may never know."

—ASHLEY PETTUS

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LIVING LIST

World-Wide Web of Life

Of the 23 types of salamander in the genus *Thorius* endemic to Mexico, 21 are endangered: so rare that they live only on certain mountain ranges, or, in some cases, on a single mountaintop. James Hanken, director of the Museum of Comparative Zoology (MCZ) and Agassiz professor of zoology, has studied these amphibians for years and thinks many of them may disappear. "We need to know a lot more about what we have if we're ever going to inventory additional, unknown species before they're lost," he says, "and if we're ever going to be able to save them."

In an enormous effort to collect what we *do* know about Mexico's salamanders—and about the rest of the 1.8 million known species on the planet—Harvard and other scientific institutions have come together to create an on-line catalog of all the planet's animals and plants, an Encyclopedia of Life (EOL).

In late February, the project went on line with roughly 35,000 specimen pages, culled from other digital resources such as FishBase (which explains why the encyclopedia initially had a ichthyologic bent). Scientists associated with the project have also built two dozen "exemplar pages": detailed looks at everything from a species' life cycle to its role in the ecosystem. But most of the site consists of a million blank place-holders—pages with lit-

DOUG BACKLUND, SOUTH DAKOTA DEPT. OF GAME, FISH, AND PARKS

GARY M. STOLZ

JIRI DUCHON

Images from the Encyclopedia of Life include an American burying beetle, a cheetah, and a smooth snake (*Coronella austriaca*). James Hanken plans to allow amateur ecologists to upload their own photographs to the catalog.

tle more than scientific names—waiting for contributions from scientists and amateurs alike. The aim is to give every species an on-line profile within 10 years.

Pellegrino University Professor emeritus E.O. Wilson (see Open Book, page 26, and "Of Ants and Earth," March-April 2003, page 36) first called for the Encyclopedia of Life in a 2003 article in the scholarly journal *Trends in Ecology & Evolution*

DAVID BURDICK

TIM BOWMAN

Above: A white tip reef shark. Right: A long-billed dowitcher

(fondly known in the field as *TREE*). "I even encountered a bit of skepticism," he recalls, when "a British scientist,...a former adviser to the prime minister and a friend, called me to ask if I were out of my mind." In 2003, he concedes, the idea was farfetched. But now, aided by the Biodiversity Heritage Library—10 libraries (including two at Harvard) that are in the process of digitizing 300 million pages of literature on comparative biology—it is possible to aggregate everything written about a particular species into a rough draft of its Web page.

Harvard is only one of what Hanken calls the encyclopedia's "cornerstones." Also involved, in contributing entries or managing the site itself, are the Smithsonian Institution, the Field Museum in Chicago, the Marine Biological Laboratory in Woods Hole, Massachusetts, and the Missouri Botanical Garden in St. Louis. (Hanken chairs the EOL's overall steering committee.)

But even the combined strength of the world's finest scientific institutions, Hanken believes, would fail to corral the planet's astonishing biodiversity. Early next year, the EOL will begin emulating Wikipedia and allow ecology buffs to upload information about their favorite species. "The only way the Encyclopedia of Life can succeed is with the contributions of tens of thousands, hundreds of thousands, of amateurs," says Jesse Ausubel '73, a senior research associate at Rockefeller University in New York City who helped the encyclopedia obtain $50 million in grants from the MacArthur and Sloan Foundations.

It won't be a complete free-for-all. "To maintain the support and participation of the professional community," says Hanken, "we have to exert some kind of control." Each page will have a curator who checks and authenticates user contributions. Fortunately, he says, certain amateurs are judged knowledgeable enough to curate their own pages. He also notes that because so little information exists about most species (typically the only paper on a species is the one in which it is named), amateur naturalists will be as capable as professionals at keystroking scientific literature into first-rate Web entries.

Hanken envisions the encyclopedia in the tradition of Carolus Linnaeus, who invented the modern taxonomic system, and Louis and Alexander Agassiz, who founded the MCZ and revolutionized the way natural-history museums display their collections (by separating public exhibits from scientific labs). "I think the Encyclopedia of Life is the equivalent in our age," he says, "putting information about biodiversity on line, making it accessible to people, displaying it, constantly updating it." Already, visitors to its website can learn about more than a dozen of Hanken's salamanders: modern technology helping to foster stewardship of life on earth.

—PAUL GLEASON

ENCYCLOPEDIA OF LIFE WEBSITE:
http://www.eol.org

WOEFUL WASTERS

The Financial Cost of Feeling

In 1890, Harvard psychology professor William James sought to redefine the "self," which, he wrote in *The Principles of Psychology*, includes not only our bodies and "psychic powers," but the clothes we wear, the house we live in, the horses we own, and the money we keep in the bank. How we feel, he said, is invariably tied to these belongings.

Today, this may sound obvious—yet during the century that followed James's assertion, economic theories on spending largely ignored emotion. Someone buying shoes, so traditional economics teaches, approaches the purchase with purpose, rationally weighing a pair's pros and cons—will they last through the season? will they match my clothes?—before calmly making a choice. The grief the purchaser happens to feel about a recent death in the family should have no bearing on what is spent. But Jennifer Lerner says it does.

"Emotions have a way of taking hold and directing behavior and carrying over

to influence judgments and decisions, even when they shouldn't," says Lerner, a professor of public policy and management at the Harvard Kennedy School who also holds a secondary appointment in the psychology department of the Faculty of Arts and Sciences. Lerner's research on emotion and decision-making lies at the intersection of psychology and economics, in the field of decision science. Drawing on James's ideas of the self, her most recent study shows that when people feel sad and self-focused, they're willing to spend more money, perhaps in an effort to bolster who they are by acquiring more possessions. The paper, "Misery Is Not Miserly" (co-written with graduate student Cynthia Cryder of Carnegie Mellon and faculty members Ronald Dahl of the University of Pittsburgh and James Gross of Stanford), appeared in the June issue of the journal *Psychological Science*.

When people feel sad and self-focused, they're willing to spend more money...

In one of their typical studies, 33 participants were randomly assigned to watch either a sad film clip (a four-minute scene from the 1979 film *The Champ*, in which then child actor Ricky Schroder cries at the side of his dying father, a former boxing champion) or a neutral one (in this case, an excerpt from a National Geographic special about the Great Barrier Reef). Afterwards, the *Champ* viewers wrote briefly about how they'd feel in a similar situation, as a way to help them personalize their emotions. The control-group members wrote about their daily activities. As the participants finished writing, they were shown, individually, a water bottle and told to complete a form indicating whether they would or wouldn't buy it at 20 predetermined price points (increasing in 50-cent increments from 50 cents to $10). If their price choice matched the bottle's assigned value, they were told, they would buy it with a portion of their payment for participating. Sad participants who were particularly self-focused—as measured quantitatively by what they wrote in their essays—were willing to pay 300 percent more for the water bottle than their control-group peers.

What's very important "is that people are unaware they're doing this," says Lerner, who has conducted similar studies using objects ranging from highlighters to coffee mugs. When researchers asked participants if their feelings in any way influenced the price they chose, "They said, 'No, are you kidding?'" she reports. "They acted like, 'Why would that happen?'"

Even within the fields of psychology and behavioral economics, Lerner's ideas are unorthodox. Prevailing theory says that people devalue things in their lives when they feel any negative emotion. Lerner's research suggests that someone's valuation of something depends on what exactly those negative feelings are: in her research on risk perception, for example, she has found that fear generates pessimism, but anger leads to optimism.

Outside academia, a popular link between sadness and shopping already exists: a link both anecdotal and concrete, given that compulsive shoppers are sometimes treated with antidepressants. But Lerner says her group's findings may not relate to the same issue, in part because her study participants have no idea they're paying more when they're sad. "The full picture of what we think is going on is the aphorism 'Out with the old, in with the new,'" she says. "When people are sad, there's a meta sense of wanting to change circumstances." Lerner is now conducting a similar study with participants whose spouses have recently died; it involves looking at the economic choices the survivors make. She also wants to explore sadness effects among adolescents. In the long term, she's interested in how emotions affect economic judgments and decisions, and whether consumer-spending indexes ought to include emotion.

There are some troubling implications of this work: advertisers and others already prey on people's insecurities and pain to induce them to spend money. Lerner says she and her colleagues worry about this, and their many media appearances since the study was announced are in part an effort to help make consumers more aware. That way, says Lerner, when people shop, "they aren't victims of their sad moods."

—KATHARINE DUNN

JENNIFER LERNER LABORATORY WEBSITE:
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Illustration by Jon Krause

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FIZZ PHYSICS

A Durable Bubble

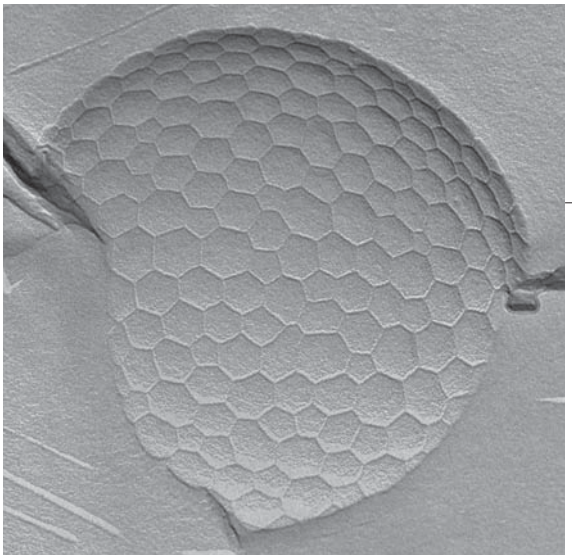
THE FIFTH FLOOR of McKay Laboratory houses an unlikely scientific tool: small, gleaming silver, and available at department stores for a few hundred dollars. In the hands of mechanical-engineering doctoral student Emilie Dressaire, the KitchenAid mixer can whip up a fine foam full of bubbles only a few micrometers wide. More remarkable than the bubbles' size is their resilience. Bubbles this tiny usually disappear in a matter of seconds, but a tube of this fluffy white stuff has lasted in a lab refrigerator for more than a year.

Dressaire's bubbles could improve low-fat ice cream. They are small and sturdy enough to replace the fat droplets that give ice cream its rich texture (less persistent bubbles cause the dessert to collapse into a yogurty goop). "When people ask me what I'm doing and I say, 'Oh, I'm working on fat-free ice cream,' they start paying attention," she reports. "And I can tell them more about the science and technology involved in a product of everyday life."

Her ingredients sit beside the KitchenAid in two containers, one holding a viscous corn syrup and the other a powdery mix of sucrose ester molecules. The latter acts as a surfactant, lowering the surface tension between the liquid and the air and thereby stabilizing the bubbles. (Note that any future ice cream, though low in fat, would not be low in calories.) By mixing the ingredients together for two hours, Dressaire traps minuscule air pockets in the dense foam.

Mechanical engineer Emilie Dressaire

JIM HARRISON



EMILIE DRESSAIRE

The diameter of one of Dressaire's bubbles is one one-hundredth that of a human hair and the individual polygons are only about 50 nanometers wide. To obtain this image, Dressaire used a powerful transmission electron microscope.

Normally, these pockets would quickly disappear, but the sucrose ester encircles the bubbles, forming a protective shell. The sucrose, or "head," is attracted to water and sits on the bubble's surface. The ester, or "tail," prefers air and consequently sticks into the bubble's center. Because the pressure inside the bubble initially is greater than the pressure outside, air slowly escapes (imagine pricking a balloon and seeing it slowly deflate). But at some point, the tough crust prevents further shrinking: the bubble "has found an optimal balance," Dressaire explains. "The overall bubble would be happy if it could shrink more, but the shell around it doesn't want to bend more." Under an electron microscope, the bending shell is a landscape of dimpled pent-, hex-, and heptagons and looks like an irregular soccer ball.

Rodney Bee, a scientist at the consumer-product company Unilever, developed the mixing technique in 1997, but existing microscopes couldn't observe the bubbles directly, leaving open the question of how the shell formed. Nearly a decade later, Joseph professor of engineering and applied mathematics Howard Stone heard Bee discuss this research at a conference and suggested that his student Dressaire could find an answer using newer technology. The two men had competing hypotheses about the bubbles' shell: Stone suspected its polygonal surface was caused by the mechanics of the shrinking process; Bee thought that the chemical composition of the shell accounted for its geometry. Dressaire agreed to run the experiment, and Stone bought her a mixer at a local mall.

After more than two years of work, Dressaire discovered that neither the mechanical nor the chemical hypothesis alone captured the complexity of her results. "The pool of data we collected seemed to suggest that the patterns resulted from a balance of different effects that were both mechanical and chemical," she reports. The shrinking process did determine the shapes on the surface, but that process differed depending on whether Dressaire used sucrose monoester or sucrose diester molecules. In other words, the chemical composition

prescribes the mechanical process that is in turn responsible for the polygons on the surface of the shell: the chemical and mechanical explanations are, in fact, inseparable.

Dressaire's research could prove useful beyond the market for frozen desserts. Ultrasound contrast agents, for example, already contain bubbles, and she thinks her bubbles might enable the therapy to probe deeper into smaller blood vessels. "There is a relatively broad trend of engineering simple systems," she says. "It is particularly interesting to observe that, in a place like Harvard, where we have so many facilities, we are still interested in building simple systems." Something to ponder over a scoop or two on the day the foam makes it from her kitchen to yours.

—PAUL GLEASON

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emd@seas.harvard.edu

THE AFRICAN EXPERIENCE

Slavery's Sway

For economists who study development, Africa remains a mystery. It's underdeveloped, but why? Disease? Dictators? Colonial rule? Nathan Nunn, an assistant professor of economics, believes he has found at least a partial answer. The slave trade, far from being a relic of the past, he argues, accounts for much of the continent's current economic woes.

In a paper published in *The Quarterly Journal of Economics*, Nunn hypothesized that if the slave trade had negative effects, the countries that were victimized most (for four or five centuries) should show lingering consequences, visible in per capita gross domestic product (GDP) lagging behind their neighbors'. His findings supported his suspicions: the wealthier African nations—such as South Africa, Egypt, and Namibia—had been relatively unscathed, while poorer nations—including Angola, Ethiopia, and Tanzania—lost millions of people.

Establishing a link between slavery and

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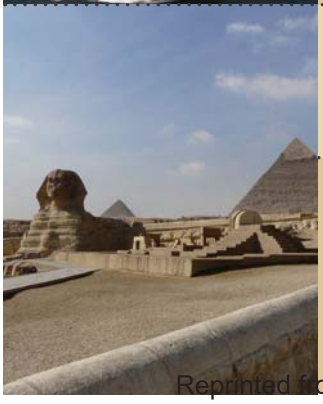

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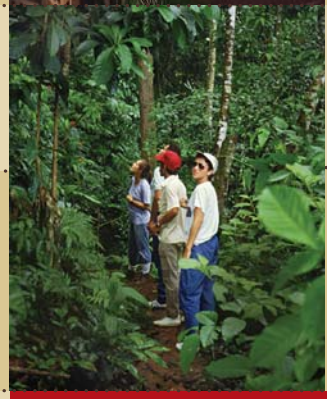

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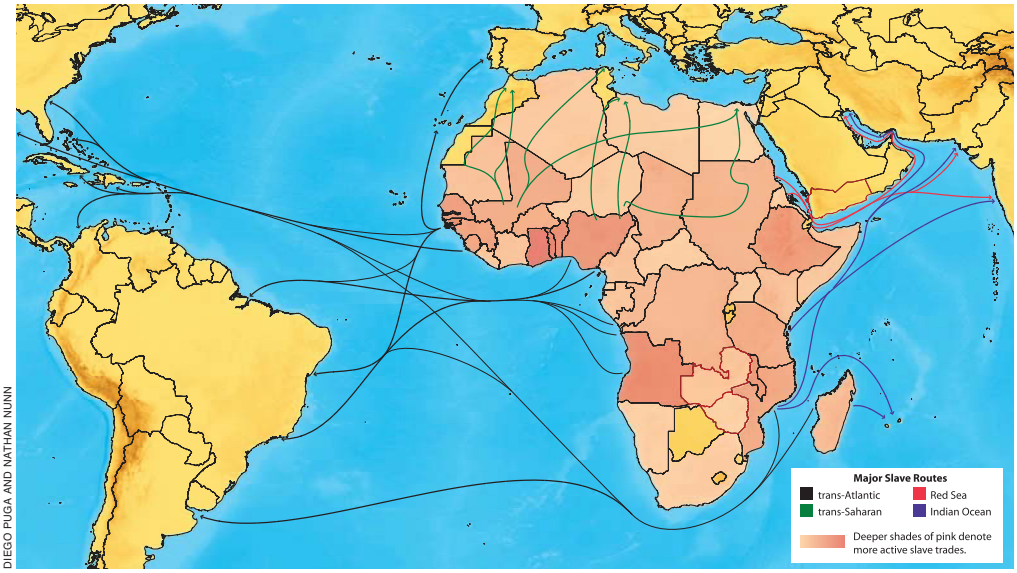
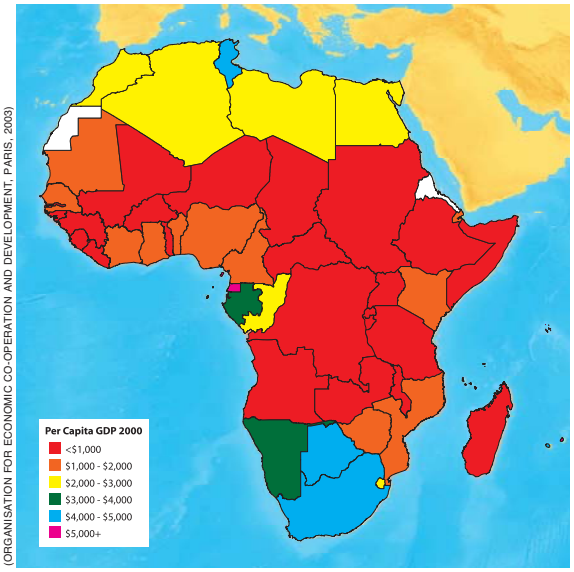


DIEGO PUGA AND NATHAN NUNN

At left: The slave trade shipped Africans to the Americas, the Middle East, and Asia; where victims ended up depended in part on which trade route their captors used. In total, the four routes ferried nearly 20 million people out of Africa. At right: A map of Africa shows how wealth is distributed across the continent. Nunn contends that, in general, the wealthier nations today are those that escaped the slave trade.

poverty proved difficult. Before he could study the problem with economic models, Nunn needed to delve into the historical records. He relied heavily on a database, built by Emory University historian David Eltis, containing shipping records from the trans-Atlantic slave trade that supplied the Americas with 12 million slaves between 1400 and 1900. But the trans-Atlantic was only one of four trade routes. Records for the trans-Saharan, Red Sea, and Indian Ocean slave trades, which together sent an estimated six million Africans to the Middle East and Asia, were scattered more broadly. To find information on the Indian Ocean route, for example, Nunn traveled to Zanzibar to do research in one of Tanzania's national archives.

Yet determining how many slaves were taken from Africa was easier than what came next: figuring out the slaves' ethnicities and what countries their tribes inhabit today. This information was vital because it allowed Nunn to connect historical events to current economic conditions. Shipping records tallied only the number of slaves on each voyage, so he had to look elsewhere to find out whether the slaves had come from the coast or farther inland. Nunn relied on secondary literature that compiled "records of sale, plantation inventories, slave registers, slave runaway notices, court records, prison records, marriage



DATA FOR MAP COURTESY OF ANGUS MADDISON, *THE WORLD ECONOMY: HISTORICAL STATISTICS* (ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, PARIS, 2003)

records, death certificates, baptismal records, parish records, notarial records, and slave interviews." In Zanzibar he studied manumission records, last-minute deeds of freedom given to slaves about to be shipped out of Africa. These documents often included the slave's original ethnicity. Then, using two ethnographic studies as guides, he superimposed his findings onto a current map of Africa.

His results were clear: most countries with an extensive history of enduring slavers' predations were worse off than those without. Based on per capita GDP figures for 2000, Nunn estimated further that slavery accounted for up to 47 percent of the income disparity between African nations and the rest of the world. (He says it might account for the entire disparity between African nations and the rest of the *developing* world.) He also found that the richer an African society had been, the more likely it was to opt into the slave trade. Ironically, an advanced understanding, centuries ago, of credit and monetary systems—which made it easier to engage in this lucrative foreign trade then—led to economic underdevelopment hundreds of years later.

Nunn's diverse sources have brought in a diverse set of readers, some of them skeptical. The doubters include David Eltis himself, who told the *Boston Globe* that although he wouldn't say that Nunn's research was wrong, it might be premature to draw such bold conclusions. Such conclusions, Nunn replies, are part of his field. "I think economists are willing to make generalizations. That's basically what our discipline does. I think it's an issue of, can you generalize across the whole continent?" Nunn believes he can. He has rewritten his paper for the general public; it is scheduled to appear next year in a collection of similarly far-reaching essays edited by Jared Diamond '58.

The next thing Nunn wants to know is precisely *how* the slave trade eventually produced poverty. He suspects it may be an issue of trust: Africans sometimes sold other Africans to foreign slave traders. "If your rule of thumb is not to trust anyone because you've had a culture that's evolved in a very insecure environment for 400 years," he says, "that can persist and lead to bad institutions or bad economic outcomes." —PAUL GLEASON

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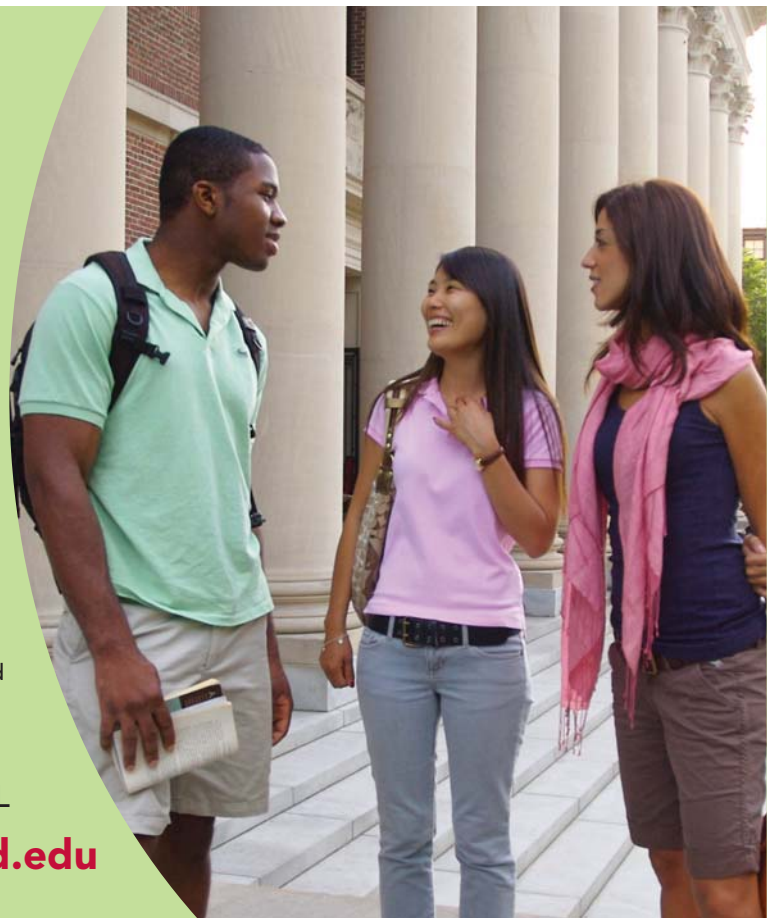

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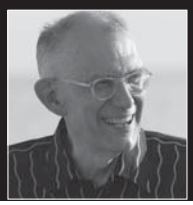
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The 125th Harvard vs. Yale competition. Harvard Stadium. (See page 24G for Game-related concerts.)

Harvard Square's Holiday Happenings
www.harvardsquare.com
617-491-3434
• November 29 at 5 P.M.
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• December 7, starting at 12 noon.
Opening of the ***Skating Rink*** at the Charles Hotel. Holiday treats, music, and...Santa Claus.
• December 20, starting at 1 P.M.
The second annual ***Everybody Loves Latkes Party*** features potato pancakes and toppings, along with holiday music and storytelling in Winthrop Park.
• December 21, 11 A.M.-2 P.M.
Holiday Parade through the Square. Begins at Brattle Plaza.

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www.fas.harvard.edu/ceramics
617-495-8680
• December 11, 3 P.M.-8 P.M.; December 12-14, 10 A.M.-7 P.M.
The work of at least 60 ceramic artists from Greater Boston, ranging from beginners to professionals, will be on display at 219 Western Avenue, Allston.

The Revels
www.revels.org
• December 12-30
The annual Sanders Theatre show offers English country music and dancers, with the Mellstock Band and David Coffin.

Harvard Glee Club and Radcliffe Choral Society
• December 13 at 8 P.M.
www.boxoffice.harvard.edu; 617-496-2222
Congregational Church, 75 Pleasant Street, Arlington, Massachusetts.

Memorial Church Christmas Carol Services
www.memorialchurch.harvard.edu
617-495-5508
• December 14 at 5 P.M.; December 15 at 8 P.M.
The University community is invited on Sunday, the general public on Monday. ***Christmas Eve service*** is at 11 P.M.

THEATER

The American Repertory Theatre
www.amrep.org; 617-547-8300
• November 28 through December 28
Aurélia's Oratorio, written and directed by Victoria Thierrée Chaplin, and starring Aurélia Thierrée. Discover this heroine's world of surreal surprises, tricks, and transformations, where dreams come to life and the impossible happens before your very eyes. Suitable for adults and children (age 8 and up). Loeb Theatre.

FILM

The Harvard Film Archive
www.harvardfilmarchive.org
Visit the website for complete listings.
617-495-4700
• November 7-9
French filmmaker Claire Denis will be on hand to discuss her work, which includes *Beau Travail, Chocolat,* and *Friday Night.*
• December 5- 22
Nagisa Oshima and the Struggle for Radical Cinema, a major retrospective on the Japanese New Wave director, includes *In the Realm of the Senses, Taboo,* and *Boy.*

Left to right: A wintry scene by Kate Cardamone on display in *Twelve Months: Painting Through the Seasons* at the Arnold Arboretum; from *In the Realm of the Senses* at the Harvard Film Archive; the eponymous heroine of *Aurélia's Oratorio* at the American Repertory Theatre.

FROM LEFT TO RIGHT: COURTESY OF THE ARTIST AND THE ARNOLD ARBORETUM; COURTESY OF THE HARVARD FILM ARCHIVE; COURTESY OF THE AMERICAN REPERTORY THEATRE

JOHANNES HEVELIUS, *MACHINA COELESTIS* (GDANSK, 1673-1679), FIG. M. HOUGHTON LIBRARY, TYP 820.73.451 F.

From *Machina coelestis* by Johannes Hevelius, an early book about science now on display at Houghton Library

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Harvard Dance Center, 60 Garden Street
• December 5 and 6 at 8 P.M.
Dance Showcase Two includes a new work by former Boston Ballet principal Tai Jimenez, as well as pieces by several undergraduate groups, including the ***Harvard Irish Dancers*** and the ***Asian American Dance Troupe.***

LECTURES

The Harvard University Native American Program
www.hunap.harvard.edu
617-384-9621
• November 6 at 6:15 P.M.
HUNAP celebrates Native American Month and the sixtieth anniversary of the UN's Universal Declaration of Human Rights with a panel discussion, "The UN's Declaration on the Rights of Indigenous Peoples." Free admission. Radcliffe Gymnasium.
• November 13 at 6 P.M.
HUNAP presents a free lecture, "From Stereotyping to Invisibility: Consequences of American Indian Social Representations," by Stephanie A. Fryberg, of the American Indian Studies program at the

THEY BATTLED HOSTILE NEIGHBORS, CIVIL WAR, AND BLOODTHIRSTY LIONS. AND NOW THEY'VE TAKEN OVER THE MFA.

ART AND EMPIRE
TREASURES FROM
ASSYRIA
IN THE BRITISH MUSEUM

MUSEUM OF FINE ARTS, BOSTON SEPTEMBER 21, 2008 – JANUARY 4, 2009 FOR TICKETS VISIT MFA.ORG

Set of protective spirits, Near Eastern, Mesopotamian, Assyrian, Neo-Assyrian, 645–640 B.C. Gypsum. The Trustees of the British Museum ME 118918. © The Trustees of the British Museum 2008. All rights reserved.

THE BRITISH MUSEUM

"Art and Empire: Treasures from Assyria in the British Museum" is a collaboration between the British Museum and the Museum of Fine Arts, Boston.

mfa BOSTON

University of Arizona. Fong Auditorium.

The University Committee on Human Rights Studies
www.humanrights.harvard.edu
617-384-5011
• December 10, 6-8 P.M.
UCHRS honors the Universal Declaration of Human Rights with a discussion of "Sixty Years of Human Rights: Idea and Reality," by Lamont University Professor Amartya Sen and Presley professor of social medicine Paul Farmer. President Drew Faust moderates. A concert by Malian singer and women's-rights activist Oumou Sangere follows. John F. Kennedy Jr. Forum.
• December 11, 2-8 P.M.
UCHRS and the Humanities Center at Harvard cosponsor a conference on "Sixty Years of Human Rights: Implementation and Innovation." Harvard Faculty Club.

EXHIBITIONS

The Harvard Art Museum
www.artmuseums.harvard.edu
617-495-9400/9422
Please note: The ***Busch-Reisinger*** and ***Fogg Museums*** are undergoing renovation and are closed to the public.
• Continuing: ***Re-View,*** at the ***Sackler Museum,*** features a wide range of selected works from all three art museums.

Carpenter Center for the Arts
www.ves.fas.harvard.edu; 617-495-3251
• Opening November 6
Three Easy Pieces features two of artist Paul Chan's digital projections related to history and war, and a video featuring floating images. The artist gives a talk on November 13 at 6 P.M.; a reception follows.

Peabody Museum of Archaeology and Ethnology
www.peabody.harvard.edu; 617-496-1027
• Opening November 10
Reception, 5 P.M.-7 P.M.
Digging Veritas: The Archaeology and History of the Indian College and Student Life at Colonial Harvard. The exhibit showcases archaeological finds to date and provides descriptions of early life on campus (see "The College Pump," July-August, page 80).
• Continuing: ***Remembering Awatovi: The Story of an Archaeological Expedition in Northern Arizona, 1935-1939,*** reveals the social and historic importance of this investigation of a site that is held sacred by the Hopi people, and offers insight into the lives of the archaeologists themselves.

Harvard Museum of Natural History
www.hmnh.harvard.edu
617-495-3045
• December 11 at 6 P.M.
Confronting the Energy-Climate Challenge: A presentation by Daniel Schrag, director of the Harvard Center for the Environment, and Kelly Gallagher, director of Energy Technology Innovation Policy at the Kennedy School.
• Continuing: ***The Language of Color*** explores the many ways animals acquire and use this vivid means of communication (see page 42).
• Continuing: ***Looking at Leaves: Photographs of Amanda Means*** invites a closer look at the beauty and diversity of the natural world.

HARVARD-SMITHSONIAN CFA

The Pleiades star group, a photograph by Robert Gendler at the Center for Astrophysics.

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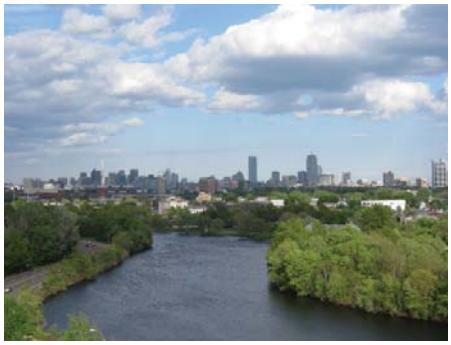
CAMBRIDGE, MA
Brattle Street - Charming 2 bed condo in a classic brick landmark Harlow building. Spacious living room, dining room w/ built-in cabinet & wide bay, study, and newly renovated kitchen w/ granite. Includes a tiled bath, built-ins, hardwood floors, tall windows, wainscoting & storage.

CAMBRIDGE, MA
Just off Brattle Street on almost a quarter of an acre is this turn-of-the-century home. Features include a 25' Living room w/ fireplace & window seat; dining room w/ diamond shaped leaded glass windows; eat-in kitchen w/ granite; master w/ study & sleeping porch; & 3rd floor guest suite & family room. $1,785,000

CAMBRIDGE, MA
Beacon Hill style brick row house, c.1859. Living room w/ wood stove; renov. kitchen w/ ss, granite & island; 3 beds + study, 2½ baths. Curved Bullfinch staircase, wide pine floors, high ceilings, period moldings & skylight. Beautiful front garden; enclosed back garden w/ brick & stone patios. $876,000

CAMBRIDGE, MA
Harvard Square – Corner 2 bed, 2 bath condo in a brick elevator building. Open living/dining room w/ fireplace & sliding glass doors to balcony; Master w/ bath en suite; C/A, in-unit laundry, live-in superintendent & garage parking. Across from Harvard Law School & next to Cambridge Common. $565,000

CAMBRIDGE, MA
Huron Village - Handsome 2 bed Philadelphia -style condo. Living & Dining rooms each w/ a large bay window, nicely renovated kitchen w/ large island, granite, stainless appliances & sliding glass doors to fenced yard with brick patio. Close to shops, restaurants, golf course & Fresh Pond. $499,900



WATERTOWN, MA
Crossroads on the Charles – Brick concierge building w/ amazing views of the river & Boston, w/ garage parking, indoor pool & sauna. This 2 bed condo has a 26' living/dining room w/ phenomenal views; master suite w/ walk-in closet & both marble bathrooms have been handsomely renovated. $495,000

CAMBRIDGE, MA
Avon Hilll – Spacious condo in a brick Harlow building w/ lovely landscaped yard & garden. Living room w/ fireplace & bookshelves; dining room; 2 studies; large bedroom w/ 2 walk-in closets; tiled bath & hardwood floors. Near Mass Ave shops, restaurants, Harvard Square & Law School $386,000

CAMBRIDGE, MA
Raymond Park – Chic new construction – 2 bed, 2 bath condominium. Open living/dining & kitchen w/ granite, stainless & cherry. Hardwood floors, great closet space, in-unit laundry area, central air & garage. Convenient to Porter, Davis Squares & Mass. Ave. shops & restaurants. $459,000

gail@roberts.org
gailrobertsrealestate.com
617 245-4044

The Semitic Museum
www.fas.harvard.edu/~semitic
617-495-4631
• ***Ancient Egypt: Magic and the Afterlife*** offers a distinct view of the hereafter.
• Continuing: ***The Houses of Ancient Israel: Domestic, Royal, Divine*** features a full-scale replica of an Iron Age (ca. 1200-586 B.C.E.) village dwelling.

Houghton Library
http://hcl.harvard.edu/libraries
617-495-2444
• Through December 20
To Promote, To Learn, To Teach, To Please: Scientific Images in Early Modern Books. European books of science produced between 1500 and 1750 were also deeply influenced by economic, social, and cultural considerations.

COURTESY OF THE HARVARD-RADCLIFFE COLLEGIUM MUSICUM

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NATURE AND SCIENCE

The Harvard-Smithsonian Center for Astrophysics
www.cfa.harvard.edu/events.html
617-495-7461
Phillips Auditorium, 60 Garden Street
• Lectures at 7:30 P.M.—"The Truth about Black Holes" on November 20, "Gems of the Winter Sky" on December 18—followed by stargazing, weather permitting.

The Arnold Arboretum
www.arboretum.harvard.edu
617-524-1718
Jamaica Plain, Boston.
• Through December 14
Twelve Months: Painting Through the Seasons features the work of landscape

designer and artist Kate Cardamone, who has been exploring life at the arboretum for three decades. Hunnewell Building lecture hall. Visit the website for details on other events and outings.

MUSIC

• November 9 at 4 P.M.; 617-496-2263
www.hcs.harvard.edu
The ***Harvard Wind Ensemble*** plays in the "Bands of the Beanpot Concert" at Northeastern University, Boston.
• November 21 at 7:30 P.M.
www.kroks.com; 617-495-5160
A Harvard-Yale Game Concert with the ***Krokodiloes*** and ***Yale Whiffenpoofs.*** Location to be determined.
• December 6 at 8 P.M.
www.hcs.harvard.edu; 617-496-2263
The ***Harvard Wind Ensemble*** plays music by Henry Brant. Lowell Lecture Hall.
• December 13 at 8 P.M.
www.hcs.harvard.edu/~jazz; 617-496-2263
The ***Harvard Jazz Bands*** play with pianist Steve Kuhn '59. Lowell Lecture Hall.

