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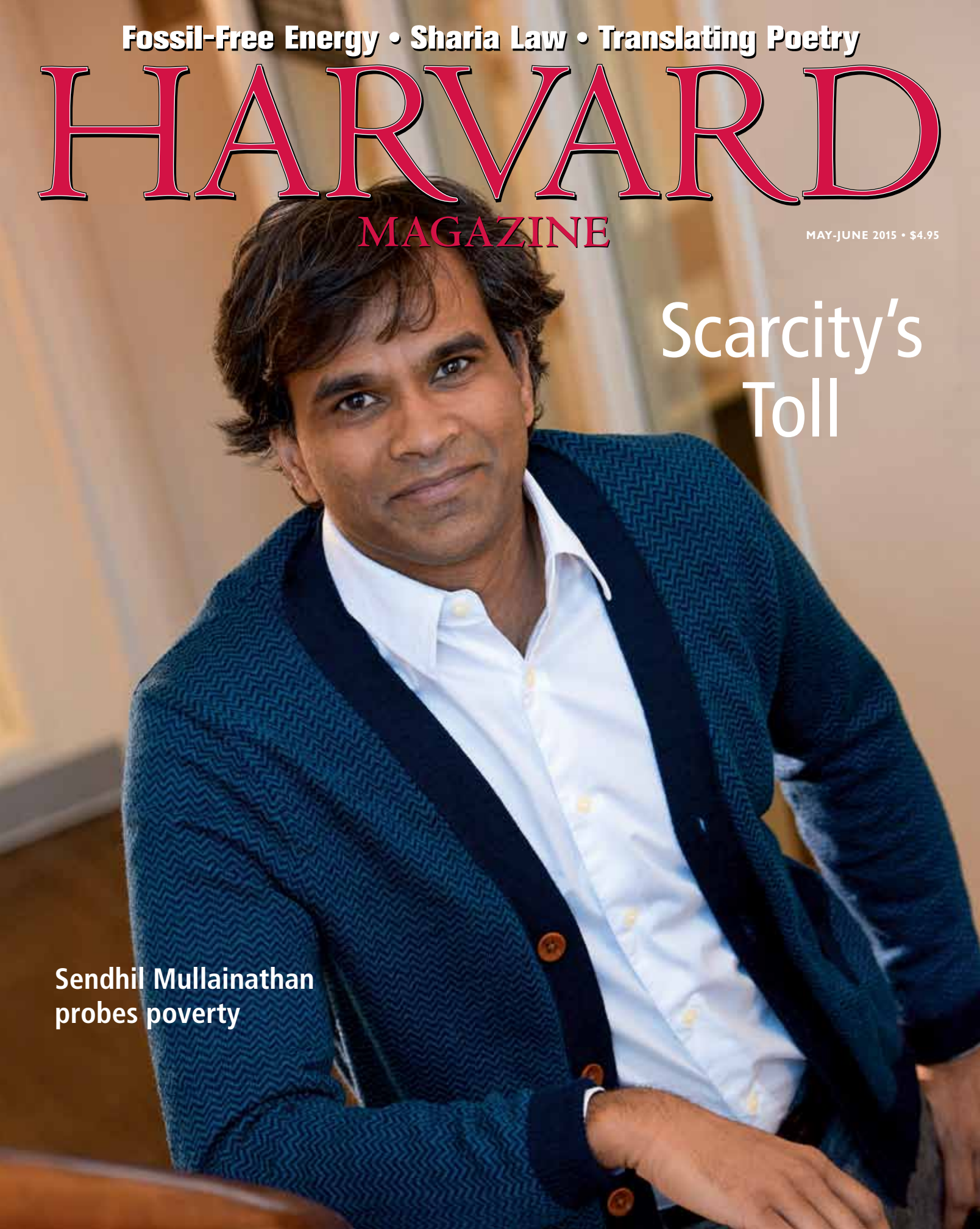
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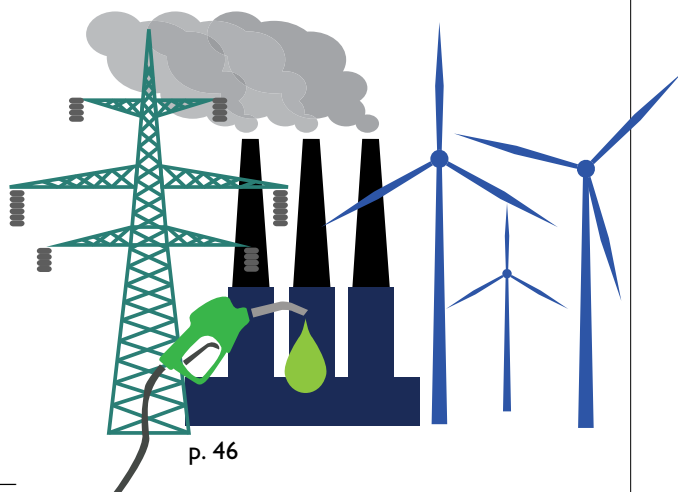
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On the cover: Photograph by Jim Harrison

Cambridge 02138

Climate change, China's gains, palliative care

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ATHLETICS ANGLES

ANENT THE LETTER in the March-April issue (page 8) about football: should Harvard not take the lead in banning this dangerous sport? There is compelling evidence of lasting—and potentially lethal (suicide)—psychological/neurological adverse sequelae following the repeated

occult cerebral injuries incurred by the players. They are inevitable by the nature of the game.

GIULIO J. D'ANGIO, M.D. '45
Philadelphia

Editor's note: For other views and news, see the next letter; the book review by for-

7 WARE STREET

On My Honor

HARVARD UNDERGRADUATES now have an honor code—spelling out expectations of integrity in their academic work, as legislated by the Faculty of Arts and Sciences (FAS) last spring. This fall, they will have to “affirm their awareness” (emphasis added) of the code, but not take an oath to accept the values it embodies or conform to its standards—see harvardmag.com/honorcode-15. (Whatever their position on the code's merits, students are bound by its standards, much as they operate subject to civil and criminal law in the larger society.) Entering freshmen and sophomores will also write briefly about academic integrity.

The honor code, in the making since 2010 (and given greater urgency during the 2012-2013 academic-misconduct investigation and ensuing punishment of dozens of students for impermissible collaboration on a take-home final exam) was never going to be punitive. For example, students will not be compelled, or asked, to report on apparent violations by their peers. The language about affirming awareness of the code, delicately drafted during the past year in response to some professors' objections to any kind of oath, and questions about the efficacy of the measures enacted (see harvardmag.com/honorcode), makes the code, its student-faculty honor board—and its encouragements to faculty

members to raise such issues in class—an effort to alter the *culture* on campus. The true aim of creating a code in an age of cut-and-paste and collaborative assignments, its proponents explain, is to prompt explicit understanding of previously implicit assumptions about norms within an academic community.

This is real progress. But the single best opportunity to foster those conversations came during the lamentable events of 2012-2013, when more than 100 students were ensnared in an Administrative Board investigation of their behavior. At least one House master held forums to air the issues; presumably resident tutors, departmental leaders, and others did, too. But no community conversations for freewheeling discussion of academic expectations among professors and students were convened: by the administration, FAS, or even students themselves or their Undergraduate Council.

In choosing to direct so much of the discussion into formal channels (committee deliberations, faculty meetings, and legislation), an important teaching moment was lost. Such forums would have been risky, to be sure—but at worst, too few people would have attended. At best, the conversation could have been more organic, more vivid, and, in all likelihood, more meaningful for advancing a healthy College academic culture.

—JOHN S. ROSENBERG, *Editor*

An Extraordinary Season

REGARDLESS OF YOUR DISTANCE from greater Boston, you likely know that Harvard slogged through a semester of record-breaking—and patience-testing—winter weather. The type of meteorological event immortalized by Ralph Waldo Emerson in “The Snow-Storm” as “...myriad-handed, his wild work/So fanciful, so savage, nought cares he/For number or proportion” buffeted our campus month after month, totaling more than 108 inches of snow. Temperatures—often in the single digits—stayed below 40 degrees for 43 consecutive days stretching from January to March. The view from Mass Hall was akin to peering out from inside of a snow globe and bracing for the next shake.

Harvard cancelled classes and suspended most operations for three days this year, but there is no such thing as shutting down the University. We have more than 10,000 students to feed and house regardless of the weather—and efforts to keep up with Mother Nature were nothing short of remarkable. Staff members kept pantries open and patrol cars running, and made trekking and traveling across campus possible. The University depended on their skill more than ever this year, and I, like countless others, am deeply grateful for all their dedication and hard work.

Snowstorms send us out and keep us in. True to form, the winter weather sent students sliding down the steps of Widener Library and warming up with comfort foods including some 1,500 gallons of soup. Fortunately, every residential dining hall remained open regardless of the conditions thanks to intrepid dining services staff who volunteered to work multiple shifts—sometimes agreeing to spend the night—to keep the kitchen humming. They found eager students, tutors, resident deans, and Housemasters who helped with everything from swiping cards to washing dishes, and they received rounds of applause and notes of appreciation for going above and beyond their responsibilities.

Other colleagues managed less visible, but no less essential, functions to keep the lights on and the temperature up for everyone who calls campus home. Harvard police officers were on duty no matter the weather, and shuttle services put vehicles on the road to ensure that students, faculty, and staff were able to travel safely. Landscape services cleared and recleared more than a hundred miles of sidewalks and pathways, wielding shovels and snow blowers, pushing Bobcats and Bombardiers, and spreading sand and salt almost as quickly as the flakes kept falling. If their equipment failed, colleagues stood at the ready to make quick repairs—an absolute necessity as hours of work stretched into days of work.

As inches rapidly piled into feet, the issue of where to go with the snow became more and more pressing. In late January, the University opened what has become known as the Allston “snow farm.” For two and a half weeks, the site was open around the clock, and truck after truck—up to 1,700 in a single day—delivered snow not



only from Harvard, but also from Cambridge and Boston. Ninety percent of the 11-acre property was covered in piles that came to resemble a small mountain range—complete with a 60-foot peak. By the time the snowfall record was broken, an estimated 300,000 tons of snow had been transported to the site. As you read this, it is likely still in the process of melting.

To mark a new entry in the record books, the Harvard community gathered on the Science Center Plaza in late March and toasted with hot chocolate and s'mores, celebrating resilience, the people who worked to keep Harvard running this year, and the early signs of a welcome spring. The snow was as careless and as savage as Emerson describes, but it was also as beautiful:

Announced by all the trumpets of the sky,
Arrives the snow, and, driving o'er the fields,
Seems nowhere to alight: the whited air
Hides hills and woods, the river, and the heaven,
And veils the farm-house at the garden's end.
The sled and traveller stopped, the courier's feet
Delayed, all friends shut out, the housemates sit
Around the radiant fireplace, enclosed
In a tumultuous privacy of storm.

Sincerely,

Drew Faust

mer Harvard College dean Harry Lewis, page 65; and Brevia, page 27.

W.C. DOWLING's letter and Dick Friedman's "amplification" about "walk-ons" prompts me to recount my own participation in Harvard basketball as an extreme case.

Though I had played the sport in city and YMCA leagues in Racine, Wisconsin, I had never even gone out for my high-school team. When the call came for tryouts for the Crimson freshman team in 1949 (freshmen were ineligible for varsity in those days), I signed up just for the exercise. I was baffled when I remained after each cut was made by Floyd Wilson, then freshman (and later, varsity) coach. He apparently saw something in me that I was not aware of—for I not only made first string but in our final game against the Yale freshmen I limited their star to 9 points and made 16 as high scorer in our win. Although I lettered the next three years, that was the high point of my college basketball career.

But subsequently I was a starter on a European U.S. military all-star team for an international tournament in Cap d'Antibes (Dean Smith of North Carolina fame was on the second five), and then was player-coach for many years on college faculty intramural teams. While I most value my Harvard years for their intellectual stimulation, I remain grateful for that athletic nurturing as well.

FOREST HANSEN '53
Easton, Md.

CLIMATE-CHANGE EXCHANGE

WHILE PRESIDENT FAUST has wisely elected to be politically correct by using the words "climate change," rather than the Al Gore tag of "global warming" (The View from Mass Hall, March-April, page 3), I wonder if she is displaying a lack of humility to Mother Nature in suggesting that, despite millions of years of highly variable climate change, there is a "role that research universities can play in combating climate change."

F. GREGG BEMIS JR., M.B.A. '54
Santa Fe

I WAS BEMUSED, but not surprised, to see President Faust touting Harvard's Center



for Green Buildings and Cities as an approach to fighting climate change. Such a center presumably can't hurt. But it certainly can't help to have the most prestigious educational institution in the country steadfastly sticking to a course of investing in climate-destroying fossil fuels for profit. Faust has backed

this course and has stonewalled the students who will have to live in the world created by climate change, refusing even to meet with them until it became a tactic to try to get them out of Massachusetts Hall.

Harvard and Faust are morally disgraced by this course. If the world behaves in a sane fashion and rapidly phases out fossil fuels, they will lose a lot of money as well.

DOUG BURKE '67
Oak Park, Ill.

ALUMNI URGING the University to divest fossil-fuel stocks have chosen the wrong target. Eighty-seven percent of the world's energy is derived today from fossil fuels and divestment will not alter that. The path to effectively addressing climate change leads not to Cambridge but to Paris, where the global climate conference will be held in November.

Advocates claim that, regardless of global warming, retention of oil stocks is an unwise investment. Harvard's financial managers (and many other investors) disagree. Advocates point to recent oil-price declines, but this did not derive from falling demand (quite the contrary), but rather from additional production at shale formations in North Dakota and Texas. However, this additional production is unlikely to depress prices long term, since the additional three million barrels per day from U.S. shale is a tiny fraction of the 90 million barrels consumed daily worldwide.

Advocates further claim that the South African [divestment] experience is a useful precedent. However, the analogy is inapposite. South Africa, with less than 1 percent of the world's population, was a rogue state conducting a violent racist regime that necessarily yielded to accepted moral standards. By contrast, the production and consumption of oil is the world's largest enterprise, reaching into every country in the planet, conducted daily by

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willing producers and willing buyers in a peaceful manner.

The heart of the matter is that world oil demand is on a steady upward trend. Divestment protestors will themselves arrive in Cambridge by car or plane. A rural subsistence farmer in Myanmar owns only three tangible assets: the tin roof over his shed, a cow, and a motorcycle. World oil production will push ahead to keep up with increasing demand. Thus even if one assumes that all U.S. universities were to dump all their fossil-fuel stocks, this would have no effect either on the worldwide oil supply/demand equation, or on climate change itself.

The answer lies in a technological shift to global non-carbon energy sources with a worldwide conservation policy in the meantime.

WILLIAM H. NICKERSON '61
Greenwich, Conn.

GLOBALIZATION GAINS

STEPHANIE GARLOCK'S "How Globalization Begets Inequality" (March-April, page 11) wrongly suggests that China's poorest workers have not greatly benefited from globalization. Income inequality and the Gini index do not speak at all to the great improvement in livelihoods brought about by more than two decades of real GDP growth above 10 percent annually. It has been recently estimated that more than 300 million people have been lifted out of poverty in the last 30 years. My recent travels to China clearly reveal a much richer and more confident populace than was the case in the 1980s.

It may be that the article misunderstands or has over-interpreted the work of professors Eric Maskin and Michael Kremer. They acknowledge that "growing average wages are proof of globalization's benefits." They focus on the need for education but it may be that market forces will insure progress in this area. Demographic changes in upcoming decades will

reduce the supply of labor in most developing countries, so increased training and education will be needed to improve productivity and maintain competitiveness.

Finally, it is clearly true that China's growing income and wealth inequality is causing some concern and resentment among the populace. President Xi Jinping's attack on corruption among the elites is designed, in part, to defuse the issue. This is a delaying tactic that will do little to correct the trend. China, like the United States, may need to tackle this issue more directly through tools such as taxation, but it may also be that demographic trends will offer a correcting influence as labor becomes more scarce and more valuable and, possibly, capital will earn lower returns.

JOHN KRAFFT, M.B.A. '76
Lone Tree, Colo.

MOMENTOUS IMAGE

I HAVE ALWAYS considered the photo of the occupiers of University Hall (included in "His Own 'Decisive Moment,'" March-April, page 61) to be striking as well as historic. Thus I was interested to learn of the post-1969 career of Tim Carlson, the photographer. I'll submit one minor correction: the police bust took place in the morning, not in the nighttime. As a proctor in Weld Hall at the time, I witnessed the bust.

JOEL STUDEBAKER, PH.D. '71
Princeton, N.J.

Editor's note: The police entered Harvard Yard just before sunrise—at 4:55 A.M. The use of "predawn" might have avoided causing confusion.

BUILDING BUDGETS

EGADS! The editorial in the March-April issue ("Bricks and Mortar," page 2) implied that the expansion of the Kennedy School of Government, an institution dedicated to training our future public servants, will cost an astounding \$1,500 per square foot. Surely there is no better argument for the need for a scalpel-wielding dean. Perhaps the magazine might solicit a future article from the appropriate University official in charge of capital projects to explain costs and financing in relation to scope and purpose, accompanied by a table outlining recent and near-future projects along with their costs per square foot (total and construction), size, type of construction (office, lab, etc.), new or reno-

vation, and any qualifying comments. One way or the other, let us know the response.

BOB COOK '68
Director emeritus, Arnold Arboretum
(1989-2009)
Brookline, Mass.

MATTERS OF DEGREES

THE SQUIB regarding the Honorable Ruth Bader Ginsburg ("Brevia," March-April, page 25) indicates that she graduated from Harvard Law School in 1959. That is not true. Ginsburg dropped out in 1957, following her first year. [*Editor's note:* She transferred to Columbia Law School, when her husband took a job in New York.]

Academies understandably like to publicize luminaries among their graduates. However, by misrepresenting such an accomplishment, neither you nor Ginsburg honors our institution. HLS has less need than perhaps any other law school for such aggrandizement, either false or true.

ERNEST M. THAYER, LL.B. '59
San Francisco

Editor's note: Harvard records the class year of those who enroll in a degree program—hence Ginsburg, L '59, or College dropout Bill Gates '77. Those who complete degrees are so designated—as Mr. Thayer is (above). The magazine adheres to this University standard.

THANK YOU for another good read in the March-April issue. The magazine usually adds the Harvard degrees to the names mentioned in articles, so I am wondering why no degrees were mentioned in "An Extra Layer of Care" (page 33). Joanne Wolfe, Andrew Billings, and Atul Gawande are all graduates of Harvard Medical School. Joanne and I celebrated our twenty-fifth reunion last year, so in the article she should have been listed as Joanne Wolfe, M.D. '89.

EDWARD CHEN, M.D. '89
Needham, Mass.

Editor's note: We do not list degrees for faculty members; it seems overkill, and their faculty affiliation is what matters most to readers. For alumnae/i who are not faculty members, we try always to list the degrees—their principal University affiliation.

PALLIATIVE CARE

IN "An Extra Layer of Care," by Debra Bradley Ruder, regarding "the progress of pal-

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LETTERS

liative medicine” at Massachusetts General Hospital, it was encouraging to read that relief of suffering has become a focus of patient care. But I was left with many unanswered questions.

The cancer patient Eric Buck is referred by his physician “to specialists to address his emotional and spiritual struggles.” It was not clear whether these “specialists” (chaplains, social workers, psychologists?) are on the staff or out in the community; if they are not professionals on the staff at MGH, the scope of treatment is sadly lacking—and hardly progressive. It was good to read that there is a “staff harpist,” but in general the approach seems far from holistic. What about a music therapist, meditation (University of Massachusetts Medical Center has developed highly effective treatments) and body workers (massage and Reiki)?

Some of these modalities are not covered by third-party payers, but they are relatively small expenditures for a major teaching hospital. Perhaps all these other approaches are integrated into the patient care and simply not mentioned. If not,

there are other hospitals with much more progressive programs. Physicians are crucial for pain medication, and on some occasions to prescribe psychoactive drugs, but many dimensions of suffering can only be treated by other professionals.

GENE GALL, M.Div. '74
Cumberland, Md.

The author responds: The palliative-care programs at all the Harvard Medical School teaching hospitals do, indeed, include or work closely with staff chaplains, social workers, and other professionals to help relieve patients’ physical, emotional, and spiritual distress, although some patients may seek outside help. Integrative therapies such as massage, acupuncture, stress management, and yoga are typically available at these hospitals, too; the staff harpist I mentioned is trained in therapeutic harp.

PALLIATIVE-CARE teams may include “physicians, nurses, social workers, chaplains, and others.” Lawyers are an important component of that last, catch-all category. “Medical-legal partnerships” combine

medical and legal services to address social determinants of health for vulnerable populations. If a moldy apartment is not up to code, a child’s asthma cannot improve. As the co-founder of Terra Firma, the first medical-legal partnership specifically for released unaccompanied immigrant children, we integrate mental health, pediatric, and immigration legal services to promote resilience in child survivors of trauma. Recently, I spoke on a panel about medical-legal partnerships with a palliative-care doctor. Though our patients and clients were worlds apart, the need to holistically address health and legal problems collaboratively, rather than in silos, was resounding.

BRETT STARK, J.D. '12
Brooklyn



Visit harvardmag.com/extras for additional letters.

COMPUTING DUO

“COMPUTING IN THE CLASSROOM” (by Sophia Nguyen, March-April, page 48) might have included the efforts of graduates Ali

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In the nearly five decades since he arrived at Harvard, **Robert N. Shapiro** '72, JD '78 has been president of the Harvard Alumni Association, president of the Harvard Law School Association, and a Harvard Overseer. His service spans the University. ■

"Radcliffe is a microcosm of the University at its best," he says. "It's an example of how Harvard can be more unified. Radcliffe catalyzes ideas, and that is the stuff of a great research university." ■ A senior partner in the Private Client Group and Boston office of the global law firm Ropes & Gray, Shapiro is honoring his mother, who graduated from Radcliffe College in 1936, with a bequest to the Radcliffe Institute. ■ For more information about making a planned gift, contact John Christel, Radcliffe's liaison at the University Planned Giving office, at (617) 384-8231 or john_christel@harvard.edu.



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and Hadi Partovi (both A.B. and S.M. '94) to encourage the teaching of computer programming in public classrooms. Their nonprofit website, Code.org. [mentioned in the text], contains extensive resources for anyone interested in learning or teaching computer programming. In addition, the Partovis created the annual "Hour of Code."

JUDITH E. BEVANS, Ed.M. '69
Blacksburg, Va.

The author responds: The article was intended to focus on those working more directly with teachers and school systems with an eye toward changing classroom pedagogy, but I thank Judith Bevans for this chance to acknowledge the Partovi brothers. As she points out, their Code.org has been a major force behind the "Coding for All" movement.

STOUGHTON SCHOLAR

THANKS FOR the reproduction of the portrait of William Stoughton and the references to him (Treasure, "Early BMOCs," March-April, page 80). When I was a graduate student in city planning at the Kennedy

School in the early 1980s, I was the recipient of an award made possible by the William Stoughton Bequest of 1701.

This assistance not only made my graduate study possible, but provided me with an opportunity to meet Seamus Malin, who signed the letter notifying me of the award [see "The Shots Heard Round the World," May-June 1994, page 38].

I never get tired of telling people that I went to Harvard thanks to the generosity of someone who, if he did not himself believe in witches, certainly lived in a time when it was possible to do so.

NED DALY, M.C.R.P. '83
Needham, Mass.

ALL HAIL HALE!

ONCE AGAIN the "Brief Life" series captures the essence of a life well lived: the January-February issue offers a superlative example in Rev. Edward Everett Hale (Vita, page 54). His motto, "Look up and not down; Look forward and not back; Look out and not in; Lend a Hand!" is as motivating today as it was in the 1800s. As a board member of the Lend A Hand Society, I am pleased to

report that over 120 years later his institution is still going strong. We're still raising resources from the more fortunate to help the less fortunate. We're still lending a hand!

WILLIAM T. GREGOR '66, M.B.A. '73
Boston

MILITARY MOTIVATIONS

IN "Youthful Ardors" (The College Pump, March-April, page 72), President Drew Faust is quoted as describing our Civil War as "a military adventure undertaken as an occasion for heroics and glory..." I pray there's a fuller context to this statement. Otherwise, it's a reeking insult to the honorable motivations and brave actions of Northern soldiers intent on preserving our country and destroying slavery. Why must the intellectual community denigrate military service even when absolutely necessary and painfully successful?

JOEL W. JOHNSON, M.B.A. '67
Scottsdale, Ariz.

Primus V offers fuller context: "A war that was expected to be short-lived instead extended for four (please turn to page 79)



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BIOLOGY OF BEHAVIOR

The Mr. Mom Switch

IN THE MOUSE WORLD, virgin male mice are not known as nurturers. They're aggressive and infanticidal, regularly injuring or killing newborn mice fathered by other males. But research led by Catherine Dulac, Higgins professor of molecular and cellular biology, reveals that these murderous mice can be turned into doting dads simply by stimulating a set of neurons, shared by both males and females, that appears to drive parental behavior.

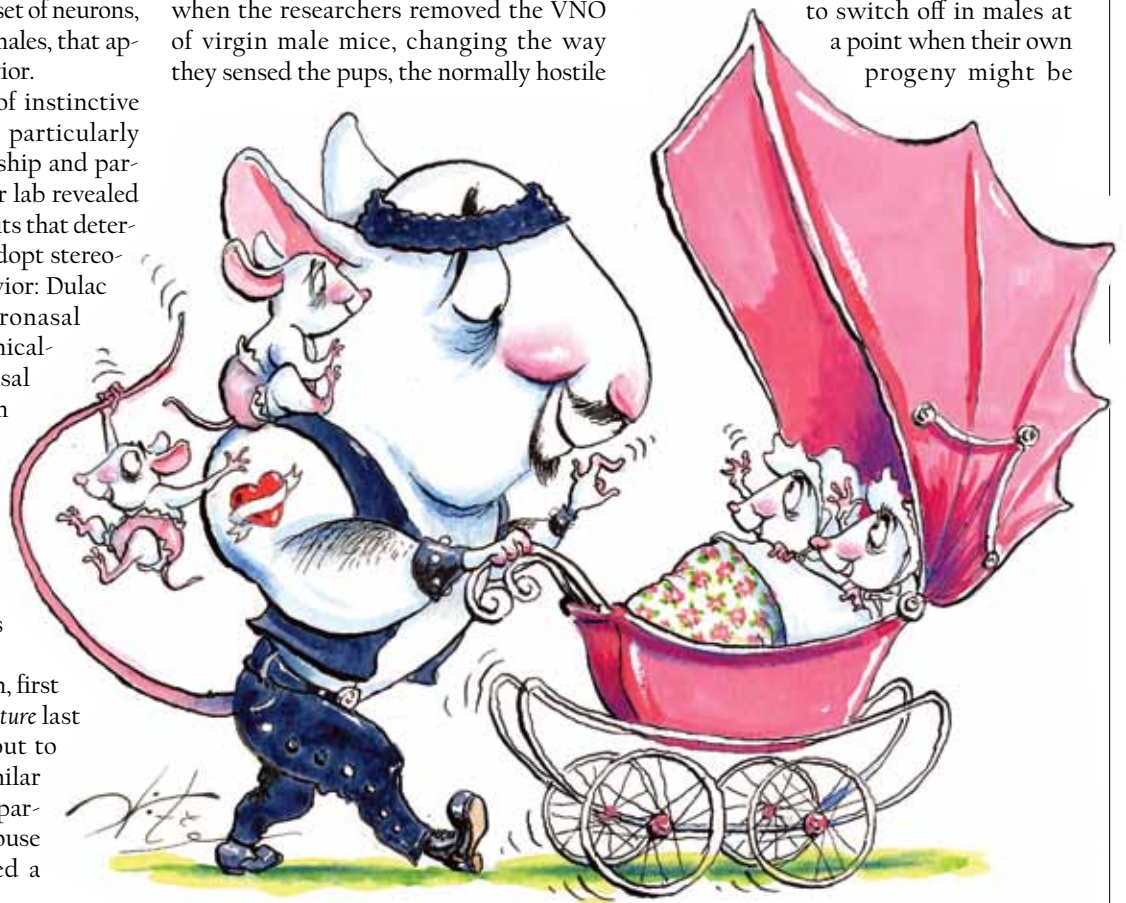
Dulac examines control of instinctive behavior in animal brains, particularly social actions such as courtship and parenting. Previous work in her lab revealed that mouse brains hold circuits that determine whether the animals adopt stereotypical male or female behavior: Dulac discovered that the vomeronasal organ (VNO), a set of chemical-sensing receptors in the nasal septa of mice, dictates which of the two circuits is activated. (Female mice lacking a functional VNO engaged in "very bizarre male-like behaviors," Dulac reports, emitting ultrasonic vocalizations normally sung by males to attract mates.)

In the most recent research, first described in the journal *Nature* last year, the investigators set out to learn if male mice had a similar capacity to match females' parenting abilities. A female mouse that has never encountered a

male or babies will nonetheless spring into action if pups are placed in her cage. "She will immediately build a nest, retrieve the pups, groom them, and crouch around them," Dulac explains. "This is very robust, stereotyped behavior. If you do the same experiment with virgin males, they will immediately attack the pups." Yet when the researchers removed the VNO of virgin male mice, changing the way they sensed the pups, the normally hostile

males became "perfect dads," Dulac reports. The infanticidal instinct vanished; the males built nests and placed the pups in them, groomed the pups, and huddled by them protectively. These findings, she says, suggest that there are "circuits in the male brain that underlie parental behavior," but those behaviors are "normally repressed."

Previous research at another lab identified one brief period in which male mice do seem driven to care for pups: beginning exactly three weeks after mating. Dulac replicated those findings and noted that it makes sense for infanticidal behavior to switch off in males at a point when their own progeny might be



RIGHT NOW

born. The males remain protective until the pups reach typical weaning age, about three weeks after birth; then the infanticidal instinct returns.

Seeking the specific brain structures that underlie parenting instincts, Dulac's team focused on the medial preoptic area of the

there are two groups of neurons—one that drives parental behavior and one [still unidentified] that drives infanticidal behavior—and somehow they inhibit each other.”

Her team then employed optogenetic technology, using light to activate galanin neurons in the brains of virgin male

“In fact, it seems like all you have to do is push the right button in the brain in both males and females and animals know how to take care of their young.”

hypothalamus (known to influence maternal behavior), and identified neurons that express a neuropeptide known as galanin. When the scientists destroyed the galanin neurons in mouse brains, the nurturing instinct disappeared in both males and females. “The effect is very striking,” Dulac points out: previously mated males and females were largely indifferent to pups, and virgin females became as infanticidal as virgin males. This suggests, she explains, “that

mice—and the stimulation made previously infanticidal males behave like fathers. Their findings point to “these few hundred” galanin-expressing neurons as “the command neurons that drive parental behavior,” Dulac says. She suspects humans possess similar circuits; neurons that express neuropeptides such as galanin are found in an area of the hypothalamus that scientists know controls instinctive behaviors such as sleeping, eating, reproduc-

tion, and aggression. “Each time these neurons have been discovered in animals, their equivalent has been found in humans, with similar functions and generating similar behavioral disorders when absent or impaired,” she notes. If galanin neurons in the medial preoptic area do have a human analogue, she believes the discovery could lead to possible treatments for postpartum depression, which can make a mother indifferent to her newborn.

These findings are particularly compelling in an era when human parents often feel they must consult books and blogs to do their jobs properly. “In fact,” Dulac says, “it seems like all you have to do is push the right button in the brain in both males and females and animals know how to take care of their young.” Male colleagues with children, she adds, “are happy to know that, at least from what is seen in mice, the male brain is also designed to care for the young.”

—ERIN O'DONNELL

CATHERINE DULAC WEBSITE:

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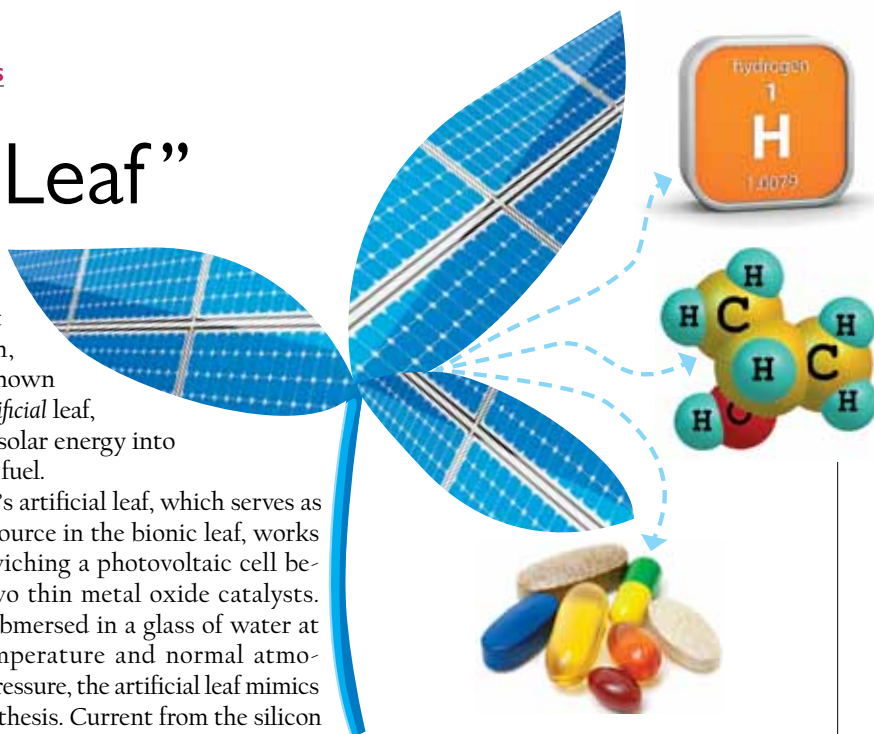
The “Bionic Leaf”

HARVARD SCIENTISTS have created a “bionic leaf” that converts solar energy into a liquid fuel. The work—a proof of concept in an exciting new field that might be termed biomanufacturing—is the fruit of a collaboration between the laboratories of Adams professor of biochemistry and systems biology Pamela Silver at Harvard Medical School (HMS) and Patterson Rockwood professor of energy Daniel Nocera in the Faculty of Arts and Sciences (FAS). The pair, who began collaborating two years ago (Nocera came to Harvard from MIT in 2012), share an interest in developing energy sources that might someday have practical application in remote locales in the developing world. Silver dubbed the system “bionic” because it joins a biological system to a clever piece of inorganic chemistry previously developed

by Nocera: that invention, widely known as the *artificial leaf*, converts solar energy into hydrogen fuel.

Nocera’s artificial leaf, which serves as the fuel source in the bionic leaf, works by sandwiching a photovoltaic cell between two thin metal oxide catalysts. When submersed in a glass of water at room temperature and normal atmospheric pressure, the artificial leaf mimics photosynthesis. Current from the silicon solar wafer is fed to the catalysts, which split water molecules: oxygen bubbles off the catalyst on one side of the wafer, while hydrogen rises from the catalyst on the wafer’s other side. Nocera has been per-

fecting the artificial leaf since he first demonstrated it in 2011; today, it is far more efficient than a field-grown plant, which captures only 1 percent of sunlight’s energy. He says he can reach efficiencies of



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70 percent to 80 percent of the underlying solar-wafer technology, which is improving constantly.

The hydrogen it produces is a versatile fuel from a chemical standpoint, Nocera reports, and could easily become the basis of a fuel cell, but it has not been widely adopted, in part because it is a gas. Liquid fuels are much easier to handle and store, hence the new *bionic leaf's* importance.

In the bionic leaf, the hydrogen gas is fed to a metabolically engineered version of a bacterium called *Ralstonia eutropha*. The bacteria combine the hydrogen with carbon dioxide as they divide to make more cells, and then—through a trick of bioengineering pioneered by Anthony Sinskey, professor of microbiology and of health sciences and technology at MIT—produce isopropanol (rubbing alcohol), which can be burned in an engine much like the gasoline additive ethanol.

“The advantage of interfacing the inorganic catalyst with biology is you have an unprecedented platform for chemical synthesis that you don't have with inorganic catalysts alone,” says Brendan Colón, a graduate student in systems biology in the Silver lab and a coauthor of the *Proceedings of the National Academy of Sciences* paper

(along with first authors Joseph Torella, a recent graduate of the department of systems biology, and Christopher Gagliardi, a postdoctoral fellow in FAS's department of chemistry and chemical biology). “Life has evolved for billions of years to produce catalysts capable of making chemical modifications on complicated molecules with surgical precision, many times at room temperature,” Colón explains. “If you can use enzymes for building chemicals, you open the door to making many of the natural compounds we rely on every day,” such as antibiotics, pesticides, herbicides, fertilizer, and pharmaceuticals.

Members of Silver's lab have been working to perfect the tricky interface between the catalyst and the bacteria, so that they will thrive and grow optimally. In its first iteration, the bionic leaf matched the efficiency of photosynthesis in plants, far below the capabilities of Nocera's underlying artificial leaf. Now the team is working to surpass blue-green algae, which—at 5 percent efficiency—do better at photosynthesis than plants. Colón has been developing a strain of the bacterium that grows well even at the lower voltages that might be emitted by the solar wafer at the system's core on a cloudy day, for example; this could dramatically improve overall efficiency.

Ultimately, though, Silver's goal is not to create fuels from this work, but “high-value commodities” in remote places. Fuel, she notes wryly, is cheap “because we fight wars over it”—and developing a system that could make fuel at a price lower than gasoline would therefore be very difficult, she says. Drugs, on the other hand, are high-value commodities, so engineering a bacterium to produce not isopropanol but a vitamin or a drug may be her next goal for this system.

Modern society, says Nocera, has created an entire manufacturing economy based not only on burning fossil fuels, but on using petroleum to make things such as rubber and plastics. “A lot of chemistry was done which set that up,” he notes. The present system makes sense now because petroleum costs so little; a sustainable system like the artificial or bionic leaf can't compete with that. But when oil becomes scarce, he says, “We might want to redo everything in terms of manufacturing. In the future, you might want to make everything renewably.” ~JONATHAN SHAW

DANIEL NOCERA WEBSITE:

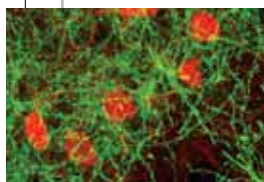
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THE SUNSHINE SUPPLEMENT

Is Vitamin D a Wonder Pill?

“IN THE CASE OF RELIGION, we put our faith in gods. And in nutrition, we have vitamins,” writes journalist Catherine Price in *Vitamina*, in which she traces vitamin crazes from the 1920s to the present. Today's star is vitamin D, nicknamed “the sunshine nutrient” because ultraviolet-B radiation prompts the body to produce it. Long known to aid calcium absorption and play an essential role in bone health, it's often added to dairy products. More recent studies, linking low levels of the nutrient to conditions ranging from multiple sclerosis to high blood pressure, led *The New*

York Times to declare in 2010 that “Vitamin D promises to be the most talked-about and written-about supplement of the decade.”

Some of the excitement seems warranted: drawing on previous research into vitamin D's immune and anti-inflammatory benefits, two new epidemiological studies by scientists at Dana-Farber Cancer Institute (DFCI) have found that it may also inhibit cancer. One study investigated the nutrient's effect on colorectal cancer survival; the other examined its impact on colorectal cancer tumors and patient immune systems.

In the first study, the largest to date of

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metastatic colorectal cancer patients and vitamin D, researchers found that on average, those with the highest blood plasma levels of the vitamin saw a 35 percent decrease in their risk of dying, and lived 33 percent longer than those with the lowest levels: 32.6 months, versus 24.5 months. Previous studies had defined a consistent, strong association between high levels of the vitamin and lower colorectal cancer risk in healthy individuals, explains the lead author, DFCI oncologist and assistant professor of medicine Kimmie Ng, so she focused her research on whether vitamin D levels matter for patients who already have colon cancer. Even after controlling for different chemotherapy regimens, and for diet and lifestyle factors (people with high vitamin D levels also tend to be less obese and to exercise more, which can complicate studies), Ng and her colleagues found that higher levels of the vitamin were associated with significantly better survival. They are now pursuing randomized controlled trials with early-stage colon-cancer patients (collecting tumor tissue to understand the biological mechanisms behind this relationship), and with patients in the late stage of the disease (testing whether extra-high doses of vitamin D, in addition to chemotherapy, might improve survival and slow the advance of the disease).

They also found an association with delayed progression of the disease, Ng reports—which strongly suggests that vitamin D might have a direct effect on a tumor and its microenvironment, and might make chemotherapy more effective. One possible explanation is that, with “more vitamin D around, perhaps there would be less angiogenesis. Blood vessels wouldn’t form, tumors wouldn’t be able to feed themselves as much.” Other theories are that the nutrient prevents the inflammation that promotes cancer growth, or stimulates immunity against the tumor. “All of these pathways are active in the tumor microenvironment,” Ng explains, “and may affect how patients do.”

The second DFCI study, published in the journal *Gut*, probed that third



possibility: that vitamin D boosts the immune system’s anti-cancer function, by means of immune cells such as lymphocytes. The senior author, professor of pathology Shuji Ogino, and his colleagues analyzed tumor tissue samples to see if vitamin D had a stronger effect on some types of cancer than on others; the results might give them a clearer sense of the nutrient’s influence in the body. The researchers determined that people with high levels of vitamin D reduced their risk for the kind of tumor permeated by immune cells; for cancers with fewer immune cells, vitamin D status seemed to have little effect. This difference implied that vitamin D affects the body’s ability to fight cancer via the immune system, thus bolstering the hypothesis that immune cells cooperate with the nutrient to promote a process called differentiation, in which the behavior of evolving tumor cells is altered.

These findings provide insight into the possible biological mechanism behind vita-

min D’s benefits, but further study is needed to determine whether supplementing with vitamins heightens the protective effect. Health authorities have defined healthy vitamin D ranges according to levels known to promote bone health, but the optimal ranges for nonskeletal benefits are still unknown—prompting some experts to urge caution. “Clinical enthusiasm for supplemental vitamin D has outpaced available evidence on its effectiveness,” Bell professor of women’s health JoAnn Manson warned in an opinion paper published in the *Journal of the American Medical Association* last February. She has spearheaded a 26,000-person study, the Vitamin D and Omega-3 Trial (VITAL), designed to test whether those nutrients reduce the risk of cancer and cardiovascular events such as heart attacks and strokes; ancillary studies will analyze whether these supplements have an effect on diabetes, depression, and cognitive decline, among other health conditions.

Supplement sales and screening rates have soared in recent years, Manson notes, even though lab definitions of what constitutes a “normal” vitamin D range vary dramatically. “It’s been referred to as the wild, wild, West,” she says, adding that “widespread screening is feeding into megadose supplementation because clinicians are chasing a number.” When it comes to vitamins, she cautions, “It shouldn’t be assumed that more is automatically better.” Supplementation might be merely ineffective, but extremely large doses could be deleterious to health.

When results of Manson’s study are available in late 2017, medical professionals will have a better sense of whether recommended daily allowances should be revised upward. In the meantime, her paper characterized research and clinical practice as being “at a crossroads”: only when more light is shed on the sunshine nutrient will it be known whether the vitamin D craze rests on fact, or faith. ~SOPHIA NGUYEN

KIMMIE NG WEBSITE:

http://doctors.dana-farber.org/directory/profile.asp?pic_id=8925287

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(From left) Detail from *Night Parade of a Hundred Demons/Kasha with DDT* (watercolor, 2010), by Moira Hahn, at the Worcester Art Museum; *Study for Stacked Color I* (1972), by Richard Tuttle, at the Harvard Art Museums; and a still from *Night of the Comet* (1984), at the Harvard Film Archive

FROM LEFT: WORCESTER ART MUSEUM; HARVARD ART MUSEUM; HARVARD FILM ARCHIVE

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STAFF PICK: Love the One You're With

A slender man (Taylor Mac) arrives on stage in a lifeboat; his sturdy peer (Mandy Patinkin) climbs out of a trunk. Strangers, they alone have survived a great flood. And for the next 90 minutes, the pair explore the realms of human existence, seeking to commune and thrive, despite the enveloping bleakness—purely through song and dance. The result is vaudeville entertainment at its *Waiting for Godot* best. Viewers are given plenty to ponder, even as they giggle. Roles intertwine: sometimes Mac is the clown, or “Lear’s fool,” as Patinkin said in an A.R.T. interview. “But at times he’s Lear and I’m the fool. That’s what’s really fun about the relationship.” The intimate project was directed and choreographed by Susan Stroman, a veteran of big Broadway musicals, and debuted in 2013 in workshop form in lower Manhattan. Mac is a playwright, songwriter, and cabaret and drag performer—among the edgiest actors working today. He and the equally versatile stage and screen actor Patinkin are clearly kindred spirits. Their singing voices meld perfectly even as they exploit a yin/yang physical dynamic. A fluid, elastic presence, Mac can also beam beatifically. Patinkin, with his meaty forearms is, at least initially, more of a reluctant rock. But he comes around. Who wouldn’t—when stranded with Mac and roused by a musical lineup from children’s ditties and Rodgers and Hammerstein to Gillian Welch, and, naturally, R.E.M.’s take on cultural chaos and new beginnings: “It’s the End of the World as We Know It (And I Feel Fine).” Do you? ~N.P.B.

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Spotlight



Spotlight

Arlene Shechet: All At Once (June 10-September 7) is the first survey of works by the Rhode Island School of Design-trained sculptor. Shechet often explores the relationship between controlled and chance changes that occur as liquid becomes solid, using readily mutable materials like plaster, paper, glass, and clay. These dynamic works offer suggestive corporeal forms, which she coats in novel color combinations and metallic glazes. There are bulbous moonscapes, lava-like amalgamations, and squished geometric shapes. Not long ago Shechet completed a residency at the world-renowned Meissen Porcelain Manufacturer in Germany, which has produced figurines and other items since the early 1700s. Her resulting sculptures (many of which were on display at the RISD Museum last year) merge traditional fine-boned objects, such as dishware and vases that she often lops off at angles, with other clay formations (animals, boxes, spouts, protruding human arms and legs) and incongruent patchwork and drippy glazing. As the magazine and art platform *Ceramics Now* sees it, "Shechet not only fractures the objects' surfaces but also undermines any single association with nature." ~N.P.B.

The Institute of Contemporary Art (ICA)

www.icaboston.org/exhibitions/exhibit/arlene-shechet

tion: Fifty Works for Fifty States features conceptual and minimalist artwork from the 1970s and 1980s. (Opens May 23)

The Radcliffe Institute for Advanced Study

www.radcliffe.harvard.edu/event/2015-rosetta-s-elkin-exhibition

The exhibition **Live Matter**, by Harvard Graduate School of Design assistant professor of landscape architecture Rosetta S. Elkin, explores the literal roots of botanical studies and reveals the unique vibrancy of each specimen. (May 5-29)

Harvard Museum of Natural History

www.hmn.harvard.edu
The Half-Wild, Half-Captive Elephants of Burma (now Myanmar). Lecture and book signing by Vicki Constantine Croke, author of the best-selling *Elephant Company: The Inspiring Story of an Unlikely Hero and the Animals Who Helped Him Save Lives in World War II*. (May 7). Visitors get a close look at how bees live and work together through an active honeybee hive on display in **Arthropods: Creatures That Rule**. (Opens May 15)

Fuller Craft Museum

www.fullercraft.org

Haystack Components: Metals and Jewelry. An array of ornamentation using gems, plastics, wood, fiber, glass, and even concrete by artists affiliated with the renowned Haystack Mountain School of Crafts in Maine. (Opens May 16)

Worcester Art Museum

www.worcesterart.org

Samurai! This multipart exhibit, which runs through September 6, explores Japanese myth and tradition in the contemporary imagination. Family events are planned, such as Star Wars Day on May 17; visitors may also watch artists create wall murals (May 5-9), or attend a Japanese flute concert featuring composer Shirish Korde (May 21).

RISD Museum

www.risd-museum.org

Golden Glamour: The Edith Stuyvesant Vanderbilt Gerry Collection spotlights European haute couture from the 1920s and 1930s.

Events listings are also found at www.harvardmagazine.com.

The Modern Revolution

Bauhaus-inspired architects built their domestic visions in Lexington and on Cape Cod.

by NELL PORTER BROWN



BILLED AS “Lexington’s second revolution,” the profusion of mid-century modern homes built by architects largely influenced by Bauhaus founder Walter Gropius forms the center of *Lextopia: Lexington’s Launch of Mid-Century Modern*. It’s a multipronged exhibit, organized by the Lexington Historical Society, that explores the town’s significant pioneering role in the American modernist movement. A rare tour of four private dwellings designed by Henry B. Hoover, M.Arch. ’26, opens the show on May 31; the exhibit starting on June 19 chronicles the origins of modern communities, such as Six Moon Hill and Five Fields, and highlights original furnishings and dishware, along with the work of resident architects such as Hugh Stubbins, M.Arch. ’35, Sally Harkness, and Benjamin C. Thompson, who founded Design Research in Harvard Square. (Gallery discussions are slated for this summer, and a second, larger house tour concludes the exhibit on October 4; www.lexingtonhistory.org.)