PHOTO: OREN SLOR. IMAGE COURTESY OF GREENE NAFTALI, NEW YORK

"Happiness (Finally) After 35,000 Years of Civilization," from a digital video projection by Paul Chan on display at the Carpenter Center

Sanders Theatre

www.boxoffice.harvard.edu
617-496-2222
• November 7 at 8 P.M.
"Montage Concert" by the ***Harvard Wind Ensemble, Jazz Band,*** and ***University Band.***
• November 8 at 8 P.M.
A ***Radcliffe Choral Society*** and ***Harvard-Radcliffe Collegium Musicum*** fall concert.
• November 21 at 8 P.M.
The "Harvard-Yale Football Concert" with the ***Harvard*** and ***Yale Glee Clubs***
• December 5 at 8 P.M.
The ***Harvard-Radcliffe Orchestra*** performs works by Mahler, Weber, and HRO music director James Yannatos, who will be retiring this coming year.
• December 6 at 8 P.M.
The ***Harvard-Radcliffe Chorus*** and ***Harvard Academic Festival Orchestra*** perform Poulenc's "Gloria" and the Boston premiere of "Dona nobis pacem" by contemporary Latvian composer Peteris Vasks.

Events listings also appear in the *University Gazette*, accessible via this magazine's website, www.harvardmagazine.com.

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Keeping It Green

Alumni contribute to sustainable building • by Nell Porter Brown

Maryann Thompson at the "Zero Impact House"

Maryann Thompson
M.Arch.-M.L.A. '89
Architect

For the first time that she can remember, clients are requesting "sustainable homes," says Cambridge architect Maryann Thompson, who is known for her "green building" principles. "It's very exciting. Lots of clients who may have been looking to tear things down are instead looking at adaptive re-uses, which is the most targeted kind of recycling you can do."

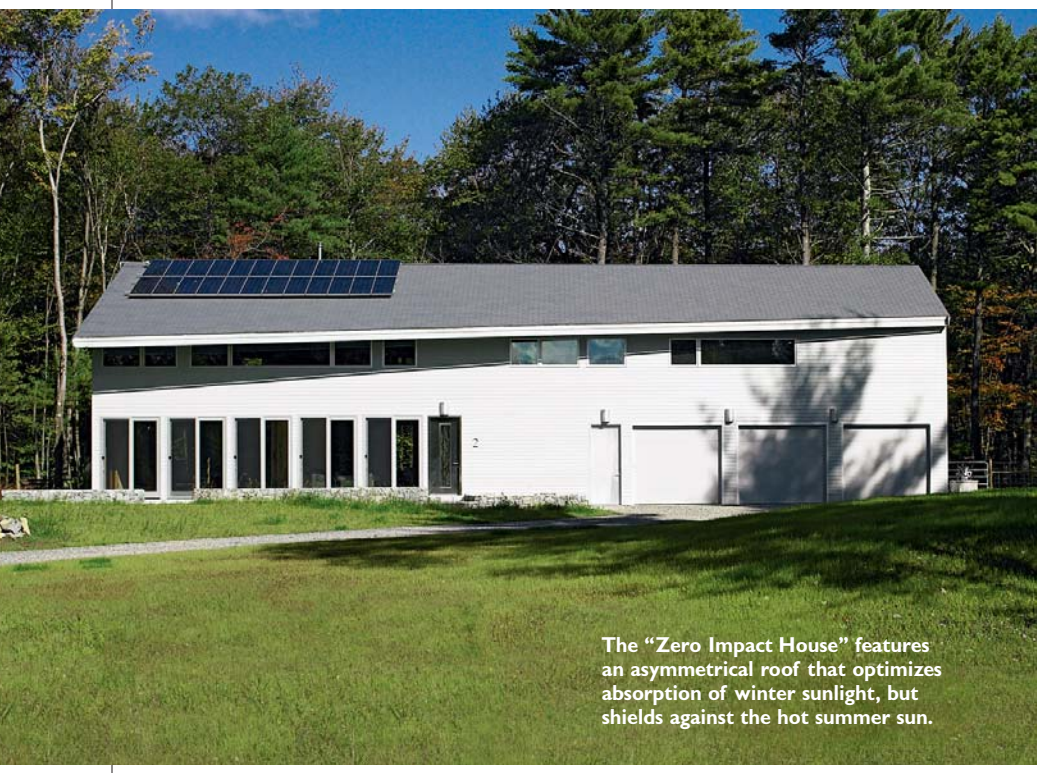
It's about time, she says. With the New England winter upon us, high energy prices, and the world's climate crisis closing in, conservation and efficiency are at the front of everyone's mind, she explains: "People are really trying to figure out what they can do personally to tread more lightly on the earth."

As a high-school student, Thompson was influenced by the Earth Day movement; she even wrote her college application essay on global warming. At Princeton, she studied engineering and architecture and, influenced by Jimmy Carter's energy policies, gravitated to a professor who focused on solar energy. "Sustainability has always been a part of my value system," she says.

In her professional life, Thompson has developed a variety of residential and commercial projects—including garden-roofed structures and a few elementary schools—in which sustainability is the overarching theme. Three current commissions—houses on Martha's Vineyard and in Scarsdale, New York, and a nursery school in New Canaan, Connecticut—will boast sedum-planted roofs as part of the insulation system. The drought-resistant sedum grows a few inches high, needs no mowing, and thrives in inorganic matter, such as ground-up stones. (The plants also block out ultraviolet rays, which break down building materials.)

Two Thompson projects near Harvard Square show innovative, adaptive-reuse techniques. One is The Atrium School, in Watertown, where an outdated, industrial warehouse was turned into a sun-filled elementary school, and the adjacent, vacant asphalt lot was transformed into a grassy campus and playground. Thompson has also converted the old Fayerweather Street School building in Cambridge into a residence. That "brutalist concrete structure"

Photograph by Jim Harrison



The "Zero Impact House" features an asymmetrical roof that optimizes absorption of winter sunlight, but shields against the hot summer sun.

CHARLES MAYER

was on the market for years, Thompson explains, because nobody knew what to do with it. She added wood to the exterior, along with balconies and terraces; she also shifted the building's main orientation to emphasize its southern façade, replacing former classroom walls with glass to offer views of the backyard and to let in sunlight that soaks into the "thermal mass" of the concrete floors and walls, then radiates back at night.

In her renovation, Thompson also made use of super-insulation and double-paned windows. Such features are beginning to border on the norm in construction and save huge amounts of energy. "There is a whole green-house movement in Germany now, of building houses without heating systems. Isn't that amazing?" she exclaims. "In the United States, by code, we *have* to put in a heating system. It's so stupid."

Of her larger residential designs, an award-winning geothermal home outside of Boston has received a lot of attention—and some criticism. The wooden house, a

series of horizontal planes, sits on a south-facing hill above a small pond. All rooms take in light on two sides; the north side is more insulated, with storage rooms and the like (inspired by the work of Frank Lloyd Wright, a master of landscape siting and space efficiency), while the south side is open to the sun and grounds. Both heating and cooling systems are geothermal. But touting the structure as "sustainable" hits a false note when its overall size, 4,700 square feet, is revealed. "One of the criticisms has been that I can't really say it's sustainable because it's so big," she says. "It's more of a house for a rarefied section of society."

That's not true of the "Zero Impact House," a simple but appealing white box with an asymmetrical roofline that Thompson designed and built in 2002 in Easton, Massachusetts. For starters, solar panels soak up so much energy that the owner sells electrical power back to the local electric utility company at retail prices. The whole house is heated with

CHARLES MAYER

The "Zero Impact House" contains countertops made of recycled metal shavings and a two-foot-thick concrete floor that absorbs solar heat.

"Everyone should start doing this—they could have their own independent solar farms."

two wood-pellet stoves (one of which is rarely lit), because the interior is designed to keep warm air circulating in the winter, and then to expel it in the summer, by means of a central atrium and a clever cross-ventilation system. (No central-air system is needed.) At 3,000 square feet (including the garage), with a modest façade, "this house is also something that anyone can do," Thompson says. "It's a regular American house that sort of looks like a colonial, but functions like a little machine."

The house faces due south on a 5.5-acre lot and uses naturally occurring materials, as well as recycled-tire rubber roofing and interior glass tiles, reclaimed wood cabinetry, and thermal-efficient windows. The roofline is angled to allow natural light in at the sun's lowest points during the winter, and shut it out at its highest and hottest. "Everyone should start doing this—they could have their own independent solar farms," Thompson declares. The whole house is constructed of thick concrete slabs, which hold heat, and the owners have made smaller adjustments, such as using low-wattage LED lights, and putting all electrical appliances on special switches to conserve energy.

Thompson's newest projects include the HingeHouse, a prefabricated series that promotes sustainability primarily through its flexible design (the hinging sections can be sited to take advantage of southern exposure and passive solar energy on any landscape), and through saving time, money, and significant resources in the construction process. The homes are to be manufactured by Empyrean Inc., in Acton, Massachusetts, in partnership with *Dwell* magazine. "These are environmentally sensitive," she explains, "because all of the pieces are cut at one site to minimize waste."

The HingeHouses are another part of the changing architectural landscape, says Thompson, who is also an adjunct professor at the Graduate School of Design. "Requests for proposals are requiring LEED (Leadership in Energy and Environmental Design) certification, and that is amazing," she continues. "At a recent GSD faculty meeting, they were talking about adding a whole new core sustainable sequence. I think that's really amazing. I never did believe in a zeitgeist until all of this started to happen with sustainable design. But now I do."

Sarah Beatty '88
Founder, Green Depot

A week before her first child was due, Sarah Beatty '88 was told her newly renovated Manhattan co-op apartment "might not be a safe living environment" because of mold contamination. Fortunately, an expert soon confirmed that the unit was not toxic. But the incident spurred Beatty to think about the products she used at home, and to switch to nontoxic cleaners, paints without volatile organic compounds (VOCs), and low-emitting caulks, sealants, and adhesives.

In educating herself about environmental issues in the home, she found a wealth of information on the Internet about "green" products, but serious hurdles to obtaining them. "New York—in fact, the whole East Coast—was underserved. There were no local resources," she says. "Most of the innovative product development and infrastructure was occurring on the West Coast." So she did what any enterprising marketing professional might

GREEN DEPOT

have done in 2005: she started her own company, Green Depot.

Five years later, the Brooklyn-based venture supplies environmentally friendly products to professionals and homeowners through five showrooms (including one just outside Boston, in Stoneham); a stand-alone retail store is set to open in New York City this winter. "In 10 years there will be no such thing as 'green buildings,' because buildings will *be* green," she predicts. "But in the meantime, I see our mission as empowering the consumer to drive the marketplace for these products."

Beatty's company is playing a role in the green-dorm pilot program at Columbia University (which is considering the best affordable, sustainable options for renovating its older buildings), and recently completed three prototypes that currently house students: one constructed with recycled/reclaimed/reused materials; one built solely with green and energy-efficient products; and a "health suite" designed for students with respiratory problems or chemical sensitivities.

Green products promoter Sarah Beatty at the opening of her Greenport, New York, store

GREEN DEPOT

In New England, Green Depot has worked with subcontractors on Harvard's newest chemistry labs and various office renovations, and with other clients on residential developments and commercial ventures. Beatty cites in particular a LEED project to "green" a Taco Bell in Northampton, Massachusetts: her company supplied Forest Stewardship Council-certified lumber, recycled sheetrock, and adhesives.

Because today's green-certification processes are "a little like the Wild West," Beatty says, Green Depot has developed its own internal methods to assess products and their ingredients. "The good news is that a lot of the certifications and

"Let's start focusing on the subtle, smart adjustments that can be embraced today."

rules surrounding a lot of the issues are in development, but they are not consistent yet," she explains. For example, an Environmental Protection Agency organic compound list exists, but "creative chemistry" sometimes enables manufacturers to replace a prohibited chemical with something else known to have health risks but not on the proscribed list.

The ultimate goal is comparable efficacy. "Products have to work properly, and be durable and effective compared to other products in their class," Beatty says. "They have to be warrantied, easily repairable, and easily maintained with nontoxic products. If something doesn't perform as well as non-green products in its class, it's not ready for the market yet."

In terms of integrating green products into the traditional construction trade, it doesn't hurt that Beatty has located her stores adjacent to or inside MarJam Supply distribution centers. The company, which calls itself "the Northeast's leading building materials distributor," was founded and is owned by her husband, Mark Buller, and his brother.

Yet Beatty had little to do with the company before environmental concerns drew her in. At Harvard, she concentrated in sociology with a strong secondary focus on East Asian studies. From there, she eventually became vice president of trade marketing and global branding at MTV and, before her daughter was born, worked under Barry Diller as the senior vice president for USA Network.

Now what stimulates and challenges her is understanding where the environment and concerns about natural resources intersect with bricks and mortar. "We must build our communities to be sustainable and embrace those innovations that help us achieve that," she says. Partly for the sake of her daughter, now four, and two-year-old son, Beatty continues to look at the green movement in wholly practical terms: what will enable people to live more healthily now and in the future? "We have to reframe the discussion around 'green,'" she insists. "It is not an all-or-nothing proposition, but let's start focusing on the subtle, smart adjustments that can be embraced today to create a positive impact for ourselves, our families, and our world."

David Hamilton

M.Arch. '00

Developer and Architect

David Hamilton, M.Arch. '00, grew up in rural North Carolina, surrounded by a lush green landscape of tobacco farms,

DAVID HAMILTON

DAVID HAMILTON

Left: David Hamilton reviewing plans in rural Virginia. Right: A rendering of planned development at Myers Farm in Greenfield, Massachusetts

"many of which are now Bed, Bath & Beyonds," he says. At Middlebury College, he grew to love another rural environment, full of dairy farms. "Vermont," he says, "has had tremendous success with protection of land, but at great cost to housing affordability, economic development, and to the state's political unity."

At the Graduate School of Design, where integrated urban planning was the focus, Hamilton plunged into work on Professor Rem Koolhaas's Harvard Design School Project on the City because, he says, "urbanization was, and remains, the greatest demographic shift afoot in our world." Still, he could not help but notice that rural landscapes, like unfa-

vored children, did not receive equal attention. "While we designed our urban spaces, we seemed, as a profession, to simply wave off rural areas: downzone them, donate them, or think, 'Maybe someone will farm them,'" he explains. "Of course, if you've spent time in rural areas, you understand that this is not just empty, natural land that needs protection from development. It's an economy, a culture, and a man-made landscape: all needs that must be addressed by planners who hope to shape a regional future."

Such is his role these days as a principal in Qroe Farm Preservation Development, based in Swampscott, Massachusetts. Qroe (pronounced "crow") was founded 30 years ago by the late William Baldwin '52, M.B.A. '56, and has developed or is still working on eight innovative properties in New England. These include Running Brook Farm, in Derry, New Hampshire—the 72-acre property, with its woodlands and open fields, has roughly 57.5 acres preserved through conservation easements—and, in Massachusetts, Todd Pond in Lincoln and Myers Farm in Greenfield.

Baldwin was a leader in the Urban Land Institute (and its sustainability council) and believed, Hamilton says, that private-sector developers were responsible for helping to control unplanned sprawl and preserve communities. Myers Farm is a good example of such "smart growth" philosophy. The 50-acre development encompasses an historic farmhouse, a fully enrolled charter school, and 39 new "farm-style condominiums" clustered on six acres. Most of the property will remain as it has for more than a century: working farmlands for hay, corn, and wildflower meadows. "What we're trying to do," Hamilton explains, "is find a way that development can occur without eliminating farming."

Qroe is targeting a mixed-use population, too: families who need a good school and older people who want to live in the country while enjoying access, via walking trails, to amenities like free classes at the nearby Greenfield Community College, to which Qroe donates a percentage of every home sale. Most of the acreage is permanently assigned to farming; in 2005, Qroe sold about 37 acres of the land to the

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DAVID HAMILTON

"Farm-style" condominiums on preserved acreage at Myers Farm

Franklin Land Trust, which then sold an agricultural preservation restriction to the state, and then sold the protected land to a dairy, Bree-Z-Knoll Farm.

Such "preservation development," while not altogether new, is more critical now than ever, Hamilton asserts. Farmland is being converted for development at "alarming" rates nationwide. According to statistics available from the U.S. Department of Agriculture's most recent National Resources Inventory, between 1992 and 1997 the average annual rate of conversion of farmland to development was 1.23 million acres, and the average annual rate for all rural land was 2.3 million acres.

The main problem in rural land conservation, Hamilton points out, "is that farmland worth $1,000 an acre is worth $100,000 an acre if it is to be developed; it's a gross differential." Conservation projects and/or easements do protect land—and Qroe utilizes them to permanently safeguard farm belts—but however you slice it, he adds, someone is paying: "Property taxes are lost, equity is lost. Sometimes a land trust can purchase the land and use state tax credits, et cetera, to offset costs, but the amount of land covered by conservation easements is less than half of the land being converted to developments."

For the last two years, Hamilton has focused on a much bigger landscape: the 2,300-acre Bundoran Farm in North Garden, Virginia, near Charlottesville, which is owned by Qroe and its partner, Charles E. Adams, M.B.A. '89 (one of the leaders in refurbishing the Mount Washington Resort in New Hampshire). This bucolic southern property has mountainous terrain, rolling hills, and hardwood forests and currently boasts 400 cows and calves and a 200-acre commercial apple orchard. Hamilton stresses that about 93 percent of the farmland will be permanently preserved and used for agriculture and forestry. Qroe is also exploring the cultivation of non-timber forest products, such as mushrooms, ginseng, and herbs, which it views as a growth market.

This is self-funded conservation. "Qroe asks its buyers, 'Do you like that view? If so, then pay for it.'"

The goal, ultimately, is to sell up to 108 building lots, sized at two to 100 acres, for between $350,000 and $1.3 million each. Qroe does not build the homes in most of

its projects, but does issue guidelines encouraging vernacular rural architecture and local materials. "We're most concerned with how homes sit on the land," says Hamilton. "What we're watching for and are more worried about is people bringing designs from Orlando, Florida, and trying to fit them into a hillside in New England; that's the problem with McMansions." Qroe does require a basic standard of sustainable construction called "Earthcraft"; LEED certification is recommended, but not enforced. "Most homeowners are not interested in LEED," he notes, "because it's expensive and there is a lot of paperwork."

Eleven lots have been sold and the first house is set to be occupied in April. Although there is no doubt that multimillion-dollar homes will go up on Bundoran, most Qroe project buyers "are land people," Hamilton says. "They want a modest home that fills their needs (which is not necessarily inexpensive), but they are more interested in their gardens, their landscaping, in being outdoors, and walking on trails and having beautiful views—and in the permanent protection of those things."

This is self-funded conservation. "Qroe asks its buyers, 'Do you like that view? If so, then pay for it,'" Hamilton explains. "Each homeowner pays for a chunk of the conservation land and what they get is to live in a place where they will always be looking at a farm because we've eliminated the potential for that land to ever be developed and become a Wal-Mart."

Such a concept was a much harder sell when Baldwin started out 30 years ago, Hamilton says, but because of high energy costs, global warming, and cultural shifts, "There is a class of buyers out there in the market for five acres next to conservation land; it is a well-defined market that we serve." Indeed, the number-one amenity requested by baby boomers and empty-nesters, he reports, is neither a golf course nor a tennis club (as it was a decade ago), but walking and biking trails. "You're not only getting the right to build in a discrete location, you get the right to walk the land," he says. "And in Virginia, that's 2,300 acres. You can walk anywhere and go have a picnic in a field, as long as the cows aren't using it at the moment."

Sushi Deluxe

Fresh, rich sushi in a futuristic setting

COURTESY OF DOUZO

THE *AMAEBI* MANGO roll, a house specialty at Douzo, comes in a curvy line on a long white plate, looking like a kingly golden serpent. A precisely carved crown of cucumber sits atop the deep-fried ornamental shrimp head that precedes the seven succulent sushi pieces forming the body.

Composed of mango and cucumber wrapped in raw shrimp, the roll is topped with a juicy mango sauce and a dollop of black caviar. Overall, the flavor was new and refreshing. Not so the similar textures: the smooth, slippery mango and soft, sweetish shrimp were a little too much of a good thing all in one bite. But points were scored for their interplay with the salty caviar, and the handsome presentation. The $13.95 dish is at once creatively flavored and showy—like much of the "modern" Japanese food at this Back Bay hot spot.

Showy could also describe Douzo's *Blade Runner* atmosphere: sort of an intergalactic lounge/restaurant-cum-nightclub. Big-box light fixtures hover over the very large room like spaceships; floor-to-ceiling drapes block out reality at the streetside windows. The dining room is divided; the lower level has dimmer lighting and fellow eaters a bit too close (unless you enjoy comparing dishes, as we did, with knowledgeable neighbors). The smaller sushi bar along one wall seems more inviting; better still are cozy booths and tables near the traditional bar area. Nowhere, unfortunately, can one escape the pulsating techno/hypno-pop that confusingly conjures a nightclub scene. Judging from the convivial crowd of mostly well-heeled but nondescript professionals, this may well be what's popular now at the dinner hour. We like conversation.

But back to the food. Some have said Douzo's sushi is among the best in Boston. We'd agree. The fish was fresh and of the highest quality. The prized yellowtail collar, *hamachi kama* ($10.75), easy to overcook, was tenderly grilled. Beef *negima* ($9) presented thinly sliced meat rolled around juicy asparagus and scallions. A cold seafood salad ($8) with rich, shredded scallops, crab meat, and crunchy cucumber had a delectable spicy drizzle on top. If eel appeals, the Dragon Roll ($13.95) offers it with fried sweet potato, avocado, and *unagi* sauce. The tempura was as delicate as a butterfly's wing, especially the eggplant ($2)—not easy to accomplish, given that veggie's spongy texture.

Tempura'd, too, were the sliced dessert bananas ($8), served in the shape of a flower and topped with walnuts next to a bamboo leaf curved over vanilla ice cream. Like a creamy custard, they were the best dish of the night, but the unusual lychee sorbet ($4) proved exquisite as well. ~ N.P.B.

COURTESY OF DOUZO

Above: The "Crunchy Roll" with salmon, tuna, and mango sauce. Right: Douzo's sushi counter.

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Matt Haimovitz is as comfortable in rock clubs as he is in symphony halls.

The Maximalist

Matt Haimovitz takes the cello to new places.

by PAUL GLEASON

Everyone in the recording booth agreed the cello wasn't coming through. Matt Haimovitz '96 huddled over the sound controls with his wife, producer Luna Pearl Woolf '95, and the music's composer, David Sanford, to listen to the playback. Sanford suggested that Haimovitz raise his part an octave, just for a few measures, to help it cut through the deep thicket of piano accompaniment. Jazz and opera singers, Sanford pointed out, do it all the time. Haimovitz joked that the next 50 cellists who played the piece would think he was doing it wrong, but agreed to give it a try.

"That's the danger of having the composer there!" Haimovitz explained after the four-day recording session ended. "He can start changing everything and you have to re-practice it."

Growing up, Haimovitz rarely faced this danger. When he enrolled at Princeton at 17—after studying at Juilliard for years, performing at Carnegie Hall, and signing a long-term record deal with Deutsche Grammophon—he had yet to play a note by a living composer. All that changed when electric guitarist Steven Mackey, a professor of composition at Princeton, invited Haimovitz to join him for a little free-form improv. Haimovitz credits those sessions for changing his approach to music. "All of a sudden I'm trying to find sounds that work with electric guitar," he recalls. "All of a sudden [I'm] doing things the wrong way to get the right sound." He dropped out of Princeton to tour (transferring to Harvard three years later), but his experiences there redirected his career to an exploration of the outer limits of his instrument. ("Matt mastered so much of the traditional repertoire at such a young age,"

HM

Visit harvard-mag.com/extras to hear clips from Matt Haimovitz's "Odd Couple."

Photograph by Harry DiOrio

OPEN BOOK

Stinging the Dinosaurs

Extraterrestrial visitors to Earth a million years ago would have found a planet teeming with 1,000 trillion social creatures, from 20,000 species—mostly insects. So report Bert Hölldobler and Edward O. Wilson, Pellegrino University Professor emeritus, in *The Superorganism: The Beauty, Elegance, and Strangeness of Insect Societies* (W. W. Norton, $65). The social insects merit further study today, the authors say, for many reasons.

The ants, bees, wasps, and termites are among the most socially advanced nonhuman organisms of which we have knowledge. In biomass and impact on ecosystems, their colonies have been dominant elements of most of the land habitats for at least 50 million years. Social insect species existed for more than an equivalent span of time previously, but were relatively much less common. Some of the ants, in particular, were similar to those living today. It gives pleasure to think that they stung or sprayed formic acid on many a dinosaur that carelessly trampled their nests.

Weaver ants (*Oecophylla smaragdina*) cooperate as they construct their leaf-tent nests.

FROM THE BOOK

The modern insect societies have a vast amount to teach us today. They show how it is possible to "speak" in complex messages with pheromones. And they illustrate…how the division of labor can be crafted with flexible behavior programs to achieve an optimal efficiency of a working group. Their networks of cooperating individuals have suggested new designs in computers and shed light on how neurons of the brain might interact in the creation of mind. …The study of ants, President Lowell, of Harvard University, said when he bestowed an honorary degree on the great myrmecologist William Morton Wheeler in the 1920s, has demonstrated that these insects, "like human beings, can create civilizations without the use of reason."

The superorganisms are the clearest window through which scientists can witness the emergence of one level of biological organization from another. This is important, because almost all of modern biology consists of a process of reduction of complex systems followed by synthesis. During reductive research, the system is broken down into its constituent parts and processes. When they are well enough known, the parts and processes can be pieced back together and their newly understood properties used to explain the emergent properties of the complex system. Synthesis is in most cases far harder than reduction.…[Biologists are] still a long way from understanding fully how molecules and organelles are assembled, arranged, and activated to create a complete living cell…[and] from mastering the many complex ways in which species interact to create the higher-level patterns.

Social insects, in contrast, offer a far more accessible connection between two levels of biological organization.…Both of these levels, organism and colony, can be easily viewed and experimentally manipulated. As we will show…it is now possible to press far ahead in this fundamental enterprise of biology.

David Sanford says, that now "he has an appetite and a curiosity and a fire for new stuff.")

Cello and piano may seem a natural pairing, but Haimovitz has titled his new album *Odd Couple*. Because the piano belongs to the percussion family and the cello to the strings, he claims, their sound qualities, or timbres, don't match. Pianos also have fixed tunings, whereas a cellist can slide or vibrate notes to produce a more expressive intonation. But the biggest problem is that the piano's massive sound can easily overwhelm the cello. This wasn't as much a challenge for Bach and Beethoven—earlier keyboard instruments were softer—but in the recording studio in Montreal (where Haimovitz teaches cello at McGill University), he and Woolf (herself a composer) had to tinker constantly with the sound controls to pick up the right balance.

All four pieces on *Odd Couple* are by contemporary composers and take different approaches to combining the two instruments. In *Cantos for Slava*, by Augusta Read Thomas, BF '91, JF '94, Haimovitz and his pianist, Geoffrey Burleson, both plucked their strings, Haimovitz on the cello and Burleson inside the piano. Achieving balance in Sanford's *22 Part 1*, which Haimovitz likened to a "rock 'n' roll boxing ring," required furious bowing on the cello and digital amplification. The Cello Sonata, op. 6, by Samuel Barber, D.Mus. '59, and the Sonata for Cello and Piano, by Elliott Carter '30, D.Mus. '70, complete the disc; Haimovitz calls the Carter "one of the most successful works in the genre, in the richness of each individual part and how the two come together" after each instrument begins in "its own metric world." The music on *Odd Couple*, he says, is "maximalist"—dense and energetic, as opposed to the current trend among composers toward more minimalist scores.

Sharing new music is as important to Haimovitz as recording it. While recording for Deutsche Grammophon, he felt disconnected from the people buying his albums. "My work was *in* the session, and then essentially I would turn my back," he says. Running his own independent label, Oxingale (www.oxingale.com), and selling CDs at his concerts has changed that. He tours from Thursday to Sunday nearly every week, and took his album *Anthem* (a celebration of American composers that begins with a version of Jimi Hendrix's

COURTESY OF OXINGALE

Haimovitz plays a cello made by the famous Venetian craftsman Matteo Goffriller in the eighteenth century.

"Star-Spangled Banner") to all 50 states. "What keeps me going at this stage is communicating with audiences," he says. "And the fact that—as many composers as I've already played, as many of these genres as I've infiltrated—I'm just continuously amazed by how little I know."

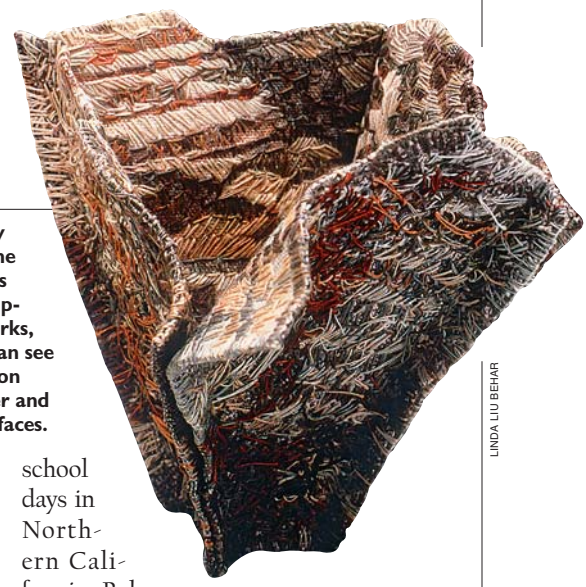
Although he never lacked for critical praise during his youth, Haimovitz has also won honors for his more innovative work. The American Society of Composers, Authors, and Publishers gave him the Concert Music Award for "taking his brilliant and passionate performances to audiences wherever they assemble," including the late, legendary New York City punk-rock club CBGB. When the American Music Center (a New York City organization founded by Aaron Copland, D.Mus. '61, among others) honored him as a "Trailblazer," Haimovitz took out his cello and played "Star-Spangled Banner" during his acceptance speech. "Freedom of speech and freedom of expression are responsible for the breadth and quality of music and art we make here in the U.S.," he says. "Jimi Hendrix understood this better than most politicians of his time. He also had the talent to communicate this and connect with a generation. I was just trying to channel a little piece of that."

In September, when *Odd Couple* came out (the octave change stayed in), the cellist and his pianist toured with a disc jockey to perform composer Tod Machover's *VinylCello* concerto, in which electronic sounds and turntables accompany Haimovitz. His goal in placing Sanford and Machover next to each other on a program is to say, "Wow! It's just as unusual for me to be playing with a D.J. as it is for me to be playing with piano."

Photos in Thread

Photorealistic fabric art that embraces both f-stops and embroidery

by CRAIG LAMBERT



LINDA LIU BEHAR

In *Quarry* (1997), one of Behar's rare "sculptural" works, viewers can see stitching on both inner and outer surfaces.

From a distance, they look like framed four-by-six-inch color photographs of landscapes and still-life subjects—salt marshes, fountains, rocks, squashes. Come closer, and they are revealed as three-dimensional images rendered in intricate embroidery. In fact, these miniatures by Linda Liu Behar '68 combine photography and fabric art. Behar begins each piece by printing one of her own photographs on cotton broadcloth. Then, with lapidary care, she stitches the forms, lines, colors, and light of the photo directly onto the underlying picture with colored threads. This makes for sharp realism—"photorealism," if you will—and produces a captivating piece of fiber art. Despite their small size, each work can take four to six weeks to complete. Yet with embroidery, "the repetitiveness is sort of meditative," Behar says. "I enjoy making the image come alive in the stitching."

Behar has been crafting these tiny gems (the largest is seven inches by nine) since 1992, building on a prior decade of making large contemporary-art designs in the form of quilts. Apart from one other fiber artist in Colorado, who works entirely on a sewing machine, Behar is the only person making such photorealistic objects. Her work has appeared in many solo and group exhibitions, including one in 2002 at Boston's Museum of Fine Arts, and has been featured in dozens of articles. The Mobilia Gallery in Cambridge (www.mobilia-gallery.com) represents her; the miniatures sell for several thousand dollars apiece. "With a draftsman's command of form," wrote *American Craft* magazine in 1998, "she creates exquisite, tiny windows on the natural world."

A serious photographer since her high-school days in Northern California, Behar starts with a vivid image. "It has taken me all these years to realize that if I want to do a good embroidery, it has to be based on a good photograph," she explains. With the salt marshes, for example (she has done 18 salt-marsh embroideries since 1997, each from a different image), "I had to consider the time of day, lighting conditions, the weather, the tides," she says. "It's

CAROL GROTRIAN

Left: Behar in her studio. Below, left: *Meadow* (2005). Below, right: the artist holds *Summer Salt Marsh 3* (2008).

"A good embroidery has to be based on a good photograph."

making a photograph, not *taking* a photograph." Sometimes, she manipulates the image digitally.

The next step is to stiffen the white fabric by sticking it to contact paper, which allows her to print a color photo image onto it with an ink-jet printer. She uses inks containing pigments, not water-soluble dyes. "Unlike dyes, these pigments don't run when they get wet, or fade over time," she explains. After removing the adhesive paper, Behar typically stitches one or more layers of appropriately colored thread onto the image, initially by using a computer-controlled sewing machine.

She uses the same perspective devices that landscape painters do to achieve the illusion of three dimensions: areas in the far distance are smaller, have less detail, and show more muted colors than those in the foreground. In the salt-marsh embroideries particularly, the built-up thickness of the thread enhances the 3-D illusion. "The threads do have dimension," Behar says, "and where they are stitched thickly, the bulk of the land forms comes forward from the surface of the embroidery, while the stitches depicting water lie flat against the surface." The computerized embroidery machine does the tedious work of accumulating a thickness of thread in the simple areas of color. Then Behar hand-stitches over the machined work, "covering it almost completely with nuanced colors and carefully angled stitching."

By combining different colors of thread and embroidery floss (a softer, thicker, more lustrous type of cotton filament), Behar constructs her fiber images in a Seurat-like pointillist manner, mixing bits of color to achieve an overall impression. (Although she has tried painting, she says, "Paint and I do not get along. I can make thread go where I want it to go, but paint seems to have a mind of its own.") In some ways, her stitching does resemble brushstrokes. In the salt-marsh embroideries, Behar creates the grasses with vertical stitches and uses horizontal ones for the water: "They work against each other."

Occasionally, Behar produces a work that literally occupies three dimensions, like *Quarry* (1997)—a kind of sculptural vessel in which both inner and outer surfaces are visible. "When people look at works in progress, they like to flip them over to see the stitching on the back," Behar says. "This piece was a more organic way of showing the 'back' side as well as the front."

Behar created her hybrid art form on her own, though it grew from experiences with a variety of visual media. At Radcliffe, she was a staff photographer for the Harvard Yearbook and sold photographs to the Radcliffe News Office for five dollars apiece. She concentrated in architectural sciences, "the only visual major Harvard offered," she says. "It was the only place where you could get your hands dirty and make things." As a senior, she took a graphic design course and "realized I had been doing that all along," she recalls.

After college, she worked for several years as a graphic designer at a downtown Boston firm. She married Ken Behar, and became a full-time mother

Art by Linda Liu Behar

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when Katherine, the first of her two children, was born. Behar took up quilting in 1983, when her son, Jonathan, was small, and soon her abstract/contemporary design quilts were appearing in shows, books, and magazines. "Quilts were in the air, beginning in the late 1970s," Behar says. "The [1976] Bicentennial brought antique quilts to the forefront, and soon people were using the old techniques for new purposes. I really enjoyed working with fabric and thread." A 1992 trip to Arizona with "a lot of visual input" inspired her to create a fabric memento in the form of a postcard, using appliqué with a little stitching on top. Before long, the stitching grew in importance, and she had begun creating her postcard-sized embroideries.

The pleasure hasn't worn off. Behar explains that, despite the intricate, detailed work, "It's not something I have to be patient about—it's just an activity I enjoy. There's something magical about it."

GALLERY

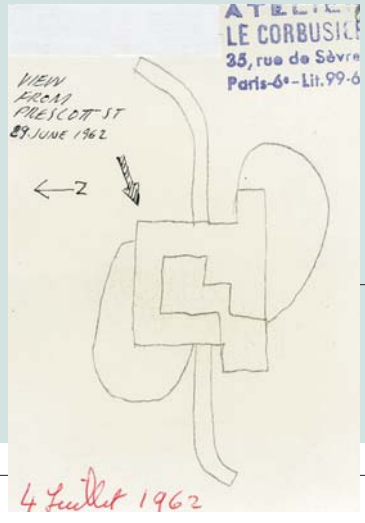
Carpenter Center's Craftsman

Charles-Édouard Jeanneret-Gris, who assumed the name Le Corbusier, became one of the world's most influential, and controversial, modern architects and city planners. His legacy resonates at Harvard, because the Carpenter Center for the Visual Arts, on Quincy Street, is the only Le Corbusier-designed building in the United States. His work as a whole is newly accessible in *Le Corbusier Le Grand,* an enormous (20-plus pounds, 768-page, $200) catalog, archive, scrapbook, and assessment recently published by Phaidon.