The society typically focuses on Lexington’s pivotal importance to the early days of the American Revolution: it manages three museums that have all been restored within the last eight years—the Buckman and Munroe Taverns and the Hancock-Clarke House—and runs related educational programs and events. This foray into modernism, explains Elaine C. Doran, the society’s curator and archivist, reflects a growing recognition that, “to our knowledge, there really is no other concentration of modernist neighborhoods of this size in the country.” The “influx of professors and engineers and mathematicians and scientists,” she adds, also permanently altered the town’s character. “We did not have this kind of demographic before; we had

Lexington’s modernist communities include a Peacock Farm house by Henry Hoover (top images), and homes in Turning Mill/Middle Ridge (lower left) and Six Moon Hill (lower right).

been a quiet, rural, farming community.”

Hoover and American architect Edwin Goodell were designing modern structures before Gropius fled Nazi Germany and arrived in Cambridge in 1937 to chair the department of architecture at the Harvard Graduate School of Design. But the earliest of the town’s modernist cul-de-sacs, Six Moon Hill (1948) and Five Fields (1951), were planned as experimental utopian communities by The Architects Collaborative (TAC), founded by Gropius and others, including Harkness and Thompson, in

CURIOSITIES: Branching Out

What it will be, nobody exactly knows: neither the 50 volunteers who will have happily trudged for hours through muddy woodlands north of Boston to gather tractor-trailer loads of saplings—linden, beech, Norwegian maple, depending on what the thaw has yielded—nor the artist himself, Patrick Dougherty. Only during the three weeks spent laying out those saplings, planting some, and then bending, twisting, and weaving them all together do the final, fantastical forms emerge. Dougherty, who hails from North Carolina and earned degrees in English and hospital administration before pursuing art, has erected more than 250 such sapling-based structures across the country and around the world during the last three decades. Judging from these, what ends up on the lawn of the colonial-era Crowninshield-Bentley House in Salem, Massachusetts, on May 23, might feature turrets or Russian onion domes, or look like a condensed Moroccan palace. It could resemble a softer, sway-backed version of Stonehenge, a clump of medieval thatched huts, or skinny teepees pushed askew by the wind. Dougherty's constructions tend to have doors and windows, but they are not homes. "Seussical" is too whimsical a description; the dreamscapes are more suited to a van Gogh landscape, or even *The Scream*. What might add another twist in Salem is whether, and how, Dougherty juxtaposes his installation with the symmetrical, squared-off Georgian-style home and its formal front entrance. Built by fish merchant and sea captain John Crowninshield in 1727, the house is a historic site now owned by the Peabody Essex Museum, which commissioned Dougherty's work. Whatever the resulting forms, they are expected to stay up for two years—unless nature reclaims them first.

Peabody Essex Museum
Stickworth: Patrick Dougherty
Opens May 23
www.pem.org/exhibitions



Clockwise from above: *Sortie de Cave* (Free At Last) 2008, in Chateaubourg, France; *Summer Palace* 2009, in Philadelphia; Patrick Dougherty



1945. The firm would soon grow to take on many more who trained at Harvard, where Gropius and his Bauhaus colleague Marcel Breuer were influential forces for years. Many of these designers, Doran says, were drawn by Lexington's proximity to Cambridge and the availability of inexpensive, open land.

The two original neighborhoods were quickly followed by others. Middle Ridge (1955) was developed by another Gropius student, Carl Koch '34, M.Arch. '37, who also designed the 1950s homes in the Conantum community, in Concord. (Thousands of his Techbuilt homes, assembled from prefabricated elements, also appeared across the country.) Peacock Farm (1953), Rumfield Road/Shaker Glen (1959-60), and Upper Turning Mill (1962-65) were based on designs by MIT-trained architects Walter Pierce and Danforth Compton.

Other custom-built modern homes and civic-minded enclaves still exist in Greater Boston—such as Kendall Common in Weston, Snake Hill in Belmont, and Brown's Wood in Lincoln—and are dotted throughout New England. Their initial popularity coincided with the arrival of European designers and intellectuals who fled World War II, a nascent American push to modernism, and the postwar "building boom and optimism about design and technology's roles in progress," says Peter McMahon, founding director of the Cape Cod Modern House Trust, which has restored and now manages three homes in Wellfleet (www.ccmht.org).

As those houses have aged, he adds—with many already demolished and others under threat—local historical societies, preservation groups, and museums are increasingly apt to add modernism's artifacts to their repertoires. Historic New England, for example, has long owned and managed the Gropius House in Lincoln, Massachusetts, where Friends of Modern Architecture/Lincoln helps preserve and promote the eclectic array of modern homes in town. On October 9, the Concord Museum mounts its own *Middlesex County Modernism* show (www.concordmuseum.org).

Of this surge in activity and interest, McMahon also notes, "Post-modernist structures have aged very badly, and nowadays architecture is just very chaotic.



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This low-lying, woods-bound home is located in the Peacock Farm enclave.

Twentieth-century modernism was, in retrospect, a golden age."

Lextopia's co-curator, the writer and documentarian Rick Beyer, sees relevant, contemporary themes, such as "climate change and the environment and fostering community, that are making some of these houses very relevant to people again." Modernists incorporated their ideals into their designs, emphasizing utility and affordability, as well as flexible private and public spaces. These were not McMansions, but human-scaled, tightly constructed homes with built-ins, spare furnishings, and a dearth of structural ornamentation. "The practical, minimalist aesthetics are appealing," Beyer notes, and support current efforts to curb energy use. The open layouts promoted group gatherings, while bathrooms and bedrooms tended to be small and peripheral.

At Six Moon Hill (where Benjamin Thompson lived for 16 years in a house he designed; his widow, Jane, will give a gallery talk this summer), much depended on group decisions and stewardship. "You didn't just buy a house, you bought a way of life," says Doran, who has recorded oral histories with former residents. "The neighbors were like one big family. The kids all played together and you never knew which house they would end up in for dinner; you just accepted whoever came over." Beyer is creating a video for the exhibit using clips from 8 mm home movies that reflect daily life in these communities—such as the annual pool clean-up day at Six Moon Hill. "I think some of the people who were designing these neighborhoods 50 years ago were thinking about the same things we are today: how do you bring people together and create positive interactions in a community?" he adds. "Nowadays so many people live shut up and isolated."

Modernists, again presaging current concerns, also valued human connections to the natural world. Residences were



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LEXINGTON HISTORICAL SOCIETY

A house in the Five Fields neighborhood nestles against trees.

carefully sited to blend in with the existing rural landscapes. Often, plate-glass walls blurred boundaries between inside and outside; in some cases, as in a 1957 Peacock Farm home designed by Henry Hoover, "trees are growing up in the middle of the living room," notes Doran. A woman who grew up in the house told her that "staring out those windows in the winter when it was snowing was just like being inside a snow globe."

That property is on the May 31 tour, as is the much earlier 1937 home that Hoover built for himself and his young family in Lincoln, Massachusetts, which remains in the family, according to his children, Henry B. Hoover Jr. and Lucretia Hoover Giese. Proceeds from the tour will help support their forthcoming book, *Breaking Ground: Henry B. Hoover, New England Modern Architect*. The structure, Giese notes in an e-mail to the historical society, reflects his "foremost concern with siting and spatial organization, which accentuated the house's integration with the land. Overlooking the Cambridge Reservoir, the house remains eminently livable and beautiful."

MODERNISM ALSO MIGRATED to Cape Cod, primarily Wellfleet and Truro, starting in the late 1930s. The Cape Cod Modern House Trust last year published the stunning *Cape Cod Modern*, coauthored by McMahon and Christine Cipriani, on the history and range of experimental homes on the outer Cape. The trust rents out its three restored homes, sponsors an artist/scholar residency, and runs tours and events, including the symposium "Rural Communities Today," on May 30-31.

Gropius, Breuer, and other artists, writers, and arts patrons (including Peggy Guggenheim), began renting cottages there—primarily at the behest of Jack Charles Phillips Jr. '30, Ds '39. Phillips, descended from the founders of Phillips Andover and Phillips Exeter academies, had recently returned from studying painting in France

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HARVARD
MAGAZINE

and chose to settle on 800 acres he had inherited in Wellfleet. Even though Provincetown already had an art colony, much of the outer Cape “was wilderness, a no-man’s land,” at the time, McMahon says—and Phillips built the first modernist house there in 1938. Known as “The Paper Palace,” it was made of pressed-paper wallboard.

“He was the paterfamilias,” McMahon adds, for what soon became a close-knit communal blend of the European architects and academics and another group of self-taught builders and artistic experimenters, such as Princeton graduate John “Jack” Hughes Hall and Hayden Walling, who tended toward radical philosophies. In 1944, architect Serge Chermayeff, who was friends with Gropius and Breuer and led

the architecture department at Harvard in the 1950s and early 1960s, bought the cabin he had rented from Phillips; it became an informal think tank for the bohemian enclave. Chermayeff eventually turned the cabin into a connected series of right-angled structures painted in primary colors. His son, Cambridge architect Peter Chermayeff ’57, M.Arch. ’62, now summers there; he has been an active supporter of the trust and will host part of the May symposium.

“The Cape Cod land was this blank slate and in the early days they all built stuff out there, mostly of found materials,” notes McMahon. With no commercial pressures, they “designed homes to suit themselves and their friends, often incorporating old shacks and a prefab army barracks. You



The Kugel/Gips House (1970) was restored by the Cape Cod Modern House Trust.

had this very high-concept, low-budget utopian community of people who also loved nature, fishing, and farming.”

By 1961 the land under these creations became the Cape Cod National Seashore. Pre-1959 structures were “grandfathered in,”

COURTESY OF THE CAPE COD MODERN HOUSE TRUST

ALL IN A DAY: The Fruit of Others’ Labor

Sue Greene, coordinator of The West Springfield Community Garden in Boston’s South End, has a few simple rules. Don’t plant trees and shrubs that will someday cast unwanted shade. Grow what you want. Have fun. “I’ve tried to cultivate the idea that everyone’s garden is unique,” she says, laughing at her word choice. Creativity rules in these 35 (mostly) vegetable plots, as it does in the dozens of other urban green spaces that are also open to the public during the annual South End Garden Tour on June 20.

The self-guided tours run from 10 A.M. to 4 P.M.; all proceeds benefit the volunteer-run South End & Lower Roxbury Community Gardens. (The \$20 ticket also includes a post-tour reception where paintings by professional local artists, created during the day in some of the gardens on view, are displayed for sale.) Visitors can explore upward of 30 private oases, besides the West Springfield plots: shaded sunken patios; lush flower beds; rooftop container gardens; and compactly built havens that may feature fountains, vine-covered walls, stonework, murals, and al fresco dining spots. Also on tap are the neighborhood’s



Boston’s South End residents treasure their green spaces—which make urban life more vibrant for all.

parks and community-planted greenways. The variety of styles, growers, and multitude of community gardens (16 in all, but only a few are on this year’s tour) reflect the South End’s historic diversity. These open spaces “are where residents come together to cultivate food and flowers, create beautiful

green places for everyone to enjoy, and grow friendships that make neighborhoods strong,” notes tour chair Maryellen Hassell. Many West Springfield gardeners have grown food

there since the first plots were established in 1976; others are energetic newcomers. Most of the gardens are tended together by families or friends. This year, Greene reports, a young Jamaican couple will attempt to grow greens to make callaloo, a traditional island dish. Others will pursue an okra that offers a pinwheel-shaped white flower with a crimson center, even if harvesting the vegetable proves tricky. Greene’s husband, Michael F. Greene, A.M. ’12, and a friend grow hops to make beer, while she has had remarkable luck with tomatillos: green bulbs covered in papery husks native to Mexico and Central America. “It’s like they’re on steroids, the way they take over,” she reports. “We only put in four plants and we get bushels of them in September and October.” Luckily, salsa freezes—and goes especially well with chips and a tall glass of her husband’s home brew.

—N.P.B.

South End Garden Tour
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COURTESY OF THE CAPE COD MODERN HOUSE TRUST

The simply decorated Weidlinger House (1953) on outer Cape Cod is now open for renters and scheduled public tours.

but more than a hundred modern houses built as the legislation was debated ultimately became the property of the National Park Service (NPS). They sat vacant, sometimes for decades, and fell into disrepair; by the 1990s most had been condemned.

McMahon, who grew up vacationing on the Cape, moved there from Manhattan in 2003. He became fascinated by the history and the homes, and focused on researching, archiving—and then saving—what he could. He and others formed the nonprofit trust in 2007 and have worked closely with the park service to identify seven of the

100 NPS-owned buildings that were historically important. Of those, two have been fixed up by the park service itself and three meticulously restored by the trust, and are now protected as part of the National Register of Historic Places. The trust holds long-term leases on the three homes: the Kugel/Gips House (1970, by Charles Zehnder); the Hatch House (1961, Jack Hughes Hall); and the Weidlinger House (1953; Paul Weidlinger, an engineer, was a former Harvard faculty member).

The Weidlinger home sits across the pond from Breuer's cottage. A wooden box

on a platform, it juts out in front atop concrete piers. A row of windows faces the woods and water, offering views of the light, wind, trees, and skies rearranging the landscape into a constantly evolving painting.

As a movement, modernism's emphasis on nature, form, and simplicity make it particularly agile. If McMahon is right—that “post-modernist structures have aged very badly”—the modernist aesthetics seem only to ripen. “There's the sense that modern has been classical, and now it's modern again,” muses Lexington's Rick Beyer. “It's timeless: what's old is new again.”

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The Week's Events



STEPHANIE MITCHELL/HPAC

COMMENCEMENT WEEK includes addresses by Harvard president Drew Gilpin Faust and former Massachusetts governor Deval L. Patrick '78, J.D. '82. For details and updates on event speakers, visit www.harvardmagazine.com/commencement.

TUESDAY, MAY 26

Phi Beta Kappa Exercises, at 11, with poet and novelist Laura Kasischke and orator Allen Counter, director of The Harvard Foundation for Intercultural and Race Relations and professor of neurology. Sanders Theatre.

Baccalaureate Service for the Class of 2015, at 2, Memorial Church, followed by class photo, Widener steps.

Class of 2015 Family Reception, at 5:30. Tickets required. Science Center plaza.

Harvard Extension School Annual Commencement Banquet, at 6. Tickets required. Annenberg Hall.

WEDNESDAY, MAY 27

ROTC Commissioning Ceremony, at 11:30, with President Faust and guest speaker General David G. Perkins, commanding general of the U.S. Army Training and Doctrine Command. Tercentenary Theatre.

Harvard Kennedy School Commencement Address, at 2, by David Miliband, president and CEO of the International Rescue Committee. JFK Park.

Senior Class Day Exercises, at 2, with the Harvard and Ivy Orations and a guest speaker, to be announced. Tickets required. Tercentenary Theatre.

Law School Class Day, 2:30, featuring former U.S. Representative from Arizona Gabrielle Giffords and her husband, Mark Kelly, a retired U.S. Navy pilot and NASA astronaut. Holmes Field.

Business School Class Day Ceremony,

2:30, with Intuit co-founder and chairman Scott Cook, M.B.A. '76. Baker Lawn.

Graduate School of Design Class Day, at 4, with a guest speaker. Gund Hall lawn.

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A Special Notice Regarding Commencement Day

Thursday, May 28, 2015

Morning Exercises

TO ACCOMMODATE the increasing number of people wishing to attend Harvard's Commencement Exercises, the following guidelines are provided to facilitate admission into Tercentenary Theatre on Commencement Morning:

- Degree candidates will receive a limited number of tickets to Commencement. Their parents and guests must have tickets, which must be shown at the gates in order to enter Tercentenary Theatre. Seating capacity is limited; there is standing room on the Widener steps and at the rear and sides of the Theatre. For details, visit the Commencement office website (<http://commencement.harvard.edu>).

Note: A ticket allows admission, but does *not* guarantee a seat. Seats are on a first-come basis and can not be reserved. The sale of Commencement tickets is prohibited.

- A very limited supply of tickets is available to alumni and alumnae on a first-come, first-served basis (with a limit of one ticket per alumnus/alumna) through the Harvard Alumni Association (<http://alumni.harvard.edu/annualmeeting>). Alumni/ae and guests may view the Morning Exercises over large-screen televisions in the Science Center and at most of the undergraduate Houses and graduate and professional schools. These locations provide ample seating, and tickets are *not* required.

- College Alumni/ae attending their twenty-fifth, thirty-fifth, and fiftieth reunions will receive tickets at their reunions.

Afternoon Program

THE HARVARD Alumni Association's Annual Meeting, which includes remarks by its president, Overseer and HAA election results, the presentation of the Harvard Medals, and remarks by President Drew Gilpin Faust and the Commencement Speaker, convenes in Tercentenary Theatre on Commencement afternoon. For tickets (which are required, but free) visit the HAA website or call 617-496-7001.

~The Commencement Office



JON CHASE/HPAC

The SIGnboard
VISIT harvardmagazine.com/commencement for news of SIG gatherings.

Masters' Receptions for seniors and guests, at 5. The Undergraduate Houses.

Harvard University Band, Harvard Glee Club, and Radcliffe Choral Society Concert, at 8. Tercentenary Theatre.

THURSDAY, MAY 28
Commencement Day. Gates open at 6:45.

Academic Procession, 8:50. The Old Yard.

The 364th Commencement Exercises, 9:45 (concluding at 11:45). Tickets required. Tercentenary Theatre.

All Alumni Spread, 11:30. Tickets required. The Old Yard.

The Tree Spread, for the College classes through 1964, 11:30. Tickets required. Holden Quadrangle.

Graduate School Diploma Ceremonies,

from 11:30 (time varies by school).

GSAS Luncheon and Reception, 11:30 to 3. Tickets required. Behind Perkins Hall.

College Diploma Presentation Ceremonies and Luncheons, at noon. The Undergraduate Houses.

Alumni Procession, 1:45. The Old Yard.

The Annual Meeting of the Harvard Alumni Association (HAA), 2:30, includes remarks by HAA president Cynthia A. Torres '80, M.B.A. '84, President Faust, and Commencement speaker Deval L. Patrick; Overseer and HAA director election results; and Harvard Medal presentations. Tercentenary Theatre.

Harvard T.H. Chan School of Public Health Diploma Ceremony at 2, with guest speaker Donald R. Hopkins, M.P.H. '70, Sc.D. '13, vice president of health programs of The Carter Center. Kresge Courtyard.

Medical and Dental Schools Class Day Ceremony. Ticketed luncheon at noon, followed by a speech, at 2, by Rajesh Panjabi, co-founder and CEO of Last Mile Health;

Public Health Award Ceremony, 4-7. Kresge Courtyard.

Graduate School of Education Convocation, 3-5, with a guest speaker. Radcliffe Yard.

Divinity School Multireligious Service of Thanksgiving at 4. Memorial Church.

Graduate School of Arts and Sciences Dudley House Masters' Reception, 4-6.



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associate physician, division of global health equity, at Brigham and Women's Hospital; and HMS instructor in medicine.

FRIDAY, MAY 29

Radcliffe Day, celebrating the institution's past, present, and future, includes a morning panel discussion followed by a luncheon honoring the 2015 Radcliffe Medal recipient, Ruth Bader Ginsburg, J.D. '59, LL.D. '11, associate justice of the U.S. Supreme Court.

The discussion, "A Decade of Decisions and Dissents: The Roberts Court, from 2005 to Today" (10:30 A.M.-noon), is moderated by Margaret H. Marshall, Ed.M. '69,

former chief justice of the Supreme Judicial Court of Massachusetts and a senior research fellow and lecturer on law at Harvard Law School. Panelists include: Linda Greenhouse '68, Knight distinguished journalist-in-residence and Goldstein lecturer in law at Yale Law School; Lauren Sudeall Lucas, J.D. '05, assistant professor of law at Georgia State University College of Law; and, from Harvard Law School (HLS), Kirkland and Ellis professor Michael Klarman and Bromley professor John Manning.

The luncheon, 12:30-2, will feature remarks by retired Supreme Court associate justice David H. Souter '61, LL.B. '66, LL.D. '10; then, former HLS professor and former dean of Stanford Law School Kathleen M. Sullivan, J.D. '81, will talk with Justice Ginsburg about her career.

Tickets for the day's events have already



JON CHASE/HIPAC

been distributed; no walk-in attendees will be admitted. The events will be web-cast live at www.radcliffe.harvard.edu.

For other Commencement week schedule updates, visit <http://commencement.harvard.edu/events-schedule>, or <http://alumni.harvard.edu/annualmeeting>.

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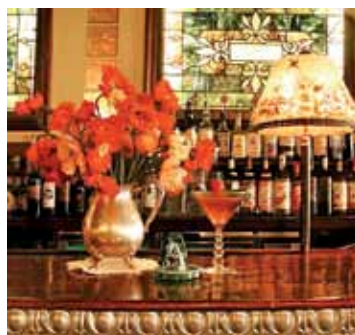
COURTESY OF T.W. FOOD

COMMENCEMENT and reunion week draws tens of thousands of people to Harvard Square, where there are plenty of restaurants suited to the ensuing celebrations—Alden & Harlow, Harvest, Henrietta's Table, Rialto, and The Beat Hotel among them. Yet some families and their graduates may tire of the crowds and traffic congestion. Here, then, are restaurants located just beyond the collective hoopla that are easy to reach by foot, bus, or subway.

Central Square is a 15-minute walk (or shorter bus or Red Line ride) from Harvard Square. The bustling commercial zone is packed with ethnic restaurants—Indian, Middle Eastern, Korean, and Japanese, among others—but we recommend the “international” cuisine at Cuchi Cuchi (795 Main Street, 617-864-2929; www.cuchicuchi.cc). Exuberant décor abounds,

inspired by Old World beauty and early Hollywood glamour. The drinks are just as jazzy. Try Salome's Potion (with muddled blackberries and basil) or Let Me Entertain You (a snappy twist on a mimosa). The “small plates” (not tapas), priced from \$9 to \$25, can be shared; they range from scallops ceviche and baby back ribs with apple fritters to spaghetti alla carbonara and *tsukune* (Japanese chicken meatballs).

Traveling farther down Massachusetts Avenue, beyond MIT and just across the Charles River, are two vastly different restaurants within a block of each other.



COURTESY OF CUCHI CUCHI

Worth the walk (or T): Deuxave's updated French menu, detailed; at T. W. Food, an ambitious tasting menu; and Cuchi Cuchi's small plates

Deuxave (371 Commonwealth Avenue, Boston, 617-517-5915; www.deuxave.com) serves exceptional French fare in a chic, modernist setting that is nevertheless very comfortable. Think neutral shades of grays and browns, gleaming silverware, and neatly appointed leather upholstery. Try the kitchen's signature nine-hour French onion soup (\$14), the Scituate lobster with gnocchi and a mélange of green

grapes, curried walnuts, and pearled onions (\$19), or the duck liver pâté with vanilla poached pears (\$13). By contrast, Asta (47 Massachusetts Avenue, Boston, 617-585-9575; www.astaboston.com), located in a small, raw-looking creative space, has no set offerings. Each night, owner-chef Alex Crabb serves three tasting menus (from \$45 to \$95) with original options: a dish may emphasize onions, prepared in five different ways; dessert may be a rich, crunchy cereal served with fresh,

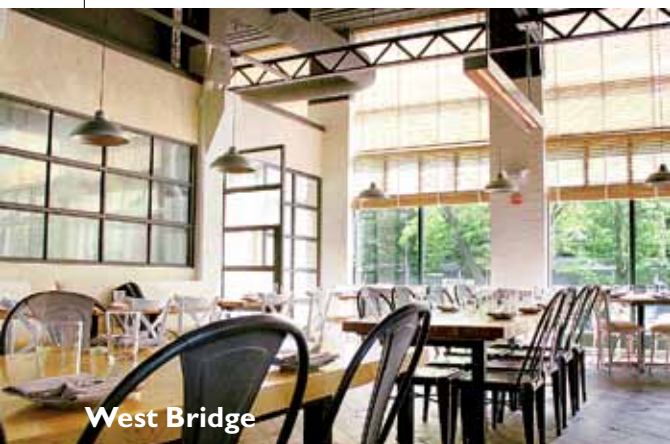
ice-cold milk. (See *Harvard Magazine's* review at harvardmag.com/asta-15.)