The Carpenter Center appears on pages 718 through 727, from Graduate School of Design dean Josep Lluis Sert's 1958 letter soliciting Le Corbusier's interest in the commission, through the minutiae of his contract, sketches, detailed drawings, the finished structure, and news coverage of its critical reception. In *Harvard: An Architectural History* (1985), Bainbridge Bunting wrote that the distinctive ramp "that curls up and through the [structure] with such showmanship can hardly be justified; it conducts visitors from one corner of the lot…through the building, and down to the opposite corner without allowing them to enter. The real entrance…is placed obscurely in the basement.…In the Cambridge climate surely little practical use can be made of the extensive roof gardens or the semi-subterranean loggias, which must have caused excessive complications in the framing." Moreover, the center's stark concrete exterior contrasts sharply with its red-brick neighbors, the Faculty Club and Fogg Art Museum, affronting traditional sensibilities.

Bunting got some things right: although the roof garden affords marvelous views, it is little used; an adjacent café and gallery had a sadly short life. And Bunting acknowledged that the "calisthenics of this design" produced a "geometry of solids and voids" whose liveliness makes ornamentation irrelevant: "the building itself is now sculpture." It affords passersby an unusually deep view into the intriguing studios and workshops within, where art is made, and a changing panorama of exhibitions in the main gallery. (Would that Harvard's new scientific laboratories were equally expressive.)

The activities Le Corbusier's center supports will attract new attention this fall, as the University task force on the arts makes its report. Meanwhile, the neighboring Fogg complex will begin to cast off some of its familiar, traditional veneer as Renzo Piano's renovation design is implemented during the next five years (see "Approaching the Arts Anew," January-February, page 51, and "Open Access to Art," July-August, page 58). Thus the conversations about architecture and its context provoked by Le Corbusier will be revitalized and extended, in University debates and in print, in the months ahead. ~J.S.R.



Top: Le Corbusier with his "Modular" system of human and architectural proportions. Left: Sketch of the site plan. Far left: Interior of the finished Carpenter Center for the Visual Arts.

IMAGES COURTESY OF FONDATION LE CORBUSIER, PARIS

Art as Chattel

Collectors and the making of the great modern museums

by JAMES CUNO

At base, works of art are chattel: the stuff of economic exchange. Historically, the British legal code forbade nobility from selling "settled land" and tangible property. Then in the 1870s, cheap grain from the United States and Canada caused a decline in the price of English wheat and with it the value of English farmed estates. The British government countered by passing a law in 1882 allowing nobility to sell their treasured property, and within months the duke of Hamilton had auctioned part of his art collection in a sale that ran for days and generated some £500,000. Some of the paintings were bought for British museums and thus remained "at home." But many, perhaps most, were sold to overseas buyers.

The transfer of so much art away from England alarmed many Britons. By one count, almost half of the works included in the famous 1857 Manchester exhibition, *Art Treasures of Great Britain,* had been sold away 50 years later. In reaction, a group of British critics, connoisseurs, and curators organized the National Art Collection Fund for the purpose of buying such works for the nation; never mind that many of these were in Britain only because they had been purchased earlier from Continental collections. But the pull of the market was too strong. (The centenary of the fund was celebrated with an exhibition at the Hayward Gallery in 2003 titled *Saved!*)

The economic decline of Britain was offset by the economic rise of the United States. By 1914, U.S. national income stood at $37 billion, more than triple that of either Britain or Germany, the next two largest economies. Individual capitalists—J.P. Morgan, Andrew Carnegie, and Henry Frick chief among them—were quickly amassing extraordinary wealth. They were also art collectors of great ambition who exercised their taste for rare and beautiful things by buying up masterworks in Britain and all over the Continent.

They were building their collections for themselves, surely, but also for the rapidly growing and rambunctious U.S. public. This was a time of great growth in our nation's art museums. Every city of any size had one, from Boston and New York to Pittsburgh, Cincinnati, Cleveland, Detroit, Chicago, St. Louis, and San Francisco.

Old Masters, New World: America's Raid on Europe's Great Pictures, 1800–World War I serves as a thoughtful and informed introduction to the early history of art collecting in the United States. The author, Cynthia Saltzman '71, is a journalist whose previous book, *Portrait of Dr. Gachet,* about a Van Gogh masterpiece, also concerned art and collecting. In the current case, I don't know who came up with the idea to use "raid" to describe the pursuit of European old-master paintings by prominent American collectors, but it casts an unfortunate pall over the book's story, for the individual accounts of collectors building first private and then public collections do not suggest a raid so much as an impassioned pursuit that enriched everyone from seller to dealer to buyer to public.

The book begins with banker and railroad executive Henry Marquand's search for two Van Dyck portraits he wanted for the fledgling Metropolitan Museum of Art, of which he would soon become second president. In 1886, he traveled to Corsham Court, the fabled country seat of the Methuen family, just outside Bath, England. Their collection had been assembled in the 1720s and now the second baron needed to part with some paintings. He sought first to sell them to Britain's National Gallery, but its trustees were slow to respond. Word spread quickly and within months, encouraged by the dealer Charles Deschamps and the artist Lawrence Alma-Tadema, Marquand saw the Van Dycks, made his offer, and acquired the paintings. And not just those two, but also three others by Rubens, Luca van Leyden, and, purportedly,

Cynthia Saltzman '71, *Old Masters, New World: America's Raid on Europe's Great Pictures, 1800–World War I* (Viking, $27.95)

ILLUSTRATION BY TOM MOSSER

Masaccio. A year later he acquired Vermeer's *Young Woman with a Water Pitcher* from a Paris dealer, and then, within a year, some 30 more paintings, most of them seventeenth-century Dutch. In January 1889, he offered them to the Metropolitan and then promptly bought and gave the museum 13 more. For this he was described by a journalist as "the greatest collector in America because he collects not for himself alone, but for a whole people and for all the world."

The book's principal players, in addition to Marquand, are the collectors Frick, Morgan, Isabella Stewart Gardner, Henry and Louisine Havemeyer, and Joseph Widener; the dealers Deschamps, Paul Durand-Ruel, Otto Gutekunst, Joseph Duveen, and Roland Knoedler; art historians and museum curators Wilhelm von Bode, Roger Fry, and Bernard Berenson; and artists Mary Cassatt and John Singer Sargent. (It is interesting to read of the persistent role artists both well and little known have played as advisers to collectors. It is also interesting to read of the importance of photography—just a few decades after the invention of the medium—in these various transactions, as collectors often first saw the paintings they purchased through photographs.)

Old masters, new world is not original research, but rather a well-told tale that synthesizes a great deal of recent research published elsewhere, and in this, it succeeds admirably. I have quarrels with some things, like the imbalance in treatment of the collectors. Why, for example, is Morgan given a single chapter of 15 pages when the Havemeyers rate one more than twice that length and Frick's coverage totals four times that? Morgan's 1914 Metropolitan exhibition comprised some 4,000 works of art shown in 13 galleries and he founded the Morgan Library itself, now also an art museum.

Nor is there any discussion of the governmental instruments that encouraged the import of artworks into this country and contributed to building our public collections. There is brief mention of the fact that in 1895 the American tariff on works of art was eliminated, only to be reinstated two years later, and a simple reference to the Payne-Aldrich Tariff Act of 1909, which eliminated the 20 percent customs duty on art more than 20 years old. But that's all. There is no mention at all of the income-tax and estate-tax provisions that allow donors of works of art to museums to reduce their tax exposure by the value of their gifts. By passing such legislation, the U.S. government became a generous partner in the building of our private and public collections during the twentieth century. If only as a kind of coda, Saltzman could have acknowledged this, for in a way, it is the end of the story: as a further means to prevent the export of art, European governments have been adopting the U.S. model, offering their own tax deductions for gifts to museums.

And of course, Saltzman mentions other very interesting persons of whom one would like to learn much more. John G. Johnson, for example, is mentioned only three times. A Philadelphia attorney, he worked for Henry Havemeyer, Henry Frick, and Peter Widener, and was himself an important collector whose purchases now form the core of the Philadelphia Museum of Art's distinguished old-master painting collection, making one curious about his role in the context of the book's otherwise rich and intriguing story.

Still, saltzman's narrative is full of tales of the interrelationships of personalities seeking personal gain. The attempts by dealers to coax works of art from collectors and by collectors to bargain down prices from dealers, and then the willingness of art historians to offer authentications (sometime, it seems, for personal profit) are illuminating. And the pursuit of individual works of art is sometimes even thrilling.

Henry Frick's purchase of the Ilchester Rembrandt, the deeply moving, late self-portrait, is but one example. Dealer Otto Gutekunst had been pursuing the painting for four months in 1906. Meanwhile, the English critic, painter, and Metropolitan curator Roger Fry had been approached by the English architect Herbert Horne, who had spoken with the sixth earl of Ilchester about possibly selling the painting to pay off steep inheritance taxes; Horne thought the Metropolitan might help by buying the work.

Then Horne learned that the earl had given the right of first refusal to the London collector Herbert Cook. Fry told Horne that J.P. Morgan, as president of the Metropolitan, would agree only to a price lower than was being asked. Because Cook was not moving on the painting either, the earl turned to Gutekunst, who pressed Frick and tried to get Fry to back away. Fry kept after the painting

Chapter & Verse

Correspondence on not-so-famous lost words

Dennis De Witt hopes someone can identify "a song or bit of doggerel last heard, I think, in the 1960s, suggesting that there was nothing left for the Modern Movement to discover because, in the approximation of the refrain that lingers in my mind, 'It was all done in the Twenties in Berlin.'"

Harry Goldgar asks if any fan of the 1992 film *School Ties* can identify the French text which a sadistic teacher orders a student to memorize, thereby causing the victim's nervous breakdown.

Bruce Hoff is curious about the meaning of a taunt uttered on at least one occasion by Zelda Fitzgerald: "I hope you die in the marble ring." Sally Cline's biography refers to a childhood game Zelda played in the marble rotunda of the Alabama state capitol; other writers refer to the ring used in a game of marbles. Does the reference ring any other bells?

"born of Lust unchained/And most vile Flux" (September-October). Daniel Rosenberg identified these lines by the fifth-century pagan epigrammatist Palladas of Alexandria, as translated by Dudley Fitts in his *One Hundred Poems from the Palatine Anthology* (1938). Palladas sets his "ruder Truth" against the claims that man is "divine" or even simply "dust."

Send inquiries and answers to "Chapter and Verse," *Harvard Magazine,* 7 Ware Street, Cambridge 02138, or via e-mail to chapterandverse@harvardmag.com.

and Morgan, but by the time Morgan finally agreed, it was too late: Gutekunst, with Roland Knoedler and Colnaghi, the English dealers, had secured the self-portrait.

They offered it to Frick for $225,000; he demurred, but later offered $200,000. Knoedler wanted to accept the offer, but Gutekunst and Colnaghi held out for the original price. Gutekunst then raised the specter of the Rembrandt scholar Wilhelm von Bode buying the painting for Berlin. Finally, Frick suggested he wanted the picture, but also wanted six months to pay. He added that he wanted to pay in part with a painting he had purchased 11 years earlier that he reckoned was worth almost $25,000 (he had paid $14,000). This allowed him to pay $200,000 in cash—the amount he'd initially offered.

The sale had been a year in the making, and many of the book's key players were involved: a cash-strapped earl, three leading art dealers, two competing museum curators, and both Morgan and Frick. A short time later, prompted by the purchase and his growing collection, Frick bought the Manhattan property on which he would construct the building we know as the Frick Collection. There the Rembrandt hangs not far from the singular masterpiece *St. Francis in the Desert* by Giovanni Bellini, the subject of another great story.

All in all, *Old Masters, New World* is a very good read. No doubt it will encourage its readers to learn more about the history of art collecting in this country, which, like all such histories, is intertwined with the history of extraordinary individuals and national and international political, economic, and social circumstances. I hope, too, that it will inspire them to learn more about the building of our great public art museums, for that is ultimately the great story here: how these very wealthy men and women turned their private fortunes into lasting, public legacies for the benefit, as the early journalist said of Marquand, "not for himself alone, but for a whole people and for all the world." ∇

James Cuno, Ph.D. '85, is president and director of the Art Institute of Chicago. From 1991 to 2002, he was director of the Harvard University Art Museums. His most recent book is Who Owns Antiquity? Museums and the Battle over Our Ancient Heritage *(Princeton).*

Blindspot: A Novel

A send-up of eighteenth-century literary forms

by JONATHAN SHAW

Jill Lepore and Jane Kamensky, friends since graduate school, didn't plan to write a book. Their project, set in 1760s Boston, was supposed to be a sketch, a playful spoof of two genres: the picaresque, with its rogue hero exposing the hypocrisy around him, and the sentimental epistolary narrative—in this instance, a series of letters from a young "fallen" woman to a friend. Lepore would write a chapter as Stewart Jameson, a portrait painter in exile; then Kamensky would pick up the story in a letter from Miss Fanny Easton. They planned to present the finished product as a gift to their mentor, John Demos, the historian under whom both studied at Yale.

"We were both trained in history as a creative discipline…trained to think of imagination and rigor as being sympathetic rather than antithetical," says Kamensky, chair of the history department at Brandeis. A fellow at the Radcliffe Institute during the 2006-2007 academic year, Kamensky wrote her installments furtively to keep them from Demos, also a fellow, who had an office nearby. "I was living a double life…sometimes secretly working on one of Fanny's letters when John walked in to talk about my work on Gilbert Stuart," she recalls. "*Blindspot* felt like a covert piece of business that wasn't really germane" to her fellowship's focus on life writing.

But that feeling, she found, turned out to be wrong: "I was reading all this stuff about biography and theory of biography and different ways of writing lives, but none of that was in any way as transformative a project as just writing a life from the inside out." *Blindspot*, a first work of fiction for both women, eventually grew to more than 400 pages and became, Kamensky says, "the deepest piece of work I have done in re-imagining life writing." (Spiegel & Grau will publish the book in December.)

Jane Kamensky (left) and Jill Lepore

Photograph by Nina Subin

Still, the coauthors distinguish between creativity in writing a novel and the creative aspects of their nonfiction books. "Writing early American history always requires a fair amount of hunch-playing and intuition," explains Kamensky, author of *The Exchange Artist: A Tale of High-Flying Speculation and America's First Banking Collapse*. "While modernists have the problem of throwing stuff away, for biographers and even social historians of the seventeenth and eighteenth centuries, only rarely is the historical record comprehensive and complete enough to write a life history."

Lepore agrees. "We can know what the American Revolution was like for poor widows in Boston as a group, because we know how many of them went on the poor rolls or how many of them sold their breast milk for cash in the *Boston Gazette*, but you can't really get a life story," says the Kemper professor of American history, who is also chair of the history and literature program and author of *New York Burning: Liberty, Slavery, and Conspiracy in Eighteenth-Century Manhattan* (see "Witness to Violence," September-October 2005, page 42). "In my own work, [the point] where I find the limits of social history are awfully frustrating is in the anonymity of the people that you are writing about." Eighteenth-century fiction, of which Lepore is "a very big fan," brings a "degree of drama and human depth that...social history just can't do."

"In part," says Kamensky, "what the novel does for us is segregate this play of imagination, so that rather than creeping close to the line between history and fiction in our work as Ph.D.-carrying historians, we jumped the fence and tried something else."

The pair worked mostly by e-mail, "pinging back and forth like a tennis game" the two interwoven first-person narratives: a chapter, then a letter, and another chapter. The first hundred pages flew by. There was no preplanned plot. Lepore likens it to the game families play on long car trips, where each person gets to add a sentence to a story going around and around, except that theirs was set within a contained imagined world: Boston in the 1760s, a period they both know well.

Off the Shelf

Recent books with Harvard connections

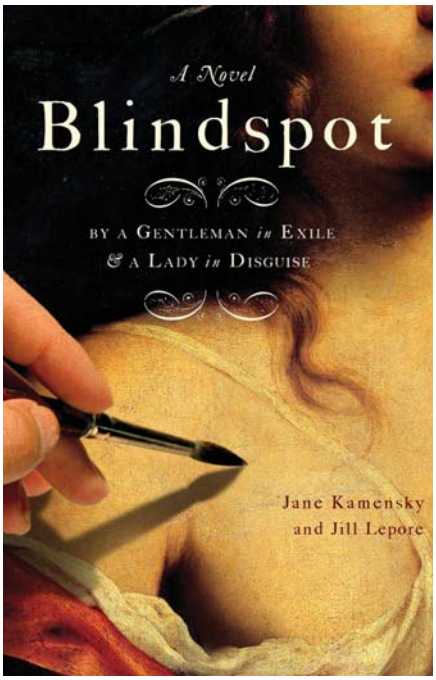
Reputation: Portraits in Power, by Marjorie Williams '79 (PublicAffairs, $26.95). No matter who is elected, the president must contend with those permanently in power. No one ever portrayed such people better than the late Marjorie Williams, as this second collection of her work, edited by her husband, Timothy Noah '80, vividly shows. The profiles—of the likes of Clark Clifford, James Baker, Lee Atwater, and Colin Powell—get at a Washington where, Noah notes, "the worst thing they can call you is a human being." Williams showed why.

George, Being George, edited by Nelson W. Aldrich Jr. '57 (Random House, $30). Two hundred ways, more or less, of looking at George Plimpton '48, of the *Paris Review* and other ventures. We learn that his graduation, delayed by World War II service, was further postponed because the irate professor in his final-semester gut geography course (taken to fulfill a science requirement) flunked Plimpton for skipping every class.

Your Child's Strengths, by Jenifer Fox, Ed.M. '95 (Viking, $24.95). How to discover, develop, and use same, rather than dwelling on weaknesses, by the head of the Purnell School, in Pottersville, New Jersey.

Home Girl, by Judith Matloff '80 (Random House, $25). Back from reporting in Moscow, the author buys a fixer-upper in West Harlem. This is the chronicle of what it means to build a "dream house on a lawless block."

Words in Air: The Complete Correspondence between Elizabeth Bishop and Robert Lowell, edited by Thomas Travisano with Saskia Hamilton, RF '01 (Farrar, Straus and Giroux, $40). The exchanges between the poetic giants, linking Lowell '39, Litt.D. '66, and Bishop for 30 years and spanning 458 letters. The period covered includes Lowell's time teaching at Harvard, 1963-1977.



"These characters were in some way more real to us than other people we have written about…"

When they realized that the sketch would become a book, they sat down to do some storyboarding and began revising what they had already written. As they worked, Lepore read colonial artist John Singleton Copley's letters. Her portrayal of the fictional painter Jameson, which may leave male readers squirming, also drew on her familiarity with Laurence Sterne's *Tristram Shandy* and the works of Henry Fielding, just as Kamensky drew on sources such as Samuel Richardson's epistolary novels *Pamela* and *Clarissa*. Always, in trying to imagine what people's lives were really like, they strove to be faithful to the past, Kamensky says, but "in a way completely different from the work of history, one that was wonderfully liberating."

To imagine their characters standing or sitting in space, they visited an eighteenth-century house in downtown Boston that became the setting for the home where their two characters lived. Lepore had made many such field trips for history research, but found this particular experience unique. Writing the novel "was worth doing fully" because "these characters were in some way more real to us than other people we have written about—about whom we just couldn't know enough to have that realness. I think," she adds, "that will make me work harder" as a historian—and as a teacher.

Blindspot is full of learning and literary allusions, as well as historical documents that Lepore says she and Kamensky introduced into the text. But writing it, she emphasizes, was a "privileging of the emotional, the delightful, the playful, and the imaginative: writing about things that we really care about by giving vent to different faculties than we usually draw on."

Physicists on Wall Street, by Jeremy Bernstein '51, Ph.D. '55 (Springer, $34.95). Somewhat accessible essays on options pricing and on why Wall Street has become a home for the physicists and other "quants" not employed at CERN's Large Hadron Collider, plus "other essays on science and society."

Patronizing the Arts, by Marjorie Garber, Kenan professor of English and of visual and environmental studies (Springer, $34.95). A meditation on the dual attitudes toward art in modern culture—patronage and condescension—and universities' role in sustaining support for the artistic enterprise.

The Gridlock Economy, by Michael Heller '84 (Basic Books, $26). The author, Wien professor of real-estate law at Columbia, explores how "too much ownership" complicates development and deployment of drug discoveries and new technologies, urban renewal, and more.

The Global Achievement Gap, by Tony Wagner, M.A.T. '71, Ed.D. '92 (Basic Books, $26.95). The codirector of the Change Leadership Group at the Graduate School of Education laments that American schools are obsolete, and focuses on how to retool them for the global information economy by emphasizing such core skills as critical thinking and collaboration.

A Great Idea at the Time, by Alex Beam (PublicAffairs, $24.95). Beam, a *Boston Globe* columnist, writes vividly about the Great Books program of the 1950s, tracing its formation in part to Harvard president Charles William Eliot's "five-foot shelf" of Harvard Classics (reconsidered in this magazine's November-December 2001 issue by Adam Kirsch).

***Daniel Boone Escorting Settlers through the Cumberland Gap,* by George Caleb Bingham (American, 1811-1879)**

Frontiersman: Daniel Boone and the Making of America, by Meredith Mason Brown '61, J.D. '65 (Louisiana State University Press, $34.95). The author's father, John Mason Brown '23, wrote a Landmark (for teenagers) biography of Boone in 1952. From the late 1700s on, the Brown family had interacted with Boone in Kentucky. Now comes this clear, well-illustrated modern biography of an icon who helped bring about America's "birth and transformation."

Courtesy of the Mildred Lane Kemper Art Museum, Washington University in St. Louis

Poetic Patriarch

The singular Richard Wilbur displays a "Mozartean felicity" with verse.

During the extended World War II battle of Monte Cassino, Richard Wilbur spent a lot of time in a foxhole. The Germans had pinned down his army division in a valley, firing their 88s from the hills above. "As Waugh said, a lot of war is just waiting around," says Wilbur, who used that waiting time to read Edgar Allan Poe, among others, and to write poems. Years later, he observed that if there were no atheists in foxholes, there were plenty of poets. "Poems were a way of putting your world in order, a bit," he explains.

Wilbur, A.M. '47, JF '50, sent one of those battlefield poems to his wife, Charlee, who showed it to a friend who was an editor at the *Saturday Evening Post.* The magazine immediately published it. Wilbur mailed many more poems home; when he left the army, he had $400, a wife and daughter to support, and a stack of wartime poetry. On the GI Bill, he enrolled in a Harvard doctoral program in English literature. "I figured I'd become a great scholar of Europe in the seventeenth century," he recalls. The stack of poems, joined by others that he continued to write, grew in a desk drawer.

In Cambridge, the Wilburs became friends with André du Bouchet, A.M. '46, a Frenchman who helped found a little literary magazine called *Foreground.* "We used to sit around in a living room translating each other from French into English, and English into French," Wilbur remembers. "At that time, I hadn't taken myself seriously as a professional poet." But Charlee had. Without telling her husband, she gave some of his poems to du Bouchet. "He came back in an hour and kissed me on both cheeks," says Wilbur, "and he exclaimed, 'You're a *poet!*'"

During the next six decades, the rest of the world has come to share du Bouchet's opinion. Wilbur has published 10 volumes of poetry, as well as many translations: of classic French plays and of poets writing in French, Italian, Russian, Portuguese, Spanish, Hungarian, and Bulgarian. He served as poet laureate of the United States from 1987 to 1988. His third book, *Things of This World,* won the 1956 Pulitzer Prize in poetry and the National Book Award; when his *New and Collected Poems* won another Pulitzer in 1989, he became the only living American poet with two Pulitzers. In a 2004 *New Yorker* review of Wilbur's *Collected Poems 1943-2004,* critic Adam Kirsch '97 wrote, "No other twentieth-century American poet, with the possible exception of James Merrill, demonstrates such a Mozartean felicity in the writing of verse. This is partly a matter of formal mastery: Wilbur has written the best blank verse of any American poet since Frost."

by Craig Lambert

Near the fairgrounds in the western Massachusetts town of Cummington, a gently winding country road leads to the modern yet rustic home, across from a dairy farm, where Wilbur has lived since 1965. He manages alone now, with a modicum of domestic help; Charlee passed away in 2007 after a long illness. Near the house rises a barn-like studio, where the poet, now 87, writes daily; on its walls are framed theatre posters from plays on which he has worked, including *The Misanthrope* (translator) and *Candide* (lyricist).

The wooded 80-acre property is serene on a summer afternoon. Thriving gardens, a tennis court, and a sparkling aqua-blue swimming pool surround the house, and an older white Mercedes rests placidly in a curving driveway under a porte-cochère. These are not the digs of a starving poet.

In many ways Wilbur has led a charmed life. Tall, robust, and cheerful, he's a physically active man who swims and gardens, and has been for much of his life an accomplished tennis player. He and Charlee had "the closest kind of marriage," according to their longtime friend Daniel Aaron, Thomas professor of English and American literature emeritus. The marriage produced one daughter, Ellen, a writer (see page 40), and three sons, Christopher, Nathan, and Aaron, none of whom has entered the lit-

Photographs by Stu Rosner

erary life. Wilbur is a lover of jazz and a great joker who draws Thurber-like cartoons. A cryptographer in the army, he enjoys puzzles and vanquishes books of crosswords in odd moments.

Wilbur's strong feeling for plants, animals, and natural phenomena infuses many of his poems. Rural life has always appealed to him; though born in New York City, he grew up on the gentleman's farm of a retired English textile manufacturer in North Caldwell, New Jersey: "All the benefits of country living, without the labor," he says. It was not an arty home, but Wilbur recalls, "If you wrote anything, drew anything, or played any instrument, it was approved of. That was better than an atmosphere of exhortation." His father was a portrait painter ("All he wanted to do was paint") and his mother came from a long line of journalists; when Wilbur edited the student paper at Montclair High School in New Jersey and later at Amherst College, from which he graduated in 1942, he wrote everything from reports on wrestling matches to editorials, news, and features, and drew cartoons. "I thought I might follow a family tradition and be a multiple-threat journalist," he says.

But he also published a few poems in those student papers, and as a teenager listened to Robert Frost reading his own poems at the Montclair Women's Club, the first time Wilbur had ever heard a poet read to an audience. (Later, he learned that Charlee's grandfather, clergyman William Hayes Ward, was the first person to publish a Frost poem, in the *New York Independent*.)

When he arrived in Cambridge in the fall of 1946, "the flavor of Harvard was quite intoxicating, because of the great influx of former servicemen on the GI Bill," Wilbur says. "People were really spoiling to read, write, and talk about literature and the arts. They were starved, and just giddy with the transition. Everyone felt lucky." Archibald MacLeish, Boylston professor of rhetoric and oratory, was soon to teach a poetry course, and talented young poets like Maxine Kumin '46, A.M. '48, John Ashbery '49, Robert Creeley '49, Frank O'Hara '50, Robert Bly '50, Donald Hall '51, and Adrienne Rich '51 populated the classrooms. Wilbur studied Poe with Hall, and notes that even though "Bly never took a course with me, I did teach him how to throw a boomerang. I took him down to the football field, gave him his instructions, and he turned out to be a promising boomeranger."

Wilbur's first big break came when André du Bouchet sent some of his early work to the publishing firm Reynal & Hitchcock, which was on the lookout for new talent. "Soon I had a phone call saying, 'Mr. Wilbur, we'd like to publish a book of your poetry,'" he recalls. "That's the most painless path to getting a book published I've ever heard!" The result was *The Beautiful Changes* (1947).

In December 1948, Wilbur sent the *New Yorker* a poem called "Year's End." Soon, *New Yorker* editor Katherine S. White was on the phone. "Mr. Wilbur, we want to use your poem in our year-end issue," she said. "There's no time to send you proofs, so we'll have to talk through it on the phone." Wilbur quickly assented. "You don't seem to have any understanding of the difference between *which* and *that*," she began. "I don't at all," Wilbur admitted. "*Which* sounds like a brisk word and *that* is a soft-sounding word." White replied, "Fowler [author of *Modern English Usage*] wouldn't find that acceptable," then added, "But Fowler was British, wasn't he, and we're an American magazine, so we'll let it go."

Fortune soon smiled on him again. He had taken his language exams in German and was on his way to a Harvard doctorate when, after only one year of postgraduate study, "by tremendous luck, I was taken into the Society of Fellows." Professor of history and literature F.O. Matthiessen and English professor Harry Levin, a senior fellow of the society, backed him for the prestigious fellowship, which gave him free

The Writer

In her room at the prow of the house
Where light breaks, and the windows are tossed with linden,
My daughter is writing a story.

I pause in the stairwell, hearing
From her shut door a commotion of typewriter-keys
Like a chain hauled over a gunwale.

Young as she is, the stuff
Of her life is a great cargo, and some of it heavy:
I wish her a lucky passage.

But now it is she who pauses,
As if to reject my thought and its easy figure.
A stillness greatens, in which

The whole house seems to be thinking,
And then she is at it again with a bunched clamor
Of strokes, and again is silent.

I remember the dazed starling
Which was trapped in that very room, two years ago;
How we stole in, lifted a sash

And retreated, not to affright it;
And how for a helpless hour, through the crack of the door,
We watched the sleek, wild, dark

And iridescent creature
Batter against the brilliance, drop like a glove
To the hard floor, or the desk-top,

And wait then, humped and bloody,
For the wits to try it again; and how our spirits
Rose when, suddenly sure,

It lifted off from a chair-back,
Beating a smooth course for the right window
And clearing the sill of the world.

It is always a matter, my darling,
Of life or death, as I had forgotten. I wish
What I wished you before, but harder.

rein for independent study at Harvard from 1947 to 1950. *The Beautiful Changes* appeared just as his fellowship began. "I was always torn between scholarship and writing poems," he says, "so I had a confusion about who I was. The happiest moment was when [McLean professor of ancient and modern history] Crane Brinton, who chaired the Society of Fellows, told me, 'You can be a scholar if you like, but I assure you that the poetry is enough.' That was liberating for me to hear."

At that time, Wilbur says, "Harvard regarded a three-year stretch in the Society of Fellows as the equivalent of a doctorate," and consequently he was appointed assistant professor of English in the fall of 1950. He taught a seminar on Poe, a class in modern American and English poetry, and a writing class on the short story; he also assisted University Professor I.A. Richards in an experimental freshman humanities course. The literary resurgence that had thrilled Wilbur after the war was intensifying. Poetry readings were suddenly popular. "Before the late 1940s, there hadn't been too many people trotting around America giving poems in auditoria," Wilbur points out. "Suddenly, quite young poets like me had frequent opportunities to read."

When Wallace Stevens '01, Litt.D. '51, first read at Harvard in the late 1940s, "No one had imagined what kind of audience he would draw," Wilbur recalls. Stevens was scheduled to read in Emerson Hall, but an hour beforehand, "F.O. Matthiessen poked his head in the door and saw that the room was full," so he moved the venue to Sever; it soon overflowed, forcing the audience to shift once more, to the Fogg Museum's auditorium. "I remember how shocked Stevens looked when he saw the size of the audience," Wilbur adds. When T.S. Eliot '10 lectured in Sanders Theatre, "Those who arrived late beat on the doors, shouting, 'Let us in! Let us in!'"

Wilbur's *Ceremony and Other Poems* appeared in 1950; he dedicated it to his mentor Matthiessen, who leapt to his death from a Boston hotel window that year. The New Critics, who reigned in the literary establishment of that time, welcomed the book. "I was very fortunate," Wilbur says. "Of course I had my refusals, but I was greatly encouraged from the beginning. Encouragement is different from adulation, which could louse you up: it could lead you to change your tune."

HM

Visit harvard-mag.com/extras to hear Richard Wilbur read his poem "The Writer."

One early encourager was Robert Frost '01, Litt.D. '37, whom Wilbur cites as an inspiration. After the war, Frost spent some winters living in Cambridge, on Riedesel Street, off Brattle Street; Wilbur got to know him there and also at the Bread Loaf Writers' Conference in Vermont. Later, Frost dined and stayed with the Wilburs. "When my first book came out, Frost spoke very kindly of it to my wife—not to me—over the phone," Wilbur says. "I was aware that he read what I wrote as it came out. The first time he praised a specific poem was when I published 'The Puritans.' At Dartmouth, he told me, 'That's the best little poem I've seen in quite a while.' I was so flustered that I began saying something about the poem, but Frost interrupted to say, 'Now, wait—if you're going to explain it to me, I won't like it anymore.' Frost didn't like his poems, or any poems, to be put into other words."

In 1950, Wilbur was among the founders of the Poets' Theatre in Cambridge. Other prime movers included Ashbery, Hall, O'Hara, MacLeish, Peter Davison '49, Edward Gorey '50, Alison

Lurie '47, and Richard Eberhart, G '33. (The Poets' Theatre staged plays until 1968, when fire destroyed its home on Palmer Street; it revived in 1988 and remains active today.) The group's productions ranged from *Change Your Bedding*, a comedy by O'Hara (whom Wilbur recalls as "breezy and amusing"), to a couple of MacLeish's radio plays from the 1930s, to a staging of *Oedipus at Colonus* in the original Greek. "It was a time of great liveliness, excitement, and innovation," says Wilbur, who finds himself bemused "when people speak dismissively of the 1950s, as if they had been a tame and suppressed time, and everything began with Allen Ginsburg."

In 1955, the Poets' Theatre produced Wilbur's translation of *The Misanthrope* by Molière, with Davison playing the lead. The play proved such a hit that after two nights, the production moved to a big auditorium at MIT. His *Misanthrope* translation soon led to Wilbur's most famous collaboration, with Lillian Hellman and Leonard Bernstein '39 on *Candide*, the 1956 Broadway musical based on Voltaire's novella.

Hellman conceived the idea of staging *Candide* and enlisted Bernstein to write some music. Several writers, including Dorothy Parker and James Agee '32, John Latouche, Bernstein and his wife, Felicia, and Hellman, contributed lyrics. But Wilbur became the primary lyricist ("I wrote or rewrote 82.5 percent of the lyrics," he says—not facetiously, but following his theatrical agent's calculation) after Harry Levin recommended him to Hellman, citing his work on *The Misanthrope*. "If he can do one witty Frenchman," Levin said, "I imagine he could do another."

In the summer of 1955, all the principals rented houses on Martha's Vineyard and worked on *Candide* each day, typically meeting at Bernstein's place, with him at the piano. "We all thought we had singing voices," Wilbur recalls, smiling. Each time Hellman wrote a scene, the others would make it into a musical number, transforming *Candide* from a play to a comic operetta. "Lenny was full of energy and urgency," Wilbur says. "He and I quarreled occasionally as to whether the music or words should be written first. One time I wrote a very good lyric, the closest thing to Voltaire, and Lenny couldn't think of a tune for it. After a few days, director Tyrone Guthrie chided him, saying. 'Lenny, we know you were water-skiing yesterday, not trying to produce a tune for Richard's lyric.'" (Bernstein found a melody.)

Candide opened to favorable reviews, "but the praise, by Brooks Atkinson ['17] in the *New York Times*, for example, made it sound too highbrow for block-ticket buying," Wilbur says. The show closed after a three-month run. "The main defect of the show is the defect of *Candide*," he observes. "It's the same joke over and over." Though technically a flop, *Candide* has triumphed in the long run, thanks to a continuing series of revisions and revivals. Wilbur collects royalties whenever its overture is played, and occasionally still gets requests for new lyrics. (Dick Cavett's television show used the aria "Glitter and Be Gay" as theme music.)

In the mid 1960s, he collaborated with the French composer Michel Legrand on a musical adaptation of the 1943 play *The Madwoman of Chaillot*, by Jean Giraudoux, but the show's inexperienced producer lost control of the adaptation rights, scuttling the project. "Once I had lost so much hard work, I said, 'To hell with musical theater, I'm going to stick with my poetry, teaching, and translations,'" Wilbur explains. (Today, his translations of Molière, Racine, and Corneille have become standard, and critics have called his renderings of Baudelaire and many other poets the best versions available in English. He knows French, "especially seventeenth-century dramatic language," and can read Dante in Italian; for languages like Russian and Bulgarian, he gets help from scholars and native speakers.)

After a year at the American Academy in Rome and two years teaching at Wellesley, Wilbur joined the Wesleyan College

Filial Fiction

At age five, Ellen Wilbur asked her parents for a typewriter for Christmas. Pecking at its keys, "I was in heaven," she recalls, "sitting in that same pose I now fall into, trying to put things into words." Decades later, her father, poet Richard Wilbur, offered a paternal perspective on Ellen's fledgling struggles with language and art in his poem "The Writer" (see page 38). "From the first, we knew Ellen had a gift, and told her so," he says. "But I don't think she has learned anything from me—she's a natural writer. She has a perfect sense of narrative structure that I don't have at all; it amazes me."

Editors and fellow authors have concurred. A short-story writer, Ellen Wilbur, a Bunting Institute fellow in 1990-91, has a small, finely wrought body of work published in prestigious venues such as *Ploughshares*, *The Virginia Quarterly Review*, *Shenandoah*, *The Georgia Review*, *The Harvard Review*, *The Yale Review*, *Agni*, and *New Letters*. Her fiction has been included in eight anthologies, including two *Pushcart Prize* volumes. In 1984, Stuart Wright's Palaemon Press Limited published *Wind and Birds and Human Voices*. "Skilled, sensitive, and daring in their reach," wrote Eudora Welty of this collection of her short fictions, "they are clearly the work of a born writer."

Early on, Ellen Wilbur tried writing a novel, but soon recognized short fiction as her métier. "The whole excitement of a short story is the tension in it," she explains. "Every word is important. When it works, it's thrilling." (Her father has written only one short story in his career, in the New Mexico desert in 1952. He comments that "the result, shall we say, was rather arid.") The yarns Richard Wilbur invented to tell Ellen and her brothers when they were children helped fuel her affinity for fiction. "He taught me the joy of imaginary play," she says. "He made the mind and imagining things more fascinating than anything else."

Today, Wilbur supervises the afterschool program for beginners and kindergartners at Shady Hill School in Cambridge. She has also edited *The Consolations of God* (Eerdmans, 2003), a collection of sermons by Phillips Brooks, A.B. 1855, S.T.D. '77, who was, for more than 20 years, rector of Trinity Church in Boston, where she worships. ("Even in print, and at the remove of a century, Brooks sounds well," wrote Pusey Minister in the Memorial Church Peter J. Gomes in a foreword, "which is no small thing when few sermons last beyond lunchtime.") Wilbur has even ventured into verse. "If you can believe it, I started out writing poetry," she says. "I had the nerve and the gall and was utterly fearless. Maybe it was because I was a girl—or my father was so good that I didn't worry about comparisons."

faculty in 1957 and stayed for 20 years. To "keep his hand in" as a writer, he requested, and received, every third semester off with pay. He moved to Smith College for 10 more years of teaching before retiring in 1986.

He always preferred subject-matter courses to creative-writing seminars, and consistently spent six or seven hours preparing for each hour of class time. "Looking back on 40 years of teaching, the thing I don't like about my performance is that I always cared too much about seeming omniscient, and didn't let the students do as much talking as they should have," he says. "They learn it when they say it for themselves, and sometimes students sitting around a table discover something quite fresh. It's satisfying when they find out things that no one had found out before."

In 1956, *Things of This World* appeared, winning the Pulitzer Prize and National Book Award; it contains what is probably Wilbur's best-known poem, "Love Calls Us to the Things of This World." After this pinnacle of success, years of critical disparagement followed. "Beginning in the 1960s, to write my kind of poetry, to write in meter and often in rhyme, was seen as altogether retrograde and old-hat," he explains. The introspective "confessional" poetry popularized by Robert Lowell '39, Litt.D. '66, Anne Sexton, and Sylvia Plath (Wilbur's poem "Cottage Street, 1953" describes his singular meeting with the suicidal Plath) took poetry in a direction that contrasted sharply with Wilbur's more oblique approach to self-expression. "When those distinctions between 'palefaces' and 'redskins' came around, I was invariably a 'paleface,'" he says in Jeanne Braham's 2007 book *The Light within the Light*, which profiles four modern poets, "and when poetry was dubbed either 'raw' or 'cooked,' mine was definitely 'cooked.'"

Though he says that every new poem is an experiment, Wilbur is no avant-gardist; he has steeped himself in the history of his art since antiquity, and builds on this heritage. "Wilbur's collections double as sparkling cyclopedias of forms," writes associate professor of English Stephen Burt, in a scholarly critique, "not just sonnets and villanelles but taut quatrains, couplets of all sorts, Provençal ballades, flawless terza rima, comically polysyllabic exact rhyme...." The poet has published only one free-verse (lacking rhyme and regular meter) poem in his life.

Yet Wilbur declares that he has no interest at all in form *per se* ("In the dictionary, *formalist* isn't far from *formaldehyde*") or in poetic craft for its own sake. "The kind of poetry I like best, and try to write, uses the whole instrument," he says. "Meter, rhyme, musical expression—and everything is done for the sake of what's being said, not for the sake of prettiness." At the same time, he believes that "For anyone who knows how to use these forms powerfully, they make for a stronger kind of poetry than free verse can ever be."

"All these traditional means are ways of being rhythmically clear," he explains: "making the emphases strong, making it clear what words are important. Rhyme is not just making a jingling noise, but telling what words deserve emphasis. Meter, too, tells what the rhythm of thought is. It doesn't necessarily sound like music, but it has the strength of sound underlying everything being said. I encourage my students to memorize poems. If a poem is good, it is well to say it again and again in your mind until you've found all the intended tones and emphases." He adds, "One of the great fascinations of poetry is that you're going almost naked: the equipment is so small, just language."

Today, Wilbur is one of the few active major poets writing rhymed verse in English; "Rhyming," he asserts, "will never go away." Braham quotes him on the subject: "Robert Frost had a wonderful way of putting it. He said, 'Bad poets rhyme words; good poets rhyme phrases.' That's central to my way of composing a poem. I want the rhyme to happen inevitably, as a part of the flow of the argument—not as a way of completing an arbitrary pattern. That latter thing is just ornamentation, doily-making."

Daniel Aaron observes that his "sense of form and control carries out the tradition of English lyric poetry. Dick's poems will last; they have finish, humor, detachment, coolness, elegance, precision. There's always something held back. The *(please turn to page 93)*

Blackberries for Amelia

Fringing the woods, the stone walls, and the lanes,
Old thickets everywhere have come alive,
Their new leaves reaching out in fans of five
From tangles overarched by this year's canes.

They have their flowers too, it being June,
And here or there in brambled dark-and-light
Are small, five-petaled blooms of chalky white,
As random-clustered and as loosely strewn

As the far stars, of which we now are told
That ever faster do they blot away,
And that a night may come in which, some say,
We shall have only blackness to behold.

I have no time for any change so great,
But I shall see the August weather spur
Berries to ripen where the flowers were–
Dark berries, savage-sweet and worth the wait–

And there will come the moment to be quick
And save some from the birds, and I shall need
Two pails, old clothes in which to stain and bleed,
And a grandchild to talk with while we pick.

A Measuring Worm

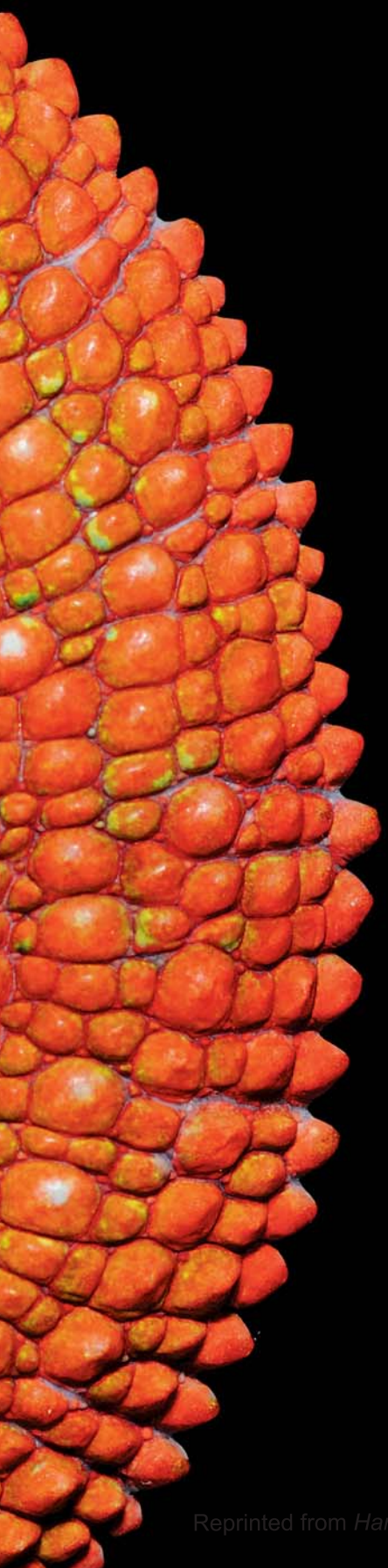
This yellow striped green
Caterpillar, climbing up
The steep window screen,

Constantly (for lack
Of a full set of legs) keeps
Humping up his back.

It's as if he sent
By a sort of semaphore
Dark omegas meant

To warn of Last Things.
Although he doesn't know it,
He will soon have wings,

And I, too, don't know
Toward what undreamt condition
Inch by inch I go.



ANIMALS *speak* COLOR

A new exhibition reveals how they acquire the language and use it.

To delight and instruct, *The Language of Color* at the Harvard Museum of Natural History corrals a many-hued menagerie of birds, mammals, reptiles, fish, mollusks, and wonderfully iridescent beetles from the University's numerous collections of specimens, and adds a colony of live dart frogs in a miniature jungle. With text, videos, and engaging interactive computer displays, it offers revelations to humans not fluent in the language of color.

The poisonous dart frogs use conspicuous color to tell predators that they are not good to eat. Similarly, a venomous coral snake sports rings of bright color to advertise that it isn't to be messed with—by a bird considering it for lunch, for instance—while a milk snake, which isn't poisonous and could be taken quite safely, looks much like a coral snake and trades on the latter's reputation. Bauer fellow Marcus Kronforst studies a bad-tasting species of butterfly that is orange, black, and yellow, and other species of unsavory butterflies that mimic its color and pattern to form a uniformed corps of the unappetizing.

Colors can conceal as well as warn, as in, "You can't eat me because you can't see me—I'm a cuttlefish and can change my color to match my background in a millisecond." Or, conversely, "I'm so well camouflaged with stripes [or spots] that you can't see me creeping up...and *I'm* going to eat *you*." Hopi Hoekstra, Loeb associate professor of the natural sciences, studies the genetic mechanisms at work in a species of mouse that adapts to its environment by being sand-colored if it lives at the beach and dark if it lives inland.

Visit harvard-mag.com/extras to view a video of the exhibit.

Perhaps some of the richest language of color has to do with sex. Janis Sacco, director of exhibitions, offers such examples as a male bird of paradise from New Guinea that not only sports much bolder colors than any female of the species, but also a ludicrously long tail. "Pick me as a mate," he says, "because I have this splendid thing you females may select mates on the basis of, and I must be fit because I have managed to survive despite having to carry it around with me while wearing these obvious colors." One sex story fit for the tabloids concerns wrasses and parrotfish. In many species, the females in a group are much less

Tail of the panther chameleon, *Furcifer pardalis,* of Madagascar. The same species appears on the cover. Chameleons do not change color to match their backgrounds, but to communicate excitement, anger, fear, and other emotions.

Photograph by Paul Bratescu

colorful than the dominant male. If the male gets eaten, the dominant female changes her sex—and puts on those brilliant colors.

But note: an animal's color depends on how it appears to the intended observer, and animals don't necessarily see color as humans do. Apparatus at the exhibition allows visitors to experience color through others' eyes. A deer, for instance, cannot distinguish reds. A pair of parrots looking each other over may appear richly colored to us, but to the parrots, who see ultraviolet light, they are even better—intensely, bodaciously flamboyant—and must knock each other's socks off.

The *whys* of the language are various, and so are the *hows.* Many animals acquire the language of color through pigments that they themselves metabolize. Others take in pigments through what they eat and show the pigments through their skin, as in the case of the scarlet ibis, which eats crabs and shrimp that eat red algae. And some colors are produced not by pigments, but by microstructures in fur, feathers, or scales that reflect only certain wavelengths of light. If you're Kermit the Frog, you are green not because you have green pigment, but because you reflect blue light through yellow pigment. Visitors to the exhibition can examine, as if through an electron microscope, the inner parts of a tiny barb on the feather of a bluebird to see how this reflective trick is done. The white hairs of a polar bear or of an arctic fox's winter coat, on the other hand, are *clear*—they lack pigment to absorb wavelengths selectively, or structures to reflect certain wavelengths—so they reflect back the entire spectrum, making the animal look white to us.

The Language of Color teaches that colors and the percep-

Many nudibranchs, a type of mollusk, are toxic or bear spines. This species, *Chromodoris magnifica,* uses bright warning coloration—aposematic colors—to signal predators to stay away.

OPPOSITE: PHOTOGRAPH BY COLIN TEO. RIGHT: TONY RINALDO. BOTTOM LEFT: KORY ROBERTS. BOTTOM CENTER: ROGER T. HANLON. BOTTOM RIGHT: BRIAN GRATWICKE

Left: The male Lady Amherst pheasant, *Chrysolophus amherstiae,* with his magnificent (and cumbersome) tail, says "Look at me!" to prospective mates. Below, left: The nonvenomous milk snake at top, *Lampropeltis triangulum,* lives side by side with the poisonous and brightly colored Texas coral snake at bottom, *Micrurus tener*, and takes on similar colors to fool predators into avoiding it, too—a trick called Batesian mimicry. In habitats where coral snakes are absent, such as New England, the milk snake's colors are more subdued. Below, center: In the blink of an eye, as a video shows, the giant Australian cuttlefish, *Sepia apama,* can change color to blend with its background. Below, right: The exhibition features a display of live frogs that, in the wild, have in their skins bitter, alkaloid toxins (derived from what they eat) strong enough to sicken or kill animals much larger than themselves. Their bold colors trumpet a warning. The dyeing poison frog, *Dendrobates tinctorius,* a blue morph of a species native to Suriname, appears at top, and at bottom, the phantasmal dart-poison frog, *Epipedobates tricolor,* from Ecuador.

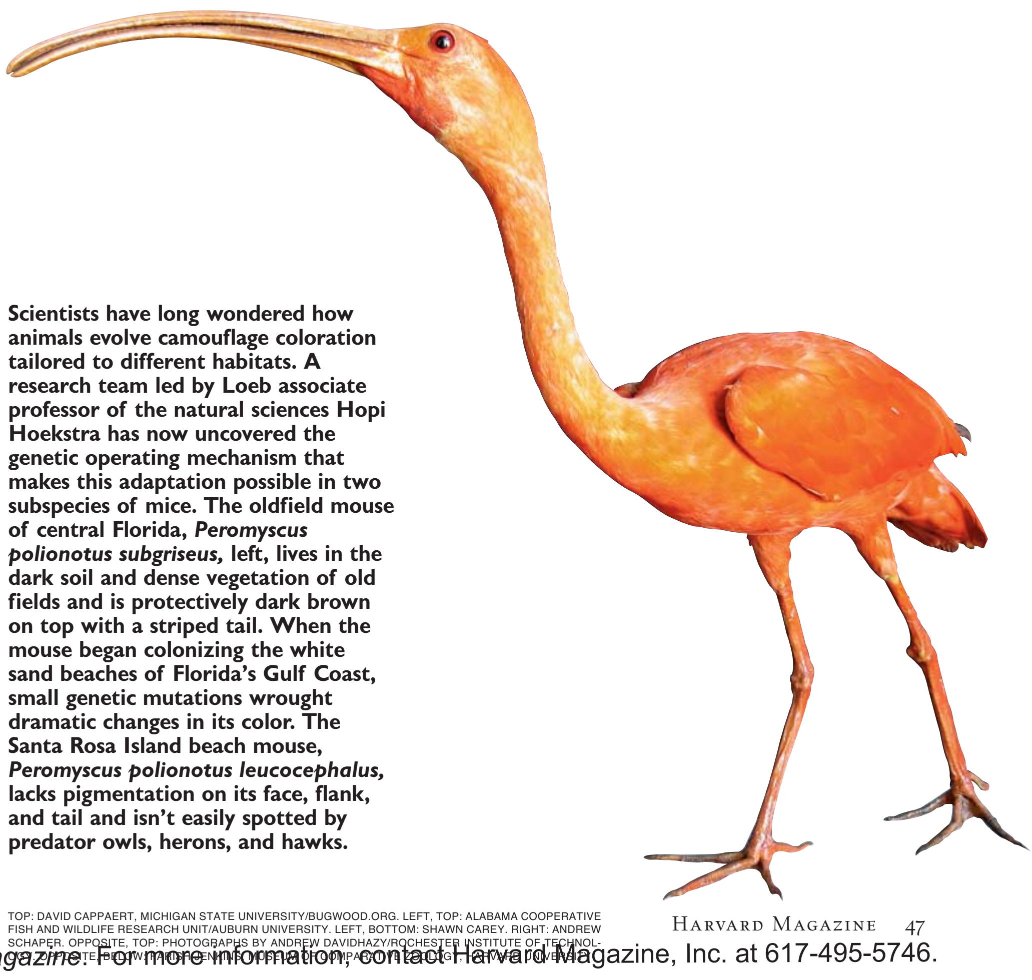
tion of them co-evolve. "Evolution R Us," says museum executive director Elisabeth Werby, who conceived the exhibition, "and color is a great way to get people excited about evolution, not as some dusty old theory that began and ended with Darwin, but as something which continues to inform all biology. Evolution is responsible for the amazing diversity and variety of nature showcased here. Evolution allows us to ask and answer the questions that researchers at Harvard are asking, such as, 'Why does the zebra have stripes?' Instead of reverting to the *Just So Stories*, we can use evolutionary theory to start to answer these questions."

—CHRISTOPHER REED

The Language of Color *runs through September 6, 2009. For information about the museum and exhibition hours, visit www.hmnh.harvard.edu.*

What humans see of the world is not all there is to see. An interactive computer display allows us to see how a deer, a whale, a bee, a fish, and a bird might perceive the world. Although we cannot visualize all that a parrot sees, for example, we can note how ultraviolet light, which it does detect, changes the emphasis of plumage on these two white-bellied caiques, *Pionites leucogaster,* perhaps evaluating each other as potential mates. A blossom of *Rudbeckia hirta,* a black-eyed Susan, under normal light looks simply yellow to us. The black-and-white image shows the same flower under UV light and reveals patterns that have probably evolved to attract pollinator bees and butterflies that can see the UV part of the spectrum. Bottom: A group of mares of *Equus burchellii,* the Burchell's zebra of the African plains. The exhibition explores research into how the zebra gets its stripes. What are the stripes good for? One theory is that when animals are in groups, the stripes make it more difficult for a predator to distinguish the outline of a single individual.

Nearly all the blues we see in the animal world, including the colors of the bluet damselfly above (of the genus *Enallagma*), are produced not by blue pigment but by blue light reflected by tiny tissue structures that scatter light and often enhance it. The scarlet ibis (below), *Eudocimus ruber,* gets its color from carotenoid pigments in the food it eats.



Scientists have long wondered how animals evolve camouflage coloration tailored to different habitats. A research team led by Loeb associate professor of the natural sciences Hopi Hoekstra has now uncovered the genetic operating mechanism that makes this adaptation possible in two subspecies of mice. The oldfield mouse of central Florida, *Peromyscus polionotus subgriseus,* left, lives in the dark soil and dense vegetation of old fields and is protectively dark brown on top with a striped tail. When the mouse began colonizing the white sand beaches of Florida's Gulf Coast, small genetic mutations wrought dramatic changes in its color. The Santa Rosa Island beach mouse, *Peromyscus polionotus leucocephalus,* lacks pigmentation on its face, flank, and tail and isn't easily spotted by predator owls, herons, and hawks.

TOP: DAVID CAPPAERT, MICHIGAN STATE UNIVERSITY/BUGWOOD.ORG. LEFT, TOP: ALABAMA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT/AUBURN UNIVERSITY. LEFT, BOTTOM: SHAWN CAREY. RIGHT: ANDREW SCHAPER. OPPOSITE, TOP: PHOTOGRAPHS BY ANDREW DAVIDHAZY/ROCHESTER INSTITUTE OF TECHNOLOGY. OPPOSITE, BELOW: PARISH JENKINS, MUSEUM OF COMPARATIVE ZOOLOGY, HARVARD UNIVERSITY.

Albert Gallatin Browne Jr.

Brief life of an early war correspondent: 1832-1891

by WILLIAM P. MACKINNON

WITHIN MONTHS of his 1857 inauguration, President James Buchanan plunged nearly a third of the U.S. army into an unprecedented power struggle with Utah territory's pugnacious governor, Brigham Young, and his large Mormon militia. Traveling with the army was Albert Gallatin Browne Jr., A.B. 1853, a 25-year-old war correspondent for Horace Greeley's *New York Tribune*—who also talked himself into the job of clerk for Utah's new federal chief justice, Delana R. Eckels, en route.

Browne's path to the Utah War (1857-1858) was anything but straight. The son of a prominent Salem, Massachusetts, ship chandler and abolitionist, he chose to forgo his father's business to enroll at Harvard Law School and study with Boston lawyer and abolitionist John A. Andrew. In 1854 he helped lead the mob seeking to free escaped slave Anthony Burns from federal officers enforcing the Fugitive Slave Act; when a constable died, Browne and several of Boston's most prominent abolitionists were indicted for homicide. The charges were dismissed, but Browne's family packed him off to the University of Heidelberg to take a Ph.D.—a distinction that prompted illiterate mountain man Jim Bridger to dub him "Doc" when they shared an army bivouac in the Rockies.

How Horace Greeley came to hire fellow-abolitionist Browne as a reporter is unclear; Browne's acceptance is not. By 1855, he had already considered a well-paid job as European correspondent for another newspaper. Once home, in 1856, he told an acquaintance he was resuming legal studies, but added: "I must learn to love the law from necessity, for I cannot from choice." The risky *Tribune* assignment offered an alternative—and was sufficiently noteworthy that a Mormon agent on the East Coast reported it to Brigham Young. Thus began Browne's second career, in journalism and publishing.

Key to Browne's success as a war correspondent were his curiosity, energy, resourcefulness in cultivating knowledgeable sources (military and civilian), and extraordinary access (through Judge Eckels) to newsworthy court documents, such as Young's federal treason indictment. So fascinating were his dispatches that one infantry officer in the expeditionary force had a friend in Buffalo mail him the *Tribune* so he could read Browne's reports on gossip from other regiments. Along with garrison tidbits, Browne included his own strong opinions: after Young proclaimed martial law and Mormon raiders destroyed nearly $1 million in army supplies, he wrote, "Either the laws of the United States are to be subverted and its territory appropriated by a gang of traitorous lechers, who have declared themselves to constitute 'a free and independent state,' or Salt Lake City must be entered at the point of a bayonet, and the ringleaders of the Mormon rebellion seized and hung." Technological advances in printing and telegraphy meant that his *Tribune* articles were relayed to the mass readership of other newspapers throughout the country. His copy reflected the style of the earliest English war correspondents covering the recent Crimean War and provided a model for reporters in the coming Civil War.

Then Browne himself became part of the story. On New Year's Day 1858, the Utah expedition's commander, having learned of Mormon plans for a spring offensive, offered him an extraordinary mission: return east with a plea to Buchanan and the army's general in chief for reinforcements. Four days later, Browne embarked on a daunting 4,000-mile trek to Washington and back that ended at the expedition's winter quarters at Fort Bridger, Wyoming, on May 28. When Young realized he was cornered, negotiations resolved the conflict: the Mormon leader was replaced as governor, a presidential amnesty for Utah's entire population ended plans for 30,000 Mormons to flee the territory, and the nation's largest army garrison was established near Salt Lake City. Browne stayed on until 1859, to file colorful descriptions of Mormon life and army frustrations, run unsuccessfully for the territorial legislature, and serve briefly as court-appointed guardian for a 12-year-old English girl whom the British government wanted repatriated after her retrieval from her aunt's polygamous family. (He later published a thinly disguised account of the affair, *The Ward of the Three Guardians*.)

Back in Boston, he rejoined Andrew's law office, lectured on Mormonism, and drafted the definitive insider's account of the Utah War for the *Atlantic Monthly*. Then came Andrew's election as governor in 1860, and the outbreak of the Civil War. Browne agreed to serve as Andrew's military secretary, his confidante and expediter: the liaison between Abraham Lincoln's principal gubernatorial backer and the government in Washington. After the war, he married a leading abolitionist and feminist, Martha "Mattie" Griffith, and worked successively as publisher for the Massachusetts federal court system and as editor of several New York papers, including the *New York Herald*, before returning to Boston to finish his life as a banker, clubman, and leader of his Harvard class. A classmate attributed his relatively early death to "a disease dating probably from the privations encountered in the Utah Expedition, from which he had suffered for many years with fortitude."

The greatest adventures of Browne's life were the Utah and Civil Wars. As the sesquicentennial of the first concludes and that of the second approaches amid continuing debate on media coverage of current wars, it is worth taking note of his foundational role.

William P. MacKinnon, M.B.A. '62, is a management consultant and independent historian. The first volume of his two-volume study of the Utah War, At Sword's Point, *appeared this year (University of Oklahoma Press).*

Browne in 1863, and samples of his dispatches from the Utah front.
Photomontage by Naomi Shea. Photograph courtesy of the Schlesinger Library, Radcliffe Institute, Harvard University; New York Tribune clippings courtesy of the Harvard College Library

DECODING DIABETES

New discoveries about a growing disease threat

>BY ELIZABETH GUDRAIS

As you read these words, conditions in your body may feel peaceful. Savor that feeling, because it is a Herculean achievement on nature's part. We owe this ability to sit reading quietly to a state of internal equilibrium—the technical term is *homeostasis*. This deceptive mantle of calm relies on an intricate choreography beneath the surface: picture air-traffic control at LaGuardia on a Friday evening. Under the skin, blood pulses, hormones circulate, microscopic proteins dart between cells. An incredibly complex web of signals transmits feelings of hunger and fullness, energy and fatigue, cuing the body to store energy or release it. We are oblivious to the hubbub within.

But in our bodies, as in the air-traffic control center, things can go wrong. A chronically overloaded flight schedule leads to chaos and, eventually, collapse. So, too, turning food into energy takes a toll. The body can metabolize a wide range of substances—fat, carbohydrate, protein—but this system begins to break down if chronically overloaded with excess calories that provide little nourishment. Our bodies' equilibrium is remarkably resilient—but not endlessly so.

Public-health statistics reveal the repercussions of pushing the limits of this resilience with poor diet, too little exercise, and otherwise unhealthy lifestyles. Two-thirds of American adults are now overweight, according to the Centers for Disease Control (CDC); half of these are clinically obese. In the past 30 years, the prevalence of obesity has more than doubled. In 1985, there were only eight states where more than 10 percent of adult residents were obese; by 2001, there was not a single state with obesity prevalence *below* 15 percent (see the map opposite). "Collectively," says Iacocca professor of medicine C. Ronald Kahn, "American adults gained two billion pounds during the 1990s." (That's roughly 10 pounds for each American adult, but an arresting figure nonetheless.)

Obesity, in turn, brings vulnerability to another debilitating metabolic dysfunction: diabetes. Someone with a body mass index above 40 (240 pounds for a person 5 feet, 5 inches tall; 295 pounds for a person 6 feet tall) is *seven times* as likely to develop the disease as someone of normal weight.

The CDC estimates that 18 million Americans have been diagnosed with diabetes, and almost 6 million more have it but have not been diagnosed. The cost of caring for diabetes and its complications accounts for one in every 12 dollars of healthcare spending in the United States. In fact, the health-related costs of obesity have surpassed those of smoking, notes Kahn, who from 2000 to 2007 directed the Harvard-affiliated Joslin Diabetes Center, which has 44 principal investigators and a research budget of $42 million this year. And, says Kahn, "the real impact of this hasn't even been felt yet." The CDC estimates that yet another 57 million Americans have prediabetes—elevated blood-sugar levels indicating the beginning of a breakdown in the body's mechanisms for reining in blood sugar after a meal and for getting energy from food.

In the face of this looming public-health crisis, science is a source of hope. New discoveries—driven by research in genetics, cell metabolism, and the study of small molecules—are creating a vastly more nuanced understanding of the risk factors that underlie obesity and diabetes, and of how those factors operate in the body to bring about disease. With such knowledge comes the promise of new therapies, preventive measures, and perhaps even a cure.

>Diabetes Basics

Diabetes has two main variants: type 1 and type 2. Both result from a defect in the body's insulin-producing mechanism, but the way they develop is quite different.

Insulin, the hormone that signals the body to take up circulating glucose from the blood, is produced by beta cells in the pancreas. That organ, lodged beneath the stomach, is roughly the size and shape of a banana; in a healthy person, the all-important beta cells, taken together, have the volume of the first joint of a pinkie finger.

Type 1 diabetes is an autoimmune disease: a person's own immune system attacks the beta cells, for reasons that are not well understood. Type 2 diabetes, the form associated with obesity, delivers a double whammy: cells in muscles, fat, and the liver become resistant to insulin's effects, and the beta cells compensate by pumping it out in ever higher amounts. Although medications and lifestyle changes—such as weight loss and exercise—to increase insulin sensitivity are a first line of defense, many patients ultimately need injected insulin to balance their blood glucose after their beta cells fail altogether.

This article deals mainly with type 2 diabetes, the form that is linked to the obesity epidemic and modern lifestyle factors. (This is the variant that has commonly been called adult-onset diabetes, but it is increasingly affecting children, too.) To read about recent advances in the treatment of type 1 diabetes, often called juvenile diabetes, see "Stem-Cell Progress," page 63.

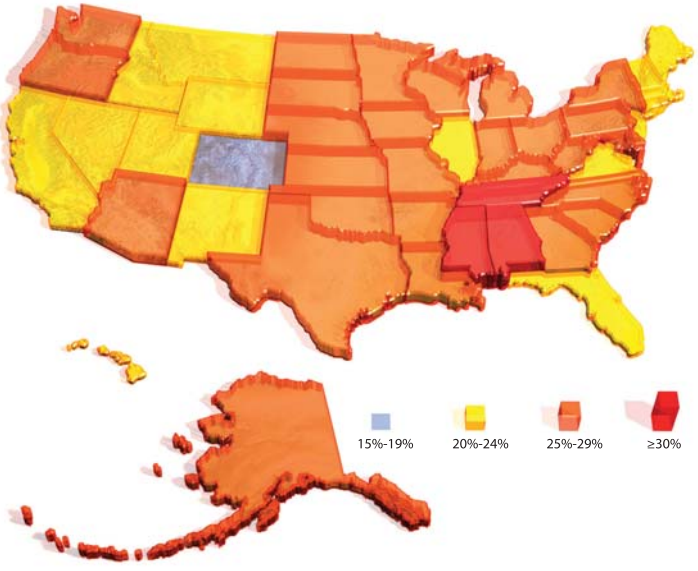
Portraits by Fred Field. Maps by Stephen Durke

Gökhan Hotamisligil

>BEYOND BLOOD SUGAR

Diabetes is a complex disease, but its medical definition is simple. In a healthy person, the body maintains blood glucose within a very tight range. (Commonly known as blood sugar, glucose is the body's primary circulating energy source, produced by metabolism of ingested food or synthesis from energy stores.) To keep glucose in check, beta cells in the pancreas secrete insulin. This, in turn, signals cells in the fat tissue, muscles, and liver to take up excess glucose from the blood and reserve it for use later.

AMERICA, THE (INCREASINGLY) OBESE



OBESITY, THE MOST POWERFUL RISK FACTOR for type 2 diabetes, is on the rise in the United States—at a dramatic pace. The map at left shows the prevalence of obesity among adults in each state in 2007. In 1985, there were only eight states where more than 10 percent of adults were obese; by 2001, not a single state had obesity prevalence below 15 percent. In some states, the prevalence now exceeds 30 percent.

But in diabetics, both the ability to produce and the ability to respond to insulin are impaired, so blood sugar remains elevated. The diagnosis of diabetes rests entirely on glucose level, but the reasons the disease is dangerous lie downstream. Experts agree that with perfect control of blood sugar, it would be possible to prevent most or all of the disease's complications. But monitoring blood sugar and injecting insulin, while life-saving, does not begin to approach the precision of the body's own control. Over a period of years, repeated glucose spikes after meals damage the blood vessels, contributing to a host of complications: heart disease, hypertension, nerve damage, kidney failure. Diabetes is a leading cause of blindness as blood vessels in the retina are damaged; poor circulation in the feet leads to sores that won't heal and, in a sadly high number of cases, amputation.

Some argue that developing better ways to monitor and manage blood sugar is the key to stemming the tide of diabetes-related healthcare costs, and certainly this is critical in the absence of a cure. But in the last decade, with the help of new research methods, scientists have been able to delve one layer deeper, fleshing out the insulin-glucose dichotomy to include contributions from other hormones, genes, organelles, and small molecules.

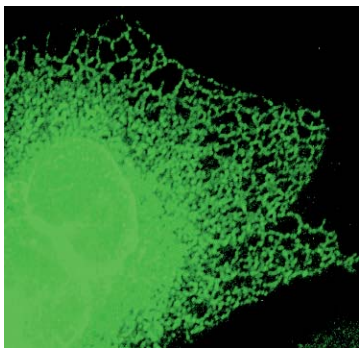
Consider the discovery of leptin, a hormone produced by adipose tissue, or fat. The hormone's identification in 1994 by Rockefeller University molecular geneticist Jeffrey Friedman

MAP DATA COURTESY OF U.S. CENTERS FOR DISEASE CONTROL

MICE FROM Gökhan Hotamisligil's lab: left, an ordinary mouse; center, a leptin-deficient mouse; and right, a mouse that lacks both leptin and adiponectin. Although hormone deficiencies and a high-fat diet have caused the latter mice to become obese, they appear to be immune to diabetes because of another genetic mutation. The next question is whether this discovery might translate to humans.

shook up existing notions of appetite, metabolism, and obesity. Up to that point, the scientific community had viewed fat as mere energy storage, excess calories socked away for later. Gradually, it came to view fat as an endocrine organ in its own right, secreting hormones and other molecular signals into the body. The discovery by Simmons professor of genetics and metabolism Gökhan Hotamisligil that fat emits inflammatory signals also informed this newly robust understanding of fat.

Leptin has potent effects on hunger and physical activity. Mice that lack leptin due to genetic mutations weigh three times the normal amount and are lethargic; injected with the hormone (named after the Greek word *leptos*, meaning "thin"), the mice become more active, eat less, and lose weight.



GÖKHAN HOTAMISLIGIL

PROTEIN STAINING turns a cell's endoplasmic reticula green. These organelles, responsible for folding newly made proteins, show up as a mesh-like network inside each cell. Endoplasmic reticulum stress, a state that results from caloric overload, is critical in the progression to diabetes.

Nor are these its only effects. Associate professor of medicine Christos Mantzoros has shown that in female athletes who are so lean they stop menstruating, leptin therapy will restore menstrual periods absent any weight gain or changes in diet—a finding that also has implications for the study and treatment of anorexia nervosa. Walker professor of medicine Jeffrey S. Flier, who is dean of Harvard Medical School (and in whose lab Mantzoros trained), discovered that although some obese humans have low leptin levels—and lose weight when given synthetic leptin—*most* obese people have abnormally *high* levels of the hormone. Flier soon realized that leptin *resistance* commonly accompanies obesity, akin to the insulin resistance that characterizes, and precedes, type 2 diabetes. In these people, evidently, leptin does not have its normal effect of inducing feelings of satisfaction and energy, so their bodies produce more and more, but to little effect, because the signals are scrambled.

This finding prompted questions about why and how leptin resistance arises. Flier was among those to note a structural similarity between leptin and cytokines, proteins used in intercellular communication. He suspected that a category of proteins known as SOCS—suppressors of cytokine signaling—acted on the cellular receptor system that handles leptin signaling. His findings confirmed the hypothesis: a protein called SOCS3 interferes with leptin action. Increase the SOCS3 level and mice show decreased response to leptin and don't stop eating as

>Diet, Exercise, and You

Plain and simple, humans are becoming more obese and more diabetic. Although genetic factors undoubtedly contribute, the pace of change is so fast that the explanation cannot possibly lie in changes in our DNA.

But the recognition that environmental factors are vitally important to the obesity and diabetes epidemic is roughly where the consensus ends. Most scientists working in the area agree that some variation of too much food and too little activity is to blame. But others say the real problem is the wrong *type* of food—and even here there is disagreement about whether the chief culprit is too much sugar, too many carbohydrates in general, too many refined (as opposed to complex) carbohydrates, too little fiber, or too much animal fat.

And food and exercise are not the only environmental factors that matter. Some experiments have shown that sleep deprivation causes hormonal changes that ramp up hunger; a study published this year found that poor sleep quality impairs the body's ability to regulate blood sugar. One recent paper linked increased diabetes risk to chronic, low levels of arsenic in drinking water; another linked obesity to high levels of monosodium glutamate (MSG) consumption. But teasing out the relative importance of each influence is, in some sense, an academic exercise.

Diet and exercise are still the most powerful ways to protect against diabetes (see "The Way We Eat Now," May-June 2004, page 50, and "The Deadliest Sin," March-April 2004, page 36). But getting people to follow this advice is difficult—particularly when the cheapest and most convenient foods are often the least healthful, and government policies contribute to the problem by subsidizing the production of high-fructose corn syrup and livestock feed, making fresh produce relatively more expensive.