Back in Cambridge, the Kendall Square neighborhood—a biomedical and technology mini-mecca—is now loaded with restaurants, most walkable from the Red Line's Kendall Square station. The Blue Room (One Kendall Square, 617-494-9034. www.theblueroom.net) is a low-lit dining room and bar, with exposed brick and a subterranean appeal. It can be packed with a lively crowd, especially at

the bar. Meals are a good step up from pub food, with some especially nice touches: the Macomber turnip soup (\$9), made from southeastern Massachusetts produce, arrives with a dollop of sumac-flavored *labne* (yogurt cheese), and the grilled whole branzino (fish) is paired with a refreshing salad of fennel, watercress, and radicchio (\$28). Across the courtyard is West Bridge (617-945-0221; www.westbridgerestaurant.com). Open and airy, this restaurant

has an urbane farmhouse feel that matches its cuisine: simple, farm-fresh regional ingredients cooked French-style. Sit inside or out, sipping novel cocktails—Conant's Island (cucumber vodka, rice-wine vinegar, and green Tabasco) or Love and Fear (gin, lemon, pineapple, fernet, and Aperol)—and order a series of sides, like Brussels sprouts with macadamia nuts, or a family-style dish to share. The rustic “chicken and jus” (\$45), which comes with rutabaga, cabbage, lentils, and bacon-like *guanciale*, serves three or four.

T.W. Foods (377 Walden Street, 617-864-4745; www.twfoodrestaurant.com) is easily worth the 1.1-mile jaunt northwest from Harvard Square. Proprietors Tim and Bronwyn Wiechmann (who also own a terrific German and Austrian restaurant, Bronwyn, in Somerville's Union Square) offer prix-fixe tasting menus (\$55 to \$85), with optional wine pairings. It is among the most meticulously prepared, subtly adorned cooking around. On a recent night, that meant house-made ricotta and sunchoke agnolotti and a beet soup laced with horseradish and crème fraîche, fol-



COURTESY OF WEST BRIDGE

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COURTESY OF BLUE ROOM

The Blue Room in Cambridge's Kendall Square—the technology and biotech center with a Silicon Valley vibe (or the Boston equivalent)

lowed by a delicate rhubarb gâteau Breton with lavender ice cream and lemon curd.

More down-to-earth and moderately priced are two places well suited for celebratory extended-family gatherings in Somerville's nearby Davis Square. (Take the Red Line two stops outbound from Harvard Square.) Posto (187 Elm Street, 617-625-0600; www.postoboston.com) aptly calls itself “a modern interpretation of a classic Italian pizzeria, *enoteca*,

and trattoria,” and is good for all ages. The 13 wood-fired, thin-crust pizzas (\$12-\$21) come with white or red sauce and well-paired toppings, such as the eggplant with pine nuts, raisins, roasted peppers, and ricotta. For pastas, try the tagliatelle with ragù Bolognese (\$20), or combine a few appetizers: the rosemary sea-salt bread (\$2.50) can envelop the classic “*nonna's* rec-

ipe” meatballs with melted mozzarella (\$12), or be dunked in the marinara that comes with it. Down the street, The Painted Burro (219 Elm Street, 617-776-0005; www.paintedburro.com) offers imaginative Latin American dishes. Start with the \$10 hibiscus-flavored margarita—very strong and not too sweet—and the “cholo” corn-cob with garlic mayo, cotija cheese and a touch of cayenne (\$6) or the corn masa griddle cakes with goat cheese and sautéed apples (\$12). The slow-cooked short ribs come with roasted carrots, charred onions, red wine mole, and Oaxacan grits (\$24), but the lighter fare, such as the fresh mahi mahi tacos with a serrano-spiced salsa (\$7.50), is just as satisfying. For dessert, head to Mr. Crêpe (51 Davis Square, 617-623-0661; www.mrcrpe.com): everyone, no doubt, has earned the right to indulge in the specialty of the house, the “Tiff and Tone” (\$8.95): a hot crêpe filled with strawberries, bananas, and melty Belgian chocolate, and topped with two scoops of vanilla ice cream.

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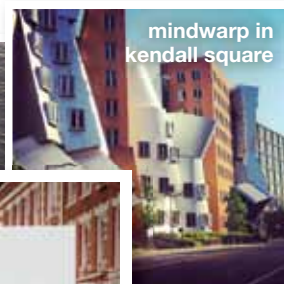
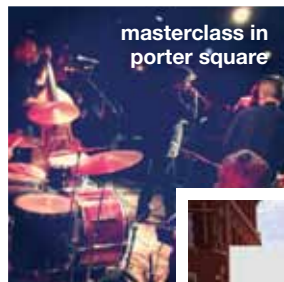
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JOHN HARVARD'S JOURNAL



Isaac Kohane

Toward Precision Medicine

Building scale in biomedical informatics

ANTICIPATING “radical transformations” in medicine in coming decades, the dean of Harvard Medical School (HMS) has authorized a full-scale department of biomedical informatics, effective July 1. Jeffrey Flier’s move recognizes the growing importance of data in the healthcare professions, and, he said, builds on the school’s “outstanding record of achievement” in the field. Henderson professor of pediatrics and health sci-

ences and technology Isaac “Zak” Kohane will chair the new department. Since 2005, he has co-directed HMS’s Center for Biomedical Informatics (CBMI); five of its associates will become the department’s first core faculty members, and Kohane has committed to recruit 10 more colleagues during the next five to seven years.

What is biomedical informatics, why does it matter, and why now at HMS? The

emerging discipline “reflects the dramatic development of large data sets in genetics, genomics, studies of proteins, the nervous system—all aspects of biomedical science and ultimately patient care,” says Gilbert Omenn, M.D. ’65, director of the University of Michigan’s Center for Computational Medicine and Bioinformatics, who chaired the external committee that reviewed the proposal for the new department. But much of this information is “heterogeneous,” he explains: the data range from the molecular and genetic to the behavioral and sociological. “All of it,” Omenn says, “has to come together to paint a complete picture of the determinants of health and disease, as well as response to therapies and general care.” Biomedical informatics aims to create an information commons that will be useful to researchers, doctors, and even their patients. Kohane’s experi-

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ence as director of informatics at Boston Children's Hospital, and at HMS's Countway Library (see "Gutenberg 2.0," May-June 2010, page 36), is directly pertinent.

Lessons from Netflix

"MEDICINE AS A WHOLE is a knowledge-processing business that increasingly is taking large amounts of data and then, in theory, bringing that information to the point of care so that doctor and patient have a maximally informed visit," says Kohane. He compares this idealized patient experience, in a sense, to Netflix or Amazon's connection to consumers: they already know "your entire prior purchase history...what other consumers with a similar history are going to buy next, and what to recommend to you." But in medicine, he points out, patients with chronic diseases must repeat some abbreviated version of their entire medical history "again and again to every provider."

To enable precision movie-picking or shopping, the titans of online commerce take advantage of "knowing a lot about a population and a lot about you," Kohane says. Most patients, on the other hand,

would be lucky if their providers knew about similar patients in their own practices—let alone all patients with similar histories—and about which drugs worked for different patient subgroups. This kind of precision medicine simply doesn't exist yet. (Kohane served on the National Academy of Sciences committee that delivered a 2011 report on the subject to President Obama; among his own projects is the creation of a central repository for information about neurodevelopmental diseases, with a special focus on autism spectrum disorder, in which both genes and the environment are thought to play important roles.)

Another goal of biomedical informatics is to improve diagnoses and treatments by removing some of the subjectivity of clinical interactions. For example, many doctors, when listening to a patient's heart through a stethoscope, "will disagree about what they are hearing, and what it means," says Kohane. "Whereas you can attach a computer to a microphone, and get consistent, reliable diagnoses of which valve is affected."

A related, pedagogical goal is enhancing physicians' search and numeracy

skills. "The best predictor of a doctor ordering a genetic test is knowing whether the patient asked for it," Kohane continues—usually because that patient has searched on Google. But researchers have found that even "well-trained physicians are both uncomfortable and incompetent in interpreting these tests," often because they lack numeracy skills. One of Kohane's former students, Arjun Manrai '08, asked doctors and residents at a Boston hospital a simple question: "If a test to detect a disease whose prevalence is one in a thousand has a false positive rate of 5 percent, what is the chance that a person found to have a positive result actually has the disease?" The test will yield 50 false positives in a population of 1,000, but only one patient will actually be ill—so a positive test result would mean that a patient has only about a 2 percent chance of having the disease. More than three-quarters of the respondents in the study got this wrong; the most common answer was 95 percent.

As Kohane puts it, "In the era where we're beginning to take away pieces of your body, like a breast, based on a ge-

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Commencement 2015

Planning for Commencement week exercises in May is already under way at the College and Harvard's graduate and professional schools. Read about the speakers who will be addressing the new graduates at Class Day and Commencement ceremonies at harvardmag.com/tags/commencement-2015

CLOCKWISE FROM TOP LEFT: KRIS SNIBB/HFAC; COURTESY OF TIM MAYOTTE; BEN DANNIER, JON CHASE/HFAC

netic test, we're going to have to better understand the meaning of probability." That points to the department's pedagogical mission: educating graduate students (who will become research scientists) and medical students in order to ensure that they know how to use the computational tools in increasingly wide use.

Grappling with Genomic Data

THIS NEW APPROACH is consistent with trends in medical education generally. "It's now accepted that in medical school you're only going to learn a tiny fraction of what you need to actually provide expert care for patients," Kohane points out—even in a narrow subdiscipline. Genomics, he adds, has compounded the problem by several orders of magnitude: "There's no way anyone, no matter how manic, is going to know what a million different [gene] variants mean for an individual." Doctors therefore need a computational "decision support infrastructure" that *interprets* a patient's medical history, family history, and genomic background to show what the risks are, as well as the preferred therapies.

Bringing individualized genomic information into the clinic will "accelerate the realization that we need just-in-time decision support," Kohane continues. But "process automation"—such as digitizing medical records to streamline hospital operations and doctors' offices—is nowhere near that capability, so tackling that problem is on the new department's agenda, too.

Such a system might do what Google has done for maps: layer atop a location's geographical coordinates all kinds of other useful information, such as current weather or crowd-sourced data on good places to walk or dine. Imagine if environmental exposures, genetic makeup, lifestyle habits, diet, and epigenetic information (about which genes are actually turned on or off) were "mapped" onto patient records. "Stacking that all together," he says, will provide "a better understanding of the patient as a whole" in order to predict, for example, if someone is at risk for diabetes.

New Models of Diagnosis and Care

TWO YEARS AGO, Kohane and colleagues demonstrated the power of integrating genetic data into diagnoses in a contest, the Clarity Challenge (see www.irdirc.org/?p=2892). Thirty teams of doctors around the world were given the histories

HARVARD PORTRAIT



Jelani Nelson

Jelani Nelson lights up when he talks about algorithms. The soft-spoken assistant professor of computer science is a rising star in a field made vital as data proliferate exponentially faster than the growth of computational power or storage. Algorithms, well-defined procedures for carrying out computational tasks, speed the way to answers. Nelson has a knack for speed: online, where he is known as "minilek"—a handle chosen in youth when he was growing up on St. Thomas, and derived from the name of an early ruler of Ethiopia, whence his mother hails—he has won with equal ease coding competitions and typing contests (topping out above 200 words per minute). Though he is a theorist now, solving real problems quickly "cements the concepts in your mind," he says. Borne of that conviction, every homework assignment in his undergraduate course Computer Science 124, "Data Structures and Algorithms," includes an algorithmic programming problem. His own student years were spent practically next door, at MIT, where he majored in mathematics and computer science, and remained to earn a Ph.D. in the latter field. He came to Harvard in 2013 after post-doctoral research at Berkeley and Princeton's Institute for Advanced Study. Nelson's specialty is "sketching," an approach to dealing with problems in which there are "too many data in the input." He figures out how to create compressed, often exponentially smaller, versions of datasets that nevertheless retain useful, accurate information. His proofs defining the limits of such approaches have illuminated fundamental questions, some of them unanswered for decades. Though he is humble and quiet, his colleagues are less reserved: they call him "simply brilliant." —JONATHAN SHAW

Yesterday's News

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

1925 The senior and freshman classes assemble on the Widener steps to have their respective pictures taken, and the freshmen, according to custom, contribute to the seniors' pre-Commencement celebration: the total is \$244.24 and two cats, one alive and one dead.

* * *

Thirteen Harvard men gather on May 1 to organize the Harvard Club of Shanghai; Way Sung New, M.D. '14, is elected president.

1940 After Germany invades the Netherlands, President Conant argues on national radio that "the changed military situation in Europe threatens our way of life," and student support for aid to the Allies increases.

1950 Harvard enjoys its "most amazing financial year in history," raising nearly \$26 million in gifts, bequests, and grants.

1955 The Corporation approves a new doctoral gown for Harvard degree holders, "crimson silk and worsted stuff"

faced down the front with black velvet and with three black velvet bars on each wide bell-shaped sleeve.

1980 Class Day speaker Walter Cronkite warns graduating seniors that unless they come to grips with the "mega-problems" of overpopulation, pollution, natural-resource depletion, and nuclear proliferation—"our modern Four Horsemen of the Apocalypse"—civilization as we know it cannot survive.

1990 In mid May, President Derek Bok makes public the Harvard Corporation's eight-month-old decision to remove from the University's portfolio all stock in firms that manufacture tobacco products.

1995 Class Day speaker Hank Aaron shares a story about a young man who went running up to his father, saying, "Look, Dad, I got it! I got my A.B. from Harvard." To which the father replied, "Son, that's fine. We are all real proud. Now it's time for you to go to work and learn the rest of the alphabet."

and genome sequences of three families, each with a sick child whose disease was believed to be genetic. Seven teams converged on very useful diagnoses for two of the patients (including a case that had gone 11 years without one), a result that demonstrated the potential utility of genomic data in such cases. But there was an even more significant lesson, Kohane believes: one of the patients, he reports, "had *already been evaluated* in two of the hospitals that were home to winning teams," but had remained undiagnosed. During the challenge, on the other hand, the teams successfully identified the problem. That means, he says, "that there is a *better* process, that does not look like the *current* process, of medical care that is multidisciplinary, and involves the use of computational experts, as well as genetic experts, as well as clinicians, working as a team to create qualitative—or quantum—differences in care."

That experience persuades him that the new department will generate "new models of diagnosis." The HMS biomedical informatics group has already been tapped as the coordinating center for a new national network on undiagnosed diseases. This program, based on a pilot developed at the National Institutes of Health that resulted in successful diagnoses for rare diseases 30 to 50 percent of the time, involves genome sequencing and then a referral for the patient to the leading specialist in the disease.

Ultimately, Kohane says, such efforts will require both a new infrastructure that can encompass all kinds of, and *lots* of, data, and a new kind of caregiver: individuals who "want to make a difference in biology and medicine and yet are wizards in quantitative reasoning and computational methods." In his estimation, such "quants" could probably have greater impact than any single doctor by identifying early signs of disease, finding new treatments, and warning about drugs that do not work.

A New Breed of Doctor

CHIRAG PATEL, a CBMI research associate in biomedical informatics who will become a faculty member in the new department

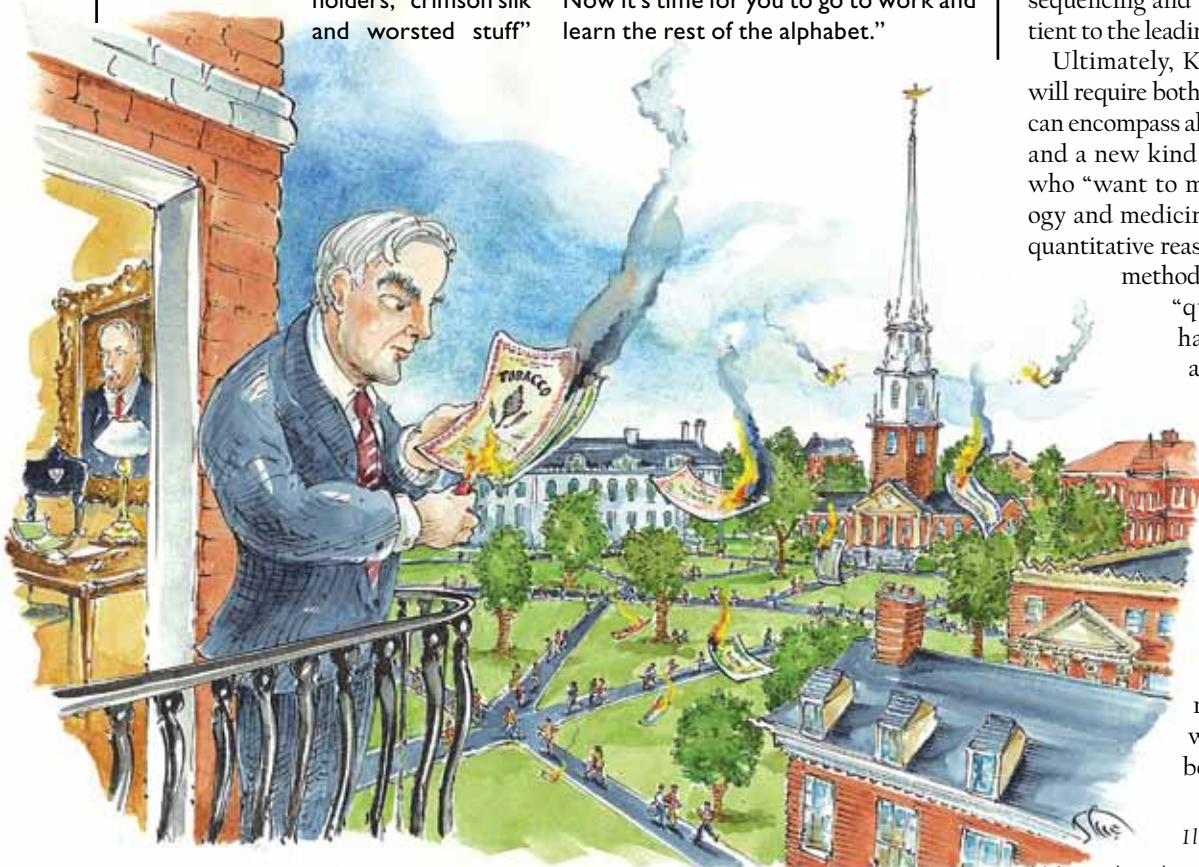


Illustration by Mark Steele

in July, is one role model for this new generation of student. After studying molecular biology and computing at the University of California, Berkeley, he began working as a software engineer at a biotechnology company focused on genome sequencing. Later, mentored by biomedical informaticist Atul Butte at Stanford, Patel “fell in love” with biomedical informatics because it combined genomics with computer science, statistics, and mathematics—“all my core interests.” After earning a Ph.D., he worked for a year with Stanford professor of medicine John Ioannidis (who is also an adjunct professor at the Harvard T. H. Chan School of Public Health), developing analytical methods to mine large, epidemiological data sets.

One of Patel’s current projects is to develop software for environment-wide association studies that will allow researchers to study the relationship between genomes and exposomes (the totality of a person’s environmental exposures to such things as drugs, diet, diseases, and pollutants). For example, type 1 diabetes, an autoimmune disease, arises spontaneously, typically in children and young adults. Researchers know that some people have a pre-existing genetic susceptibility, but also that the disease is *triggered* by an environmental exposure. Figuring out which exposures cause the autoimmune response has proven challenging: an individual genome represents a huge amount of data, but at least it is a discrete entity. A person’s exposome, on the other hand, encompasses data ranging from electronic medical records, to membership in epidemiological cohorts, to personal exposure monitoring—a *gigantic* “big data” problem (see “Why Big Data is a Big Deal,” March-April 2014, page 30).

Fortunately, Patel “likes to look at everything at once. I try to hammer out connections...and correlate everything with everything else.” Then he tries to “fish out the signals from the noise.” Correlations will always emerge from enormous sets of data; the challenge is figuring out which exposures have a basis in biology—and merit further exploration. For example, Patel and other researchers have found a link between diabetes and such persistent pollutants as the pesticide DDT and polychlorinated biphenyls (PCBs, commonly used as coolants in electrical apparatus and other applications). “But we still can’t pin down the biology behind these correlations,” he explains. “Are they biased



Chirag Patel

by other factors such as age, for example, which is a huge risk factor for diabetes and cardiovascular disease?”

Training students to ask the relevant questions, Patel believes, is one of the biggest challenges in biomedical informatics. Students need to be just as adept in biology and patient care as in advanced computing and data analysis. “The challenge is finding folks who can bridge those worlds.”

Forming a Faculty

RECRUITING additional faculty members who can do that is Kohane’s responsibility. He seeks expertise in three areas. The first involves creating a *patient-centered information commons* that will bring together patient data of diverse kinds so that it can be incorporated into population-level research, and make the findings useful in individual care. Such a system will demand rapid computation across millions of individuals and hundreds of thousands of data types, as well as privacy protections. Scientists working on this effort, including Patel, come from the medical and public-health schools and the Harvard/MIT Health Sciences and Technology program (the training ground for biomedical researchers). The aim is to enable precision medicine that could, say, combine data from a patient’s psychiatric history, genetic information, and records of environmental exposures to derive clinically relevant information.

His second focus, noted earlier, is identifying faculty members who can develop new tools and techniques for using data to *generate automated diagnoses* more accurate than those the current healthcare system provides.

The third priority involves *reimagining the clinical encounter*: “How do we provide the providers with all that just-in-time data about the patient? How do we provide it in a way that is useful in making decisions about the patient? How do we allow them to measure things quantitatively—through noninvasive imaging such as ultrasound—and integrate that into their assessment of the patient?” The kind of person who could successfully change the healthcare encounter will probably combine skills in systems engineering, human-productivity and effectiveness engineering, and a variety of real-time information technologies.

These challenges are immense, but the effort to put such knowledge back in the hands of healthcare providers is overdue. As Kohane puts it, “For a variety of reasons—some out of reasonable caution, but some out of institutional inertia—medicine has been slower than other disciplines to take advantage of the new insights and the new productivity that you can get through data science and process automation.” His department aims to make a difference throughout biomedical research—and practice.

—JONATHAN SHAW

Debating Sharia Law, Digitally

A SIMPLE GOOGLE SEARCH for the word “sharia” illustrates the magnitude of the gap Harvard Law School (HLS) professor Intisar A. Rabb wants to fill. Up top, there’s a 2,000-word overview from the Council on Foreign Relations, along with the usual Wikipedia link. But even on that first page of results, there’s also a far less neutral take from a Christian missionary website, and an alarmist article on sharia law in Dearborn, Michigan, that on further investigation turns out to come from the satirical news site *National Report*.

More than a billion people globally live in countries that use legal systems grounded in part or in whole in *sharia*—defined quite broadly as the “divine word of God”—and its interpretation by Muslim jurists, or *fiqh*. Yet it can be hard for both scholars and those outside academia, including policymakers and journalists, to easily access reliable information about these legal traditions. As co-director of the Law School’s Islamic Legal Studies Program (ILSP), Rabb has set out to change that. Her answer is SHARIASource, a website that aims to serve as the go-to resource on Islamic legal issues by gathering basic information, primary and secondary sources, and scholarly debates on topics spanning dozens of countries and more than 1,400 years of history. Though explicitly designed for easy public consumption, the site’s foundation will be in academic discussions, with a strong emphasis on connecting scholars from different disciplines to new sources and to each other. As a result, SHARIASource is part of a twenty-first-century digitization revolution that will change not only how knowledge is collected, but also how it is created.

The idea for the project grew from an online resource for journalists that Rabb worked on as a fellow at HLS’s Berkman Center for Internet & Society from 2011 to 2013. Expanding this vision was one of her major priorities when she joined the HLS faculty in January 2014 as the ILSP’s first permanent faculty director in nearly a decade (professor of law Kristen A. Stilt joined her as co-director in September). The rejuvenated ILSP is part of a wave of increased interest in international law

across the American legal academy. (During the past decade, for example, a curricular reform at HLS introduced a requirement in comparative or international law for all first-year students.) But inviting students and fellow scholars into conversations about Islamic legal traditions has been difficult, Rabb says: many people are unfamiliar with Islamic nations and their histories in general, and there is no reliable, easily digestible reference source for Islamic law. She points to her own long career path—a J.D. at Yale, a Ph.D. at Princeton, and research conducted in Egypt, Syria, and Iran. “It shouldn’t be that you have to have the specialized training to go into the archives just to say *anything* about Islamic law,” she says. “And it also shouldn’t be that we just don’t talk about Islamic law in law schools because we don’t have that training.”

The development of SHARIASource, whose beta version is set to launch later this year, fits what Rabb sees as the guiding mission of ILSP: promoting research in, and providing resources for, the study of Islamic law. The site’s chief mandate is scholarly, says ILSP deputy director Rashid S. Alvi, a former corporate lawyer who joined the program in January 2014 to organize the launch of SHARIASource. “In the long run, academic approaches to a subject are the ones that are given the greatest credibility,” he reflects. Though the site will, by virtue of credibility and accessibility, serve as a resource for journalists and others outside the academy, Rabb and Alvi agreed that they didn’t want “something that just put a Band-Aid on bad articles on Islamic law,” Alvi says. “I wanted to put something together that over 20 years, 50 years, 100 years would pull together the best scholarship and thinking.”

THE MODELS for the project are two sites that have become central to conversations about American law for insiders as well as observers. The first is Westlaw, an online legal research platform that includes exhaustive databases of case law, statutes, public records, and more. Making SHARIASource a similarly comprehensive database for Islamic law will provide critical access for those unable to travel to the few libraries with extensive holdings on the subject.

Intisar A. Rabb



COURTESY OF INTISAR A. RABB

(Discussions are under way, in fact, about what books in Harvard’s collection could be scanned and uploaded to the site. For more on the changing digital landscape of libraries, see “Gutenberg 2.0,” May-June 2010, page 36.) Rabb sees even more of a model in SCOTUSblog, which offers commentary on the work of the U.S. Supreme Court. SHARIASource, she hopes, will similarly serve as a forum for interpretation and a space for scholars to make sense of the connections they find among its sources. “The big catch,” Rabb acknowledges, is that, unlike the Supreme Court, Islamic law “is not one institution in one country.” She and Alvi have “Google-like aspirations” for the site’s content—a big project, “but that’s also part of the excitement of it.”

During the past year, ILSP has consulted with experts at the Berkman Center and the MIT Media Lab while building the SHARIASource site. The most concrete hurdle standing in the way of a launch is ensuring that a public, open-access site tasked with hosting sources from around the world respects copyright boundaries. Berkman’s Cyberlaw Clinic has already conducted an intellectual-property analysis for the United States; the ILSP team is working with experts at Berkman as well as collaborators abroad on guidelines to analyze other countries’ systems.

The other serious challenge is creating systems to populate the site with sources and commentary—an essential part of fulfilling Rabb’s vision of an ever-growing marketplace of ideas. Though just a few hundred resources have been uploaded to the portal thus far, the beta site’s extensive

Life after graduation is *even more* rewarding

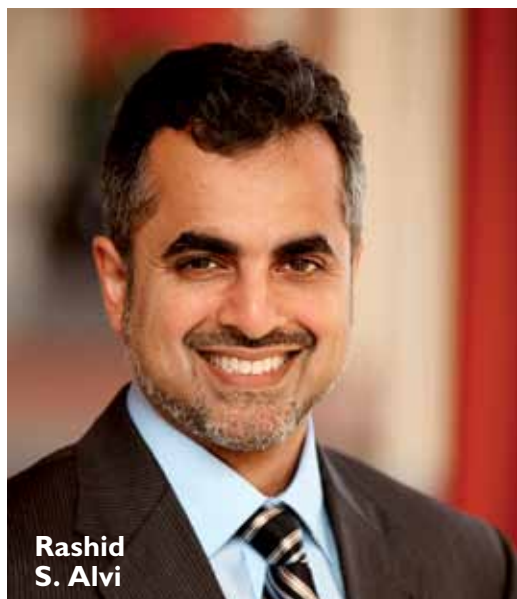


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Rashid
S. Alvi

COURTESY OF RASHID S. ALVI

roadmap makes the scope of her ambitions clear. Documents can be sorted by type—whether a primary source like a legal treatise or fatwa (an advisory opinion), or a secondary source like a book review. Other menus array their contents by the typical topics taught in law schools (criminal law, property law, and so on), or by themes such as environmental law, apostasy and blasphemy, and legal pluralism. Users will also be able to search through the site's expansive map of space and time, accessing material by contemporary regions and countries as well as by historical empires and eras, reaching back to the founding of Islam. So far, the beta site has collected sources in and translations from English, Arabic, Persian, and Bahasa Indonesia, with plans to expand to Turkish next.

"There was never going to be a way to cover all of that by having two people—or even 10 people—sitting at Harvard," says Alvi. "We realized early on that this was going to be a worldwide collaborative project." It will be crucial, he notes, to recruit contributors who align with the site's academic, apolitical mission. Already, professors from Australian Catholic University have agreed to take charge of developing content on Islamic law in Southeast Asia, including major Muslim countries like Indonesia, Malaysia, and Brunei.

What scholars could get in return for collaborating on SHARIASource highlights how new ways of cataloging knowledge in the digital age will also create knowledge. The site is intended as a plat-

form for researchers to engage with their peers. Contributors will also be responsible for thoughtfully adding tags on subjects and themes to the database's ever-growing network of sources from around the world in order to help fellow researchers make connections among different eras, regions, and areas of expertise. A tenth-century manuscript, presented as an original scan on one side of the screen and an English translation on the other, will live comfortably alongside the latest decisions on blasphemy laws in Pakistan. For the first time, scholars will be able to make connections between sources of different types, eras, and geographies easily, says ILSP visiting fellow Meagan Froemming, who holds a master's from Harvard's Center for Middle Eastern Studies along with a law degree from New York University. As Alvi puts it, the first reactions of most professors who hear about the project has been: "Why wasn't this around when I was writing my latest book?"

IN ANOTHER STEP to populate the site, Rabb is running the Digital Islamic Law Lab this spring, a class of 12 students who will each research four articles for SHARIASource. The students' experiences speak to the potential value of the online resource. Though

few began the course as experts in Islamic law, they've made connections between the theoretical areas that interest them and the case studies they've found. One student, Rabb says, applied her background in contemporary U.S. intellectual-property law to what she found in the nineteenth-century Ottoman law code. Bringing examples of Islamic law into larger debates in the legal academy is part of the site's explicit goal, Rabb says. (Froemming, for example, sees the site's potential to connect her work on Afghani finance law to that of other researchers who are interested in the theories of law and development.) The platform aims to make Islamic law more accessible and, in turn, Rabb says, help promote "the study of Islamic law *as law*, rather than purely as religion."

Above all, SHARIASource—like its model, SCOTUSblog—is explicitly designed as a user-friendly place for policymakers, the journalists who cover them, and ordinary readers trying to make sense of what they find in the news each day. Right now, Rabb says, journalists may "do a Google search and find thousands of hits on any given topic of Islamic law, but have no idea what's credible, what's not." Rabb hopes that SHARIASource—vested with the authority of a university, and with entries from legal scholars explaining what's happening "in plain English"—will become a real, reliable search engine for such questions.

—STEPHANIE GARLOCK

University News Briefs

Climate-change Currents

THE Climate Change Solutions Fund—announced in April 2014 by President Drew Faust, and intended to channel \$20 million into innovative research (see harvardmag.com/climate-15)—has made its first seven grants, totaling \$800,000, for projects ranging from work on food waste (at the Law School) and coping with extreme heat events (Harvard T.H. Chan School of Public Health) to work on energy and climate policy in China and India.

In mid March, Faust focused on climate issues during a capital-campaign "Your Harvard" event in Beijing; among the faculty members who appeared was professor of architectural technology Ali Malkawi, director of the Center for Green Buildings and Cities (described more fully at

harvardmag.com/cities-15). Faust also spoke at Tsinghua University, where she highlighted academic partnerships, research, and training, drawing on examples from Harvard-Tsinghua collaborations on air pollution, the atmosphere, and global warming (see harvardmag.com/climates-15).

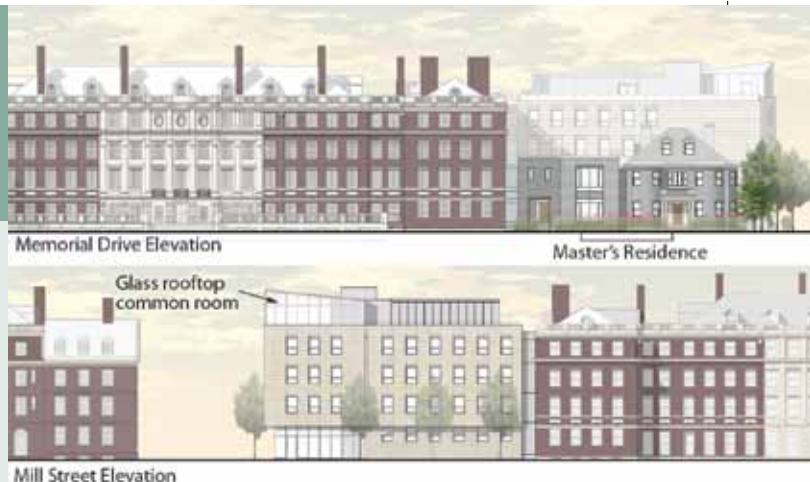
On campus, Harvard's environment center has organized a series of climate-change events for the week of April 6-10, and the University convened an expert panel discussion on April 13 (see harvardmag.com/divest-15); both were scheduled to occur after this issue went to press. Separately, students campaigning for divestment of Harvard's investment in fossil fuels staged a sit-in at Massachusetts Hall in mid February, and alumni supporters promised a more comprehensive action there for "Harvard Heat Week," scheduled for April 12-17. Among the support-

Putting the “New” in House Renewal

When students vacate Winthrop House after Commencement 2016, they will make way for something new in the program of undergraduate residences: not just stem-to-stern renovation, but significant fresh construction, in the form of a five-story addition to Gore Hall that will accommodate more than 50 students now living in overflow apartments on DeWolfe Street; a separate master’s residence; and enlarged dining facilities.

The plans, unveiled in February, suggest the work to be undertaken at the second House to be wholly redone. (Construction is now under way at Dunster House, which is expected to receive its returning residents for this coming fall term.) “Winthrop East,” the addition to Gore Hall, will replace surface garages at the corner of Plympton and Mill streets. In addition to student living quarters, it will provide classroom and socializing spaces, for which designs are incomplete. (Such features appear in the prior

Winthrop House renovation plans include a five-story addition to Gore Hall at Plympton and Mill streets (below). A house on Memorial Drive (above right) becomes the master’s residence.



renovations, including the overhaul of Quincy House’s Stone Hall and the current work at Dunster.) The plan also includes a glass-enclosed rooftop common room and open-air terrace with views of Cambridge, the Boston skyline, and the Charles River.

The design adapts a modern architectural idiom, rather than attempting to blend in with the existing façade. As Elizabeth Leber, a partner with project architects Beyer, Blinder, Belle, told the *Harvard Gazette*, “We felt that it was appropriate that a building should be of its time, rather than trying to be what it’s not. Winthrop House has a number of wonderful entablatures that announce entries and provide a good deal of character and stature to the building. What we’re proposing is a contemporary way of using similar traditional materials.”

The master’s residence will be created by reconstructing a wood-frame building at the corner of Plympton Street and Memorial Drive and linking it to Gore Hall. The expansion and improvement of the existing dining hall, to accommodate the enlarged number of House residents, encompasses lowering the adjacent outdoor terrace to make it accessible from the dining area. This will also admit more natural light into the two-story hall, where the lower story is below grade.

During the 2016-2017 academic year, Winthrop House residents will relocate to the former Inn at Harvard and other nearby swing spaces; their House is to reopen in the fall of 2017.

See harvardmag.com/winthrop-15 for additional details and images.



ers is Archbishop Desmond Tutu, LL.D. ’79, a Nobel laureate and former member of Harvard’s Board of Overseers, whose campaigning against apartheid in South Africa famously led to his support for University divestment of investments in companies that operated there—a step then-president Derek Bok declined to take. The alumni advocates of divestment also announced a Fossil Free Alumni Fund, for donations to an investment vehicle designed by the Natural Resources Defense Council. The University would receive

the proceeds “when the Harvard Corporation publicly commits to divesting from fossil fuels.” If Harvard has not committed to divestment by the end of 2025, the funds would be directed to tax-exempt climate-change organizations. A lawsuit challenging Harvard’s investment in fossil-fuel companies, brought by student divestment advocates last fall, was dismissed in mid March for lack of standing.

On Your Honor

HAVING ADOPTED an honor code for under-

graduates in May 2014, the Faculty of Arts and Sciences discussed its implementation (beginning this fall) at its meeting on March 3, and expressed hope of enacting the language and procedures for use during a meeting later this spring. Incoming undergraduates would be educated about the code, and would write a personal response to it upon matriculation, and students would affirm their *awareness* of the code at registration (without having to actually pledge their *acceptance* of it). For students’ signed affirmations for final exams, theses, and all

other final papers and projects, the draft language suggests that faculty members “may wish to use” this text: “I attest to the honesty of my academic work and affirm that it conforms to the standards of the Harvard College Honor Code.” For details, see harvardmag.com/hchonor-15.

Separately, on March 24, Stanford provost John Etchemendy wrote to faculty members and teaching staff there about “an unusually high number of troubling allegations of academic dishonesty” reported during the winter quarter—one involving “as many as 20 percent of the students in one large introductory course.” He noted, “At the beginning of our students’ Stanford careers, they are introduced to the Honor Code and agree to abide by it.”

Olympics Ambitions?

As 100 inches of snow buried Boston and Cambridge from late January to early March, stranded commuters were not much focused on the 2024 summer Olympics. But the organizing committee promoting the city’s bid to host the games suggested several Harvard venues for competitions: field hockey in the Stadium (indicated as seating 30,000, although renovation plans call for that to be reduced significantly), fencing in the Gordon Track, and aquatics, water polo, and tennis in temporary facilities at “Beacon Yards”—an area the University hopes it may, by then, develop as a commercial “enterprise research campus” (see “A New Era in Allston,” March–April, page 18). Similar plans are sketched for Paralympic venues, including football, swimming, fencing, and tennis. In remarks to faculty members on March 3, President Drew Faust said that University interactions with local Olympics sponsors had been general and non-committal, and that Harvard would maintain its academic, financial, and fundraising interests—and be mindful of impacts on its campus neighbors—in any future discussions, plans, or detailed submissions for a Boston-based event. Sports fans, stay tuned.

Fundraising Facts, Near and Far

THE UNIVERSITY announced that The Harvard Campaign had tallied \$5 billion in gifts and pledges (toward the \$6.5-billion goal) as of December 31, up from \$4.3 billion as of June 30, 2014.

Not that other institutions are standing still: elsewhere on the fundraising circuit, Cornell alumnus Charles F. Feeney, who

has given his alma mater hundreds of millions of dollars (including the lead gift for its New York City technology campus), gave the University of California, San Francisco, \$100 million for its hospitals and research on neuroscience and aging, bringing his support for UCSF to \$394 million. Roberta Buffett Elliott (sister of Warren Buffett) gave her alma mater, Northwestern, more than \$100 million for global studies. A few weeks later, Northwestern alumnus and trustee Louis A. Simpson and his wife, Kimberly K. Querrey, gave \$92 million, the naming gift for a new biomedical research center there; they earlier gave \$25 million for medical research.

As an indication of the pace of contemporary fundraising, less than four years after concluding its \$3.88-billion Yale Tomorrow campaign, that institution announced a snap \$200-million Access Yale drive for financial aid, in part to support more undergraduates, who will be accommodated in two new residential colleges under construction.

And Princeton announced a *nonmonetary* gift: the bequest of rare books and manuscripts, including a Gutenberg Bible, a first printing of the Declaration of Independence, a run of Shakespeare folios, and important musical manuscripts. The donation, valued at \$300 million, is the largest gift in the school’s history.

More on MOOCs

A TWO-YEAR REVIEW of enrollments in 68 HarvardX and MITx MOOCs (massive open online courses) offered through their joint edX venture refined earlier findings. It confirmed that about half the people who register for a course subsequently do not engage with it at all. Focusing on those who *do* participate (about 1 million people, who became involved with 1.7 million course units through September 2014), researchers found a highly educated cohort (in every course, a majority of participants had at least a bachelor’s degree)—among them a large number of teachers and instructors who may be incorporating the online materials in their own classes, magnifying the reach of the MOOC contents and techniques. Computer-science classes continue to be the most attractive subject area, garnering far larger enrollments than those in other fields. The report also suggests a transition from descriptive to experimental research that might begin to demonstrate



how online students learn most effectively; it hints as well about the use of the online materials and techniques in campus-based classes—one of the initial aims of the edX enterprise. For a detailed report and discussion, see harvardmag.com/mooc-15.

Online Accessibility

THE National Association of the Deaf and four deaf and hard-of-hearing individuals have filed suit against Harvard and MIT, alleging that their online content, including courses distributed through edX and recordings of speeches and presentations on campus, are not captioned, or are insufficiently accommodating, and thus are discriminatory, in violation of the Americans with Disabilities Act and other laws. The University, while declining to address the litigation *per se*, responded, “Expanding access to knowledge and making online learning content accessible is of vital importance to Harvard...We expect that the U.S. Department of Justice may issue proposed rules in June 2015 to provide much-needed guidance in this area. We look forward to the establishment of those new standards and will, of course, fully comply once they are finalized.” Separately, under a settlement with the U.S. Department of Justice, edX agreed to make its course offerings fully accessible to users with disabilities during the next 18 months.

Stockholder Sentiments

THE Corporation Committee on Shareholder Responsibility’s annual report (<http://media.www.harvard.edu/content/CCSR-Annual-Report-2014.pdf>) details its decisions on 56 issues presented during the spring 2014 proxy season. In 51 cases, the committee concurred with the recommendation of the Advisory Committee on Shareholder Responsibility, a 12-member student, faculty, and alumni body. In general, the Corporation committee favored shareholder proposals for corporate actions to reduce greenhouse emissions; strengthen environmental planning, monitoring, and reporting; and disclose political contributions and lobbying.

The \$60,000 Term Bill

The College's term bill—tuition, room, board, and student fees—will be \$60,659 for 2015-2016, up 3.5 percent from \$58,607 this year. The bill first exceeded \$50,000 in 2010-2011; \$40,000 in 2005-2006; and \$30,000 in 1997-98. Princeton and Yale each imposed increases of approximately 4 percent, bringing their estimated costs of attendance, including books and personal expenses, to more than \$60,000 per year, too. Separately, the College announced on March 31 that it had granted admission to 1,990 candidates from a record pool of 37,307 applicants seeking a place in the class of 2019: an admission rate of 5.3 percent. Stanford admitted 5 percent of 42,487 applicants and Yale 6.5 percent of 30,237 applicants. The two institutions said first-generation college students represented 16 and 16.8 percent of those admitted, respectively; Harvard's figure was 14 to 15 percent. For further details, see harvardmag.com/costs-15.

Public-Affairs Post

Paul Andrew has been appointed vice president for public affairs and communications, succeeding Christine Heenan, who has moved to the Bill & Melinda Gates Foundation (see Brevia, November-December 2014, page 33). Andrew, who came to Harvard in late 2012 as assistant vice president for communications—in time to work on the launch of The Harvard Campaign—was previously executive vice president at Weber Shandwick Worldwide, a public-relations firm. He recently served as acting vice president, and now has responsibility for communications, media relations, government affairs, and community relations.

NFL Ties

Professor of medicine Elizabeth Nabel, a cardiologist and president of the Harvard-affiliated Brigham and Women's Hospital, will advise the National Football League on health and medical policies. The league's players' association earlier contracted with the Medical

Brevia



COMMENCEMENT CLOSER:

Turning from national and international leaders and celebrities (Michael R. Bloomberg, M.B.A. '66, LL.D. '14, Ellen Johnson Sirleaf, M.P.A. '71, LL.D. '11, Oprah Winfrey, LL.D. '13), the University has gone local. Deval L. Patrick '78, J.D. '82, who completed his second term as Massachusetts governor in January, will be the guest speaker at the Afternoon Exercises of the 364th Commencement, on May 28. Since leaving office, Patrick has been a visiting fellow at MIT's Innovation Initiative. For more details, see harvardmag.com/patrick-15.

School to conduct health studies, in the wake of wide concern about concussions and other problems. Separately, the NFL retained Harvard Corporation member Theodore V. Wells Jr., a lead litigator at Paul, Weiss, Rifkind, Wharton & Garrison, to investigate "Deflategate": the apparent under-inflation of footballs used during the New England Patriots-Indianapolis Colts conference championship game in January.

On Other Campuses

Rather than building facilities abroad, the University of California, Berkeley, has announced plans for a nearby global education hub and approached schools from

England to China, Japan, and Singapore. It aims to persuade foreign institutions to establish satellite locations on a 130-acre parcel just 10 miles away, where Berkeley and partner schools' professors could create research and degree programs focusing

on global governance, ethics, political economy, and cultural and international relations....

Yale plans to renovate its Hall of Graduate Studies, home to student residences and faculty offices, to build an interdepartmental humanities center (like Harvard's Barker Center), while simultaneously constructing new graduate-student apartments nearby. Yale announced a \$25-million gift for the work from Lisbet Rausing, Ph.D. '93, a co-chair of The Harvard Campaign, and her husband, Peter Baldwin, a Yale alumnus....Following a partially online doctoral nursing degree

launched in 2011, Yale School of Medicine has unveiled a "blended" master's degree program for physician assistants, with online courses and in-person, clinical experiences at field sites around the country selected by Yale faculty members.

Ratings Report

The U.S. Department of Education's (DOE) proposed ratings for university and college performance progressed in late December, with the unveiling of likely metrics. The aim is to help the public assess access, affordability, and student outcomes. Public institutions and community colleges have been more favorable toward the proposed ratings than have private institutions. Among the criteria the DOE outlined are the percentage of students enrolled at an institution who receive Pell Grants, their family income, and first-generation college status; a school's average net price (after scholarships and grants); completion rates; and labor-market success (some measure of graduates' incomes). In a December *Washington Post* interview, President Drew Faust said the ratings proposal "raises the issue of what do you rate them for? It goes back to what is college worth....Is it all going to be about how much more money an

individual makes with a college degree?" She continued, "I think these should be very complex portraits of institutions. And not reduce an institution to a simple metric." The DOE intends to release the initial ratings this coming autumn.

Nota Bene

OVERSEERS LEADERS. Karen Nelson Moore '70, J.D. '73, a judge on the U.S. Court of Appeals for the Sixth Circuit, will serve as president of the Board of Overseers for 2015-2016, succeeding intellectual-property lawyer Morgan Chu, J.D. '76. Diana Nelson '84 will be vice chair of the board's executive committee, succeeding Walter Clair '77, M.D. '81, M.P.H. '85, a cardiologist at Vanderbilt. Nelson, chair of Carlson, the travel and lodging company, and a long-time University fundraiser, serves on The Harvard Campaign's executive committee.

TOWARD TEACHING THEATER. The Faculty of Art and Sciences (FAS) was expected to approve the new undergraduate concentration in theater, dance, and music as this issue went to press—an important step toward effecting the recommendations of President Drew Faust's 2007-2008 arts task force, and increasing the role of performance and experiential learning within the curriculum. See <http://harvardmagazine.com/2015/03/harvard-theater-major>.

ATOP I TATTI. Misheff professor of history of art and architecture Alina A. Payne, who trained as an architect and teaches about early modern and modern European architecture, has been appointed director of the Harvard University Cen-

ter for Italian Renaissance Studies, at Villa I Tatti, near Florence. She assumes her new responsibilities this summer, succeeding Pescosolido professor of Romance languages and literatures Lino Pertile, director since 2010.

FOCUS ON FOOD. Harvard University Dining Services, which has been composting excess fresh food, has now partnered with Food for Free to donate some 2,000 meals per week to local families in need. (The dining halls purchase supplies sufficient to feed all undergraduates on meal plans, but not all of those ingredients are consumed.)

INNOVATION OVERSEER.

Jodi Goldstein, M.B.A. '96, director of the Harvard Innovation Lab since its inception in 2011, has been appointed managing director (the senior leadership role), effective in June. She succeeds Gordon Jones, who has accepted a decanal role at Boise State University (see Brevia, March-April, page 26).



Jodi Goldstein

COMPUTING AT CORNELL. Cutting professor of computer science Greg Morrisett, a Harvard College Professor whose research focuses on computer security, is departing the School of Engineering and Applied Sciences to become dean of Cornell's Faculty of Computing and Information Science, effective July 1.

BANCROFT HONORAND. Bell professor of history Sven Beckert has won a 2015 Bancroft Prize, the premiere recognition

in historical scholarship, for *Empire of Cotton: A Global History*. He and the book were featured in "The New Histories" (November-December 2014, page 52). Read more at harvardmag.com/beckert-15.



Sven Beckert

COLLEGE CHIEFS. Clayton S. Rose, professor of management practice at Harvard Business School (HBS) and a former vice chairman in investment banking at J.P. Morgan, has been appointed president of Bowdoin College, effective in July. Clark G. Gilbert, president and CEO of Deseret News, has been named president of Brigham Young University-Idaho; he was previously a professor in HBS's entrepreneurial-management unit. Gilbert succeeds Kim B. Clark, who was HBS dean before assuming his BYU responsibilities in 2005.