Professor of genetics and of medicine David M. Altshuler cites an experiment that reduced the progression to diabetes by two-thirds in a prediabetic population. That study provided people with exercise coaches and dietitians—the kind of one-on-one attention and monitoring that keep celebrities lean and fit, but are expensive and, says Altshuler, "unrealistic to apply in a broad-based way across the country." Even with that intensive intervention, he notes, some of the subjects still developed diabetes. "The rate in the control group was 10 percent per year," he says. "Slowing that by two-thirds was really great—but people were still getting diabetes." Other than bariatric surgery (which reduces the size of the stomach), says Altshuler, "the available treatments are just not very effective."

Even as scientists acknowledge the importance of behavior, they recognize that we are human and prone to falling off the wagon. A diet that succeeds fabulously in mice may be impossible to replicate in people, short of locking subjects in a lab and physically preventing them from eating more than a certain amount.

The notion of thinness as a badge of superior will power rankles some researchers. "Even today, at least 30 percent of people maintain normal body weight without thinking about it very much," says


David M. Altshuler

soon; take away SOCS3, and mice are *more* sensitive to leptin.

But this signaling pathway, once identified, did not translate easily into a new therapy. Removing one substance from the body can leave receptors more sensitized to some other molecule that uses the same pathway; conversely, blocking the receptor may affect bodily processes far outside the intended conse-

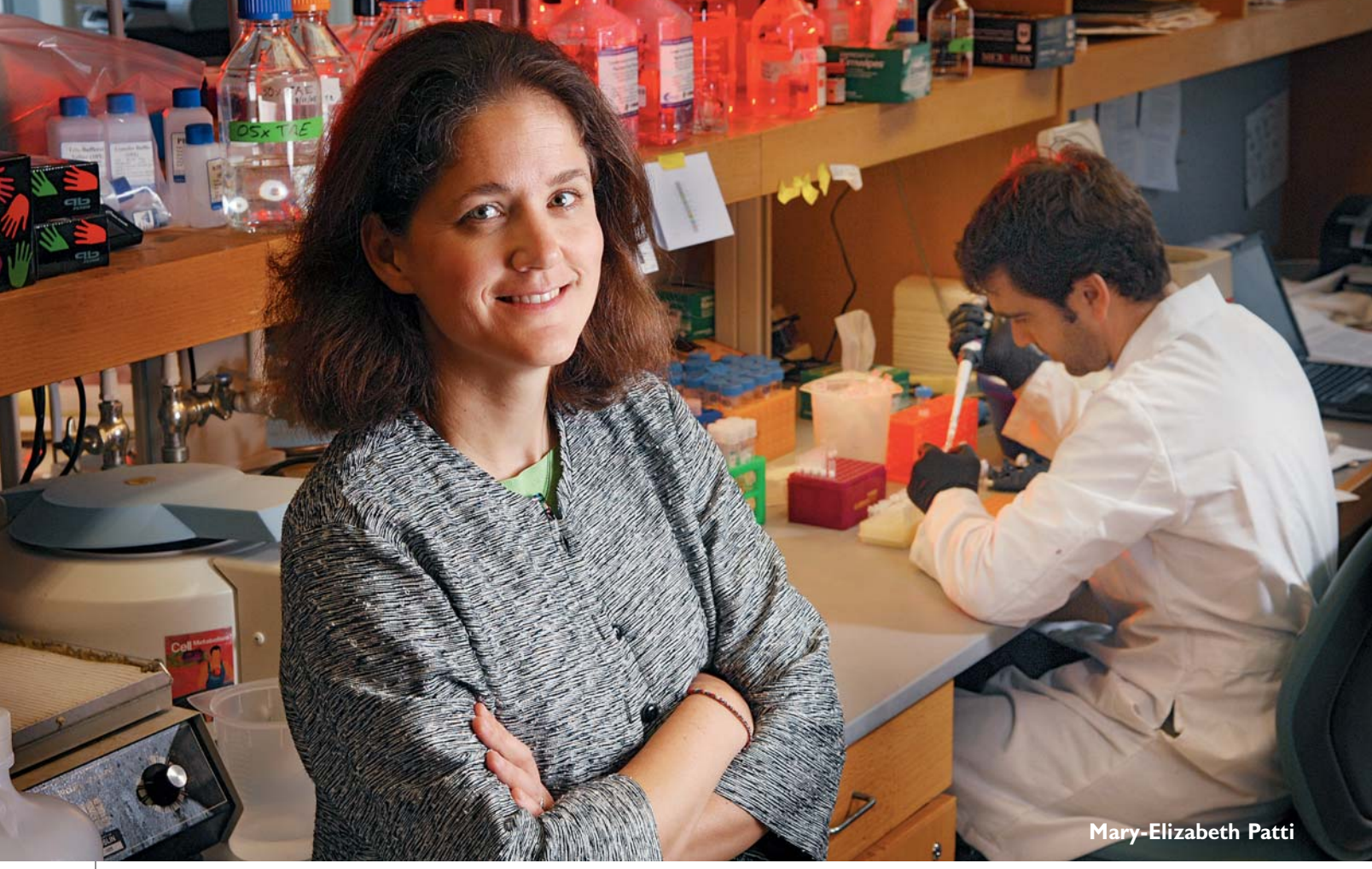
associate professor of medicine Eleftheria Maratos-Flier, an endocrinologist who treats obese patients at the Harvard-affiliated Beth Israel Deaconess Medical Center and researches the hormonal signals and neural pathways that regulate energy balance. Although many people stay lean only through vigilant eating and exercise, others can eat vast amounts of food day after day without becoming obese. Some studies have found people who fail to lose weight despite very low caloric intake. Learning more about genetic variation can help explain why some people stay thin without trying. This, in turn, points to therapies that may help bridge the physiological gap between those who are prone to obesity and those who are not.

The study of individual variation also points to lifestyle-change strategies that don't set people up for failure. Research by associate professor of pediatrics David S. Ludwig, who directs the Optimal Weight for Life program (www.optimalweightforlife.com) at the Harvard-affiliated Children's Hospital Boston, has revealed an apparent biological explanation for individuals' varied responses to the same weight-loss regimen. Ludwig has found that the population falls into two groups—rapid insulin secreters and slow insulin secreters. When given an oral glucose solution, the ultimate simple carbohydrate and the common test for diabetes, people in the first group show a pronounced spike in insulin secretion; such spikes can lead in turn to *low* blood sugar and hunger. The latter group, with more gradual insulin release, avoids this roller-coaster effect.

In an 18-month randomized controlled trial of obese young adults, slow insulin secreters lost the same amount of weight on a low-fat diet as on a low-glycemic-load diet (rich in fat, protein, and slow-digesting carbohydrates such as vegetables and whole grains). The rapid insulin secreters, in contrast, lost *five times more* weight on the low-glycemic diet than on the low-fat diet. Probing individuals' distinct biology this way can help explain why some dieters find the pounds melting off, while others find weight loss stubbornly elusive, says Ludwig: "The individuals who do well on a low-carb diet may not be the same individuals who do well on a low-fat diet."

Take another example: eating seafood regularly and consuming one alcoholic drink per day are generally considered ingredients of a healthy diet. But professor of nutrition and epidemiology Frank B. Hu has found that for people with a condition called hyperuricemia—excess uric acid in the blood, a condition genetic in origin and more common among Asians than in the general population—these same dietary choices further heighten uric acid levels and, consequently, diabetes risk. Hu and others have also published findings of increased diabetes risk for people with an elevated level of iron in the blood: for certain people whose bodies are genetically primed to absorb iron with particular efficiency, iron supplements may harm, not help.

Such knowledge may one day produce personalized prescriptions for losing weight and avoiding diabetes. For now, they point to one conclusion, says Walker professor of medicine Jeffrey S. Flier, an obesity researcher who is dean of Harvard Medical School (and Maratos-Flier's husband): "It isn't as simple as eating less and exercising more."


Mary-Elizabeth Patti

quences. In this case, it would seem desirable to design a drug that somehow immobilizes SOCS3 in the body and therefore pumps up leptin's effects, were it not for another of the protein's functions: limiting inflammation. Mice with SOCS3 genetically deleted die when injected with inflammatory cytokines. SOCS3, says Flier, is "one way the body protects itself from going into shock every five minutes."

Even well-known biological mechanisms are often more complex, and more interconnected, than we ever imagined. Earlier diabetologists believed insulin's relevant action was on the liver, signaling the organ to synthesize or store glucose. Then a series of experiments in mice, some of them in Ronald Kahn's lab, showed that insulin also affects the brain, muscles, fat tissue, beta cells, and the endothelial cells of the blood-vessel walls. "It turns out," says Kahn, "that all tissue has insulin receptors." Such discoveries underscore the difficulty in devising a cure.

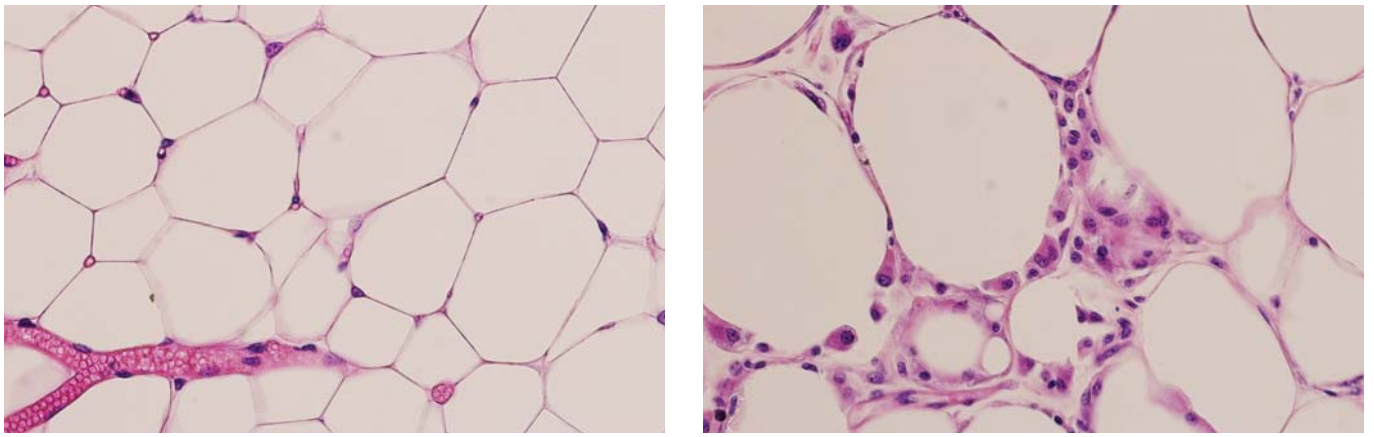
A newer line of research by Kahn illustrates that not all fat is created equal. Previous studies found an association between copious visceral fat, which accumulates around the internal organs, and health problems including insulin resistance and type 2 diabetes; subcutaneous fat, which resides just underneath the skin, is associated with *improved* insulin sensitivity and *lower* diabetes risk, particularly when that fat is located in the gluteofemoral region—the hips, thighs, and buttocks.

Kahn and colleagues used a fat-transplantation experiment in mice to test whether the operative factor was the fat's location or, rather, some properties inherent in the fat. Their results, published in *Cell Metabolism* in May, imply that visceral fat and subcutaneous fat are fundamentally different: mice that had subcutaneous fat added to their abdominal cavities scored better on metabolic tests, while mice that had visceral fat added under their skin scored worse, indicating that the two types of fat tissue retained their original effects in a new location. The next challenge is to determine what makes subcutaneous fat salubrious and visceral fat harmful, and what factors—genetic or environmental—lead people to develop one type or the other.

Even if we narrow the focus to consider only hormones (chemical messengers that travel the relatively long distance from one organ or type of tissue to another), the contributors to weight gain and diabetes go beyond insulin and leptin. Also involved are adiponectin, which acts similarly to leptin and is also secreted by fat; ghrelin, secreted by the stomach and pancreas to stimulate appetite; glucagon, secreted by the pancreas to tell the liver to release stored glucose for immediate use; and melanin concentrating hormone, which stimulates appetite and is generated in the brain.

At the same time that scientists are trying to understand the functions of known hormones, they are discovering entirely new ones. Just this year, researchers at the Harvard School of Public Health announced the discovery of a new class of hormones: lipokines. Unlike previously identified hormones, which are steroid- or protein-based, lipokines are made of lipids, or fats. Hotamisligil, postdoctoral fellow Haiming Cao, and colleagues used a novel technique to identify hundreds of fatty acids and pinpoint one that carried a message from mice's fat cells to their muscles and livers, improving insulin sensitivity and blocking fat accumulation. Their work, published in *Cell* in September, also showed that obesity compromises the body's ability to make this marvelous molecule.

Mapping these small-scale processes can seem like a game of whack-a-mole: understanding one small constituent part leads



GÖKHAN HOTAMISLIGIL

COMPARING THE ADIPOSE TISSUE of fat and thin individuals reveals major differences in structure and function, as shown in these slides of mouse tissue. Fat cells from a lean mouse (above left) are tightly packed and relatively uniform in shape and size; fat cells in an obese mouse (above right) have swollen up with stored lipids and become much larger. The purple dots between the cells are inflammatory cells and macrophages that cluster around dead and degenerated cells to engulf and digest them.

only to the realization of how much else *isn't* understood. But the approach has already led to new therapies: several popular diabetes drugs act on signaling pathways—for instance, to stimulate insulin production, decrease glucose synthesis in the liver, and discourage fat storage. And teasing out each step has importance beyond finding drug targets; it helps distinguish primary changes from mere side effects in the progression to diabetes.

>FROM HEALTH TO DISEASE

Obesity almost always precedes type 2 diabetes, but not everyone who becomes obese will go on to develop the disease. Does obesity *cause* diabetes, or is there some underlying factor that causes *both* conditions? So far, the answer appears to be "some of each." Assistant professor of medicine Mary-Elizabeth Patti is among the researchers who are working on the road map that leads from health to disease, trying to figure out where the balance lies.

"By the time people get diabetes, there are many, many things that have changed," says Patti, a researcher and endocrinologist at the Joslin. "Their glucose levels are high. Their insulin levels are lower than they should be, given the high glucose. Their lipids—circulating fats in their blood—are high." Using medical imaging, scientists (the Joslin's Alan M. Jacobson and Gail Musen among them) have revealed changes in both brain structure and brain function in diabetic patients, compared to those without the disease. The challenge is distinguishing cause from effect. Says Patti, "There are a lot of things that are already abnormal. Each of these things clouds the picture, so it's hard to tell which are the primary changes."

Setting out to learn what people with diabetes had in common from a genomic standpoint, Patti found impaired function in the expression of genes regulating mitochondria, the cellular powerhouses that convert glucose, lipids, and amino acids into ATP, the form of chemical energy that powers the body. This defect in one of the body's most fundamental cellular components made sense. "If you don't have as many mitochondria, or you don't have normal function of mitochondria, you wouldn't be able to oxidize or burn fuel, and that fuel would reside in cells and not be utilized well," she says. But among people with high risk of developing diabetes because of obesity or family history, Patti *did not* find higher incidence of mitochondrial dysfunction, indicating that it is probably not the medium by which these risk factors coalesce into disease. Rather, she says, the results "suggest that mitochondrial dysfunction is an end result of everything that's happened."

Gökhan Hotamisligil believes he has a candidate for the culprit that tips a healthy human into a state of illness. He has zeroed in on a phenomenon called endoplasmic reticulum stress: a sort of energy overload, like an assembly line moving just slightly too fast for a worker to keep up. As the products move by, the worker can speed up a bit, but she tires faster, falls behind, and eventually gives up completely—at which point the products move by unattended and the whole operation collapses.

Like mitochondria, the endoplasmic reticula are organelles housed within cells, and they perform a function fundamental to life: folding newly made proteins and transporting them to the proper destinations. But the endoplasmic reticulum does not have an infinite capacity for increasing the rate at which it works: it "is highly sensitive to the energy and glucose level inside the cell," says Hotamisligil, "and if demand is very high, it starts having trouble." It emits an "SOS signal" in the form of enzymes called JNK, discovered by Hotamisligil's lab in 2002, and IKK, identified around the same time by professor of medicine Steven E. Shoelson's lab at the Joslin.

The medical world had long recognized that protein-folding problems played a critical part in cystic fibrosis and some neurodegenerative diseases, such as ALS (Lou Gehrig's disease) and some forms of Alzheimer's. But the idea of a link to diabetes was new. Now, Hotamisligil's lab is working on "chemical chaperones," compounds that they have already shown (in mice) to assist in protein folding and shore up the capacity of the endoplasmic reticulum, resulting in a reversal of diabetes. Pharmaceutical companies are hot on the trail of drugs that incorporate this technique, and also of JNK inhibitors that cancel the SOS signal and its effects downstream in the body.

>THE INFLAMMATION CONNECTION

Elucidating the very specific roles of tiny proteins points to large-scale synergies in the body. Obesity typically accompanies a whole host of health problems: not just diabetes but often heart disease, hypertension, cirrhosis, impaired fertility, and even cancer. New research is revealing the ways in which whole systems and processes are interwoven—elegantly so in health, and vexatiously so in disease. Efforts to understand what exactly ties isolated health problems together into multifaceted disease

have led scientists to focus on inflammation, a familiar physiological mechanism whose true import is only now becoming clear.

Many molecules implicated in type 2 diabetes—JNK, IKK, and SOCS3 among them—are components of the inflammatory signaling system, part of the body's immune response. And these signals are activated by food intake.

Whenever we eat a meal, the body responds as if to an infection. In healthy people, this reaction, which accompanies the release of insulin in response to food, dies down after a time. The trouble seems to come when meals are so close together, or so inordinately large, that the body never gets a chance to recover from its inflamed state. "This ancient capacity of fat cells to produce an immune-like response is activated when they're exposed to large amounts of energy," says Hotamisligil. "The body starts perceiving excess amounts of energy as a foreign invader."

While working in Hotamisligil's lab, Kathryn Wellen, Ph.D. '06, identified a new group of molecules called STAMPs that help fat cells cope with the onslaught of energy. Mice without these molecules developed metabolic problems (high blood sugar and lipids, insulin resistance, fatty liver, abdominal fat accumulation) when fed a normal diet; the hope is to harness STAMPs' effects for use against the hazards of overeating in humans. Foods such as fruits and vegetables, herbs and spices, oily fish, and some nuts have natural anti-inflammatory properties, so a diet high in these foods also helps to mitigate this response.

Adipose tissue itself secretes pro-inflammatory molecules that are highly correlated with diabetes risk, independent of other factors. Professor of nutrition and epidemiology Frank B. Hu has found that obese people with high levels of interleukin-6—a potent inflammatory cytokine secreted by fat tissue—are more likely to develop diabetes than those with lower levels. On the other hand, people with high levels of adiponectin, an anti-inflammatory hormone also secreted by fat, enjoy a strong protective effect: people in the highest quintile for circulating adiponectin have a 90 percent reduced risk of getting diabetes. This effect held true in lean and obese subjects, whether active or sedentary, across all age groups. Because circulating levels of these substances are determined in part by genes, such findings help explain why some people are very resistant to developing diabetes, despite having multiple risk factors.

Particularly in obese individuals, adipose tissue contains clusters of macrophages, the immune-system cells that destroy and then digest invading pathogens. There are two types of macrophages: one that attacks viciously and kills alien microbes, and another that swoops in to repair the damage afterward, bringing about healing and tissue repair. The latter type is more plentiful in the fat tissue of lean people; obese people tend to have more

>Genetic Protections

Diabetes does not have a simple, single genetic basis in the Mendelian sense (tall plants or short, blue eyes or brown, diabetic or not). Rather, it is a complex, *polygenic* disease. That is to say, in almost everybody who develops diabetes, several genes act together, with input from environmental factors, to bring it about.

New tools are enabling the systematic study of the genes that underlie the disease, and producing surprising findings. Comparing the genomes of people with and without diabetes, scientists at the Harvard-affiliated Massachusetts General Hospital and the Broad Institute of Harvard and MIT have identified 17 specific genetic variants associated with type 2 diabetes, says professor of genetics and of medicine David M. Altshuler, an endocrinologist and human geneticist who heads the Broad's program in medical and population genetics. Before conducting the analysis, researchers at the Broad and other prominent programs that study the disease made a list of more than 500 "suspect" parts of the genome where they expected to find a correlation with diabetes based on earlier research. Not a single one came back positive. "What this tells me," says Altshuler, "is there's a lot of the biology of the disease that we don't yet understand."

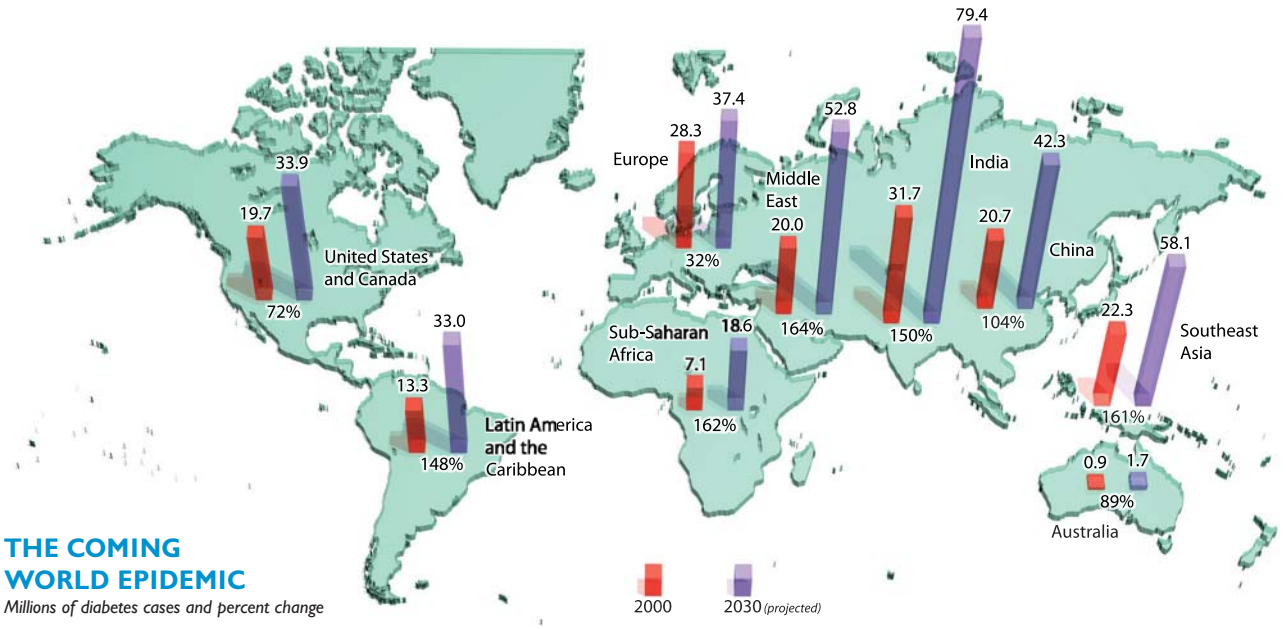
The fact that type 2 diabetes has a far stronger genetic concordance in identical twins than type 1 does is not widely recognized. Someone whose twin has type 1 diabetes has a 30 percent chance of developing it himself; for someone whose twin has type 2 diabetes, the probability is "upwards of 80 percent," says Altshuler.

He hopes genetic analysis will ultimately lead to therapies. It has already yielded intriguing hints about how the disease might work. Of the 17 diabetes "hot spots" identified, 11 were associated with decreases in insulin secretion—and not one was associated with insulin resistance. Type 2 diabetics have both insulin resistance and impaired insulin secretion; this finding implies that the latter plays a stronger role than the former in the progression to disease. In other words, the people who get diabetes are those whose beta cells cannot compensate by pumping out immense doses of insulin to compensate for insulin resistance—and individual genetic makeup strongly influences the body's capacity to generate more insulin. This, too, indicates a closer similarity between type 1 and type 2 diabetes than previously recognized, since type 1 diabetes is characterized by complete breakdown of insulin production when pancreatic beta cells are destroyed.

Another group of researchers is looking beyond the genome to epigenetics: changes in the expression of genes independent of changes in the underlying DNA. Changes in the way DNA is packaged encourage or discourage gene expression, and here the intrauterine environment has powerful influence. Assistant professor of medicine Mary-Elizabeth Patti studies low-birthweight mice as a way to understand the strong correlation between low birthweight and obesity later in life, in both humans and mice. Patti was surprised to find that the *offspring* of the low-birthweight mice—that is, the grandchildren of the mice that were underfed during pregnancy—were also predisposed to diabetes, even though nutrition during their gestation, and their entire lifetime, had been normal.

Although this study brought about low birthweight through gestational caloric restriction, low birthweight can result when the mother's health suffers in other ways—including hypertension and diabetes. So Patti's findings mean that the current epidemic of metabolic disease could result, at least in part, from our grandparents' life experiences. More unsettling is the potential impact on future generations.

But Patti's research has yielded one bit of happy news. Restricting food intake for the low-birthweight mice, so that they eat no more than the baby mice whose weight at birth was normal, keeps the former from gaining weight as rapidly—and from becoming obese and diabetic later in life. "There is a period of plasticity when the organism is still sensitive to manipulation," says Patti. "That's the key point." This research may have revealed a strategy for breaking this metabolic vicious cycle. But, she says, "We clearly need to test this in humans."



THE UNITED STATES'S CAR-CENTRIC CULTURE and labor-saving appliances have saved Americans from having to walk anyplace or get even the minimal amount of physical activity involved in washing dishes by hand or wringing out laundry. Combined with the easy availability of cheap, highly processed, calorie-dense foods, the American lifestyle represents the "perfect storm" for diabetes. As this lifestyle continues to spread, it is a fair assumption that so will the American pattern of health problems. In rural China, for instance, diabetes incidence is less than 2 percent; in Hong Kong—with a genetically similar, but urbanized, population—the rate exceeds 10 percent.

Although diabetes incidence in the United States, Canada, and Europe is still relatively high, it is not because people of non-European descent have some sort of genetic protection. In fact, with similar lifestyles they are *more* likely to develop the disease. Diabetes incidence among non-Hispanic white American adults is 6.6 percent; among Asian Americans, it is 7.5 percent; among Hispanics, 10.4 percent; and among blacks, 11.8 percent.

Disparities persist even after controlling for factors such as diet and exercise. One factor: the threshold for developing diabetes varies among racial groups. For example, researchers with the Asian American Diabetes Initiative (http://aadi.joslin.harvard.edu) have found that for people of Asian ancestry, heightened diabetes risk begins at a body mass index of 23—well within the range the Centers for Disease Control considers normal. And this group is doubly vulnerable: people of Asian descent have higher genetic susceptibility to the disease's *complications*, such as atherosclerosis.

If obesity and diabetes are a ticking time bomb in the United States, they pose an even larger threat in the developing world, where in many places the number of people with the disease is expected to double during the next two decades.

of the former. Assistant professor of genetics and complex diseases Chih-Hao Lee is trying to parse cause and effect, and has found evidence for causality in both directions, in mouse models that presumably would translate to humans: inflammation makes an individual more prone to gaining weight, which makes the body's baseline state more inflamed—a vicious cycle.

In a way, it makes perfect sense that inflammation and the immune response would be intimately linked to metabolism. Although the recognition of postprandial systemic inflammation is relatively recent, scientists have known for many years about another physiological state that triggers coordinated action. During acute infection, as the immune system fends off an invader, the body induces a temporary state of full-body insulin resistance, apparently because macrophages demand huge amounts of glucose. In a state of insulin resistance, the muscles, fat, and liver leave glucose circulating in the bloodstream instead of taking it up, and even release stored glucose to further bolster the immune response. Thus, the body gets the necessary power supply to counter the crisis of infection.

This phenomenon was taken for granted, perhaps because the articles documenting it were published so long ago, says Lee, that "when you do a PubMed search, you can't even find them." But recognition of connections between insulin action and metabolism on the one hand, and inflammation and the immune system on the other, has spurred renewed interest.

Visit harvardmagazine.com/-extras to:

- **calculate** your body mass index
- **find out** whether you are at risk for type 2 diabetes
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- **listen to** interviews with Gökhan Hotamisligil and David Ludwig

It has also spurred a rethinking of the medical dogma that type 1 and type 2 diabetes are entirely distinct. Type 1 has been—and still is—characterized as an autoimmune disease, while type 2 was considered altogether different. Although a type 2 patient's body does not attack the beta cells in the pattern that defines type 1, scientists are beginning to recognize that the immune system plays a part in the development of type 2. And assistant professor of medicine Rohit Kulkarni, a researcher at the Joslin, has found that type 1's pathogenesis is also not as simple as previously thought. Studying mice genetically predisposed to get type 1 diabetes, Kulkarni found that in those animals that eventually developed the disease, there was a breakdown of insulin signaling—the hallmark of *type 2* diabetes—even before beta cells began to die off. It is also not lost on those who study the disease that the onset of type 1 diabetes sometimes follows an acute infection—that is, it follows the aforementioned full-body insulin resistance.

As the gap between the disease's two variants shrinks, there is hope for new findings that shed light on both—and for therapies with dual applicability. "They are not the same," says Hotamisligil. "But they are much more similar than we thought even five or six years ago."

Elizabeth Gudrais '01 is associate editor of this magazine.

MAP DATA COURTESY OF S.H. WILD, G. ROGLIC, A. GREEN, R. SICREE, AND H.KING, "GLOBAL PREVALENCE OF DIABETES ESTIMATES FOR 2000 AND PROJECTIONS FOR 2030." *DIABETES CARE* 2004, 27:1047-1053

JOHN HARVARD'S

JOURNAL

Labs, Size Large

The Northwest Science building houses the Center for Brain Science, a systems-biology lab, classrooms, and (coming soon) entire collections from the Museum of Comparative Zoology (MCZ). But the impressive façade, rising four stories above Oxford Street, only hints at the building's true size. "I wouldn't say 'tip of the iceberg,'" explains project manager Vincent Pafumi, "but a large percentage of the building is below grade." More than half of Northwest's 470,000 square feet is underground.

Four stories beneath the surface, work continues on a neuroimaging lab, soon to include MRI machines. On the second and third floors down, facilities for the MCZ occupy nearly 50,000 square feet. James Hanken, director of the museum and Agassiz professor of zoology, says that the collections (at least five, likely ranging from mammals to birds to mollusks) won't simply sit in storage. Undergraduates and visiting scientists alike will be able to study the specimens in work areas and labs. The museum's current facilities are less than ideal—too hot in the summer, too cold in the winter—but Hanken promises that the new space will be state of the art. The first floor below ground level already teems with

Photographs by Stu Rosner

Above left: High windows overlooking a courtyard reflect the Museum of Comparative Zoology. The low granite curbs among the trees frame skylights. Top: The eastern façade. Above center: Dawdlers can relax on couches and gaze up through those same skylights in one of the building's social spaces. Above right: The labs in the building are unusually flexible. Instead of air pipes affixed to a wall, for example, hoses drop down from the ceiling. The desks and tables, rather than remaining bolted to the floor, can be readily reconfigured to suit researchers' needs.

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students going to and from class in the building's two auditoriums and seven seminar rooms. The ground level has teaching labs and a café that is scheduled to open in December. The second and third floors contain the Center for Brain Science, where neuroscientists will study everything from memory to how young birds learn their fathers' songs. The top floor is devoted almost entirely to systems biology, a relatively young field that brings experimental and theoretical biology together. Altogether, more than 300 people, including about 30 faculty members and their research groups, will work in the new facilities.

The most difficult part to build? That, says Pafumi, would be the floating staircase that connects the first floor to those above and rises from landing to landing without support pillars in between.

Endowment Edges Up in a Down Year

The university's endowment increased by $2.0 billion, or 5.7 percent, during the fiscal year ended June 30, according to the annual report by Harvard Management Company (HMC), released in early September. The new total of $36.9 billion represents an 8.6 percent investment return on endowment assets after expenses and fees; plus endowment gifts received during the year; minus the distribution of $1.6 billion in funds to support University operations and substantial capital outlays.

Jane L. Mendillo, HMC's president and chief executive officer since July 1, called the results for fiscal year 2008 "very solid" in light of "pretty turbulent market conditions." She said that Robert S. Kaplan, who served as acting president and CEO from last November through June 30, had done a "fantastic job" of leading the organization during a time of senior management transition and very challenging financial circumstances. Kaplan, who has now joined HMC's board, cited the work of the "great team here" in the investment organization.

The 8.6 percent return on investments follows a stellar 23 percent return in the prior fiscal year (see "The Endowment: Up, and Upheaval," November-December 2007, page 64). That returns in fiscal year 2008 were less robust is hardly surprising. The endowment assets are diversified among many categories of investments (domestic, foreign, and emerging-market equities, private equities, commodities, real estate, various kinds of bonds, etc.), but HMC noted, as it does traditionally, that popular market measures such as Standard & Poor's 500 index (of large U.S. stocks) had declined 13.1 percent during the fiscal year, while the Lehman Aggregate Index (a broad proxy for the bond market) gained 7.1 percent.

In seven investment classes, HMC results exceeded those for the appropriate market benchmarks: domestic, emerging-market, and private equities; real assets (including all three subcategories of commodities, timber and agricultural land, and real estate); and domestic, foreign, and inflation-indexed bonds. In three classes, HMC performance fell short of market benchmarks: foreign equities, absolute-return funds, and high-yield assets. (See chart at left for returns by asset category. The University's annual financial report, released in late October and covered on page 68 of this issue, further details performance by class in its narrative on HMC.)

In the aggregate, HMC's 8.6 percent investment return exceeded its market benchmarks' 6.9 percent return, providing a "value-added" margin of investment performance of 170 basis points, worth some $600 million-plus in extra endowment earnings. In fiscal year 2007, the value-added margin was 580 basis points, or $1.7 billion of extra return. One significant drag on fiscal year 2008 results was the July 2007 collapse of Sowood Capital Management, previously reported, on which HMC recorded a loss of approximately $350 million; the break-even results for absolute-return investments in part reflect the Sowood liquidation. The median return of a group of large institutional investors, aggregated by the Trust Universe Comparison Service, was negative 4.4 percent. Peer universities whose investment strategies are similar to Harvard's in several respects also reported modestly positive returns, down sharply from their gains in the prior year: Yale, 4.5 percent (versus 28 percent in 2007); Stanford, 6.2 percent (versus 23.0 percent); MIT, 3.2 percent (versus 22.1 percent).

The star performers in HMC's portfolio were the three components of "real assets," which in the aggregate produced a 35.8 percent investment return for fiscal year 2008. Real assets comprise "liquid commodities" (oil and gas, agricultural goods, metals, and so on), which soared in value during the year, driven by strong demand from developing nations and from investors' perception of rising inflation; timber and agricultural land, an inflation hedge for which values fluctuate on a different cycle, but where results significantly exceeded market benchmarks; and real estate, both commercial (offices, warehouses, retail facilities, and so on) and residential (apartment and condominium buildings, for instance)—

Fiscal Year 2008 Performance
(in percent)

	Harvard Return	Market Benchmark
Domestic equity	-12.7%	-13.1%
Foreign equity	-12.1	-11.1
Emerging-market equity	7.6	4.8
Private equity	9.3	6.3
Absolute return	0.1	1.8
High-yield	-8.3	0.7
Real assets	35.8	33.0
Domestic bonds	16.1	12.7
Foreign bonds	21.3	18.5
Inflation-indexed bonds	20.3	16.3
Total	**8.6%**	**6.9%**

where results in the recent fiscal year were slightly positive and ahead of market returns. As might be expected, all of the fixed-income asset classes performed strongly during the year. In total, the real assets account for about one-quarter of endowment holdings, and the bond portfolios another 15 percent; the gains there offset the negative returns in the large domestic and foreign public equity portfolios—about one-third of total assets.

In their written narrative on the year's results, Kaplan and Mendillo cited "periods of intense market turmoil highlighted by liquidity disruptions, severe dislocations in various financial markets (examples include residential mortgages, commercial paper, consumer loan markets, leveraged loan markets, and municipal auction rate preferred markets), and emergency policy responses." (Those "responses" ranged from sharp cuts in U.S. interest rates by the Federal Reserve Board to the supervised takeover of the Bear Stearns investment bank, the government assumption of control over the Fannie Mae and Freddie Mac housing-finance enterprises, the demise of Lehman Brothers, the takeover of Merrill Lynch, and more.)

The result, Kaplan and Mendillo wrote, was "the early to middle stages of a fundamental financial market de-leveraging"—as banks, other institutions, and investors shed assets and pared down debt, often leading to the distressed sale of assets, sharp volatility in investment markets, and unusual movements in the prices of commodities such as oil, all prompting concerns about slower economic growth and, simultaneously, rising inflation worldwide. In the immediate future, they wrote, "[W]e expect to see a continuation of the process of financial market de-leveraging. This process will likely create periods of disruption and market volatility."