MISCELLANY. David Brion Davis, Ph.D. '56, Sterling professor of history emeritus at Yale, won the National Book Critics Circle award for nonfiction for *The Problem of Slavery in the Age of Emancipation*, the third volume in his trilogy on slavery around the world. A National Humanities Medalist in 2014, he received the Graduate School of Arts and Sciences' Centennial Medal in 2009 (see harvardmag.com/medalists-15)....*The Harvard Crimson* reported in February that all the undergraduate Houses now offer mixed-gender suites; the FAS previously authorized allowing all upperclassmen to request such gender-neutral rooming options....Zapal professor of anaesthesia Emery N. Brown has been elected a member of the National Academy of Engineering, the only Harvard faculty member so honored this year.

CHANGING SQUARE SCENE: Harvard has released renderings of the pending conversion now that the former Holyoke Center has been renamed the Smith Campus Center. This illustration, presented to the Cambridge Historical Commission in March, depicts the remade Forbes Plaza and "welcome pavilion" facing Massachusetts Avenue.



Outsmarting Our Smartphones

by OLIVIA MUNK '16

ONE SKETCH from the pilot episode of *Portlandia*, Carrie Brownstein and Fred Armisen's eclectic homage to the niche (read: hipster) culture of Portland, Oregon, has always resonated with me. Surrounded by an iPad, Macbook, and iPhone, Armisen becomes entrenched in what can only be described as a technological Scylla and Charybdis: as soon as he checks one buzzing device, another one beeps. He watches a video on YouTube, proclaims that he is determined to get through his Netflix queue, texts, tweets, sends e-mails, and snaps photos until Brownstein finally jolts him out of his trance by showing him a framed picture of himself when he was in high school. "See how happy you were?" she cries, overlooking his unfortunate, outdated hairstyle. They decide to both go "off the grid" by installing "Mind Fi," an app that allows them to communicate telepathically. Even if you long for a technological purge, there's an app for that.

I can't help but think of that scene whenever I sit down to complete my homework. I rarely crack open a book before spending at least 30 minutes responding to e-mails about everything from meetings to TF office hours to scheduling time to see friends for meals. Then I must spend another 15 minutes making sure all these delicately planned events go into my physical planner and also a Google calendar, lest I have to burrow through hundreds of messages to rediscover the particulars of a nearly forgotten appointment.

Often, I realize that many of my plans conflict, causing a new slew of messages and re-organization. Only then can I focus on actual school work—that is, until I get responses that I have learned I must reply to immediately, before they are buried by alerts from the *Crimson*, sales messages from nearby clothing

stores, urgent fellowship meetings, and impending application deadlines. (I could probably calculate how many minutes of schoolwork I actually complete per hour, Gmailing aside, but I don't want my parents to compare it to my tuition, so for now I will mark this "important" and file it away for later.)

If this were *Portlandia*, a well-intentioned character might show me a picture of myself from simpler times (though in reality, my online habits were probably worse in high school—and I'd prefer not to remember any of my past hairstyles). During my sophomore year of college, I requested a watch for Christmas with the hope that I could maintain my schedule while doing homework, without ever consulting my phone. In the year since, I've gone to the library sans portable electronics exactly zero times, and probably posted between three and five photos of the watch on In-

stagram. I did manage to go several weeks without a smartphone during the summer, though not by choice: a skilled pickpocket in Germany is surely enjoying my collection of Simon & Garfunkel. My parents were not pleased with the loss, but it was understood that I needed a replacement—as a college student in 2015, not being connected is not really an option.

Being away from e-mails and text messages means missing out on things ranging from the purely social, such as deciding on dinnertime with blockmates, to academic, like receiving a last-minute assignment or notifications about University operations. During a February snow day that was preceded by another snow day, one of my roommates received an e-mail at 12:30 A.M., notifying her that she was to be present at her computer by 10 A.M. to participate in an online makeup class. Our shouts of glee about another day off were replaced with cries of outrage: could she be held responsible for a message sent at such an hour? We all agreed that it might be presumed she had gone to bed early and planned to sleep in, past the appointed hour. That may not have been the most responsible decision, but when professors and TFs begin to assume that students are academically available 24/7, a line must be drawn somewhere.

"There is no policy that mandates that professors have to give a certain amount of prior notice before posting assignments," Dhruv Goyal '16, vice president of the Un-



Illustration by Phil Marden

dergraduate Council told me (fittingly, in an e-mail). “It is up to their discretion and most often they use it wisely and give students enough time to prepare.”

Allowing a 24-hour window seems entirely reasonable—how, then, did messages regarding classes and assignments sent at “witching hour” become the norm? “The Networked Student,” a 1999 Undergraduate column by Jennifer 8. Lee ’99, provides interesting insight on how students’ schedules, studies, and communication habits have evolved due to the growing ubiquity of laptops and cell phones. I am sure it was the proverbial “millennial” in me that audibly scoffed when I read that “Libraries have signs gently admonishing students to use their computers in areas preapproved for keyboard clicking”; what is Lamont today

plug into a website where we answer quick questions about material in the lecture, using an Internet-connected device of our choosing. In another large class, the lights often stay off after the screening of videos or demonstrations. For students who dutifully take notes on glowing laptops or tablets, neither of these teaching styles poses a problem. But for a shameless Internet addict like me, incorporating a device into classroom teaching all but sanctions my distraction. At the beginning of the semester, I firmly made a no-laptop-or-cell-phone rule, and took notes by hand. But after several weeks of squinting in dim light and squirming uncomfortably while everyone around me tapped out an answer, I gave in and reintroduced my computer to class.

Unchecked access to communication has undoubtedly transformed the under-

graduate life means being part of a network. You are a hub, with your inbox as a crucial meeting ground. Given the ease and demands of our current technological circumstances, we truly are “on call” 24/7.

The only thing that keeps me from feeling totally overwhelmed is knowing that at the end of the day, I will *not* succeed at keeping up with it all. I will inevitably receive more messages than I can reply to. When I am in the library, staring at a long night’s worth of homework that can be put off no longer, the panic will probably steer my attention to a cat video on YouTube, at least for a few minutes. But if this were 1999, and I were sitting in the library’s designated “no-typing zone,” I probably would be doodling. My habits, for better or for worse, are not created by technology, but only magnified.

The true pressure is created when we feel as though our digital inadequacies translate into disappointment and failure in real life—such as when we miss a message regarding an important assignment—or feel guilty about sleeping in on a snow day when we know we may be ignoring an e-mail about a 10 A.M. class online. It is important for us as students, and for our professors as our educators, to determine what constitutes a healthy level of expectation to demand of each other regarding online connectivity. Perhaps syllabi can specify “e-mail office hours,” during which both parties are expected to check for and respond to messages.

Maybe we can also be more honest with our friends about what events we can make, and learn not to rely on the opportunity to cancel plans or ask for a favor just because text messages can be exchanged almost instantaneously. Everyone else’s calendar has been balanced just as delicately, and canceling or creating meetings at the last minute inevitably affects several people, or even an organization, perpetuating the culture of frantic, time-sensitive messaging. And if we absolutely must alter schedules at the last minute, let’s do so in a timely manner, and be clear about our reasons—because unfortunately, or perhaps fortunately, *Portlandia*’s imaginative Mind-Fi is not yet a reality. Methods of communication will only multiply as phones become smarter; we have to become smarter along with them. ▢

Berta Greenwald Ledecy Undergraduate Fellow
Olivia Munk ’16 has not yet gone off the grid.

My habits, for better or for worse, are not created by technology, but only magnified.

without its legions of the sleep-deprived all tapping away on varying models of the same sleek chrome device? Lee observed long lines forming around “e-mail kiosks” where students could check their electronic messages between classes. Today’s “kiosks,” I suppose, are the miniature computers that 95.8 percent of the first-year students carry in their pockets, according to *The Harvard Crimson*’s Class of 2018 Freshman Survey. (Only 3.9 percent of students reported having a non-smartphone; only 0.3 percent—that would be *five* members of the class—said they had no cellphone at all.) Although these statistics reflect many things—the increasing affordability of devices once considered a luxury, better technology that has made cell phones fast and efficient—the biggest takeaway, to me, is that being constantly connected is no longer an asset: it is an expectation.

I NOTICED this semester just how deep the connection between academia and technology has become, because many of my professors have adopted an “If you can’t beat ’em, join ’em” mentality. If you give students a buzzing device, they will most likely check it during the course of a lecture; in that case, why not imbue that hotspot of connectivity with an academic purpose? In one of my classes, “Pyramid Schemes: The Archaeological History of Ancient Egypt,” we receive a code at the beginning of each class that allows us to

graduate experience at Harvard. Being able to make and break plans with a few swift clicks makes our schedules more malleable and subject to quick change. But these changes come with related responsibility, and a mutual understanding: if I can ask for an extension via e-mail the day before an assignment is due, a professor can call for an online class during a snow day; if I cancel social plans with a text message, there’s no reason a friend can’t or won’t do the same to me at a moment’s notice. The sketch from *Portlandia* rings so true to me because it is easy to get caught up in the idea that how we conduct ourselves in front of a screen reflects how we are seen in three-dimensional life. When I am alone in a library, facing massive amounts of reading I can never get done, I can still feel productive by replying promptly to e-mails and balancing a precariously loaded calendar, because—at least to the people I’m accommodating—it seems like my life is under control, even when it is anything but.

I could say I will take a Luddite approach to life: I’ll delete my Google calendar and curl up with my Moleskine. I will check out a library book instead of frantically searching for the text on Project Gutenberg on my tablet the day before a midterm. I could schedule specific times to check my e-mail and use Internet applications to block distracting websites when I am in class. But in college, being in sync with the flow of stu-

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SPORTS

How the Ball Bounced

After a rollercoaster season, and another Ivy crown, whither men's basketball?

ON A Saturday evening in early March 2011, Harvard men's basketball coach Tommy Amaker stood in the team's locker room preparing to give one of the most important speeches of his Crimson career. In just a few minutes, Harvard would take the floor against Princeton, with a chance to capture at least a share of its first Ivy League championship, and Amaker wanted to impress upon his players, seated before him, the magnitude of the opportunity. To do so, he referenced the white board behind him—where earlier in the week he had asked each team member to sign his name and pledge his maximum effort. Now he narrowed their focus: they had worked hard to get here, but they needed to direct their entire focus to this one crucial moment.

When the current Harvard team convened for practice last fall, the signatures

on that wall had long since been erased. But the sentiment they represented—that the players had an extraordinary opportunity to leave their mark on Harvard basketball—has endured. As Wesley Saunders '15 told *The Boston Globe* earlier this year, the senior class in particular talked about the importance of solidifying their “legacy.”

Mission accomplished. After initially grappling with offensive inconsistency, this year's team—particularly its seven seniors—came together to lead the Crimson to its fifth straight conference championship and fourth consecutive NCAA tournament berth. But given the graduation of so much talent, a season in which the rest of the league demonstrated newfound strength, and lingering uncertainty about Amaker's trajectory and Harvard's timeline for constructing a new arena, can the

men's program sustain—and ultimately build on—this success?

Early-Season Highs—and Lows

AFTER A narrow loss to Michigan State in the round of 32 in the 2014 NCAA tournament, many thought this year's squad would be the first in program history to reach the second weekend of March Madness. The Crimson returned Saunders, the reigning Ivy League Player of the Year; All-Ivy point guard Siyani Chambers '16; and a host of front court talent. As a result, Harvard was a unanimous pick to win the league in the pre-season media poll, and the squad cracked the Associated Press's pre-season top-25, the first such recognition for an Ivy squad since 1974.

It took just two games to deflate the hype. After defeating MIT, a Division III opponent, the Crimson fell 58-57 to Holy Cross, a middling program that would finish the season two games below .500. The loss immediately knocked Harvard from the national rankings—and raised real concerns. Other than Saunders, who scored 24 points, no Crimson player tallied more than nine; in the past, the Crimson had won with a balanced attack, but this team seemed frighteningly one-dimensional. More disturbing, as Saunders said, was that Holy Cross exhibited greater “intensity”—a comment hinting at a leadership void. If the Crimson could not muster the desire to defend its top-25 ranking against a middling foe, how would the team compete in Ivy League play, let alone the NCAA tournament?

A six-game win streak temporarily allayed these concerns, but the buoyant feeling evaporated during the holidays when the University of Virginia, then ranked fifth in the country, annihilated the Crimson 76-27, and Harvard suffered closer losses to Arizona State and Boston College. For the first time since the 2006-2007 season, the team had failed to defeat a high-major opponent (a representative of a leading NCAA league such as the Atlantic Coast Conference [ACC]).

Meanwhile, the rest of the league was nationally competitive. Brown knocked off Providence, an NCAA tournament team. Columbia led top-ranked Kentucky in the second half. Most remarkably, Yale defeated the University of Connecticut, the defending national champion, on a buzzer-beater in Storrs.

Photograph by Steve Banineau

The Ivies

As conference competition began, these colliding forces yielded an excruciating loss. On a chilly January day, the Crimson hosted Dartmouth, a team it had beaten by double digits in Hanover two weeks earlier. But after Harvard pulled ahead by 14 points to start the second half, the Big Green unleashed a 26-2 run and won 70-61. The unnerving loss dropped the Crimson to 1-1 in the league—a significant consideration because Ivy teams, lacking a championship tournament, have an extremely narrow margin of error to be selected for the NCAA or other postseason opportunities.

Harvard's play was even more alarming. The offense was again anemic. Even Saunders, who along with Chambers led Harvard with 13 points, struggled to find a rhythm—in part a byproduct of sound defense: Dartmouth packed the paint, essentially daring Harvard to make outside shots; they didn't. But the Crimson's lapses also suggested that Dartmouth, as Saunders acknowledged, had played "harder."

In light of that admission, Harvard's metamorphosis during the next four weeks was remarkable: the Crimson won eight consecutive games—the first four of them on the road. The highlight was a 52-50 victory over Yale in New Haven. The Bulldogs had been undefeated in conference play and had an opportunity to take a two-game Ivy lead over the Crimson. But Harvard locked in on defense and did just enough on offense, preserving the team's chance for another conference title.

Across the board, the team was playing better. The offense became more balanced. At Princeton, Corbin Miller '15 ('17) nailed five three-pointers to lead Harvard in scoring. Against Columbia, Saunders led the Crimson with 18 points, but three teammates also scored in double figures.

After a series of players-only meetings, the Crimson brought greater urgency to the court. As Jonah Travis '15 observed, the team realized that it was suffering from an embarrassment of riches: with seven seniors, it had many players who were capable of leading, but no one was asserting control. The seniors, Travis explained, needed to meld their skills.

But after the Crimson's win streak ended with a 57-49 loss at Cornell, none of that guaranteed the Ivy championship. The stumble dropped Harvard into a tie with Yale atop the conference with two games

to go. Fittingly, the Crimson (20-6, 10-2 Ivy) hosted the Bulldogs (21-8, 10-2 Ivy) in the penultimate game of the season in a de facto championship game on March 6.

With ESPN broadcasting live from campus, and a raucous, sold-out Friday-night crowd at Lavietes Pavilion, it was the most hyped and significant Harvard basketball game since the Crimson hosted Princeton in 2011. But in contrast to that cathartic victory, Harvard lost to Yale, 62-52. Most Harvard fans assumed the team's title hopes had vanished. Among them was Tom Stemberg '71, M.B.A. '73, a longtime Harvard basketball supporter, who lamented that this squad lacked the firepower of last year's team. "If you lose a Laurent Rivard and you lose a Brandyn Curry, that hurts," said Stemberg. "And last night it showed. We couldn't score."

But Amaker (who became the Stemberg Family head coach after an endowment gift, announced at halftime during the Princeton game on February 21) did not give up. Instead, preparing for Saturday's game, he shared with his team an adage that he attributed to John F. Kennedy '40, LL.D. '56: "Never settle for second place when first place is still available." The advice proved apt. After the Crimson overcame a second-half deficit to defeat Brown that evening, the Bulldogs squandered a five-point lead with less than 30 seconds remaining and fell to Dartmouth. That gave the Crimson a share of its fifth-straight conference title—and set up a one-game playoff at the University of Pennsylvania a week later to determine whether Harvard or Yale would play in the NCAA tournament.

The rematch came down to the final basket. With less than 30 seconds remaining, and the score knotted at 51, Saunders received the ball on a dribble handoff, drove, and drew the defense, just as he had at the end of the team's loss to Holy Cross, when his shot rimmed out. This time, Saunders passed to co-captain Steve Moundou-Missi '15, who sank the game-winner. Harvard was dancing again.

The Tar Heel Test

WHEN THE NCAA field was announced, the Crimson paid a price for its inconsistency. After receiving a 12-seed last year, Harvard received a 13-seed and an opening-round matchup with perennial power North Carolina. Toppling the Tar Heels—a team that had just beaten Virginia in the superb ACC tournament—would be an exceptionally tall task.

Too tall, as it turns out, but by an impressively narrow margin: the Crimson overcame a 16-point second-half deficit to take a two-point lead with just over a minute remaining. Then the Tar Heels pulled ahead, and Harvard's magic ran out. Once again, the Crimson delivered the ball to Saunders on a dribble handoff. The senior—who had been the best player on the floor with 26 points and five assists—first looked to pass to Miller. But with the Crimson's sharpshooter guarded, Saunders hoisted a three-pointer. His class's



At left: After an extraordinary collegiate career, Wesley Saunders '15 is seeking to join Jeremy Lin '10 in the NBA. Above: Next year's Harvard team, meanwhile, will be in the hands of his backcourt mate, All-Ivy point guard Siyani Chambers '16.

last shot at history clanged off the rim, and Harvard fell 67-65.

A win would have been thrilling, but it is unfair to malign the Crimson for failing to live up to unrealistic expectations. In retrospect, the graduation of Curry '13 ('14), Rivard '14, and Kyle Casey '13 ('14) left a leadership and offensive void that was unlikely to be readily filled: that pre-season top-25 ranking was unwarranted. What's more, the Crimson's performance during the past four seasons and down the

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stretch this year has been extraordinary. As Amaker said less than a week after the NCAA tournament, the loss to North Carolina “still hurts,” but he is nonetheless proud of how his team played and believes the squad should feel good about what it accomplished.

In Prospect

So WHERE does the program go from here? This spring, Harvard graduates one of the most talented classes in program history—and apart from Chambers, the dynamo point guard who earned All-Ivy honors for the third straight year, it does not return any stars.

Meanwhile, the rest of the league continues to improve. To cite two examples, Penn just hired as its coach Steve Donahue, who led Cornell to the Sweet 16 in 2010; and Columbia, which nearly upset the Crimson in 2014, may have the strongest core of returning talent. As Kathy O’ton, a *Washington Post* reporter and the author of *Outside the Limelight*, a book about the 2005-2006 Ivy League basketball season, recently observed, Harvard’s increased commitment to basketball has helped spur a similar commitment throughout the league and “now you have...more parity than I recall in the league ever.”

How can Harvard remain the team to beat? For one thing, it needs to maintain its defensive prowess: the Crimson was the only Ivy team to give up fewer than 60 points per game. Its underclassmen also need to improve. When superstar Jeremy Lin ’10 graduated, Keith Wright ’12 became the focal point of the Harvard offense, en route to becoming Ivy League Player of the Year. The departure of Saunders leaves another big hole, but it also means that underclassmen like Zena Edosomwan ’17 have an opportunity to take on a much larger role.

Whether Harvard becomes a true national power in men’s basketball hinges on whether Amaker stays—a perennial source of anxiety for athletics administrators and fans alike. During the past eight years, the coach has repeatedly attracted to Cambridge some of the most talented academic and athletic recruits in the country, and then done an admirable job of ensuring that his players cohere and helping them manage the on- and off-campus chal-



Tommy Amaker, shown here celebrating Harvard’s playoff victory over Yale, has led the Crimson to unprecedented heights. Now fans are wondering how much higher his teams can go.

lenge of playing basketball at Harvard.

After the 2014 season, there was public speculation about whether he would move to Boston College—a transfer across town that would bring him into the ACC, in competition with his alma mater (Duke), and surely elevate him into the ranks of much more highly paid basketball head coaches. Amaker has emphasized how much he and his wife, Dr. Stephanie Pinder-Amaker, a clinical psychologist who directs the College Mental Health Program at McLean Hospital and is an instructor in psychology at Harvard Medical School, love being a part of the Harvard community.

But he is young, with a strong record in directing a competitive program at an academically demanding university, and according to a longtime observer of Harvard athletics, retaining him has required a “whole lot of talk with him” on topics

Harvard Hardwood

Read David Tannenwald’s complete coverage of the basketball season
harvardmag.com/basketball-15.



ranging from facilities improvements to community engagement to support and encouragement from the administration. “It’s very meaningful,” the observer said, “just to tell him that you’re glad he’s here.”

There will always be offers, though, and Harvard’s future basketball facilities remain an open question. Several years ago, Harvard announced plans to build a new basketball arena as part of its Allston development, but it has yet to reveal a specific timeline for construction. Amaker said that the program has taken some “wonderful growth steps” in terms of community support—but like any coach, he wants the program to get better across the board and, in particular, he would “most certainly like our facilities to improve.” Absent a new facility, or incremental improvements to Lavietes Pavilion, which seats only 2,195 people and is the second-oldest Division I basketball arena in the country, it will be harder for the Crimson to attract and retain top talent, across the board.

The young men who autographed that white board in 2011 have graduated, and

the class that stepped into their shoes is preparing to move on. The man who brought them to Cambridge has not. Just how far the next generation of Harvard basketball players goes depends in large part on what happens next.

Tidbits

THE CRIMSON has received a host of postseason accolades: Moundou-Missi became the first Ivy League Defensive Player of the Year in program history and was also a Second Team All-Ivy selection (joined by Chambers); Saunders was a unanimous selection to the All-Ivy First Team. Meanwhile, Amaker was selected as a finalist for the Hugh Durham and Ben Jobe Awards, which recognize the top mid-major and minority coaches in Division I, respectively.

After leading the Crimson with 16.6 points per game, Saunders is being mentioned as a top-level professional basketball prospect. In a postseason news conference, Amaker said he thinks the swingman is “definitely” an NBA-caliber player, and an ESPN analyst recently projected him as

a possible second-round pick. The senior’s prospects will clarify through a series of pre-draft workouts and camps he is expected to participate in this spring.

The women’s basketball team finished the season with four straight wins to even its record at 14-14 overall and 7-7 in the Ivy League. The Crimson was led by Temi Fagbenle ’15, an All-Ivy Second Team selection; she averaged 14.4 points and 10.4 rebounds per game. Erin McDonnell ’15, who averaged 12.9 points per game and hit the game-winning three-pointer on senior night, and AnnMarie Healy ’16, who averaged 13.4 points per game, were All-Ivy honorable-mention designees. Head coach Kathy Delaney-Smith lauded her team for persevering through “adversity” (especially injuries to key players) and praised the seniors, particularly co-captain Kaitlyn Dinkins, for their commitment.

—DAVID L. TANNENWALD

David L. Tannenwald ’08 is a Cambridge-based writer focused on the intersection of sports and society.

A Feel for the Water

YALE WAS DETERMINED. They were heartily sick of Harvard’s ownership of the annual Harvard-Yale crew race, where the Bulldogs’ only win this century came in 2007. Indeed, the late Harry Parker, arguably the greatest rowing coach of all time, amassed a lopsided 44-7 record over Yale in the ancient boat race during his Harvard career, which began in 1963.

The Elis took countermeasures. In 2010 they hired one of the nation’s premier crew coaches, Steve Gladstone, who, at 68, was extraordinarily well seasoned for a new hire. In 2012, Yale College abolished freshman crew (a program dating back to at least 1893; Harvard’s freshman program continues), allowing Gladstone to bring fresh recruits straight into his varsity eight.

By last spring, the Elis were feeling their oats. Their undefeated varsity marched into the climactic Eastern Sprints regatta in May as the number-one seed. Alas, Yale finished a deflating sixth in the final. Harvard won. Three weeks later, at New London, Harvard recorded its seventh straight sweep of Yale, annihilating a skilled, highly motivated Eli varsity by more than three

boat lengths. Excepting the Intercollegiate Rowing Association national championships, where the University of Washington earned its fourth consecutive title, Harvard went undefeated last spring.

As discouraging as such results must have been for the Bulldogs, they were equally heartening to the Crimson faithful, as a

new coach led the Harvard heavyweights for the first time in half a century. Charley Butt, chief of the Crimson men’s lightweighters since 1985, became Bolles-Parker head coach for Harvard men’s heavyweight crew after Parker died in the summer of 2013. His job was to fill the biggest shoes in college rowing—and he has, admirably.

Charley Butt



"It's wonderful that we could accomplish what we have this year, just for all the obvious reasons," he told *The Boston Globe* after the Yale race. "We moved on as we began, following the tenets that H. Parker established, and it's been a real pleasure."

Though Butt's appointment was not automatic, he was for many reasons the logical choice, having worked alongside Parker for a quarter-century and having built a record of success nearly as impressive. In his 28 years at the helm, Butt's lightweights logged 25 winning seasons, 15 Eastern Sprints titles, and nine national championships, monopolizing both the latter honors in 2012 and 2013. Decades in Newell Boathouse mean that Butt "knows the Harvard culture," says John Powers '70, the *Boston Globe* sportswriter whose chapter on lightweight rowing appears in the recently published *Third H Book of Harvard Athletics: 1963-2013*. "He knows the kind of people you are dealing with, and what motivates them. Like Harry, Charley has a gift for explaining to a rower, 'You're doing *this*, which makes you do *that*.' Harvard athletes want to know *why*—they want 'news that stays news,' the eternal essentials of moving a boat."

Furthermore, Butt owns an impressive track record in international competition. He coached single scullers Andrew Campbell '14 (to a gold medal in world competition) and Michelle Guerette '02 (to a silver medal at the 2008 Olympics). About Guerette's win, Powers recalls, "Charley's race plan in Beijing was brilliant, and absolutely on the money. He knew all six women in that final, and told Michelle, 'Row your race, and the field will come back to you.' And that's exactly what happened [late in the race, her opponents lost speed relative to her pace]. That kind of advice gives you confidence when the field jumps out in front of you at the start."

In 2004, Butt coached Henry Nuzum '99 and Aquil Abdullah, the first American men since 1984 to make an Olympic final in the double scull. "It was all due to Charley's coaching," Nuzum explains. "He has an unbelievably keen technical eye. He notices seemingly small biomechanical elements that make a big difference in boat speed." (In lightweight rowing, technical superiority can be crucial, because the weight limit removes the option of winning with bigger athletes.)

"You need a feel for the water and a feel

for whether the work you are doing is producing hull speed," Butt explains. "Everything is in rhythm and sync, and that makes the hard work satisfying. There's no escaping the work, but it's the quality of the work and the feeling of working together that make it enjoyable. You have to respect how a boat moves, and you cannot go outside the lines of how a boat moves. Water doesn't compress, but it does *pile*—you'll find a mound of water in front of an oar blade. You're in a highly intense and potentially chaotic situation, with no timeouts, so you want to stay smooth. And you need a very strong sense of pace."

BUTT BEGAN absorbing such knowledge from his father, Charles ("Charlie") Butt Sr., an MIT-trained engineer who is a legend in the sport. Butt the Elder started a crew at Washington & Lee High School in northern Virginia in 1949 and coached this public-school program to win the Princess Elizabeth Cup at the Henley Royal Regatta in England in 1964 and 1969, for example. "I remember the excitement," his son recalls. "In those days, the cup stayed in your home, and I remember what it felt like—it even had a distinctive odor." Top rowing coaches

Hockey Highlights— and Heartache

National Runners-Up

The women's hockey team—under Landry Family head coach Katey Stone for the twentieth season—finished 27-6-3: a tremendous year marked by the Beanpot championship, Ivy League title (8-2), and the Eastern College Athletic Conference season and tournament titles (the former, tied with Clarkson; the latter, a 7-3 win over Cornell). Having reached the NCAA national championship game, the Crimson fell 4-1 to Minnesota in the Gophers' home arena on March 22.

Seniors Hillary Crowe, Sarah Edney, Lyndsey Fry, Marissa Gedman, Michelle Picard, Josephine Pucci, and Samantha Reber depart with a 97-29-11 record. But junior goalkeeper Emerance Maschmeyer returns, as do offensive powerhouses Mary Parker, Miye D'Oench (both juniors), Sydney Daniels (a sophomore), and Lexie Laing (a freshman): four of the five team leaders in points.



Jimmy Vesey

A Brief Postseason

The men's hockey squad, for the most part healthier this year than in past campaigns, finished 21-13-3. The Crimson swept Brown in two games in first-round ECAC tournament competition, and then dramatically defeated Yale in the second round by taking the third game in double overtime, 3-2. Subsequent victories over Quinnipiac and Colgate at Lake Placid earned the Crimson the championship, and its first NCAA tournament appearance since 2006, with a three seed in the Midwest region.

But the postseason was a one-and-done affair: Harvard fell to Nebraska-Omaha, 4-1, in its first-round Midwest Regional contest at South Bend, Indiana. Fittingly, the Crimson's goal was scored by junior Jimmy Vesey, the ECAC Player of the Year, who entered the game with 31 goals, leading the nation. A finalist for the Hobey Baker Award, conferred on the top NCAA men's ice hockey player (the decision was scheduled for April 10, after this issue went to press), Vesey, drafted by the Nashville Predators, decided to return for his senior year—a big boost for the Crimson in 2015-16. Senior goaltender Steve Michalek set the Harvard record for saves in a season, finishing with 1,029.

were always coming by the house and staying overnight. (Harry Parker, in fact, once stayed there as a Penn undergraduate when his crew was displaced by a flood.) Each winter, young Charley would help sand and varnish the school's shells in the basement.

Former Harvard coxswain Bill Leavitt '50 coached Butt at Rutgers. He became an outstanding oarsman who rowed for the U.S. lightweight eight that finished fourth at the 1980 World Championships, and won a silver medal in the same event at the 1985 Worlds in Belgium. Meanwhile he graduated from Rutgers in 1983 with a major in history (which remains a passion; he devours audiobooks on the subject while commuting). After coaching at his alma mater, he learned of the lightweight job opening in Cambridge and met with Parker. "We talked a long, long time about coaching, and I really enjoyed myself," Butt says. "It was exciting because it meant that I was going to work and learn with one of the best coaches of his generation. First-hand, I could learn how to get it done."

LAST JUNE, before the Yale race, there was a dedication ceremony for a memorial to Harry Parker at Red Top, Harvard's rowing camp on the Thames River in Connecticut. Butt asked for 44 seconds of silence to honor Parker and his 44 victories over Yale on that course. "Over the years, I saw Harry use four or five different approaches," he says, and he shares Parker's open-minded philosophy. "The more you look at something, the more you find there is to learn," he says. "Ultimately, it's about how effectively you can work with an individual. And if you're both motivated, you can learn a lot from each other."

One of Butt's former oarsmen, Tom Fallows '97, describes his coach as "quiet, introspective, and then a little bit crazy. Each and every member of his crews would probably cite Charley as one of their top role models, but the funny thing is that very few of us really know him that well. Part of what makes him such a strong coach is keeping a little bit of distance with the crew—he keeps you guessing, keeps you a little uncomfortable, so you know you have to perform." A temperament that sounds uncannily similar to Parker's. It's been known to work.

~CRAIG LAMBERT

Craig Lambert retired as the magazine's deputy editor last December.

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Sendhil Mullainathan

The Science of Scarcity

TOWARD THE END of World War II, while thousands of Europeans were dying of hunger, 36 men at the University of Minnesota volunteered for a study that would send them to the brink of starvation. Allied troops advancing into German-occupied territories with supplies and food were encountering droves of skeletal people they had no idea how to safely renourish, and researchers at the university had designed a study they hoped might reveal the best methods of doing so. But first, their volunteers had to agree to starve.

The physical toll on these men was alarming: their metabolism slowed by 40 percent; sitting on atrophied muscles became painful; though their limbs were skeletal, their fluid-filled bellies looked curiously stout. But researchers also observed disturbing

A behavioral
economist's fresh
perspectives
on poverty

by CARA FEINBERG

mental effects they hadn't expected: obsessions about cookbooks and recipes developed; men with no previous interest in food thought—and talked—about nothing else. Overwhelming, uncontrollable thoughts had taken over, and as one participant later recalled, “Food became the one central and only thing really in one’s life.” There was no room left for anything else.

Though these odd behaviors were just a footnote in the original Minnesota study, to professor of economics Sendhil Mullainathan, who works on contemporary issues

of poverty, they were among the most intriguing findings. Nearly 70 years after publication, that “footnote” showed something remarkable: scarcity had stolen more than flesh and muscle. It had captured the starving men’s minds.

Mullainathan is not a psychologist, but he has long been fascinated by how the mind works. As a behavioral economist, he looks at how people's mental states and social and physical environments affect their economic actions. Research like the Minnesota study raised important questions: What happens to our minds—and our decisions—when we feel we have too little of something? Why, in the face of scarcity, do people so often make seemingly irrational, even counter-productive decisions? And if this is true in large populations, why do so few policies and programs take it into account?

In 2008, Mullainathan joined Eldar Shafir, Tod professor of psychology and public affairs at Princeton, to write a book exploring these questions. *Scarcity: Why Having Too Little Means So Much* (2013) presented years of findings from the fields of psychology and economics, as well as new empirical research of their own. Based on their analysis of the data, they sought to show that, just as food had possessed the minds of the starving volunteers in Minnesota, scarcity steals mental capacity wherever it occurs—from the hungry, to the lonely, to the time-strapped, to the poor.

That's a phenomenon well-documented by psychologists: if the mind is focused on one thing, other abilities and skills—attention, self-control, and long-term planning—often suffer. Like a computer running multiple programs, Mullainathan and Shafir explain, our mental processors begin to slow down. We don't lose any inherent capacities, just the ability to access the full complement ordinarily available for use.

But what's most striking—and in some circles, controversial—about their work is not what they reveal about the effects of scarcity. It's their assertion that scarcity affects anyone in its grip. Their argument: qualities often considered part of someone's basic character—impulsive behavior, poor performance in school, poor financial decisions—may in fact be the products of a pervasive feeling of scarcity. And when that feeling is constant, as it is for people mired in poverty, it captures and compromises the mind.

This is one of scarcity's most insidious effects, they argue: creating mindsets that rarely consider long-term best interests. "To put it bluntly," says Mullainathan, "if I made you poor tomorrow, you'd probably start behaving in many of the same ways we associate with poor people." And just like many poor people, he adds, you'd likely get stuck in the scarcity trap.

Poverty Taxes the Mind

MULLAINATHAN IS THE FIRST to admit he's no stranger to the scarcity cycle—particularly when it comes to time. A self-confessed over-committer with endless energy for exploring new passions, he is "quite familiar" with tardiness and missed deadlines. Though he's no slouch at juggling tasks—at age 42, he's a tenured professor, a MacArthur Fellowship recipient, and a rising star in behavioral economics—things are still always piling up, he says during an interview, pointing to actual piles of papers around his office desk.

No one ever has enough time—making it an excellent way to understand how scarcity works, he explains. A time crunch *can* be useful; deadlines often increase motivation and concentration. But there are prices to pay for that amplified focus: anything that falls outside the scope of that time-limited task gets slighted, ignored, or put off to a later date. While this isn't breaking news,

for Mullainathan, anecdotes about time and its limits are a trusted Trojan Horse of sorts: a way to get into the minds of readers and audiences at lectures who may never have experienced more extreme types of scarcity. "The cycle of poverty generally gets talked about as a problem *other* people face," he says. "Our hope is to get people to understand how easy it is to get caught in it, even if they've never had the experience."

Though he spent much of his early life in "decently comfortable" economic circumstances, Mullainathan has seen poverty first-hand, and it seared itself deep in his psyche. Born in a small South Indian sugarcane-farming village, he moved to Los Angeles at age seven with his family so his father could study, and later work in, aerospace engineering. But, as he recalls it, in the 1980s, when new laws mandated heightened security clearances in departments that had not previously required them, noncitizens like his father were suddenly out of a job with no chance of finding another one in the industry.

"This was the first time I felt real economic insecurity," Mullainathan remembers. It was also the first time he saw scarcity's effects in action. The job loss "in some ways liberated him," he says of his father. Suddenly without a roadmap for the first time, Mullainathan's parents bought a video store, which, through creative strategies—like developing a computer program they sold to other stores—became in time a successful endeavor. But those initial years were also packed with tensions and insecurity that set the family on edge. "Overnight," he says, "I saw my parents change": suddenly, they were much more stressed out and short-tempered, as if part of their personalities was different.

Years later, as a behavioral economist, Mullainathan saw this phenomenon at work in impoverished people around the world. "The evidence is everywhere," he says. "We just had to find ways to gather it scientifically." But like any science in the making—as Mullainathan and Shafir describe work like theirs—the path had to be blazed. Early on, for instance, as the authors recount in the introduction to their book, "When we told an economist colleague that we were studying scarcity, he remarked, 'There is already a science of scarcity....It's called economics.'"

The colleague, of course, was right, Mullainathan concedes; economics is the study of how people manage physical scarcity. But even though actual scarcity is ubiquitous—there are always limits to time, food, and money—the *feeling* of scarcity is not, he explains. This overpowering mindset was what he and Shafir were interested in studying, and it had effects, they argued, that could be quantified and explored empirically.

In 2010, the authors and their colleagues set out to do that—setting up scientific trials in what Mullainathan jokingly calls "the best lab in the world": a shopping mall in New Jersey. The group hoped to show in an experiment that poverty imposed a kind of "bandwidth tax" that impaired people's ability to perform. "To put it crudely," he explains, "poverty—no matter who you are—can make you dumber."

To prove it, they planned to administer Raven's Progressive Matrices tests (essentially IQ tests that measure skills without requiring experience or expertise) to their subjects. Just before taking the test, subjects were asked to consider a hypothetical scenario:

Imagine you've got car trouble and repairs cost \$300. Your auto insurance will cover half the cost. You need to decide whether to go ahead and get the car fixed, or take a chance

and hope that it lasts for a while longer. How would you make this decision? Financially, would it be easy or hard?

Using self-reported household income, the researchers split the subjects into groups of “rich” and “poor.” When they tallied their scores on the Raven’s Matrices, there was no statistically significant difference in the groups’ performance.

But in a second version of the test, researchers raised the price tag for the repairs to \$3,000. Although rich people’s test scores showed no significant difference, the poor people’s scores dropped the equivalent of about 14 IQ points: the difference between the categories of “superior” and “average” intelligence—or more pointedly, from “average” to “borderline deficient.” That’s a greater deficit than subjects in sleep studies typically show after staying awake for 24 hours, Mullainathan and Shafir highlight. “Simply raising monetary concerns for the poor,” they explain, “erodes cognitive performance even more than being seriously sleep deprived.”

They attribute this result to the maelstrom of problems poor people must suddenly confront in the face of a large unexpected expense: how will I pay the rent, buy food, take care of my kids? This round of mental juggling depletes the amount of mental bandwidth available for everything else. Such problems simply don’t arise for the rich.

Low blood sugar can deplete physical capacities; a struggling mind can create similar chemistry in the brain— and trigger the same debilitating results.

To rule out other factors, the researchers posed nonfinancial questions with small and large numbers; they even tried versions where they paid people for correct answers to questions. In each case, there was no difference in performance.

But the real test lay in the real world, Mullainathan continues. If just *thinking* about scarcity preoccupied subjects, what effect would *real* scarcity have?

The answer came from fieldwork he and his colleagues were already conducting in India. Sugarcane farmers, they discovered, get their income in one lump sum at harvest time, just once or twice a year. That meant farmers were poor during one part of the year, and flush with cash during another. Because harvests took place at different times for different farmers, researchers could rule out seasonal weather, events, and their accompanying obligations as bandwidth-usurping factors. And when the researchers conducted a study there similar to the New Jersey mall experiment, the results mirrored their original findings: the Indian farmers performed worse on Raven’s Matrices tests before their harvest, and better after they’d been paid.

The conclusion was clear, Mullainathan explains: poverty itself taxes the mind. And in the case of the Indian farmers, he adds, the data were even more convincing: unlike the New Jersey “lab” study, where subjects were compared to *other* people, the farmers were compared to *themselves*. The only variables that had changed were their financial circumstances.

Scarcity Begets Scarcity

DURING THE LAST HALF-CENTURY, the effects of stress and distraction on attention and self-control have been well explored by

social scientists: psychologists like Roy Baumeister of the University of Florida (formerly of Case Western Reserve University) have done extensive work on willpower and mental depletion, for example, showing that people who had forced themselves to eat radishes instead of tempting chocolates quit working on unsolvable puzzles sooner than those who had not. At Stanford, another study on decisionmaking found that subjects asked to memorize long strings of numbers had a harder time choosing healthy snacks over sweets than subjects asked to remember just two or three digits.

It’s a phenomenon scientists can see even in the chemistry of the brain: during periods of stress and tough self-control tasks, glucose levels plummet in the frontal cortex (the region associated with attention, planning, and motivation). Low blood sugar can deplete physical capacities; a struggling mind can create similar chemistry in the brain, and trigger the same debilitating results.

But despite these advances in psychology and neuroscience, the idea that behavioral findings could beget insight into *economic* decisions is relatively new. For years, neoclassical economics maintained that people were rational, selfish actors who consistently made decisions in their own best interests. But in 1979, a breakthrough paper on decisionmaking by Princeton psychologist Daniel Kahneman, LL.D. ’04, and Amos Tversky of Stanford, began to

chip away at that idea. Their study asserted that the *way* choices are presented has as much effect on decisions as the actual value of the things people choose. In the following decades, their paper became one of the most widely cited studies in economics; 23 years later, after Tversky’s death, Kahneman won a Nobel Prize.

Today, behavioral economics is a mainstream endeavor (see “The Marketplace of Perceptions,” March–April 2006, page 50), and to Kahneman, work like Mullainathan and Shafir’s represents the field’s next logical steps. “Clearly there is a psychology of scarcity,” Kahneman said in an interview, “and this idea that scarcity itself produces its own decisions is a new—and very interesting—one.” The pair’s work inverts the long-held thinking that the poor are poor because they make bad decisions, he added. “Instead, people make bad decisions *because* they are poor.”

And, as Mullainathan explains, those bad decisions abound. Though he doesn’t place all of the problems that poor people face on scarcity’s shoulders, he believes scarcity *can* explain a mentality that people in its grip face. “We’re not just talking about shorter patience or less willpower,” he says. In the poor, “We’re often talking about short-term financial fixes that can have disastrous long-term effects.”

Take payday loans, for instance: high-interest loans that provide cash on demand, to be paid back when the borrower’s paycheck arrives. According to Mullainathan and Shafir, in 2006, there were more than 23,000 payday lender branches in the United States—more than all the McDonald’s (12,000) and Starbucks (nearly 9,000) locations combined. It’s a popular way to get money *today*, particularly for those without bank accounts. But for people without reliable incomes, debts must often roll over into the follow-

ing month, incurring exorbitant fees. “This type of high-risk borrowing seems ridiculous,” Mullainathan says, but “we wanted to prove that thinking like this doesn’t come from a lack of financial understanding or foolishness—it comes from putting out fires.”

In 2011, in collaboration with Anuj Shah, now assistant professor of behavioral science at the University of Chicago Booth School of Business (then a graduate student at Princeton), they devised a study that they hoped would prove their point, inducing that same high-risk borrowing behavior in Princeton undergraduates by having them play a version of the American TV game show *Family Feud*.

In the show, contestants are asked to name things that belong to categories—for instance, “Things you might find in a professor’s office.” Unlike regular trivia games that have right and wrong answers, there are no right responses in *Family Feud*, just popular ones (the list of answers is gathered from a survey of 100 people prior to the show). Because contestants must think through an array of options before answering, time pressure limits the number of paths they can explore before hazarding a guess, so scarcity’s effects are in full bloom.

At Princeton, contestants were randomly split into “rich” and “poor” groups—the rich having more time to guess than the poor. All were given the option to borrow time: each additional second borrowed would cost them two seconds of “interest” deducted from their total time.

“The results mimicked everything we see in the real world,” Mullainathan reports. At first, the poor performed *better* than the rich did; scarcity made them focus more intently on the task. But when, in the next round, the subjects were allowed to roll over their loans and “repay” in subsequent rounds (thus making future rounds shorter), things quickly fell apart for the poor contestants. Early borrowing created a vicious circle for the poor; pressed for time, they needed to borrow more seconds, and borrowing more made them more pressed for time. By the final rounds, most of their time went to paying back loans, and the poor lost rounds that the rich won handily.

These students were randomly assigned to “poverty,” Mullainathan explains, so there could be nothing substantially different between them and those fellow students labeled “rich.” “The study shows the intimate link between success and failure under scarcity,” he and Shafir write in *Scarcity*. And scarcity, no matter whom it menaces, inevitably leads to more scarcity.

Escaping the Scarcity Trap

SO HOW CAN PEOPLE ESCAPE the scarcity trap? And why does such research matter? The answer, says Mullainathan, isn’t necessarily a shift in policy, but a shift in policymakers’ perspective.



Sugarcane farmers, like this one near Ahmedabad, suffer seasonal scarcity—and the distortions from deprivation.

Typically, he explains, when the poor remain stuck in the grip of poverty, policymakers tend to ask what’s wrong with *them*, pointing to a lack of personal motivation or ability. Rarely, he continues, do we as policymakers ask, “What is it about this situation that is enabling this failure?”

This is the question we should be asking, says Mullainathan—a point he and Shafir make quite memorably in their book by telling a story about a spate of plane crashes that occurred during World War II. During that era, the authors recount, the United States military experienced an inordinate number of “wheels-up” crashes; after planes had landed, pilots would inexplicably retract the wheels instead of the wing flaps, sending the planes crashing to the runways on their bellies. At first, the blame fell squarely on the pilots, the authors explain: why were they so careless? Were they fatigued? But when the military began to look more closely, they realized the problem was limited to two particular plane models: B-17s and B-25s. Instead of looking inside the heads of the pilots, Mullainathan and Shafir write, the military looked inside the cockpits of those specific planes; there investigators discovered that the wheel controls and flap controls were placed right next to each other and looked nearly identical—a design specific only to the crashing planes. After identifying the problem and implementing a minor change in design (a small rubber wheel was placed on the end of the landing-gear lever), the number of wheels-up crashes declined.

“Error is inevitable, but accidents are not,” Mullainathan and Shafir explain. It’s not that pilots don’t bear responsibility for their training and alertness, but “a good cockpit design should not facilitate mistakes.”

The same should be true, they argue, for programs and policies that address poverty. Just as well-trained World War II pilots made seemingly silly errors in poorly designed cockpits, well-intentioned social programs such as low-income job-training courses, subsidized vaccination programs, and bank programs designed to help people save money, sometimes fail to attract—or retain—the people they are designed to serve.

It's natural to look at the intended clients and blame a lack of personal responsibility, the authors explain. But, as Mullainathan and Shafir have shown through their own work, all individuals stuck in a cycle of scarcity will inevitably find themselves plagued with similar slips in performance; focus often suffers, long-term planning gives way to immediate financial fire-fighting, follow-through on commitments often becomes sporadic.

So why not design social programs that make room for this scarcity-induced behavior? the authors ask. Why not look at the “cockpit” instead of the “pilot”?

Take job-assistance programs, for instance, where absenteeism and non-completion are a regular problem. The clients these programs serve are often mentally depleted by the time they arrive for classes, the authors explain: out-of-work clients struggle to make ends meet and often must arrange transportation and child care in order to attend a session. If a client misses a class—a likely occurrence—the authors explain, attending the next one becomes much more difficult, and dropping out becomes increasingly likely.

But what if the class had a less rigid curriculum? Instead of offering more classes or changing the curriculum, Mullainathan and Shafir suggest, existing classes could be altered to start at different times and proceed in parallel. Then, if clients miss a class, the authors argue, they could simply show up the following week to a parallel session running a week or two behind.

Although this type of accommodating approach is often criticized as coddling or paternalistic, Mullainathan and Shafir argue that it's just the opposite. This is not a substitute for personal responsibility, the authors claim; rather, “fault tolerance is a way to ensure that when the poor do take on [responsibility] themselves, they can improve—as many do. It is a way to ensure that small slipups—an inevitable consequence of bandwidth [depletion]—do not undo hard work.”

Most importantly, the authors explain, this shift in focus from

“pilot” to “cockpit” does not necessarily require expensive monumental changes in existing policy. Rather, they argue, just as the addition of the small rubber wheel to the landing-gear lever in the World War II planes reduced pilot error, these social programs might achieve greater success through small tweaks to their design.

Designing for Scarcity

SMALL CHANGES can have huge effects, Mullainathan explains—an approach to policy that has gained traction during the last decade, in particular through the work of Richard Thaler, Walgreen Distinguished Service Professor of behavioral science and economics at Chicago's Booth School, and Walmsley University Professor Cass Sunstein, of Harvard Law School (see “The Legal Olympian,” January-February, page 43). Their 2008 book, *Nudge: Improving Decisions about Health, Wealth, and Happiness*, presented years of research and insight on “choice architecture”—methods of influencing decisions by changing which choices are offered, without taking away people's freedom to choose.

This type of decision manipulation is well known—and widely used—in the world of marketing, and like any tool, Mullainathan says, “It can be used for evil.” But in the world of behavioral economics, the idea is to help people do the things they already want to do: ironically, to make the rational, healthy, self-benefiting choices that traditional economic models (wrongly) assumed they already consistently did.