In this context, HMC did not itself need internal instability. The sudden resignation of its president and CEO Mohamed El-Erian in the fall of 2007 (see "An Unexpected Risk Factor," November-December 2007, page 64) raised the specter of just such disruptions, as he had recently put in place a new operating structure and the personnel—several of them new

HARVARD PORTRAIT

Photograph by Harry Stuart Cahill

Tarun Khanna

"A million mutinies now" was V. S. Naipaul's 1990 description of the social upheaval then rocking India. "Lurking in that idea," says Lemann professor Tarun Khanna, Ph.D. '93, a native of New Delhi, "are a million entrepreneurial ventures, because an entrepreneur is somebody who is exercising productive mutiny against some status quo." After earning his doctorate in a joint program offered by the economics department and Harvard Business School, which hired him the same year, Khanna staged a mutiny of his own: he shifted his emphasis from hard numbers to the delicate art of integrating Western business models into emerging markets. "I was becoming conscious of the desire to do something for my country of origin and in general for poor countries," he says. But, as he realized in conversation with his former HBS colleague Yasheng Huang '85, Ph.D. '91, nations develop in wildly different ways. Their class on how China's state-controlled growth differs from India's democratic scramble for wealth became a 2003 *Foreign Policy* article. The provocative title ("Can India Overtake China?") and answer (perhaps!) sparked heated reactions, he says: that it made "a huge amount of sense" or was "completely absurd." Those who "were not observers of [India] found it surprising because it didn't mesh with their image." Today, Khanna sees the status quo changing at his children's school, where students study China and listen to Indian music. At Harvard, he serves on the South Asia Initiative's steering committee (see "Global Gains," January-February, page 64), bringing Asia to the University even as he sends business ideas to his old home.

Probing Policing

In the wake of complaints about interactions between the Harvard University Police Department (HUPD) and black members of the community, President Drew Faust in late August appointed a group of attorneys, faculty members, and a student to undertake a "special review" of "how best to assure the strongest possible relations and mutual understanding" between the police and "Harvard's highly diverse community." Among the issues to be considered are "HUPD's diversity training, community outreach, and recruitment efforts," plus any lessons that might be learned from best practices elsewhere.

Faust's letter announcing the task force (see www.president.harvard.edu) referred to an incident in August, when HUPD officers "confronted a person using tools to remove a lock from a locked bicycle. It was later established that the person was working on the Harvard campus for the summer, owned the bicycle, and was trying to cut the lock because the key had broken off in the lock." That information apparently came out only after at least one officer reportedly moved toward unholstering her gun. (Two officers were placed on administrative leave during an investigation, following a formal complaint from the youth.) In another incident, a May 2007 event sponsored by black student groups at the Radcliffe Quad led to calls to the police and HUPD queries about who the participants were and whether they were legitimately using Harvard property—and sparked sharp discussion in the *Crimson*'s opinion pages.

The review is being led by Ralph C. Martin II, formerly Suffolk County district attorney and now managing partner of the Boston office of Bingham McCutchen. Other committee members are former Overseer William F. Lee '72, now co-managing partner of WilmerHale; Hauser professor of nonprofit organizations Mark Moore, of the Harvard Kennedy School (whose research focuses on criminal justice and policing); Clark professor of ethics in politics and government Nancy L. Rosenblum, chair of the department of government; Undergraduate Council president Matthew Sundquist '09; and Kirkland and Ellis professor of law David B. Wilkins.

The HUPD issued a statement on the review, noting that it would "provide the department with an invaluable opportunity to benefit from Mr. Martin's expertise and to hear in new ways from the Harvard community about how we might better serve our diverse population. We look forward to any recommendations generated by the process that will help ensure the HUPD remains as effective as possible." The committee is expected to report to the provost and the executive vice president by year's end.

to HMC—to staff it. Indications are that such fears were not realized. Noting superior relative investment returns in certain HMC assets, Kaplan and Mendillo cited "the outperformance of our internal portfolio management group"; successful execution of midyear adjustments to respond to market risks, and of "overlay strategies" to insure the endowment portfolios; and "strong results delivered by a number of our longstanding and recently added external managers." (As Kaplan noted, HMC's hybrid structure, with internal and external money management, may yield dividends in turbulent years: because HMC manages some funds in-house, senior personnel can get immediate, direct insights into market conditions from their colleagues; such data would be less readily available and timely if they relied solely on third-party firms to invest endowment funds.)

Reflecting on the transitional year, Kaplan and Mendillo cited further recruiting of investment professionals who complement "our existing strengths"; further steps to encourage investigation of new investment ideas and themes; continuing work on asset allocation in a changing world, and on the evolving dynamics of the private-equity and hedge-fund industries (which have been important sources of superior investment performance for Harvard and other diversified endowments); and appropriate responses in light of the rising risks of inflation.

The fiscal year 2008 results and accompanying commentary bear on the two topics most pressing for the University itself: the availability of funds from the endowment to support Harvard's academic mission; and the investment environment in the near and intermediate future. See "In the Black," page 68, for a detailed discussion of the 2008 distributions and budget difficulties ahead.

As to the investment environment, Kaplan and Mendillo sounded unusually wary. "During these challenging times," they wrote, "we continue to emphasize the importance of HMC's hedging and risk management strategies. We are quite cognizant of the near-term risk of subpar investment returns from many of the asset classes in which we and other investors participate. We are closely monitoring the deterioration in certain underlying debt and equity markets and the potential impact of these declines on the ultimate realizable value of investments in our private equity portfolio and on certain of the investments held by our hedge fund managers."

Citing what Kaplan calls "very successful" past performance—five-year annualized returns of 17.6 percent, and 10-year annualized returns of 13.8 percent, with very large margins of performance in excess of the market benchmarks and the median returns of large institutions—they were "keenly aware that returns produced in the next few years may fall well short of these robust historical levels. We will continue to aggressively pursue our key investment strategies, as well as appropriate risk management, in order to help the endowment navigate these challenging market conditions. Even with this said, our expectations for the endowment's returns in fiscal year 2009 and over the next several years are very cautious."

The positioning of HMC's model portfolios and its management strategies suggest confidence in long-term perfor-

mance for the endowment—Mendillo describes "the great talent working at Harvard Management Company" now, and Kaplan envisions "strong prospects" in the future. But for the next few years, they foresee the likelihood of a much rougher ride.

Stem-Cell Progress

This past summer and fall saw the announcement of five important breakthroughs by University stem-cell scientists—a forceful validation of the Harvard Stem Cell Institute's (HSCI; www.hsci.harvard.edu) approach, says executive director Brock Reeve. HSCI funds research throughout Harvard and its affiliated institutions and hospitals, organizing its investigations by disease areas, such as diabetes, cancer, neurodegeneration, and diseases of the blood or heart. The developments ranged from successful muscle-stem-cell transplants in mice, to the creation of disease-specific stem-cell lines using adult cells, to an extraordinary "direct conversion" of one adult cell type to another. (For background on stem-cell research at Harvard, see "Stem-Cell Science," July-August 2004, page 36.)

The most stunning advance arose from diabetes research conducted by HSCI co-director Douglas Melton, Cabot professor of the natural sciences, and postdoctoral fellow Qiao "Joe" Zhou, who figured out how to transform one type of cell into another in a living animal by using a new process their research team has dubbed "direct reprogramming." Specifically, Zhou and Melton created insulin-secreting pancreatic beta cells. But reprogramming holds promise, as well, for treating other diseases that involve missing cells, including cardiovascular and neurodegenerative conditions such as Parkinson's disease and ALS (or Lou Gehrig's disease).

Melton, Zhou, and their colleagues achieved this result by delivering a combination of three transcription factors (a class of genes known to regulate cell fate during early development) to target cells in the pancreas of a mouse. During a multiyear process of elimination,

Yesterday's News

From the pages of the *Harvard Alumni Bulletin* and *Harvard Magazine*

1923 Ninety-six women with degrees from the School of Education have been listed in the new *Harvard Alumni Directory.* "To publish their names," the *Bulletin* points out, "is simply an unavoidable recognition of their standing…it does not invite them to attend meetings of the Associated Harvard Clubs nor necessitate a ladies' dining room in the Harvard Club of New York or Boston…there is no reason to assume the admission of women to a professional school is the 'entering wedge' of coeducation throughout the institution."

1958 An informal survey of drugstores in and around Harvard Square the morning following The Game finds them entirely out of aspirin.

1963 Dean of students Robert Watson criticizes lax undergraduate attitudes toward parietal rules, insisting that Harvard "must be concerned that its students do not set an example for the relaxation of morals among youth…fornication must also be understood as an offense punishable by the University on the same grounds as thievery, cheating, and lying."

1973 In response to the energy crisis, a new University-wide energy-conservation program lowers the temperature in all Harvard offices and student rooms from 75 degrees to 68 degrees.

1983 Forty coin-operated word processors have been loaned to Harvard in a trial; if enough students demonstrate interest, "additional word processors and possibly computer equipment will be installed on the same basis." An hour of operation costs $2.

1988 Harvard drops its objections to the conduct of the preceding spring's union election (the victory margin was 44 votes), clearing the way for the National Labor Relations Board to certify the Harvard Union of Clerical and Technical Workers as the collective bargaining agent for more than 3,000 support-staff members after a 13-year struggle.

1993 The Yard is wired to 2.7 million feet of fiber-optic cable, prompting the editors to note that the class of 1997 is "the first in Harvard history to be bonded electronically….Many students correspond daily by E-mail." (The Quad and Lowell House are to be hooked up by midyear, the river Houses in the spring.)

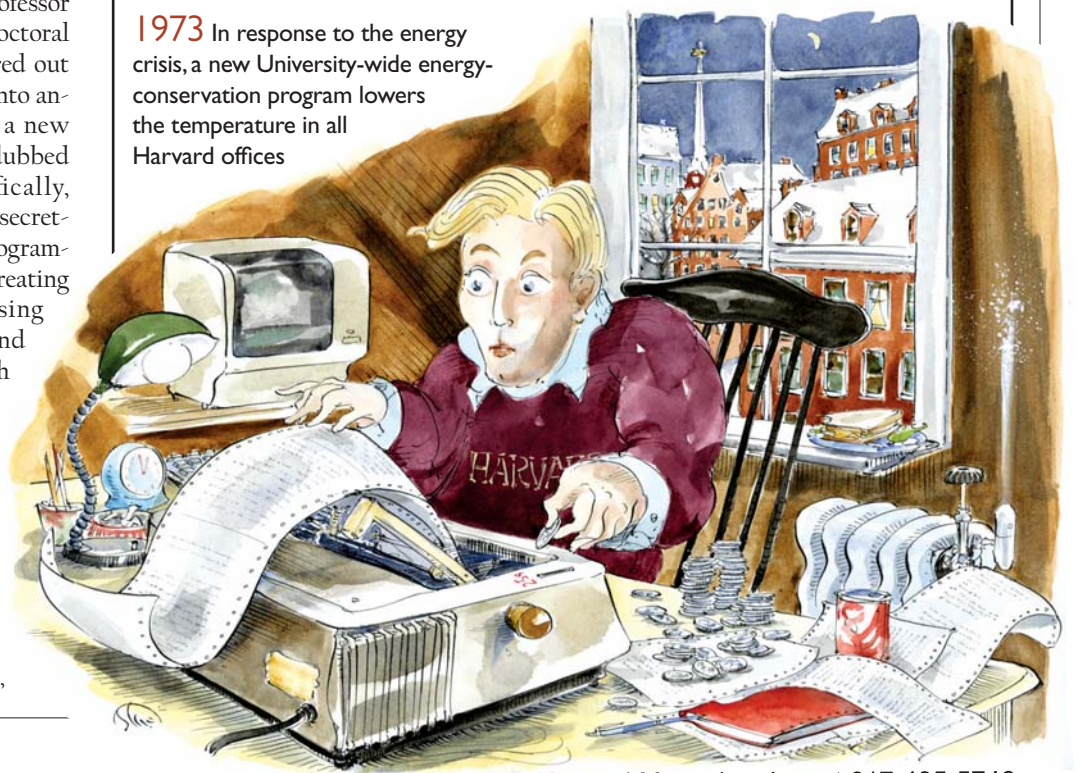
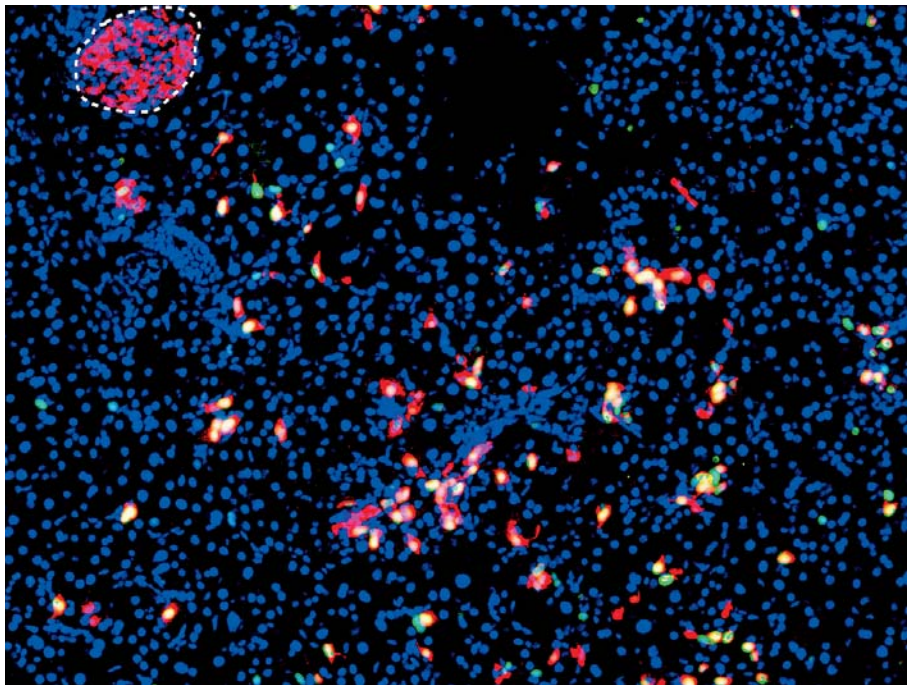


Illustration by Mark Steele

they chose the three genes—which were delivered by means of a virus—from among more than 1,100 potential candidates they had identified as being expressed in the embryonic pancreas. In adult mammals, just 1 percent of the pancreas consists of beta cells that produce insulin, critical for the regulation of blood-glucose levels, while 95 percent consists of exocrine cells, which secrete digestive enzymes. Using their three introduced genes, Melton's team has been able to "flip" exocrine cells, causing them to become rare beta cells that are indistinguishable in shape and function from preexisting beta cells. (For more on the disease, see "Decoding Diabetes," page 50.)



Viral delivery of a three-transcription-factor cocktail has transformed pancreatic exocrine cells (blue) into scattered insulin-producing beta cells (red). A preexisting islet, or grouping of beta cells, is outlined at the upper left.

Unlike conventional stem-cell science, which involves using *undifferentiated* cells and then figuring out how to coax them to become a particular cell type, Melton and Zhou's work points the way to a potential shortcut for treating any disease in which a cell type is missing. The trick was learning which genes to use. "The idea of reprogramming one differentiated cell type of adult tissue into another is very exciting, and it is applicable to achieve the regeneration of different types of cells in the body," says Paola Arlotta, an assistant professor of surgery and of stem-cell and regenerative biology affiliated with Harvard's new interschool department of stem-cell and regenerative biology (www.scrb.harvard.edu). Arlotta is performing related work to reprogram neurons of the central nervous system. Although different combinations of genes will be needed to cause reprogramming in different individual tissues, substantial progress toward their identification is now being made.

"It's a wonderful piece of work," says Sir John Gurdon, an emeritus professor of developmental biology at the University of Cambridge who oversaw Melton's graduate work at Oxford. "Particularly impressive is the idea of trying to derive the required cells from a related cell type, rather than going from adult cells back to the beginning and out again. It's much more logical, really."

In some ways, Melton's departure from strict adult-stem-cell research was guided by a paper he published in *Nature* in 2004. There he described his finding that new beta cells in adults don't derive from adult stem cells, as so many other tissues in the body do; instead, they are produced by replication of existing beta cells. This showed there would be no way to coax stem cells in adults to become beta cells. (He nevertheless continues to try to create beta cells from *embryonic* stem cells, which are totipotent—they can make *any* cell type.)

Melton's feat echoed that of Shinya Yamanaka of Kyoto University, who in 2006 employed viruses to reset adult cells to a primordial state. These induced pluripotent stem cells (iPS cells), as they are known, can in theory be prodded to differentiate into more specialized kinds of cells, but no one has figured out all the steps to do this yet. Melton's simpler approach—directly changing one adult cell type into another—is the first method to achieve such success. Yamanaka's technique also uses retroviruses that become permanently integrated into the genome and can induce cancer; the virus employed in Melton's technique does neither. Melton nevertheless hopes to identify a drug that will mimic the action of the gene transcription factors he has identified as critical for pancreatic cell transformation. That would facilitate approval of potential treatments in humans, which could be as little as two to five years away.

In announcing his discovery, Melton emphasized the importance of continuing to work with embryonic stem cells derived from fertilized human eggs because of the critical insights they continue to provide in the field of developmental biology, and with iPS cells, which were at the heart of some of the other Harvard advances this past summer.

Two separate teams of HSCI researchers, employing variations of the Yamanaka technique, created disease-specific iPS stem-cell lines using adult cells from human patients. Kevin Eggan, an assistant professor of stem-cell and regenerative biology, announced in *Science* that he had used the technique to create motor neurons from the cells of an 82-year-old patient with ALS. George Daley, an associate professor of biological chemistry and molecular pharmacology and of pediatrics at Harvard Medical School (HMS), writing in *Cell*, announced that his laboratory had created 20 stem-cell lines representing a variety of afflictions, from "bubble-boy" disease to Parkinson's. The iPS

Courtesy of Qiao Zhou

cell lines created by Eggan and Daley, made freely available to researchers throughout the world, will allow study of the development of these diseases in a petri dish, making them powerful tools for research even though they cannot be used in human therapy because of their cancer-causing potential.

But there was progress on that front, too. Konrad Hochedlinger, an assistant professor of medicine and of stem-cell and regenerative biology, has discovered a way to create iPS stem cells in mice without causing cancer. Instead of the retroviruses employed by Yamanaka, he used adenoviruses that "infect the cells" carrying the genes needed for cellular reprogramming, "but are cleared... after a few cell divisions."

In the wake of these discoveries, HSCI announced that it would create a new "core laboratory" dedicated to iPS techniques, augmenting its four existing shared core facilities devoted to specialized aspects of stem-cell science.

At the Harvard-affiliated Joslin Diabetes Center, the viability of using stem cells in clinical treatments was demonstrated in principle using mice carrying an induced form of muscular dystrophy.

Morning Prayers: All Creatures

President Drew Faust's Morning Prayers address in Appleton Chapel on September 16

This chapel, this church represent places where we stop for a moment or an hour outside our usual work and lives to consider the larger meaning of what we do. It is also a place where we think beyond our own individual ambitions and achievements to reflect upon our obligations to one another and to a wider world.

Today I want to speak about one such obligation, one I am asking our community to take on with new focus and new force. It is an obligation to our children and to their children, and it is in one sense a quite simple matter of human self-interest and survival. But it is also a question with deeply spiritual implications concerning what we owe not just to one another and our descendants but to whatever god or transcendent being or divine force we might believe in. What I want to talk about today is the preservation of the world—its glaciers, its forests, its waterways, its species—in the face of the crisis of global warming and environmental change.

Among the most powerful memories of my childhood experiences in church and Sunday School are hymns that still echo in my mind. And a great many of those hymns are songs of praise and thanksgiving for creation's wonders. "Fair are the meadows; fairer still the woodlands." Or perhaps for me and so many others, most memorably:

All things bright and beautiful,
All creatures great and small,
All things wise and wonderful,
The Lord God made them all.

Each little flower that opens,
Each little bird that sings,
He made their glowing colors,
He made their tiny wings.

Written in 1848, the words to this hymn are steeped in Victorian romanticism, extolling the glowing colors of each little flower, the tiny wings of each little bird. Its rather treacly sentimentality and continuing popularity in a far more cynical age moved Monty Python to parody:

All things dull and ugly
All creatures short and squat
All things rude and nasty
The Lord God made the lot.

Each nasty little hornet,
Each beastly little squid
Who made the spiky urchin?
Who made the sharks? He did!

But Monty Python's mockery actually reinforces, rather than rejects, my fundamental point: Urchins, squid, hornets, sharks matter too. They play an essential part in what we might call the wonders of biodiversity.

Yet we humans of the twenty-first century seem to be doing our best to destroy that wondrous creation. Pollution and climate change, habitat destruction and species extinction are growing threats to the world we have inherited and the world we will bequeath to our descendants—the creation we steward for purposes far larger than ourselves.

In July, I announced a new initiative for Harvard indicating that Harvard would be making an ambitious commitment to reducing its emission of greenhouse gases in an effort to lessen our carbon footprint and our contributions to global warming.* The goals we have set will not be easy to attain; they will require all of us to change assumptions and behavior, to live with enhanced consciousness and responsibility about our stewardship of the earth. And we will at the same time commit our intellectual resources as an institution devoted to learning and discovery, to explore policies and technologies that can make a significant difference in the crisis of sustainability that we face. In our work as students and scholars, in our lives as members of this community we must commit ourselves to preserving this wondrous creation all around us. However we may differ in our religious explanations and understandings, our lives are deeply intertwined and interdependent—with one another and with this world which we cannot permit to perish. To borrow words from the old hymn: "We must be wise to preserve what is wonderful."

*See "Environmental Action," September-October, page 57.

Amy Wagers, an HMS assistant professor of pathology, figured out a way to identify adult stem cells in muscle by means of the unique protein markers on their surfaces. She then transplanted stem cells from the muscles of healthy mice into mice with the disease. The stem cells not only restored partial muscle function, she reported, but also replenished the pool of stem cells that "could be reactivated to repair the muscle again during a second injury." For now, the technique works only on a muscle-by-muscle basis, making it impractical for treatments, but the work proves the viability of stem-cell transplantation.

The summer's announcements were not isolated successes, but proof that HSCI works as a model for catalyzing collaborative research, says executive director Reeve. HSCI faculty members "are publishing on average 30 papers a month in peer-reviewed journals," he adds. The organization's budget for scientific research and operations has increased from $5 million to just over $16 million in the last three years, with 80 percent of the funding to date coming from individuals. (That will change with increasing sponsorship from industry: GlaxoSmithKline recently pledged $25 million to support HSCI during the next five years. Reeve notes that the development of disease-specific iPS stem-cell lines is of particular interest to the pharmaceutical industry, because it will not only provide therapies, but also offer the ability to test drugs against specific diseases on an unprecedented scale.)

The growth in stem-cell research at Harvard has been even more rapid than anticipated: a shared therapeutic screening facility designed to handle the work of HSCI researchers until the opening of the first science building in Allston three years from now is already operating at capacity. New courses are being offered this year through the department of stem-cell and regenerative biology, with plans to introduce a concentration in the 2009-2010 academic year. And the number of principal HSCI faculty members has increased from 40 a year ago to 65 this year (there are also a hundred affiliated faculty). Looking ahead, HSCI expects to fill the space allocated to stem-cell researchers in the new science building within the first two years of occupancy.

Speaking of the summer's successes at HSCI's annual stem-cell summit in September, President Drew Faust noted, "This may well be the first time since the end of World War II when major progress in basic biomedical science in the United States has been enabled primarily by far-sighted private individuals, foundations, corporations, and institutions rather than by the federal government."

Creating Space to Contemplate Success

"Rich lives include continuing internal conversations about who we are, what we want to achieve, where we are successful, and where we are falling short," Hobbs professor of cognition and education Howard Gardner and his coauthors write in *Good Work: When Excellence and Ethics Meet.* Yet these conversations—both internal and among friends—seem to happen less frequently for today's undergraduates than for previous generations. Members of the Millennial Generation "plan every single moment of every day," says dean of freshmen Thomas A. Dingman. "I think all of us who work with them are struck by how purposeful they are." Students and administrators alike worry that in the absence of introspection, material success becomes the focus by default.

Students' busy schedules are crowding out the proverbial 2 a.m. philosophical discussions in a dorm room—but that is only part of the problem, says Sheila Reindl '80, M.Ed. '88, Ed.D. '95, a counselor at the Bureau of Study Counsel (BSC). Especially at Harvard, she says, "There is this pressure to be prematurely polished, to look as though you know where you're going."

The moral-reasoning component of the Core curriculum aims to get students to mull and elaborate their personal moral codes, but for many, the experience falls short. And striking up a conversation with friends over dinner about how concepts from class might apply to one's own life is practically a *faux pas*, says Lois Beckett '09. "There's this sense that it's somehow embarrassing. It's like walking into dinner with your fly unzipped."

Disappointed with this aspect of her freshman year, Beckett approached Dingman. The seed was planted for an optional, extracurricular discussion series; around the same time, Gale professor of education Richard J. Light, author of *Making the Most of College* (see "The Storyteller," January-February 2001, page 32), was hearing similar complaints in his survey of the classes of 2006 and 2007. Dingman and Light assembled a working group of three students (including Beckett), director of freshman programming Katherine Steele, and Gardner (who had led similar efforts at Amherst and Colby) to help design Harvard's discussions. The group selected faculty members and administrators to lead discussions and then invited the entire class of 2011 to participate. About 8 percent of the class—130 students—took part in "Reflecting on Your Life."

Each group met a minimum of three times for 90 minutes last spring. Leaders could decide how to structure the meetings, but, Steele says, one widely used exercise that proved "illuminating" was asking the first-years to state their core values, then account for how they spent their time in a given week, and see how closely their everyday pursuits and values corresponded.

Judith Kidd, who oversees student life and activities as associate dean of the College, explains that today's students "are used to having their activities planned for them." This is the play-date generation; its members feel more comfortable airing young-adult angst in an officially sanctioned forum. "It's sad that if they are going to have these conversations, we need to arrange them," she says, "but I think we need to do it."

In the "Reflecting" program for first-years (which will be repeated this year) and in "The Big Question," a dinner discussion series arranged by student members of the Phillips Brooks House Association, undergraduates can say what they think without worrying that it will affect

Powerful Conversations

The Bureau of Study Counsel (BSC) has long offered students safe space for thoughtful career consideration, through weekly discussion groups such as "What Are You Doing With Your Life?" and "Roots: Where Are You Coming From and Where Are You Going?" and single-session discussions on the topic "Insanely Busy: What Would Happen If I Slowed Down?" The bureau also aims to sensitize teaching staff (with a seminar titled "Grades and Beyond: Perfectionism, Risk-taking, and Learning from Failure") and parents (with annual panel discussions during Freshman Parents' Weekend) to these issues.

These disparate efforts come together under the umbrella of the Success-Failure Project (http://bsc.harvard.edu/successfailure), headed by BSC director Abigail Lipson and BSC counselor Ariel Phillips, Ed.D. '89. The driving principle is not to get students to consider one specific career or another, but to envision their career choice broadly and consider it carefully—even if that means setting aside a career chosen before college in favor of pursuing a new passion. "We're not really advocating that people take up a particular definition" of what it means to succeed, Phillips adds. "It's the power of having the conversation."

Dean of Harvard College Evelynn M. Hammonds says these goals line up with her own for undergraduates. Even though Harvard must acknowledge the realities of the world—for instance, that certain fields strongly prefer graduates who have already completed three internships—Hammonds says that college, as much as possible, "should be the time when students feel the least amount of constraints around exploring what they want to do next."

Ariel Phillips (left) and Abigail Lipson

Lipson and Phillips are delighted that their program's themes are getting such widespread attention—organizations such as the Office of Career Services and the student Career Diversity Awareness Group have come knocking, hoping to collaborate, with increasing frequency. It is, says Phillips, "a moment in time when a lot of forces are crossing."

their grades, says Jessica Ranucci '10, one of the "Big Question" organizers this year. In its three years, the series has explored such topics as whether pursuing a career in business necessarily means "selling out," and whether popular spring-break-week community-service trips really help, or are better summed up as "service tourism."

Of course, a major reason for articulating one's morals and values is to make it possible to choose a career that fits those beliefs. President Drew Faust gave graduating seniors one last nudge in that direction during her baccalaureate address in June: "A liberal education demands that you live self-consciously. It prepares you to seek and define the meaning inherent in all you do."

Faust began that speech by noting that numerous students and recent graduates had expressed concern to her about the number of Harvard alumni going into consulting and finance. Reiterating this message before alumni at the Harvard Gay and Lesbian Caucus anniversary in September (see "Coming Out at Harvard," page 70), Faust said she got the impression that some students felt their career choices were not entirely voluntary: "I felt they were asking permission to do something different."

Efforts abound to introduce students to that "something different." The Office of Career Services (OCS) has launched a campaign to "turn up the volume" on career options other than investment banking and consulting. ("We didn't want to turn *down* the volume on opportunities in consulting and finance," explains OCS interim director Robin Mount. "We have one of the top programs in the country, and we're really proud of that.") The OCS fall schedule of events includes sessions on fields ranging from fashion design, museum administration, and social work to the ministry, fiction writing, culinary arts, and the military. The schedule also includes new events that invite students to discuss financial careers frankly ("Banking and Consulting: Myths and Realities"). And there is now a "career reflection" category (sessions include "Finding a Meaningful Path: What's Your Story?").

The number of graduates who take jobs in banking and consulting is not well established. A *Crimson* survey found that

Photograph by Stu Rosner

those fields drew 58 percent of male 2008 graduates who were starting work right away (as opposed to attending graduate school, for instance). Mount thinks this figure is distorted upward by selection bias, and notes that an OCS tally found that only slightly more than one-fifth of 2008 graduates found their first job (of *any* type) through on-campus recruiting. Whatever the numbers, joining the finance sector "is not necessarily choosing the dark path," Kidd and others note—plenty of investment bankers give generously of their money or time, and a public-service job does not automatically make one a good person.

More troubling is the idea that students may rush headlong into a job because they feel it is what they are somehow expected to do—or because it's what they see all their friends doing. "It's hard *not* to" consider finance and consulting, says Philip Parham '09. "When you see the amount of money made in that field, it becomes very attractive." (Current trends in the financial sector may attenuate this appeal.) Parham and Dhaval Chadha '08 are the founders of the Career Diversity Awareness Group, a student group that arranged an "alternative" career fair last February to highlight opportunities in fields including government, the arts, media, and education.

Parham had summer internships at both OCS and the Center for Public Interest Careers at Harvard (CPIC; www.cpic.fas.harvard.edu), an office of the College that also receives funding from the Faculty of Arts and Sciences, from individuals, and from foundations. Founded in 2001, CPIC matches students with public-service jobs and internships and serves as a clearinghouse for undergraduates interested in those paths. During his internships, Parham—who hopes to work for an educational nonprofit next year—helped recruit companies from fields besides finance and consulting to appear at the annual OCS career forum held late in September. The forum's roster ultimately included nearly even numbers of companies in banking and consulting (79) and other fields (70); Parham notes slyly that in configuring the career forum's set-up, he assigned berths so that students had to walk past tables of nonprofits and public-sector employers to get to the financial-sector booths.

Parham doesn't fault his friends who choose finance. He does, however, ask them to explain the reason for their choice—and he doesn't take "making money" for an answer. "I keep telling people, money is a means to an end," he says. "So what is the end that you're trying to achieve?"

In the Black

"Our ability to access endowment wealth has enabled us to move forward" on priorities such as the new science complex in Allston, renovation of the Fogg Art Museum, and financial aid for lower- and middle-income families. So said acting chief financial officer Daniel S. Shore, reviewing fiscal year 2008 (ended last June 30), as detailed in the *Harvard University Financial Report*, released in October (available on line at http://vpf-web.harvard.edu/annualfinancial). His assessment neatly summarized Harvard's fiscal position, aims, and challenges.

Fueled above all by distributions from the endowment (valued at $36.9 billion at fiscal year-end; see "Endowment Edges Up in a Down Year," page 60), revenue rose 8.4 percent to $3.48 billion and expenses increased 9.3 percent to $3.46 billion—rates of growth faster than in the prior fiscal year. The University achieved a modest operating surplus even as it pursued significant programmatic and physical expansion. But given recent chaos in the financial markets, rising reliance on income from the endowment to fund operations raises questions about future budgets—particularly, Shore said, "in an environment where the ability to get sponsored-research funding from the federal government continues to be challenging."

A few line items in the report merit examination. Federal sponsored funding rose about 4 percent, to $535 million, with National Institutes of Health funding up less than 2 percent. That was better than the worrisome *decline* in fiscal year 2007, but did not keep pace with either the inflation in research costs nor the larger population of scientists seeking funds. Shore said the slight improvement likely reflected no trend: "Up 2 percent in nominal terms is nothing to jump up and down about."

Among Harvard's expenses—up a brisk $294 million—compensation costs, the largest single category, rose 7 percent, reflecting an 8 percent increase in salaries and wages (driven, Shore said, by both pay increases and workforce expansion), and a 6 percent growth in benefits (relatively favorable compared to recent experience). The allocation of expenses between the University and the Broad Institute (a genomics-research joint venture with MIT, which will become a free-standing nonprofit organization in the next year or two), and between Harvard and an affiliated hospital, increased expenses more than $40 million in fiscal year 2008 compared to the prior year; that ought to be seen as a short-term, largely nonrecurring swing, according to Sharon D. DeMaranville, director of financial reporting. Travel expenses rose 18 percent, in line with a recent trend, as the University continues to "expand our footprint internationally," Shore said.

Capital spending declined

Endowment Spending Primer

Income distributed for operations	$1.2 billion	3.5%
Administrative assessment (strategic infrastructure fund)	$168 million	0.5%
Net decapitalizations	$258 million	0.8%
Aggregate payout/rate	$1.6 billion	4.8%

For these calculations, the fiscal year 2008 endowment distribution is based on its year-end 2007 value ($34.9 billion), *less* certain items (pledge balances, interests in trusts held by others), for a sum of $34.3 billion.

fractionally, to $591.1 million, reflecting completion of work on graduate-student-housing projects, large new lab buildings, and other Faculty of Arts and Sciences (FAS) projects. But, Shore said, "We certainly expect to see more," given academic aspirations and work already under way: the Allston science complex, Harvard Law School's office and classroom building (see March-April, page 54), and the Fogg renovation—three projects expected to cost perhaps $1.7 billion in all—and such planned work as the renovation of the undergraduate Houses.

Harvard continues to fund such capital programs with debt: bonds and notes payable totaled $4.1 billion on June 30, up from $3.8 billion on June 30, 2007 (during which fiscal year debt outstanding rose by more than $900 million). In the normal course of events, Shore said, Harvard's net borrowings will continue to rise, in keeping with the capital plan.

Endowment income distributed for operations rose nearly $158 million, or 15 percent, to just above $1.2 billion (see table). The administrative assessment that allows the University to contribute to the "strategic infrastructure fund" (Allston development expenses) rose $28 million, or nearly 20 percent, to $168.4 million. And unspecified "decapitalizations" for one-time or time-limited purposes totaled $258.2 million; in fiscal year 2007, a $100-million decapitalization in support of FAS construction was identified.

The fiscal year 2008 "distribution rate" established by the Corporation for all eligible funds amounted to 4.1 percent of the endowment's year-end 2007 value, down from 4.3 percent. (Endowment investment returns were an extraordinary 23 percent in fiscal year 2007; such gains lower the distribution *rate* even when the *dollars* distributed for operations rise significantly, as occurred this past year.) Summing all endowment funds tapped—$1.6 billion, including the decapitalizations of principal—the "aggregate payout rate" came to 4.8 percent, up from 4.6 percent in 2007. Those figures all slightly trail the Corporation's goal of a 5.0 to 5.5 percent aggregate payout rate—the level commonly bruited about in congressional discussions of appropriate spending from tax-exempt private university endowments. (See "Endowments—Under a Tax?" July-August, page 65; the most recent hearing on the issue took place in the U.S. Senate on September 8; see Brevia, page 71.)

But spending less in fiscal year 2008 than the longer-term goal for endowment use may be prudent. A sustained, sharp decline in the value of financial and other assets could trim the size of the endowment itself, even as demands upon it grow. And there are other concerns. As in recent years, the "Annual Report of the Harvard Management Company," within the University *Report*, mentions that "as HMC deepens and widens its relationships with external managers, efforts are being made to counteract the existing market tendency towards a lower level of information transparency." The HMC report discloses that HMC's private-equity portfolio consisted of 210 separate funds managed by 80 different external firms.

In fact, Shore and DeMaranville noted, HMC kept its books open longer this year than last to work with external money-management firms on the asset values they reported. Being confident that those

Financial Crises, Faculty Views

Amid the crises besetting U.S. financial institutions, faculty panels convened on September 23 at Harvard Business School (HBS) and two days later in Sanders Theatre to address the roots of the problem and potential solutions. Among the salient points:

- **Leverage, liquidity, transparency.** HBS dean Jay Light talked about the need for fundamental reform of both regulatory oversight and the operating standards for commercial and investment banks—and their use of new kinds of investment instruments.
- **Moral hazard.** McLean professor of business administration David Moss, author of *When All Else Fails: Government as the Ultimate Risk Manager*, emphasized the importance of balancing any federally financed rescue plan with offsetting measures to discourage inappropriate, even dangerous, risk-taking in the future.
- **Real losses.** McArthur University Professor Robert Merton noted that, beyond immediate problems of liquidity and scarce credit, the underlying deflation of house prices had caused a permanent loss of perhaps $4 *trillion* of actual wealth to date.
- **Middle-class stress.** Professor of management practice Robert Kaplan—a Goldman Sachs alumnus who served as interim head of Harvard Management Company (HMC) in late 2007 and the first half of 2008—looked beyond the immediate crisis to focus on the "severely weakened middle class in the United States" as the core economic problem.
- **Reduced global status.** Cabot professor of public policy Kenneth Rogoff, former chief economist of the International Monetary Fund, said the financial sector as a whole was "bloated" and had to shrink. Given the "*spectacular* deficits" being run by the U.S. economy, he warned, Americans could not fund the repair of their own financial system, painting policymakers into a corner: "We borrowed too much, we screwed up, so we're going to fix it by borrowing more."

Not present was Mohamed El-Erian, who left his position as HMC president late in 2007 to return to PIMCO, the huge fixed-income investment-management firm. But the book he completed during his brief HMC tenure and published this spring—*When Markets Collide: Investment Strategies for the Age of Global Economic Change*—serves as a useful guide to contemporary financial terminology and the sorts of diversified strategies the endowment's managers employ (and individuals might emulate) as they navigate perilous markets.

For detailed accounts of the panel presentations and access to a recorded webcast of the September 25 discussion, visit harvardmag.com/extras and consult the two-part "Financial Crisis, Faculty Perspectives" postings of September 26.

often-illiquid investments are properly valued, in volatile markets, will matter even more in fiscal year 2009 and beyond, because the University's reporting came under Financial Accounting Standards No. 157, *Fair Value Measurements*, as of July 1, and so will henceforth have to satisfy itself, and its auditors, that asset measurements do indeed reflect fair value.

As the Corporation determines, in late fall or early winter, the level of endowment spending and the budget for fiscal year 2010, Shore said, "It's hard to have any crystal-ball conversation not shadowed by the environment." From his perspective, University operations are proceeding well. The financial-aid initiatives, for example, increased the pool of undergraduate and other applicants, as intended. With peer institutions, Harvard continues to "try to influence the conversation in Washington" about sponsored-research funding. As of early autumn, possible leading indicators of financial weakness—fundraising, donors' fulfillment of pledges, executive-education enrollments—remained intact. "You always want to be prepared," Shore said, "but don't want to be in a mode of 'The sky is falling.'"

Over time, he said, financial strength provided by the endowment has enabled Harvard to support and attract faculty members at times when the economy constrains the academy generally. Harvard's mechanism for funding interdisciplinary science, and housing it in new Allston facilities, is encouraging intellectual progress: "We have a lot of deans now who are eager to recognize and work with the synergies that exist among these schools." Realizing the deans' "big, big aspirations" for intellectual advances will require a careful balance of fundraising, debt financing, and effective use of existing resources, Shore said—now overlaid with a pointed recognition: "Given that endowment income is such a big part of our operations, if returns get choppy, it's something we're going to have to manage to."

Coming Out at Harvard

In 1920, a tribunal set up by University administrators interrogated students suspected of being gay. This inquisition led to eight expulsions and one suicide: Eugene R. Cummings ended his life just days before he was to receive his degree from the School of Dental Medicine. (Author William Wright provides context in his 2005 book, *Harvard's Secret Court*.)

Since that time, "things have changed at Harvard—a *lot*," says Rhonda Wittels '79, the new president of the Harvard Gay and Lesbian Caucus (HGLC; www.hglc.org), which celebrated its twenty-fifth anniversary during four days in late September. Added Wittels, a software developer who lives in Watertown: "We want our older alums to know that, and to know that they're welcome to come back."

The event's very logistics underscore Wittels's statement: "From the Closet to a Place at the Table" took place on campus with Harvard Alumni Association (HAA) sponsorship and speeches by administrators, including President Drew Faust. The official program billed the weekend as "Harvard's biggest coming out party ever" and the event drew more than 500 attendees, from the class of 1941 through current students. Dozens of graduates, students, and faculty and staff members spoke publicly about issues of sexual orientation in the curriculum, student life, and wider society. (Congressman Barney Frank '61, J.D. '77, who chairs the House Financial Services Committee, was scheduled to give the keynote speech, but had to stay in Washington to work on the financial bailout package.)

Rhonda Wittels

Much has changed even since the 1970s and '80s. In her talk, vice president for alumni affairs and development Tamara Elliott Rogers '74 recalled meeting with a group of gay students when, as an undergraduate, she was a peer counselor with Room 13 (a group that still exists). Rogers said she was surprised by "the profound sense of loneliness and isolation" the students expressed. Their Harvard differed starkly from her own; the discussion was, Rogers recalled, "a rather shattering experience." (For another personal perspective, see "Gay Like Me," January-February 1998, page 50, by Andrew Tobias '68, M.B.A. '72.)

Faust, a historian of the Civil War who directed the women's-studies program at

Photograph by Stu Rosner

Brevia

Bioengineering Gift, Nobelists in Chemistry

On October 7, **Hansjörg Wyss**, M.B.A. '65, gave Harvard $125 million for bioengineering research and professorships. The next day, **Martin Chalfie** '69, Ph.D. '77, and **Roger Y. Tsien** '72 were named two of three recipients of the Nobel Prize in chemistry. For more on both stories, see harvardmagazine.com/web/-breaking-news.

Genomics Gains

The **Broad Institute of Harvard and MIT**, a joint venture established in 2003 to apply human genomics to biomedical research by fostering collaborations among the two universities' scientists and those from affiliated hospitals and the institute itself (www.broad.mit.edu; see "Genomics Joint Venture," September-October 2003, page 75), has received $400 million in endowment funding from founding supporters **Eli** and **Edythe Broad**. They earlier gave two $100-million gifts, with like support from the universities, for 10 years of operating funding. The endowment will transform the Broad Institute into a permanent, separate nonprofit organization. Separately, the institute was one of nine institutions to receive a grant from the National Institutes of Health—in the Broad's case, $86 million during the next six years—to identify small molecules that can probe cellular proteins and signals critical to life processes. Broad-affiliated scientists have been leaders in this field (see "The Chemical Biologists," March-April 2005, page 40).

Endowment Encore

Senator **Charles Grassley** (R-Iowa) has continued to stump for higher payouts from private universities' endowments (see "Endowments—Under a Tax?" July-August, page 65). With Representative **Peter Welch** (D-Vermont), he convened a congressional discussion on September 8 about "Maximizing the Use of Endowment Funds and Making Higher Education More Affordable." As the title suggests, the legislators focused on tuition and financial aid. Representatives of academia spoke in turn of their institutions' broader missions. Princeton president **Shirley Tilghman**, appearing also as vice chair of the Association of American Universities, emphasized that "endowments are not 'rainy day' funds or 'piggy banks' being saved for another day; the income that is earned through investments is the 'working capital' that we use every day to support our programs of education and research, and importantly to provide substantial amounts of student aid." In discussion, she said of the growth of knowledge, "When Princeton made the commitment to create a genomics institute, we did not turn around and cancel the department of classics." Welch may propose legislation mandating a rate of endowment payouts (such as that governing grantmaking foundations), and Grassley made clear that he will continue to monitor and speak out on the issue. Harvard was not an official participant in the discussion.

SIGNIFICANT WORKS from three collections—Fogg, Sackler, and Busch-Reisinger—come together for the first time in the Harvard Art Museum exhibit *Re-View*, at the Sackler. Although prompted by construction and renovation at the Fogg's 32 Quincy Street site (top), curators have found opportunity in juxtapositions of art from distant cultural traditions. The influence of Classical works on representations of the human body can be seen in later Western paintings in the fourth-floor gallery: here, ancient Greek and Classical Revival depictions of the hunt share space with a hickory bow of native Nipmuc or Wampanoag origin.

Nota Bene

Interim engineer. Franklin professor of applied physics **Frans Spaepen** has been appointed interim dean of the School of Engineering and Applied Sciences, during the search for a permanent successor to **Venkatesh Narayanamurti**, who stepped down in September (see "The Liberal Art of Engineering," September-October, page 59). Spaepen, Ph.D. '75, was elected to the National Academy of Engineering earlier this year.

ELIZA GRINNELL

Frans Spaepen

MacArthur fellows. Five Harvard affiliates have been awarded $500,000 MacArthur Fellowships: **Wafaa El-Sadr**, M.P.A. '96, an AIDS specialist at Columbia's Mailman School of Public Health; **Susan Mango** '83, a developmental biologist at the University of Utah who has been appointed professor of molecular

and cellular biology at Harvard effective next July 1; **Adam Riess**, Ph.D. '96, professor of physics and astronomy at Johns Hopkins; **Alex Ross** '90, music critic of *The New Yorker* (profiled in these pages in "An Argument for Music," July-August, page 13); and **Rachel Wilson** '96, assistant professor of neurobiology at the Medical School. In addition, fellowship winner **Kirsten Bomblies**, a biologist currently at the Max Planck Institute, will join the faculty next summer.

Sustainability studies. With the appointment of **Christoph Reinhart** as associate professor of architectural technology, the **Graduate School of Design** has initiated a sustainable-design concentration within its master of design studies program (which serves professional, advanced-degree students). Subjects range from lighting design to studies of buildings' life-cycle energy demand and broader environmental questions.

Research policymaker. Pathologist **David Korn** '54, M.D. '58, has been appointed vice provost for research, effective November 15. He will be responsible for developing and implementing policies on the conduct of research, especially in the sciences. That has proven challenging as the University promotes interdisciplinary scientific collaborations, involving Harvard faculties and colleagues at the affiliated hospitals, who are often governed by different standards and practices. Korn's experience as dean of the Stanford University School of Medicine from 1984 to 1995 may prove useful. Doyle professor of cosmology **John Huchra** has been serving as the provost's senior adviser for research policy.

David Korn

International affairs education. The **Harvard Kennedy School** has introduced a concentration in international and global affairs for its master in public policy students who seek to address challenges in security, human rights, energy, the environment and natural resources, and other global issues. Ford Foundation professor of science and international affairs **Ashton B. Carter** chairs the faculty group overseeing the new program.

Eating green. **Harvard University Dining Services** has published a "sustainability report" detailing its use of local produce (apples, eggplant, parsnips), composting of food waste, and efforts to reduce use of materials and energy. Copies are available on line at www.dining.harvard.edu (use the "About HUDS" tab).

Honorees of note. Professor of genetics **Gary B. Ruvkun** was named a co-winner of the 2008 Lasker Foundation's Basic Medical Research Award, one of the signal recognitions in international biomedical science, for his work on discovering microRNAs and their role in regulating gene function....**Robert M. Greenstein** '67 has received a Heinz Award, recognizing his work as founder and executive director of the Center on Budget and Policy Priorities, Washington, D.C. The center analyzes fiscal issues and programs that affect low- and moderate-income individuals and families....*Technology Review*'s annual list of 35 top innovators under the age of 35 includes assistant professor of chemistry and chemical biology **Theodore Betley**; Loeb associate professor of the natural sciences **Donhee Ham**; assistant professor of stem cell and regenerative biology **Konrad Hochedlinger**; instructor in medicine **Jeffrey Karp**; and assistant professor of electrical engineering **Robert Wood**. (For more on Wood's tiny robots, see "Tinker, Tailor, Robot, Fly," January-February, page 8.)

BILL BURKE/PAGE ONE

Robert M. Greenstein

FELLOWS' FORUM. On September 8, this year's Radcliffe Institute Fellows moved into newly renovated Byerly Hall (formerly the home of undergraduate admissions)—giving the fellows a central location, with offices, studios, common spaces meant to foster intellectual interactions, and all the "green" comforts of geothermal heating and cooling.

Miscellany. **Brett C. Sweet**, M.B.A. '00, has been appointed dean for administration and finance in the Faculty of Arts and Sciences. He had been serving in a similar capacity at Baylor College of Medicine, in Houston, following work at Boston Consulting Group. With Sweet's appointment, interim executive dean (as the position had been called) **Robert L. Scalise** resumes his responsibilities as director of athletics....**Alan E. Guttmacher** '71, M.D. '81, has been appointed acting director of the National Human Genome Research Institute, part of the National Institutes of Health....**R. Nicholas Burns**, who was U.S. undersecretary of state for political affairs from 2005 to 2008—and the highest-ranking career diplomat in the department until his retirement—has been appointed professor of the practice of diplomacy and international politics at the Harvard Kennedy School....Faculty members at **Harvard Medical School**, Stanford, and other institutions will provide content to "Medpedia" (www.medpedia.com), an on-line medical and health encyclopedia being developed for launch later this year. Entrepreneur **James P. Currier**, M.B.A. '99, of Ooga Labs, based in San Francisco, leads the effort.

NHGRI/MAGGIE BARTLETT

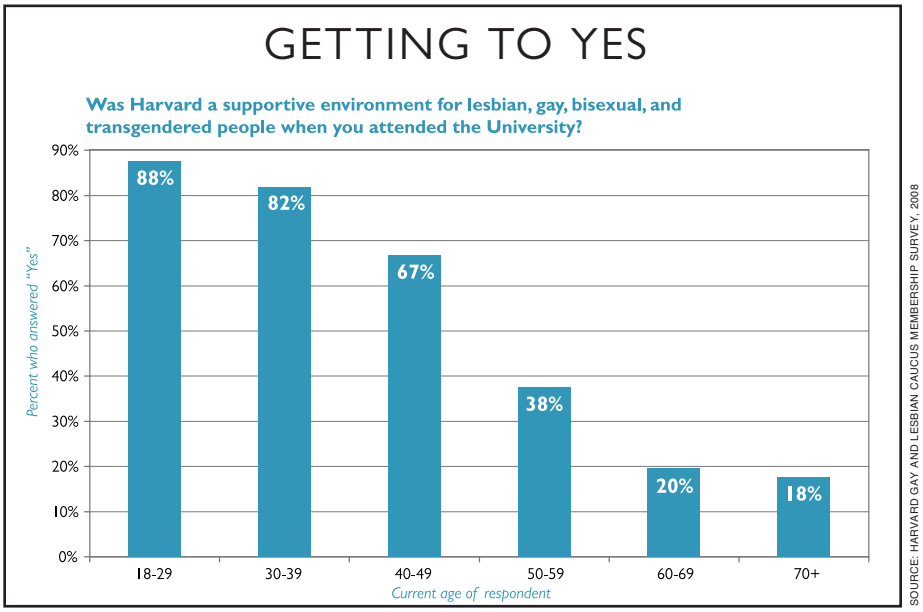
Alan E. Guttmacher

Photograph by Anton Grassl/Esto

the University of Pennsylvania before coming to Harvard in 2001, said she sees parallels between the way the University treated its gay and lesbian citizens and the way it once treated women. "For many women" in earlier eras, she said, "Harvard was not theirs." Faust wanted attendees to know they are not only accepted by the University, but "an integral and essential part of it," concluding with a message repeated throughout the weekend: "Please know that Harvard is yours. Welcome back."

HGLC formed in 1983 to rally the support of gay and lesbian alumni for amending the University's nondiscrimination policy—to forbid discriminating on the basis of sexual orientation. That campaign succeeded in 1985, and the group moved on to other issues. It lobbied for Harvard's 1993 decision to extend employee benefits to same-sex partners of faculty and staff members. The group sought to have the undergraduate Houses designate tutors to address students' concerns about sexual orientation and gender identity (something the College has required since 1997). It pressed Harvard to nominate an openly gay Overseer (it did, also in 1997), and put up its members for elected director positions with the HAA (they currently fill two of those posts). In 1998, Harvard appointed a same-sex couple to lead Lowell House: master Diana L. Eck, Ph.D. '76, Wertham professor of law and psychiatry in society, and co-master Dorothy A. Austin, Th.D. '81, Ed '94, Sedgwick associate minister in the Memorial Church and University chaplain. Another milestone came in 2006, when the University added gender identity to the nondiscrimination policy, protecting transgendered students and employees.

Although some student groups coalesced around these issues before 1983, HGLC's presence has been an important way for gay and lesbian alumni to stay involved and vocal—and to help current students. The group holds an annual dinner during Commencement Week and funds a public-service fellowship for students. Its Open Gate Foundation supports student projects and events. The group is also raising money to endow a visiting professorship in gender and sexuality to honor F.O. Matthiessen, a professor of history and literature who served as the first senior tutor of Eliot House, and whose homosexuality was an open secret well before his suicide in 1950. And Kevin Jennings '85 (one of those openly gay HAA elected directors) has established a prize for a senior thesis in lesbian, gay, bisexual, and transgender studies in memory of Eugene Cummings.



There is apparently still some distance to travel before reaching complete tolerance. Dorothy Austin recalled preaching in Memorial Church on the Sunday of Freshman Week just a few years ago and building her sermon around a recent *Crimson* op-ed in which a male freshman had confided his earnest hope of finding, during his four years at Harvard, the man with whom he would spend the rest of his life. Austin found the essay touching, and was impressed that the student felt comfortable broadcasting this hope to his classmates, his professors, and, indeed, the world. Afterwards, as freshmen and their parents filtered out of the church, many stopped to thank Austin for her message. But one mother approached her, pointed at the word *veritas* on her robe, and sneered, "That means truth! *How dare you* say this on Freshman Sunday?" Then she punched Austin so hard the minister fell backwards against the wall.

During a panel on the undergraduate experience, Clayton Brooks '10 noted that he stands to graduate with $58,000 in loan debt because of College financial-aid policies regarding "independent students" (those not receiving financial help from their parents). Brooks said he told his parents he was gay in November of his freshman year, and they responded by severing ties but giving him a substantial sum of cash. Because the College does not amend aid packages for independent students at midyear, he said, he was stuck with the bill for the spring-semester parental contribution. In addition, he said, the College expects independent students to surrender whatever assets they have (in his case, his parents' gift), but does not in turn apply that money either to previous debts or future obligations. Meanwhile, he added, dependent students who have assets in their own names are expected to pay only 5 percent of their total value to Harvard, prompting audience members to question whether the College is doing all it can to support gay students—or any students facing tremendous hardship in their personal lives. (According to financial-aid director Sally Donahue, the independent student policy has become significantly more supportive in the last few years: students are no longer required to take two years off, for example. The College, she said, considers individual circumstances and does its best to support students in difficult family situations, but must balance those concerns with the need to prevent abuse of the policy and to account for the fact

that independent students receive an exceptional amount of aid.)

Some attendees expressed dismay at the extent to which the University administration has thawed toward ROTC. Harvard pushed the program off campus in 1969, forcing students to train at MIT instead, and withdrew its funding in 1993 because of the military's ban on homosexuals. (Alumni donors have since paid MIT for the cost of training the Harvard recruits.) But the program continued to hold a commissioning ceremony for College cadets on campus during Commencement week, and in 2002, Lawrence H. Summers became the first president since 1969 to speak at that ceremony. After the September 11 terrorist attacks, Summers also persuaded *Harvard Yearbook* editors to change their policy so students could list ROTC among their activities, even though it is not a recognized student group.

President Faust followed Summers's lead this past June and spoke at the ceremony (see "Principles We Must Strive to Extend," July-August, page 53). Although reunion attendees didn't press her on this point during the Q&A, several said during panels and informal conversation that they wished she had used the occasion as a bully pulpit for criticizing "don't ask, don't tell." (See "Matters Military," September-October, page 81, and "ROTC, Continued" in this issue, page 10.)

But Harvard appears to be more tolerant than the wider society in the United States—and *much* more so than some other countries. Panelist Chai Feldblum, J.D. '85, a law professor at Georgetown, noted continuing challenges at home: for example, the Employment Nondiscrimination Act, which she helped draft, passed this year without protected status for gender identity. And during a panel featuring filmmakers, Sandi L. DuBowski '92—whose most recent film, *A Jihad for Love*, explores the Islamic world's complicated and often hostile attitude toward homosexuality and gay people—said the organizers of a film festival in Sarajevo that agreed to show his movie received death threats.

For better or for worse, gay undergraduates at Harvard face the same social disappointments as straight students, Eva Z. Lam '10 reported during a panel on the undergraduate experience. Mainly, that means a choice between a pervasive "hookup culture" and a relationship akin to marriage, with no middle ground of casual but meaningful dating. For his part, fellow panelist Marco Chan '11 said, "I don't feel self-conscious" when holding hands with his boyfriend in public. "I feel just like any other couple walking in the Yard. It's not an issue."

THE UNDERGRADUATE

Youthful Dreams

by BRITTNEY MORASKI '09

THE DAY Harvard sent out its admission decisions, I conveniently found myself at a church. The volunteer group that I had just been to Honduras with had regrouped for a photo-swapping event in St. Thomas's bingo hall. Before I left, I ducked into the darkened church itself. "Please God please God please God please God," I repeated silently, over and over, praying for an acceptance that would lead to experiences I couldn't anticipate and opportunities I couldn't name—but wanted so badly to be mine. My leg shook as I held down the gas pedal on my drive home. Upon opening and then comprehending the e-mail that welcomed me into the class of 2009, I broke into fat and sloppy tears.

It's hard to imagine how I would have reacted if I had been rejected. Getting into Harvard was the only dream I had for myself; if I got in, I figured, other successes would follow. If I didn't, they might not. Being accepted also seemed something like a personal success insurance policy: if all else failed, and little came of my life, at I least I could say I went to Harvard. Not getting in seemed to me a failure that would forever deny me confidence in my own abilities.

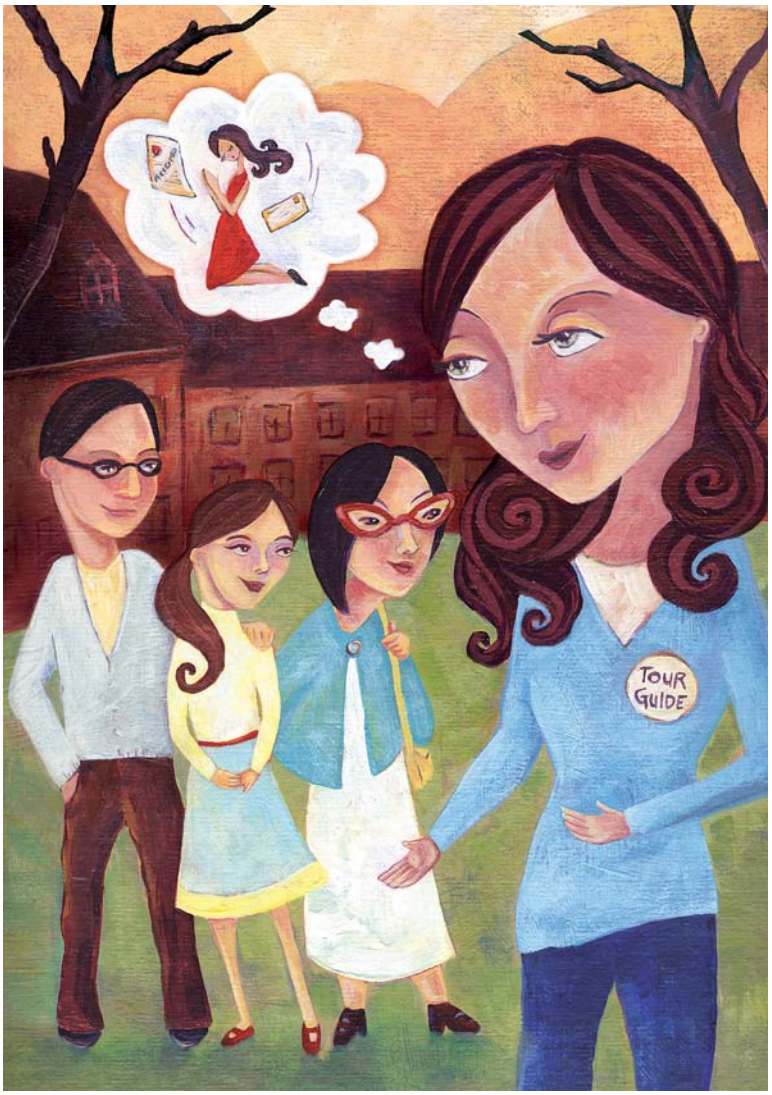
I prayed for an acceptance that would lead to experiences I couldn't anticipate and opportunities I couldn't name.

I BEGAN MY JOB as an admissions-office tour guide at the end of my freshman year, quickly learning that we work hardest during the summer. Waves of families come to Cambridge then, visiting the school as one of several stops along a son or daughter's junior-year college-tour circuit.

The tour moments that I enjoy most arise from the simplest of questions. "Why did you choose Harvard?" I'm often asked. I try to give the same answers to parents and to students alike. "Looking back now," I say, "I really don't know how I could have made anything but a gut decision, given that all the things I like about college—my friends, my classes, my professors—are things that I couldn't have anticipated in advance." I follow with an admission that has only recently become clear to me: "So I wonder if I would have been happy anywhere, but I chose Harvard because it seemed like the place where I most wanted to spend four years of my life."

Parents latch onto what I'm trying to hint at, even if it escapes their children:

that Harvard is a great school, of course, but it is also just like any other school in the sense that my experience at Harvard has been defined by the friends I've made, the classes I've taken, and the ways I've spent my time, rather than by Harvard's reputation. Parents seem to appreciate this approach—I'll see a few of them nod in agreement—and I like being in cahoots with them. I just wish I'd thought this way four years ago.



In August, I spent a week in Shanghai teaching *The Great Gatsby* to four groups of high-achieving, English-speaking Chinese students. One of my goals for my students was to have them understand that dreams are not inherently good and that their value instead depends on their influence on the person pursuing them. In the spirit of the Olympics, gold-medal swimmer Michael Phelps was my example of someone with a "good" dream. I read to my students a *New York Times* report that Phelps's third-grade teacher had recently written to him, proud that he had so clearly found the right goal to focus on despite having struggled in school. Because Phelps had a "good" dream, I told my students, he was able to do something truly great.

Jay Gatsby, of course, was my example of someone with a "bad" dream. I explained to my students that his desire to win Daisy led him to make his money illegally and, once reunited with her, refuse to see her as any different from the young girl he once fell in love with. Gatsby's dream skewed his perception of success and dictated the course of his life.

But as I began this lesson on dreams for my third seminar group, a new thought came to mind. It didn't fit so well into my established lesson plan as Jay Gatsby did, but I thought it might make more of an impression on my students. "Actually," I said, "you know what? I think I know of another bad dream. My dream of going to Harvard was a bad dream because it meant more to me than any dream should."

I elaborated: My dream to go to Harvard was a bad dream because I had staked my self-esteem and my hopes for my future on an external situation I had little control over. For the first time, I realized that I was little different from Gatsby but for fortunate treatment in the college admissions pool.

I used myself as an example because it was hard not to see something of myself in some of the students, and I was worried that they were beginning to define themselves, as I had done, by their prospects of going to a good school. Sometimes the reminders of my younger self were jarring: while helping one student make sense of the format of the college admissions Common Application, I showed her my own "Activity List," prepared for my college applications and still on my computer. Hearing another student explain how she learned English by playing a tape each morning and reciting along with it as she got ready made me think of the Great Courses tapes I checked out of my community college's library and listened to as I drove home. "Please apply to Harvard," I begged after a long conversation with her. Just don't, I thought to myself, want to get in as badly as I did.

This summer, as young girls in my tour group singled me out to ask questions about journalism on campus and I met Chinese students whose lack of opportunities in their hometowns made them all the more determined to seek new challenges in a new place, I've had the opportunity to rethink my own path to and experiences at Harvard. I understand completely how the students who arrive at the admissions office feel—shy, terrified, and entranced by Harvard—because I, too, once was an 18-year-old who could barely say "Harvard" aloud. And I think I can relate to the Chinese students who believe that the reputation that comes with going to Harvard—or any school in the United States—will provide them with a safety net of success should life ever prove difficult for them in the future.

Three and a half years since issuing my urgent—and fervent—pleas to a higher power from the nave of St. Thomas church, I've discovered many of the opportunities going to Harvard brings and

Illustration by Jeanine Henderson

the experiences it offers. But just as three years of Friday-night outings with my roommates, intersession trips, lectures in Sever 113, and conversations in the Barker Center have become the Harvard experience I speak of fondly and enthusiastically during my tours, late-night tears over a project started too late, a heart too easily hurt, or other, smaller, dreams not realized have also made it easier for me to speak of Harvard critically, even dismissively. Though I now know the joys of a Harvard education, I also know its occasional sorrows and frequent frustrations. And just as I certainly understand having an unrelenting desire to go to one's college of choice, I also now see a certain pointlessness in such passion.

This is why I wanted my Chinese students to think about both Michael Phelps and Jay Gatsby, and why I give admission tours—I want to share with these 16-, 17-, and 18-year-olds what it's taken me three years to learn. Getting into Harvard turned out to be easy and, in a sense, unimportant. It's growing up that's been the challenge.

Berta Greenwald Ledecky Undergraduate Fellow Brittney Moraski '09 is working on her history and literature senior thesis, about mental health in post-World War II America, and starting her job search.

SPORTS

Seeing the Field

A worldly player in a global game

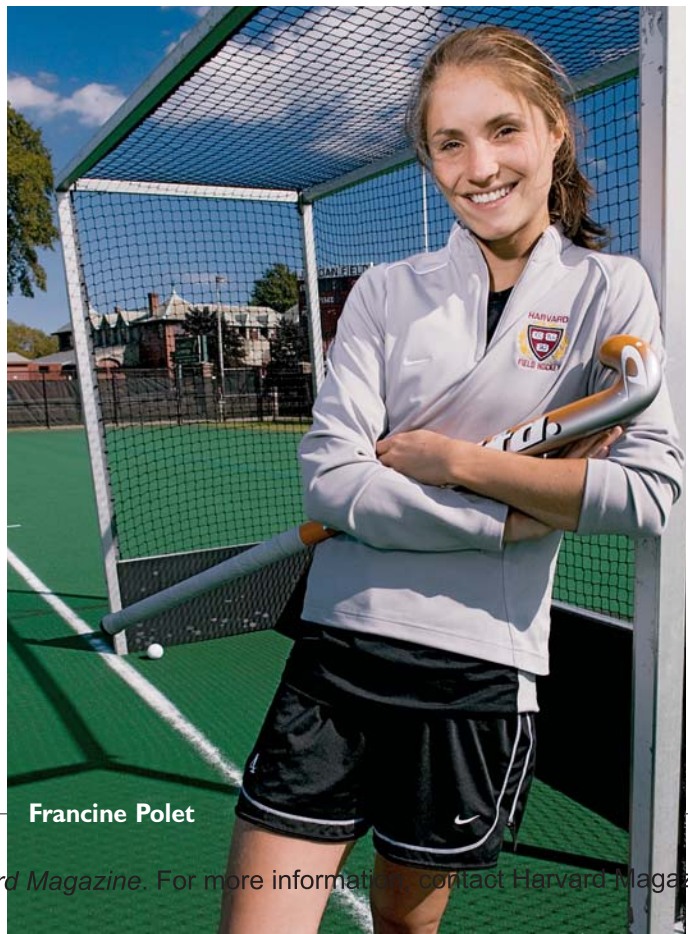
Field hockey, though relatively unknown in the United States, is a global game, and Francine Polet '09—who grew up in Malaysia and the Netherlands before going to high school in Hong Kong—has seen styles as diverse as the people who play them. Europeans favor a quick game, with hard shots and fast passing. Asian players, particularly those from India and Pakistan, boast unparalleled stick skills and deadly trick shots. The American game is based on fitness: outrunning and outlasting the competition.

Despite picking up inflections from around the world, says Harvard head coach Sue Caples, Polet remains identifiably Dutch in her style—especially in the zip she puts into her passes. "I have a hard hit," says Polet, "so distributing the ball has always been one of the things I feel is my strength." She plays sweeper, the final defender in front of the goal—a "lock on the back door," as she puts it. (In addition to a sweeper, Harvard's starting lineup includes a goalie and three defenders, midfielders, and forwards apiece, a relatively common formation.) From Polet's deep vantage point she can survey the whole field and pass to open teammates, ideally defusing the offense's pressure and jump-starting a counterattack.

Polet is also responsible for marshaling the defense in front of her. She uses what Caples calls her "good game-sense and vision" to assign teammates to opposing forwards. "You're constantly thinking and communicating and also trying to play your own game," says Polet. "It's a lot at the same time, not just for me, but for everybody. Even when I step up, I expect the next person behind me to be telling me, 'Go to the ball,' or 'Stay on your man.'" The Crimson defense has been the Ivy's third stingiest during the past two years, allowing only 19 goals in 14 league games. (The team tied for fourth in 2007, and for second in 2006.)

Polet sometimes finds herself ahead of her defensive line because, given the opportunity (such as an intercepted pass), she dashes up the field. "I like attacking," she says. "My coach always tries to pull me back. She thinks I press too high." Caples concurs in part, but at other times encourages her sweeper's aggressiveness because it gives the team a temporary advantage in midfield. In the past two years, Polet has scored three goals and dished out six assists, making her the second-highest-scoring defender on the team.

Polet also plays a vital role on "short corners," scoring chances that arise when the referee calls a minor foul near the net. Major fouls result in point-blank penalty shots, but short corners are trickier af-



Francine Polet

Photograph by Jim Harrison

Crimson in Beijing

On the water, on the court, and on the strip, Harvardians past and present competed at the Beijing Olympics. Clockwise from upper left: Malcolm Howard '05 (at right) captured gold as a member of the Canadian men's heavyweight crew. Emily Cross '08 (at left) led the U.S. to a silver medal in the team foil competition. In men's tennis, James Blake '01, beat top-ranked Roger Federer before losing in the bronze medal match. In the women's heavyweight crew contest, Caryn Davies '05 (top row, center) stroked a powerful American team to gold in the event. In the women's single sculls, Michelle Guerette '02 captured silver when she beat two-time Olympic champion Ekaterina Karsten of Belarus.

CLOCKWISE FROM UPPER LEFT: AP PHOTO/THE CANADIAN PRESS, DARRYL DYCK; TIMACHEFF/FENCINGPHOTOS.COM; JAMIE SQUIRE/GETTY IMAGES; AP PHOTO/GREGORY BULL; VLADIMIR RYS/GETTY IMAGES

Harvard athletes have a long history of Olympic competition, beginning with the first modern games at Athens in 1896 (see "The Unexpected Olympians," July-August 1996, page 36). This summer, 10 current and former Crimson athletes turned in memorable performances in Beijing, capturing two gold and two silver medals.

In rowing—a traditional Harvard strength—Caryn Davies '05, who led the Radcliffe crew to a national championship in 2003, stroked the powerful United States women's eight to victory, staving off a late surge by the Netherlands. In the men's heavyweight event, her classmate Malcolm Howard, a veteran of three national-championship Harvard crews who was rowing in the five seat of the confident Canadian eight, earned gold in a win over Great Britain. In the women's single sculls, Michelle Guerette '02, coached by Harvard men's lightweight coach Charley Butt, took the silver medal. In fifth place at the halfway mark, she put together what she called her "best race ever" over the subsequent 1,000 meters, finishing just 0.44 seconds behind Rumyana Neykova of Bulgaria, and 1.2 seconds ahead of two-time Olympic champion Ekaterina Karsten of Belarus.

In the men's pair final, twins Cameron and Tyler Winklevoss, both class of '04, placed sixth. After finishing last in their opening heat, they handily won their repechage two days later, earning a spot in the semifinal competition; there, they battled back from an early deficit to place second. In the men's lightweight fours, Patrick Todd '02—a six-time national team member—finished eleventh.

In men's tennis, James Blake '01 (see "Brotherhood at the Baseline," July-August 1998, page 76) staged a stunning upset of number-one-ranked Roger Federer of Switzerland in the quarterfinals on August 14, winning in straight sets, 6-4, 7-6 (2). But the next day Blake, who left Harvard after his sophomore year to play the pro circuit, lost a tightly contested semifinal match to Fernando Gonzalez of Chile, 4-6, 7-5, 11-9; in the bronze-medal match with Novak Djokovic of Serbia, he lost in straight sets, 6-3, 7-6 (4).

The unlooked-for success is often the most spectacular, and such was the case in fencing. Emily Cross '08 ('09), a 2005 NCAA champion, and Noam Mills '12, the number-one junior épéeist in the world in 2006, both lost in the round of 32 in individual competition. But Cross (see "Wild on the Strip", January-February 2006, page 53) had the chance to redeem herself in the team foil competition, and she did, scoring 31 touches in three rounds to lead Team U.S.A. to the silver medal. Against defending world champion Poland, the seventh-seeded Americans scored a tremendous upset in the opening quarterfinal round, 31 to 30. Then, in the semifinals against Hungary, Cross was on fire, scoring 16 of the team's 35 points, including a 7-1 victory in her eighth bout that gave the U.S. an insurmountable lead. In the gold medal match, Cross beat her first opponent from the top-ranked Russian team, but the Russians ultimately proved too strong. Even so, by helping her teammates win silver, Cross became the first Harvard fencer ever to win an Olympic medal.

At the Paralympic Games in Beijing two weeks later (September 6-17), swimmer Beth Kolbe '08 competed in the 50-meter backstroke and 50-meter freestyle events. Placing eighth and fourth, respectively, she set a new American record in the freestyle event in the process.

Further details of Harvard Olympians' Beijing experiences appear at www.gocrimson.com.

Soccer Summary

Men's Soccer
The Crimson (4-3, 1-0 Ivy) lost three games on the road in early season play, but was undefeated on its home turf. Senior Michael Fucito (see "Back on the Field," September-October 2008, page 65) leads the team in goals, followed closely by Andre Akpan '10. But it was Kwaku Nyameke '10 who secured the team's first Ivy win, 1-0 against Yale, when he blasted a loose ball off a free kick into the Yale net.

Women's Soccer
The women booters (4-3-3, 1-1-0 Ivy) have been paced this season by freshman phenomenon Melanie Baskind, who leads the team in points. Against Yale, which the Crimson defeated 3-1, Baskind scored the game-winning goal and added two assists.

fairs: they look a bit like on-side kicks, except the football has been replaced by a hard, white tennis ball. Defenders don plastic masks and crowd inside the net while the offense stands around a white semicircle 15 meters from the goal. A player standing to the side of the goal starts the action by passing the ball to a "stick stopper" crouched at the top of the semicircle. As defenders pour out of the net, the stick stopper feeds the ball to a striker who cracks it into the scrum. Polet is the team's primary striker.

She began playing field hockey at the age of six, when her parents returned to the Netherlands from Malaysia and joined a local cricket and field-hockey club. The club acted as a social hub, too, with lunches and Sunday dinners. It also extended its hospitality to visiting teams. "You know your opponents because you've played them multiple times," she explains. "You serve them food and you talk. It's very different" from the United States, where the away team generally loads up its bus and leaves directly after the game.

In her teens, Polet decided to apply to a private international high school and moved to Hong Kong on her own. (She arrived at Harvard expecting to concentrate in East Asian studies, but a desire to focus more broadly on international development led her to switch to social studies.) Once there, instead of suiting up for a team of Dutch expatriates, she joined a local club. "I wanted to integrate," she recalls, "and it was cool because I got to play for the under-21 team and travel with them."

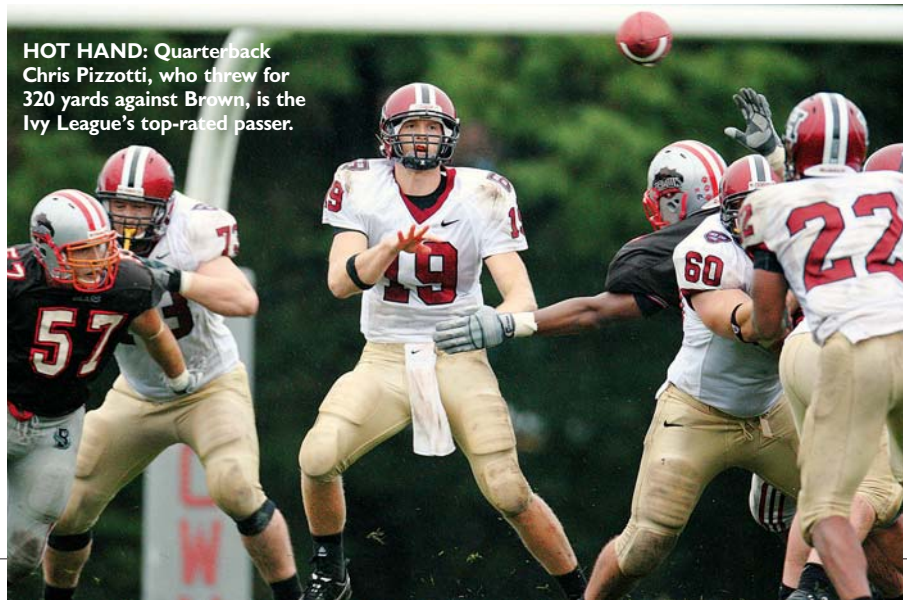
At Harvard, the amount of conditioning the team did surprised her, but she soon grasped its importance: "If your legs are not tired," she points out, "your skills are not going to break down." By her sophomore year, she was starting regularly. The team, she says, also helped her adapt to American life.

But adjusting to yet another culture hasn't dulled her wanderlust, something she thinks she inherited from her parents, who now live in London. (Her father's former job at Unilever required frequent moves.) "We just grew up that way, a very nomadic family," she says. "I've been here for four years. I kind of want to move out, see new places." Wherever she goes after graduation, Polet hopes to keep playing field hockey. It's nice, she says, that even in an unfamiliar place, she can play a familiar game. —PAUL GLEASON

Bumps in the Road

FOR THE FOURTH time in the 15-year reign of head coach Tim Murphy, the football team entered the Ivy League lists as defending champions. The 2007 squad—like those of 1997, 2001, and 2004—had gone unbeaten in Ivy play, finishing with a 37-6 demolition of previously undefeated Yale. This year's preseason media poll picked the archrivals as co-favorites to win the league (followed at a distance by Brown and Penn), but both hit speed bumps in their first Ivy outings: Harvard lost a 24-22 squeaker at Brown, while Yale was upset by an unheralded Cornell team, 17-14.

The Brown game, played in a downpour, was a hard-fought affair in which a few inches of soggy turf proved decisive. With Harvard behind, 24-16, and time running out, the deft passing of quarterback Chris Pizzotti '08 ('09) generated a 70-yard drive that advanced the ball to the Bears' three-yard line. Backup quarterback Liam O'Hagan '08 ('09) then threw a scoring pass to receiver Matt Luft '10, cutting Brown's lead to 24-22. A two-point conversion would have evened the score, and with only 1:03 to play would almost surely have forced an overtime tie-breaker. But a roughing-the-quarterback penalty put the ball on the one-and-a-half-yard line, limiting Har-


HOT HAND: Quarterback Chris Pizzotti, who threw for 320 yards against Brown, is the Ivy League's top-rated passer.

DAVID SILVERMAN/DSPICS.NET

HARVARD ATHLETIC COMMUNICATIONS

LIVING LARGE. At Dillon Field House, the football squad now suits up in opulently refurbished rooms. Lining the walls are 114 cherrywood lockers with crown moldings, equipped with built-in safes and wooden seats. Structural columns are encased in "Shaker-design custom hardwood cherry." Sports mantras ("Pride," "Commitment," "Tradition," "10,000 Men of Harvard") are inscribed on ceiling soffits, and one wall displays a mural depicting high moments from seasons past. Two multimedia stations feature 46-inch flat-panel TVs, video projectors, and iPod docks; a refrigeration unit stores beverages and ice cream. Overseen by head coach Tim Murphy, the gutting and rebuilding of Dillon's ground floor was finished last summer. Visitors' locker rooms were "touched up," but not transfigured.

vard's tactical choices, and Ben Jenkins '10, a former defensive back, was sent in to run the ball up the middle. The Bruin defense saw it coming and stacked him up inches short of the goal line.

Harvard had also played catchup a week earlier, but successfully. Opening at the Stadium against nonleague rival Holy Cross, the team trailed after three periods, 17-6, but struck for three late touchdowns to pull out a 25-24 victory. Pizzotti accounted for all three, throwing a 68-yard pass to sophomore receiver Marco Iannuzzi for the first one and scoring the other two on short-yardage carries.

The squad rebounded from the Brown loss with a convincing nonleague win at Lafayette. The Leopards had just beaten Penn, bringing their record to 3-0, but Harvard built a 24-13 halftime lead and cruised to a 27-13 victory. Tailback Cheng Ho '10 ran for 108 yards and a touchdown, Pizzotti hoisted a 67-yard scoring pass to receiver Chris Lorditch '11, and the defense, led by tackle and captain Matt Curtis '09, had three quarterback sacks and two interceptions. Sophomore kicker Patrick Long nailed field goals of 41 and 45 yards; the second was Harvard's longest since 1993.

TIDBITS: Brown's rain-soaked win—its first over Harvard since 1999—positioned the Bears as front-runners in the Ivy title chase. Brown last won the league in 2005, when its sole defeat in a 9-1 season was a 38-35 overtime loss to Harvard.

Friday night lights: The Holy Cross open-

The Force Was With Them

If you were among the 40,000 who saw the 1968 Harvard-Yale game, you sensed an invisible hand shaping the waning minutes of play. Yale's heavily favored team held a 29-13 lead, but an improbable combination of breaks and derring-do enabled Harvard to score 16 points in the last 42 seconds and gain an astounding 29-29 tie.

"You got the feeling that the universe had shifted…that some kind of weird force had descended on the Stadium," recalls former Yale tackle Tom Peacock in *Harvard Beats Yale 29-29*, a new documentary by Kevin Rafferty '70. Screened at this fall's Toronto film festival, the 105-minute movie alternates game-action footage and commentary by 50 former combatants. Though the outcome is clearly telegraphed by the title, suspense mounts as the clock winds down and the Stadium's shadows lengthen.

Filmmaker Rafferty, whose previous films include *The Atomic Cafe* and *Blood in the Face,* is a New Yorker whose grandfather, father, and uncle all played football at Yale. He witnessed The Game from the Harvard side. Two years ago, anticipating the fortieth anniversary of the contest, he bought a "slightly dinged-up" '96 Audi and added 15,000 miles to the odometer as he crisscrossed the country to interview 61 ex-players. They included backup quarterback Frank Champi '70, whose heroics sparked Harvard's rally; Brian Dowling, Yale's prodigious quarterback; team captain and halfback Vic Gatto '69; actor-director Tommy Lee Jones '69, the sole returning starter on Harvard's offensive line; and Pete Varney '71, the burly end who caught Champi's game-tying two-point conversion pass with no time left on the clock.

A *Variety* review describes the interviewees as "almost uniformly witty, charming, funny, and reflective." Their reflections touch on the politics and *Zeitgeist* of the Sixties, but are mostly about the game and what it meant to the participants. "There was the initial shock of the universe going haywire," muses Mick Kleber, a Yale tackle, "but after that it came to me, almost like an epiphany, that I was just so fortunate to have been in that game, to have had that experience. I couldn't be sad about it." Yale defensive captain Mike Bouscaren candidly admits he tried to injure the high-flying Champi in order to sideline him. "I'm glad that we lost," he adds, "because if we had won, I probably would have had more difficulty becoming just a regular person—a person who understands that life is not fair, that you can't win all the time, and that it's good to be humble."

Not everyone viewed the event as numinous. To the late Fritz Reed '69, a tackle whose 26-yard run with an errant pitchout set up Harvard's third score, "it was really exhilarating, but it was a football game. That's all it was. It wasn't even for a major championship." (Both teams finished unbeaten and shared the Ivy title.)

Champi has the last word: "I think we all won. If it wasn't for that game, none of us would be remembered today. Both teams have a small place in football history."

Harvard Beats Yale 29-29 *opens November 19 at the Brattle Theatre and at New York City's Film Forum. (The film's title originated as a headline in the* Harvard Crimson.*) Overlook Press will publish* Harvard Beats Yale 29-29 *in book form in 2009.*

er was just Harvard's second nocturnal football game, and the first to be held on a Friday. The 20,462 attendees were treated to an improved Stadium sound system and a new video scoreboard that offers instant replays. The first night opener took place a year ago and drew 18,898 fans.

Bombs away: With Pizzotti's strong arm and a clutch of nimble receivers, Harvard may have the Ivies' best aerial attack. A fifth-year senior who sat out the 2005 season with a back injury, Pizzotti got the starting job a year ago and posted the second-best single-season passing numbers in Harvard annals. He threw for 370 yards against Holy Cross, for 320 at Brown, and for 231 at Lafayette. Iannuzzi, who also returned kicks, had 11 catches in the Holy Cross game, and Luft made 10 receptions at Brown.

The Game: The annual clash with Yale kicks off at the Stadium at noon on November 22. A halftime ceremony will mark the fortieth anniversary of the legendary 29-29 tie of 1968 (see "The Force Was With Them," page 79). ~"CLEAT"

For weekly Harvard football updates, visit **www.harvardmagazine.com/football**.

ALUMNI

At Home with Old Age

Reimagining nursing homes

As the keynote speaker at an AARP workshop on elder care, William Thomas, M.D. '86, is telling the story of Eos, the Greek goddess who fell in love with the Trojan prince Tithonus. The couple lived happily until one day Eos saw something strange poking out of her husband's head. "'What is *that*???'" Thomas shrieks in mock shock and disgust as the audience laughs. "Well, it was a *gray hair*." Soon, Thomas continues, the prince's entire head was white and he grew older and older—but he could not die because he had been made immortal. His once booming voice became feeble, and his strong legs and shoulders shriveled up. In the end, Eos took pity on him and turned him into a grasshopper. "The myth," Thomas tells his audience, "offers the proposition that old age is inside of us; it is welded to the human condition."

An internationally known geriatrician, Thomas is used to lecturing about the need for attitudinal adjustment when it comes to aging. Growing old entails "elements of decline, [but] the larger truth," he maintains, "is that aging is a complex, multifaceted, and poorly understood component of *normal human development*."

Thomas takes this holistic view to work every day. A bullish reformer, he has spent his career pushing for seismic cultural and economic changes in long-term care and public policy toward aging, which has meant challenging the

Men's Basketball Exonerated

An inquiry by the Ivy League into allegations of improper recruiting by the Harvard men's basketball program and of lowered standards of admissions for the team—raised initially in a March 2008 *New York Times* article—has determined that no violations of either National Collegiate Athletic Association or Ivy League rules occurred. In addition, the league's routine annual review of admissions standards found that all admitted Harvard recruits met the requirements mandated by the league, which issued a statement on September 3 that read, in part:

> Harvard Head Coach Tommy Amaker and Assistant Coach Kenneth Blakeney were completely forthcoming in their participation in this inquiry, and interviews with others who were involved, as well as a thorough examination of relevant records, corroborated that the coaches' contacts with prospective student-athletes and their families were entirely consistent with NCAA and Ivy League rules.

"We're very pleased with the outcome," Harvard athletic director Robert L. Scalise said after the results became public. "It was what we had expected it to be," he added. "We have a program that abides by the letter and the spirit of NCAA and Ivy rules and we want to continue that."

"This matter got a lot of attention because it was raised in the press," said Jeff Orleans, executive director of the Ivy League (see "Questions about Recruiting," May-June, page 76). "The admissions part was a non-story, in the sense that the reporter could have simply waited until the admissions decisions were known, instead of asking people to speculate."

As for the alleged recruiting violations, which centered on the fact that assistant coach Blakeney had played basketball—before Harvard hired him—with a prospect, Orleans said the committee conducting the investigation asked three questions: Was Blakeney a Harvard employee? Was he a Harvard representative? Was he trying to recruit athletes to Harvard at the time of these activities? "The answer was no in each case," Orleans noted. Such issues arise and are investigated routinely in Division One athletic programs; what made the Harvard instance unusual, he said, "was the level of attention that was focused on it."

Orleans did indicate that the allegations have prompted the league to begin "discussing with all the schools the importance of being very clear about the employment relationship and how it develops. That way," he added—given the public perception that the periods before and after someone is hired "shade together"—"they can avoid even the appearance of impropriety."

$122-billion nursing-home industry.

In some ways the timing for such reforms could not be better. Many nursing homes built in the 1960s and 1970s in response to Medicare and Medicaid legislation now need major renovations just as aging baby boomers begin to create rising demand for geriatric care. (Seventy million Americans are expected to be older than 65 by 2030.) "The boomers are already changing the face of aging," says Thomas, who is 48. "They aren't going to take the declinist label: 'I am broken down and unimportant.'"

Thomas is out to improve nursing-home conditions—or, better yet, supplant them with smaller group homes where customized, flexible care is the norm. "I am talking about a vision for alleviating the main causes of human suffering in older people—loneliness, hopelessness, and boredom," he says. "The changes I am talking about are really just applying common sense. Would you rather live in an institution, or in a garden?"


William Thomas

Thomas calls himself a "nursing home abolitionist." The vision of an "Eden Alternative" for elders began in 1991 when he took a part-time job as a doctor at the nonprofit Chase Memorial Nursing Home in upstate New York. He was seeking respite from harrowing 24-hour shifts at a local emergency room, but quickly realized two things: that there was "something very wrong" with the way people were living there, and that he had "just fallen in love with the people, their families, and the nurses." He also recognized opportunities to effect deep change. "Morale is often so low at a nursing home that just about *anything* you could do there would have a huge impact," he says. "I met people who had literally given up on living. And *you* can bring joy to them—that's what turned me on."

Within two years Thomas had also brought the residents 80 parakeets, 10 finches, two lovebirds, six cockatiels, two canaries, and dogs, cats, rabbits, and chickens. Fresh-cut flowers and home-grown food—from gardens dug into Chase's once-manicured lawns—graced the hallways and dining room. He introduced new approaches to dementia, frailty, and the human need for companionship that also improved working conditions for the staff. (Staff turnover is a major problem in geriatric care.)

The Eden Alternative's most enduring contribution, he emphasizes, is not "the fur and feathers" but the Eden Golden Rule: As management does unto the staff, so shall the staff do unto the Elders. "We teach the people who own and operate these facilities how to provide staff with the same vital experiences that they want the staff to offer to the elders: dignity, respect, affection," he says. The New York State Health Department studied the impact of this unprecedented approach and found a 50 percent reduction in infections, a 71 percent drop in daily prescription-drug costs, and a 26 percent lower turnover rate among nurses' aides.

Based on that success, Thomas "Edenized" several other upstate nursing homes and then founded the nonprofit Eden Alternative to spread the word. To date, the organization has 300 registered nursing homes around the world and has trained more than 18,000 people in what he considers the 10 basic principles of creating a "human habitat" for elders.

Thomas knows personally about living with debilitating frailty. He and his wife, Judy, have five children; their two daughters, Haleigh and Hannah, have been diagnosed with Ohtahara syndrome, a progressive neurological disorder, and have always required around-the-clock, home-based nursing care. Although Thomas criticizes the pharmaceutical industry for many things—like pushing too many drugs on older people and marketing pills to "cure" such normal aspects of life as shyness, grief, and occasional insomnia—he is always quick to thank modern medicine for keeping his girls alive.

Balancing family life with his workload and travel schedule—he is gone from their Ithaca, New York, home 30 to 45 days a year—is not easy. He is still on the Eden board, but since 2002 has left daily operations to an executive director. He is a regular consultant for AARP, the author of five books, including *What Are Old People For? How Elders Will Save the World*, and a professor at the Erickson School of Aging, Management, and Policy at the University of Maryland-Baltimore County, where he writes the blog "Changing Aging."

In 2003 Thomas pushed beyond Eden to pilot a newer concept in elderly housing—the Green House Project in Tupelo, Mississippi. The challenge was to create better alternatives that meet demands for high-quality care and meaningful lives while complying with government regulations and building codes—and remaining affordable. Each house provides 10 to 12 seniors with 24-hour nursing care, well-trained and -supported staff, and private rooms and bathrooms in a layout designed with an open kitchen and dining room and plenty of light and access to the outdoors. The pilot project was funded by the Robert Wood Johnson Foundation; an additional $13-million

Photograph by Jim Harrison

grant from the foundation has enabled NCB Capital Impact, a Washington, D.C.-based nonprofit, to complete 41 Green Houses in 10 states, with another 18 projects in development. The goal is to open a Green House in every state.

Thomas views the nursing-home industry—which draws about 78 percent of its revenues from Medicare and Medicaid—as a powerful and daunting competitor. Unpopular as nursing homes may be, as of 2004 they housed 1.5 million of the frailest Americans, almost half of whom were over age 85, according to a 2007 AARP report; Thomas notes that 50 percent of people aged 65 or older will spend at least some time in a nursing home before the end of their lives. The expenses—largely absorbed by the government—are hard to bring down. (This year, the average private-pay cost for a private room is $209 per day, or $76,285 a year; a semi-private room averages $187.)

The Green Houses cost more to build than conventional facilities, Thomas says, but the elderly residents get more as well: more privacy, to begin with, and a much higher quality of life. In his model, money and resources are shifted away from middle management and used more for direct care. Operationally, the Green Houses cost the same to run on a daily basis as a nursing home, he says, adding, "This should not be that much of a surprise since the nursing home was never a paragon of efficiency."

THOMAS'S PERSUASIVE POWERS spring in part from his earthy public persona—he typically wears roomy blue jeans and Birkenstocks to speaking engagements. His speeches, while laced with philosophical references, are akin to kitchen conversations; he hands out advice like a caring, grown son and reassures people with phrases like "no worries" or "cool beans." His knowledge of the healthcare and pharmaceutical industries is formidable—he can reel off the detailed history of commercialized use of heroin and the relationship between "horse piss and hormonal supplements"—but he also tends to recall the simpler past when his grandmother tended his cuts with a milk and bread poultice, and old people worked outside and didn't take 20 pills a day.

Growing up in rural Nichols, New York (near Binghamton), Thomas was the first member of his family to attend college. He thrives on winning over a tough audience. As an undergraduate at the State University of New York at Cortland, he was a charismatic student leader—campaigning for new student-run evaluations of professors—and even ran for mayor. "You know how you are at 20," he says now. "I thought I could run the city better than my opponent, who had a college-bashing platform. I lost the election, but my consolation prize was that I got into Harvard Medical School—the first person from Cortland ever to do that."

Thomas found Harvard stimulating and ultimately advantageous. Just as "Nixon was the only politician who could go to China, because he was immunized against the claims of selling out to communism," he points out, "what better person than a Harvard-trained medical doctor to lead the way against the medical model in nursing homes? If people get up in my face about the medical issues—the main excuse given *not* to enact reforms—then I have the facts to back them down." The medical model makes illness and treatment the paramount issue, he says, and "what happens then, especially in nursing homes, is that people's pancreases get more attention than anything about their lives or what they need *as people*."

He says he would have been happy in politics, and the work he does now is far from apolitical. Ultimately, his constituents are old people. They like him for his ungodlike doctoring and for his essential championing of autonomy.

"I'm a firm believer in the rights of elders to do whatever the hell they want," he told the seniors at the AARP workshop. "If you only have the right to make the 'good, wise' decisions that your grown daughter agrees with, then you're not running your own life anymore." Old people, he says, can make decisions even if they are bed-ridden and confused. "I've taken care of lots of people who didn't even know their own children," he notes. "Sure, they probably shouldn't be making decisions about their 401(k) plans, but they can decide what to wear and what to eat and whether to go outside on a daily basis. People think that if old people cannot make the big decisions, they cannot make any decisions—and that is just wrong. They have the right to folly."

Thomas's vision seeks to shift our underlying cultural philosophy. "Old age is

Comings and Goings

Harvard clubs around the country offer a variety of social and intellectual events. For information on upcoming programs, contact your local club directly, call the HAA at 617-495-3070, or visit www.haa.harvard.edu. Among the winter happenings:

On November 12, the **Triad Harvard Radcliffe Club** of North Carolina offers "Blown to Bits: Your Life, Liberty, and Happiness after the Digital Explosion," a lecture by McKay professor of computer science Harry R. Lewis, who also addresses the **Harvard Club of Eastern New York** on November 19. On the same day, the **Harvard Alumni Association of Utah** will hear from Ann Braude, director of the Women's Studies in Religion Program at the Divinity School.

On December 6, the **Harvard Club of Boston** and the **HAA** host **"A Saturday of Symposia"** with a keynote address, "Who's Afraid of the Fundamentalists?" by Hollis professor of divinity Harvey Cox. Speakers include Aramont professor of the history of science Janet Browne ("Celebrating Darwin in 2009: Charles Darwin's Life, Times, and *Origin of Species*"); Stare professor of epidemiology and nutrition Walter Willett ("Diet and Health: A Progress Report"); Davis Center for Russian and Eurasian Studies senior scholar Marshall Goldman ("Petrostate: Putin, Power, and the Rise of the New Russia"); and Robinson professor of music Robert Levin ("Who Cares If Classical Music Dies?").

For further details and registration, please call the Boston club at 617-450-8489, or visit www.harvardclub.com.

Cape Town Conference

Alumni are invited to join President Drew Faust and other Harvard scholars in Cape Town, South Africa, for the Harvard Alumni Association's 2009 Global Series conference. The event, March 27-29, offers the chance to meet fellow alumni while exploring a region of cultural, intellectual, and economic importance.

Registration is required. Please visit http://post.harvard.edu/globalseries for further details.

and will always remain difficult. It demands much from us...and seems to offer very little in return," he writes in *What Are Old People For?* "It is the fearfulness of this vision that has led us to ignore the old, to deny aging, and to hope that someday a cure for this malady might be discovered....Such a hope, while understandable, ignores the possibility that there is something vital and true to be grasped and then savored with the distinctly human experience of growing old."

"Young and old alike," he says, "aspire to long lives full of warmth and meaning. The myth is that aging is mainly the concern of old people. The reality is that aging touches, changes, and influences everyone and everything."

—NELL PORTER BROWN

Job Notices

SEVERAL COLLEGE programs match students with paid and unpaid jobs and internships. To find out more about how alumni can provide these learning and working opportunities, contact:

The **Office of Career Services,** which connects students with employers for full-time, part-time, and summer jobs or internships throughout the year. For information, including details about developing and/or posting job opportunities, call Nancy Saunders at 617-495-2595 or e-mail nsaund@fas.harvard.edu.

The **Radcliffe Mentor Program,** which matches undergraduates with alumnae for career development, is operated by the Harvard College Women's Center. For details, please call 617-959-4864 or e-mail director Susan Marine at marine@fas.harvard.edu.

To offer a paid position, call the **Student Employment Office** at 617-495-2585 or visit www.seo.harvard.edu.

Well Done

THE HARVARD ALUMNI Association Awards were established in 1990 to recognize outstanding service to Harvard University through alumni activities. This year's recipients were to be honored on October 16 during the HAA board of directors' annual fall meeting in Cambridge. Highlights of their many contributions are given below.

Peter Bynoe

Peter Bynoe '72, J.D.-M.B.A. '76, of Chicago, has served the University for more than two decades. He was a member of the Harvard Business School Alumni Council and an HAA elected director, and then became a University Overseer (1993-2002). In addition, he has been a member of three Harvard alumni clubs in Chicago (College, Law School, and Business School), and worked on his twenty-fifth-reunion's gift committee.

Deborah Goldfine

Deborah Goldfine '85, of Newton, Massachusetts, is a longtime member of the visiting committee to athletics, cochair of the Friends of Harvard Tennis, and executive chair of the Harvard Radcliffe Foundation for Women's Athletics, where she has strengthened programming and funding. Goldfine also cochaired her tenth, fifteenth, and twentieth reunion committees, and now cochairs the Newton schools and scholarships committee.

Nathaniel Guild

Nathaniel ("Nat") Guild '73, of Concord, Massachusetts, is class secretary and cochaired his fifteenth and twenty-fifth class reunions. He has also served as an HAA appointed director and chair of the HAA classes and reunions committee. Currently, Guild leads the HAA chief marshal selection committee and is vice chair of the "Happy Committee" (which assists with Commencement). A member of the executive committee of the Association of Harvard College Class Secretaries and Treasurers, he is also a member of the Kennedy School Institute of Politics advisory committee and former treasurer of the Friends of Harvard Track.

Susan Heath

Susan Heath '67, of Pound Ridge, New York, has recruited and interviewed students for more than three decades. She recently completed her term as chair of the HAA National Schools and Scholarships Committee, and has been chair of the Harvard Club of Westchester schools and scholarships committee since 1975. A former member of her class-reunion gift committee, Heath just began a three-year term as HAA Regional Director for Metro New York and New Jersey.

Ella Smith

Ella Smith, A.B.E. '66, of Abington, Massachusetts, is a founding member and former president of the Harvard Extension School Alumni Association (HEAA), and has served on its steering committee since 1968. For many years she has also been the Extension School's HAA appointed director and a member of both the HAA's graduate schools and communications committees.

Charles Wiggin

Charles Wiggin '68, M.B.A.-J.D. '73, of Oklahoma City, is a longtime director of the city's Harvard club and served for three years as HAA Regional Director for the South Central States. He is a former member of both the HAA clubs and graduate schools committees and the committee to nominate Overseers and elected directors, of which he was also chair. In addition, he has chaired the HAA awards committee and his tenth-reunion gift committee.

Oddments

"Your wooden arm you hold outstretched to shake with passers-by."

Catch that btu: At the main entrance to the Science Center, an appeal in large type reads: "To Conserve Energy Please Use Revolving Door. Average heat transfer per use of swing door, 78 Watt hours = 1.3 hours of light from a desk lamp."

Shack: The late David Roy Shackleton Bailey, the Pope professor of Latin language and literature until his retirement in 1988, was born in England in 1917 and read Latin, Greek, Sanskrit, and Pali at Cambridge. During World War II he worked in military intelligence, translating messages in Dutch and Turkish. He returned to Cambridge as University lecturer in Tibetan and was rumored to have taught the exiled Dalai Lama rare forms of solitaire.

"Shack," as his friends and colleagues called him, became chair of Latin at the University of Michigan in 1968. He had just married Hilary Amis, former spouse of the novelist Kingsley Amis. She opened a fish-and-chips shop in Ann Arbor called Lucky Jim's, where Shack, behind an ample and snowy chef's apron, worked the cash register or tended tables. Four of his Harvard colleagues, in a memorial salute to him at a meeting of the Faculty of Arts and Sciences in May, noted that he was unsuited to domestic life, that the marriage did not last, and that his stepson, Martin Amis [in his 2000 memoir, *Experience*], found him "a laconic, unsmiling, dumpty-shaped tightwad."

Shackleton Bailey, who came to Harvard in 1976, was a prodigious scholar (and the Loeb Classical Library's most prolific author). His colleagues praised those achievements and cherished him for his nature. He was, they wrote, "a type unlikely to make it past the first search committee interview in the current orthodoxy. An eccentric by most standards—his regular attire was a grey suit and colorful sneakers long before the latter became part of the academic's uniform—but mainly in the true and joyous sense of the word: quirky, difficult, cultured in profound and complex ways, endowed with a rare and keen sense of humor now cutting, now playful, a critic of human foibles and a man whose dedication to logic, reason, judgment, and the primacy of intelligence made those in his presence careful of their thoughts and words....He was a great lover of cats; his greatest affection was for the first, the white cat Donum, to whom he dedicated the first volume of his edition of Cicero's letters, 'more intelligent than most people I have encountered,' as he once somewhat disconcertingly remarked."

Warnings: Affixed to the door of the office of professor of economics Andrei Shleifer on the second floor of Littauer Center is a news clipping headlined "Brain aging found to start at 40." The piece reports on the work of Bruce Yankner, professor of pathology and neurology at Harvard Medical School, who is investigating how human brains change between ages 26 and 106. "If you are more than 40 years old," it reads, "the news may not be good." An immediately adjacent drinking fountain has this notice above it: "Please do not use this fountain or put any liquids down the drain. The water is cloudy and in some instances there is no drain pipe." The Littauer Center building is in its seventies, of course.

Friendly fire: "You publish a book and no one in your department notices," a faculty member complained to Roger Stoddard, former curator of rare books in the Harvard College Library, agreeing with something Stoddard said in farewell remarks at a reception marking his retirement from that post. These remarks and other oddments have now been published in a privately printed booklet, *A Long Goodbye to Library Service* (2008).

"Harvard is a rough place to work in," said Stoddard in his valedictory. "I've watched comrades stumble or fall on active duty, wounded by friendly fire. Does it have to be that way: excellence attracting fear, anger feeding on achievement? Why don't we take pride in the accomplishments of our colleagues? If you don't love learning, then you don't belong here; but, you cannot love learning if you don't love people, your brothers and your sisters. If you don't love people, then you love something else, and it's *not* learning....It is our colleagues who sustain us with their love, our students who inspire us with their eagerness, and our benefactors who encourage us with their support, both material and spiritual, from the real world beyond the gates of the Yard." ~PRIMUS V

POETIC PATRIARCH

(continued from page 41)

excess and abandon of postmodern writers exposes them to a lot of messy writing. His verse is never heavy and never bristles with obscurity. Dick was very influenced by Robert Frost; there's always order, discipline, form. He sets up these hazards, as it were; in the end, the structure comes down, and there's the poem."

Vision is the dominant sense in poetry, says Wilbur. "My father was a painter," he notes. "I grew up in a world of painting and always thought in a painterly way." (He has illustrated some of the books he has written for children.) His poems typically germinate with the sight of "some interesting object out in the world—for example, just how a flycatcher flies, its way of moving its wings. Once you've seen this interesting thing, you have to find the words for it, and once you've made it satisfactorily vivid to yourself, you find it has an ideal dimension—it is related to some ideas taking form in the back of your mind." In a 1966 essay, "On My Own Work," he wrote, "What poetry does with ideas is to redeem them from abstraction and submerge them in sensibility."

"I'm a slow thinker and do almost everything slowly," says Wilbur, "except serve in tennis." He believes that "very few really good poems are written without a lot of thought and a lot of revision—I advise my students to be terribly fussy." In practice, though, he doesn't exactly follow his own counsel. "I don't revise very much," he confesses. "What I do is wait and wait in a state of paralysis for the right thing to come to me. Most writers are not as hopelessly patient as I am. I don't mind sitting in a chair waiting for the right word to come. Most people aren't willing to put in as much chair time as I am. I talked with Dylan Thomas and found that we had very much the same way of proceeding. He worked very, very slowly, though the poem might come out sounding breezy. Each morning, he'd write out what he had done the day before on a fresh sheet of paper, hoping that it would give him the impetus to write a line or two more."

Similarly, "As a translator," Wilbur reports, "I always felt that if I got six or eight lines, that was a good day. I spend so much time on each line trying to get the meaning and tone exact that I don't think my translations will die as soon as some others."

The same could be said of his poetry, which shines with the basic trust in nature and in life that are lodestars for the poet. "Emerson said, 'The deeper we go into ourselves, the more we are everybody,'" he explains. "I think I write poetry on that understanding. If I get deep within myself, I can speak about everybody else. That's my supposition, at any rate."

In some ways, Wilbur is a modern Transcendentalist, who shares with Emerson an attraction to poetry, ideas, religion, performance, and teaching, as well as a Harvard degree. This fall, he returns to Amherst, 66 years after graduating, to teach poetry one day a week. "I'm nervous," he says, "about going back to class again."

Craig A. Lambert '69, Ph.D. '78, is deputy editor of this magazine.

The Children of Noah

An argument about who went where, when, in the Bible

Hugh Broughton (1549-1612), an English theologian and Hebraist, brought out his first book, *A Concent of Scripture*, in 1588. "Concent" means "harmony," and Broughton laid out what he claimed was a correct chronology of biblical events, harmonizing jarring passages in the Bible itself. The reaction of fellow scholars was not harmonious.

Born in Shropshire, Broughton studied at Cambridge, became a fellow of St. John's College and then of Christ's, and took holy orders. Moving to London, he gained powerful friends and the enmity of the Archbishop of Canterbury for his preaching of Puritan doctrine. His *Concent* was attacked publicly by scholars at both Cambridge and Oxford, and Broughton gave weekly lectures to defend himself. Soon he left England for the continent, where he traveled for many years disputing about his chronology with Jewish, Catholic, and Protestant theologians.

The map above shows the abodes of the children of Noah and their descendants as listed in Genesis 10, with Shem getting Asia, Ham given Africa, and Japheth sent to Europe. It is tipped in to a copy of *Concent* at the Divinity School's Andover-Harvard Theological Library. It was probably not part of the book as published, but may have come from a Broughton tract of 1606 published in Amsterdam, which contained the map, uncolored. It appears to be based on a 1597 map by Broughton's friend Jodocus Hondius, one of the first uses of a Mercator projection.

This copy of *Concent* was owned by physician Edward Augustus Holyoke, A.B. 1746, LL.D. 1815, son of Edward, A.B. 1705, president of Harvard; E.A. wrote on the flyleaf that he supposed it had belonged to his great-grandfather Edward, who migrated from England in 1636-37. "The Dispersal of the Children of Noah" map is part of an exhibit of biblical treasures, prepared by Clifford Wunderlich, head of public services at the library, and on-line at www.hds.harvard.edu/library/exhibits/online/bible/index.html.

The very learned Mr. Broughton was dismayed when King James did not appoint him to help with the new translation of the Bible, and he attacked the finished product. Dramatist Ben Jonson satirized him in *The Alchemist*, where the whore Dol Common poses as a gentlewoman driven mad by studying Broughton's works. But it is said that even his opponents held him in great esteem.

Map courtesy of the Andover-Harvard Theological Library