In certain circumstances, he explains, “nudging” people into better choices can be as easy as changing the wording on a page. For instance, when workers start a new job in the United States, they are given a form asking them to check a box if they want to enroll in a 401(k) retirement plan. In a 2001 study by Brigitte Madrian and Denis F. Shea (both then at Chicago; Madrian is now Aetna professor of public policy and corporate management at the Harvard Kennedy School), researchers gave new employees at certain businesses slightly altered forms, instructing them to check the box if they did *not* want to enroll. The results were striking, notes Mullainathan: at companies where employees had to opt *out*, more than 80 percent enrolled; at companies where they had to opt *in*, only 45 percent checked the box.

The payday-loan industry (Advance America has 2,400 branches) might be different if borrowers were nudged before their needs arose.

But in other circumstances—for example in the case of payday loans—the solutions are much less straightforward. Poor people take on these predatory loans because they *have to*, Mullainathan explains; bills must be paid now. Any nudging—or even outright pushing—at that moment will likely have little effect. But what if



Photograph © David Woo/Corbis

the nudges occurred long *before* the payday loan was necessary? What if people who are consumed by financial pressures in the present got help in planning for the future?

Mullainathan and Shafir present pages of suggested solutions, citing successful programs like Save More Tomorrow, a retirement-savings plan designed by Thaler and behavioral economist Shlomo Benartzi, a professor at the UCLA Anderson School of Management. The program asks people to commit to savings deductions whenever their salary increases in the future; instead of asking them to sacrifice during times of scarcity, Mullainathan explains, it's done during times of (relative) abundance. The results were encouraging across the board, and in one firm, more than 75 percent of those offered the plan chose to enroll. By the third pay raise, those who had opted in had more than tripled their savings rates.

"Bandwidth is a core resource"—one just as powerful, limited, and influential in decisionmaking as the dollars in people's bank accounts.

To effect such changes, behavioral economists must first shift people's thinking—and the only way to do that, says Mullainathan, is to provide more evidence that their approaches to policy work in the real world.

Many scientists and nonprofit organizations are already answering that call, running experiments around the globe to test proposed changes in policy. In 2008, Mullainathan and Shafir themselves joined with several other colleagues to co-found Ideas42, a nonprofit that collaborates with organizations and businesses worldwide to test behavioral approaches to problems. A 2013 collaboration with the Cleveland Housing Network, for instance, yielded a 20 percent improvement in timely rent payment simply by sending postcard reminders and creating a monthly raffle for tenants who paid on time. Even changes as simple as new wording on a bank statement, converting interest percentages to "dollars owed," or telling people how their gas and electricity usage compares to their neighbors', have affected people's choices for the better, Mullainathan explains. "The idea is to encourage people to do things just by making things easier. And the best part is...it often costs policymakers nothing."

To *Nudge* author Richard Thaler, work like this marks the next step in the evolution of behavioral economics. Mullainathan and Shafir "are part of a generation of economists and social scientists changing the way we think about development economics," he said in an interview. "They have taken seriously the idea that we have to do things that are not just interesting to other academics, but that have the possibility of being scaled up."

Scaling Up the Science of Scarcity

FOR POLICYMAKERS, it's that potential to effect change broadly that matters—and the evidence of success from the behavioral sciences has begun to catch their attention. In 2010, the British government formed the Behavioural Insights Team, intended to spread understanding of behavioral approaches and to implement trial programs in several areas of social policy. In 2014, the White House formed its own Social and Behavioral Sciences Team

(called SBST, though many in the field refer to it as the "Nudge Unit"), and other governments around the world have shown interest in doing the same.

Perhaps the best indication of growing awareness of the value of these behavioral insights came this past December, when the World Bank released its 2015 annual World Development Report, which for the first time was devoted entirely to behavioral approaches to policy. The chapter on poverty was heavily influenced by Mullainathan and Shafir's work on scarcity, according to one of the report's authors, the Bank's Alaka Holla. "Evidence of these programs' success has been building for a while," she said in an interview. "It was time to take this to the policy world."

For Mullainathan, it's been thrilling to see the spotlight widen from its traditional focus on people's decisions to the circumstances *shaping* those choices. Mounting evidence of experimen-

tal programs' successes and increased attention from reputable organizations has spurred real interest from policymakers in exploring behavioral economic solutions. But interest and full-scale adoption are two very different things, he points out, and the biggest hurdle to widespread implementation is the problem of poverty itself. "Our solutions always struggle because the underlying problem is so complicated," Mullainathan explains. What might work for one population might completely fail for another.

Although social scientists know a lot about the economics of poverty, they know much less about the psychology it creates in individual populations, and this *social* science, Mullainathan argues, is just as important as the *technological* sciences policymakers rely on to solve problems. Scientists spend vast resources developing medications, water-purifying technologies, financial products, and social services designed to help people in need, he explains. But getting people to *use* these technologies also requires understanding the psychology of the people using them. Policymakers, he says, must make this type of research a priority.

"Bandwidth is a core resource," Mullainathan and Shafir argue—one just as powerful, limited, and influential in people's decision-making process as the dollars in their bank account. If we begin to look at bandwidth and the factors affecting it in the same way we measure economic circumstances, the authors claim, we can design and evaluate social programs based on how people actually act—not simply how numbers and statistics tell us they should.

"The mistake we make in managing scarcity is that we focus on one side of the calculus," they write at the conclusion of their book. The cost of making changes to existing policies is easy to measure, but the cost of *not* doing so is much harder to quantify. This is what the science of scarcity attempts to gauge, Mullainathan and Shafir maintain: how situations, programs, and policies can deplete, tax, or build up psychological resources that are every bit as important as the physical ones that fill—or empty—our coffers. ▢

Cara Feinberg is a journalist working in print and documentary television. She can be reached through her website at www.CaraFeinberg.com.



VITA

Thomas Nuttall

Brief life of a pioneering naturalist: 1786-1859

by JOHN NELSON

IN 1808, a day after landing in Philadelphia, Yorkshireman Thomas Nuttall found a common greenbrier, a plant new to him. The apprentice printer and aspiring naturalist took it to Benjamin Smith Barton of the University of Pennsylvania, who—struck by this fervor for botany—became Nuttall’s mentor, and in 1810 sent him on a major collecting expedition: to the Great Lakes, northwest to Winnipeg, and down the Missouri and Mississippi rivers. Nuttall, realizing he’d be welcome neither to the British in Canada nor the Plains Indians, eventually joined one of John Jacob Astor’s fur-trading parties. In prairies and woodlands he found plants new to science and collected species that had been discovered, but lost in transit, by the Lewis and Clark Expedition. Washington Irving’s historical account *Astoria* describes him as a “zealous botanist...groping and stumbling along a wilderness of sweets, forgetful of everything but his immediate pursuit.” In other first-hand stories, his use of his rifle to store seeds illustrates his obliviousness to peril in his single-minded quest to further science.

At journey’s end in 1812, with war looming, Nuttall sailed from New Orleans to London, but soon returned to Philadelphia. In 1816, he undertook a second major journey: down the Ohio River, to walk alone through Kentucky and Tennessee to the Carolinas. On his return he published *The Genera of North American Plants and a Catalogue of the Species, to the Year 1817*, which, American botanist John Torrey declared, “contributed more than any other work to the advance of accurate knowledge of the plants of this country.”

Next he financed his own expedition of some 5,000 miles down the Ohio and Mississippi into what is now Arkansas and Oklahoma, and published *A Journal of Travels into the Arkansas Territory* in 1821, partly to share “the wisdom and beauty of creation.” The book blends many discoveries of new plants with vivid accounts of his trials in finding them: drunken boatmen, river pirates, treacherous sandbars, and unmapped, mosquito-infested swamps. At his lowest, in “miseries of sickness, delirium, and despondence,” he had to flee through a stormy night, into quicksand and across a frigid river, from Indians trying to steal his horse. Yet he also told of Indians who rescued him when lost, and tried to arouse compassion for “the unfortunate aborigines...so rapidly dwindling into oblivion.” Three appendices, with linguistic notes on Southwestern tribes, would, he hoped, rectify the dismissal of Indian languages as “barbaric” and “create a new era in the history of primitive language.”

Nuttall was invited to Harvard in 1822 as a lecturer in natural history and curator of the botanical garden. He was popular with students, guiding them on woodland “rambles,” and the College allowed him botanizing absences, yet he grew restless, feeling that he was “vegetating” in Cambridge. “In that era,” writes historian Wayne

Hanley, “Harvard was a veritable desert for a biologist.”

In 1832 he published a pioneering guide: a two-volume *Manual of the Ornithology of the United States and Canada*. Despite some errors, it was accurate enough that readers often assumed he was a trained ornithologist. Birds, he wrote, “play around us like fairy spirits”; he believed them capable of conjugal fidelity, education, and even “reflection.” His call to end their “wanton destruction” has been echoed by American conservationists ever since.

He left Harvard in 1833, and in 1834 joined the Wyeth Expedition to the Columbia River, which entered lands “no naturalist had ever traversed.” Ornithologist John Kirk Townsend marveled at his older colleague’s energetic collecting (though he once found Nuttall eating an owl he had saved as a specimen). They sent “bird skins” to the Academy of Natural Sciences and their friend John James Audubon, who used them as models for *Birds of America*. “Such beauties!” Audubon exclaimed. “Such rarities! Such Novelties!”

Nuttall continued on from Fort Vancouver to Hawaii and then to the virgin scientific territory of California. In 1836 a young sailor, Richard Henry Dana ’37, was amazed to find his old professor barefoot on a San Diego beach, gathering shells. To transport his barrels of specimens east, Nuttall had gained passage on Dana’s vessel, which was carrying hides to Boston. (The crew, bemused by Nuttall’s “zeal for curiosities,” called him “Old Curious.”) During the harrowing gales around Cape Horn, Dana wrote in *Two Years before the Mast*, Nuttall stayed below, but once past Tierra del Fuego he came on deck “hopping around as bright as a bird.” He begged the captain to let him explore an island “which probably no human being had ever set foot upon,” but the ship sailed on.

In Philadelphia he learned that an uncle had left him an estate in England, provided he stay there nine months each year. He lived out his days in Lancashire, but wrote, “I prefer the wilds of America a thousand times over” and returned once, for six months in 1847-48. The preeminent naturalist of his adopted country remained proud of the work he’d done “not in the closet but in the field.”

That work lives on through the common and scientific names of Western shrubs and trees like the Pacific dogwood (*Cornus nuttallii*), 44 marine genera and species, and three birds, including Nuttall’s woodpecker. And the first U.S. ornithological society, founded in 1873, bears his name. Members of the Nuttall Ornithological Club have included Theodore Roosevelt, Ernst Mayr, and Roger Tory Peterson. “Nuttall” still publishes ornithological research, building on its namesake’s groundwork, and meets monthly for lectures at the Harvard Museum of Comparative Zoology. ▢

John Nelson ’68, of Gloucester, Massachusetts, is a freelance writer.



Altering Course

Why the United States may be on the cusp of an energy revolution

by JONATHAN SHAW



OF THE NEARLY 100 quadrillion British thermal units of energy (BTUs) used each year in the United States, 61 quads are wasted. That is not a moral judgment, or a commentary on insufficient conservation (poor insulation, idling cars, people failing to turn off lights when they leave a room). It is, as Mara Prentiss notes, predominantly fundamental physics: the fuel is burned, but less than 50 percent performs useful work. That is because the American economy depends on heat engines—such as fossil-fuel-burning electric power plants and gasoline-powered cars—that cycle to convert heat energy into mechanical work. Their efficiency, the Mallinckrodt professor of physics explains, is limited by the laws of thermodynamics. An electric power plant's theoretical maximum efficiency (its "Carnot limit") is approximately 50 percent; a car engine tops out roughly 10 percent lower. In practice, of course, actual efficiencies can be much worse (although modern gas-fired power plants approach the theoretical efficiency limit). What this means is that the energy economy of the United States, as currently structured, can never be much more than 50 percent efficient: the laws of physics won't permit it.

Prentiss sees in this fundamental limit to efficiency not an obstacle, but an opportunity. In her new book, *Energy Revolution: The Physics and the Promise of Efficient Technology* (Harvard University Press), she probes the most basic of questions: where energy comes from, how it is distributed, how it is consumed, and—critically—how it is wasted.

Prentiss is a specialist in the manipulation of matter by light, who now focuses principally on using the tools of physics to answer knotty biological questions. She decided to write her book for a wider audience, given the urgency of the energy problem, the relevance of fundamental principles of physics, and the opportunity to apply her skills to U.S. energy challenges. She aims to show what choices the country really has, and how realistic the path to a sustainable future might be.



Mara Prentiss

Photograph by Stu Rosner

Without plunging directly into current energy-policy debates, Prentiss offers a uniquely scientific perspective on what she calls one of the biggest single problems facing humanity. Beyond the connection between long-term climate change and the use of energy, and the immediate environmental impact of fossil-fuel emissions (including lead, mercury, oxides of nitrogen and sulfur, carbon monoxides, ozone, and particulate pollution), lies another stark reality: the total quantity of fossil fuel on earth is finite, and so, inevitably, eventually, “We will run out,” she says. What then? Could humanity generate enough power from sun, wind, and water to replace fossil fuels, so that they gradually became a tiny fraction of consumption? Would that require sacrifices, and sweeping lifestyle changes?

In the book, Prentiss aims both to provide a factual basis for making decisions about personal energy use and to inform public policy. Thus, she applies her scientific knowledge and analytical skills to the task of explaining how the components of the U.S. energy economy interact—often, grossly inefficiently. She explains the mechanics of power generation (from wind turbines to hydroelectric dams) and consumption (in lighting, appliances, or cars). Most surprisingly, she concludes that the opportunity to shift to renewables right now already exists—*without* sacrifices to Americans’ lifestyle. “New technologies are allowing things that were previously impossible,” she says. “We are on the cusp of an energy revolution, which might significantly improve the lives of everyone on earth, if only we have the courage to seize the opportunity.”

Prentiss envisions an economy based almost entirely on renewable sources of energy. Wind and solar power could meet the *average* total energy demand in the United States now and for the next 50 years, she says, even without eliminating wasted energy—a conclusion, based on the underlying physics, that may at least provide policymakers and consumers with some grounding for sound decisions. But meeting *peak* energy demand nationwide with renewable sources will require not only political and social change, but also a revolution in thought and practice. That revolution involves wide adoption of existing energy-efficiency technologies, computing advances that enable constant system adjustments to improve both comfort and efficiency, a broader approach to energy storage, and “smart grids that pool energy supply, demand, and storage over large geographical areas.”

Achieving those goals may seem “highly improbable given human resistance to change,” Prentiss writes in the first sentence of *Energy Revolution*, “but an examination of historical energy use indicates that humanity has already undergone several energy consumption revolutions.”

An age of wood throughout the colonial era gave

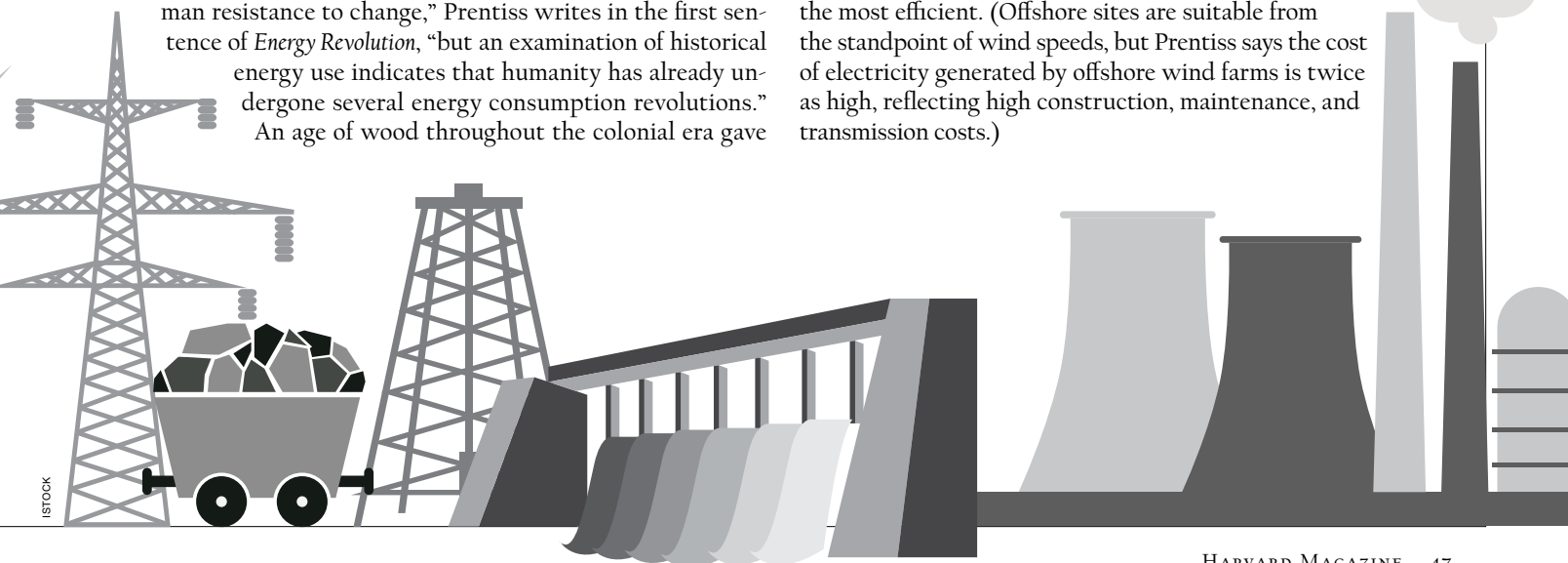
way to an age of coal in the nineteenth century, and then to an age of diversified energy sources in the twentieth, she points out. Both wood and coal remain a part of the energy economy: in fact, the United States burns as much coal as ever, though oil and natural gas have increased in importance. Today, approximately 80 percent of U.S. energy comes from fossil fuels. Another transformation—entailing a shift from use of fossil fuels to electricity generated with renewable sources—is “not only possible, but probable.”

A Renewable-Energy Thought Experiment

HOW DIFFICULT would it be to replace fossil-fuel consumption with renewable sources? To find the answer, Prentiss undertakes a thought experiment using wind power.

Energy from onshore wind costs 8 cents per kilowatt hour (kWh) for new installations: cheaper than the 9.6 cents per kWh for power generated from coal, but more expensive than the approximately 6.6 cents per kWh for natural gas (notably, the latter two numbers do not include related health or climate-impact costs). Total U.S. energy consumption (including, for example, heating and transportation) is equivalent to seven times the energy consumed in the form of electricity—so to generate enough power to satisfy *all* energy demand using wind alone, the country would need to install turbines in a north-to-south vertical stripe covering the middle, windiest, third of the nation.

As with real estate, the key to wind turbines’ value is location, location, location. The power generated by a wind turbine increases with the cube of the wind speed, so the difference in energy potential between a site where the winds average five miles per hour and one where they average eight mph is substantial: the latter site can generate more than four times as much electricity ($5 \times 5 \times 5 = 125$ versus $8 \times 8 \times 8 = 512$). The power output of a wind turbine also increases with the square of the rotor radius, so doubling the rotor length quadruples power output. There are further refinements, but these rules, combined with the fact that wind speeds increase with height, mean that, in practice, really big towers supporting large turbines in windy locations are the most efficient. (Offshore sites are suitable from the standpoint of wind speeds, but Prentiss says the cost of electricity generated by offshore wind farms is twice as high, reflecting high construction, maintenance, and transmission costs.)



But covering one-third of the nation in wind turbines sounds draconian. It could have a harmful impact on predatory birds; it might also affect weather, Prentiss notes, and that should be studied. But if those turbines were built, landholding ranchers and farmers become the oil barons of the twenty-first century. In an electrified economy, people would drive electric cars, which would raise demand for electricity and lower demand for gasoline; fossil-fuel power plants would slowly be phased out. Existing plants would not be required to shut down prematurely, so electricity providers would not be hurt. A decrease in U.S. demand for petroleum would allow Americans to reduce petroleum imports, and might even enable substantial petroleum exports. Above all, the country would need only *half* as much energy as it uses today—because replacing fossil-fuel-dependent cars and power plants with renewably generated electricity would immediately reduce total energy demand by more than half (by eliminating that fundamental Carnot limit on efficiency). That means that instead of covering a third of the country, wind turbines would need to cover less than a sixth of the nation's land area to meet average demand with wind power alone. Such a system would also dramatically reduce emissions associated with burning fuel.

The necessary land area would shrink further if contributions from solar, hydroelectric, biofuels, and nuclear energy were factored in, and still further with increased adoption of energy-efficiency technologies. (Prentiss notes that solar power alone could, like wind, in theory supply all of the nation's energy needs, albeit more expensively.) Furthermore, land that hosts wind turbines can still be used for other purposes, such as growing crops, graz-

ing cattle, or even raising biofuel. Turbines take up very little space on the ground, she points out, so on nonarable land, owners could produce even more power by co-locating solar panels among them. (Existing estimates of the land area needed for renewables, she says, generally don't consider dual-use possibilities, and therefore overestimate the acreage required.)

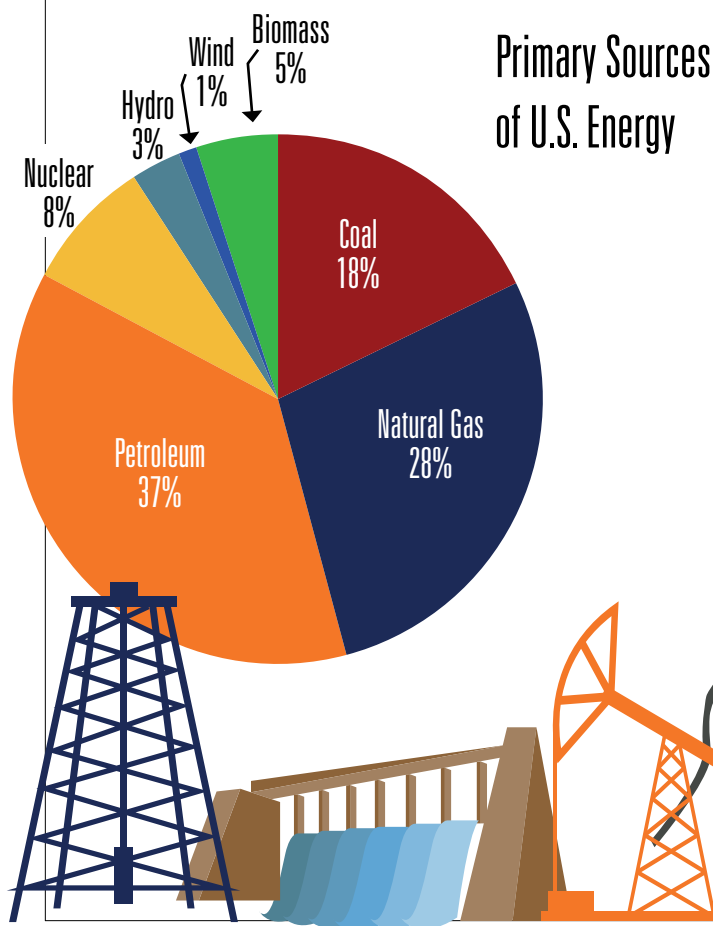
Challenges to a Renewable-Energy Economy

PRENTISS IDENTIFIES three considerable challenges to this vision of a national renewable-power system: the long-distance transport of electricity; the intermittency of the wind and sun; and the limited capacity to store renewably generated energy for later use.

Transporting electricity from the nation's heartland to the coasts, or from north to south, or from one coast to the other, would require building a national power grid, a *substantial* infrastructure investment. But science demonstrates that electricity travels well, Prentiss explains, especially in the form of direct current (as opposed to the alternating current that utilities deliver to customers). The U.S. Energy Information Agency estimates total transmission losses at approximately 6 percent, with long-distance losses around 5 percent per 1,000 miles for high voltage direct current. Such a loss in income might drive an accountant (like her spouse) crazy, Prentiss acknowledges, but "scientists talk in factors of two and 10": thus, losses from distribution of electricity across thousands of miles are not big when compared with the orders-of-magnitude differences in generating capacity between the country's most and least windy locations.

The intermittency of wind and solar power is a bigger problem, she admits. Solar panels can't make electricity when the sun doesn't shine, whether at night or during cloudy weather. And on windless days, turbines stand idle. Today, regional utilities cope with this problem by maintaining conventional, fossil-fuel-powered electric plants with sufficient capacity to cover any renewable-source fluctuations. As of 2012, wind power represented just 1 percent of U.S. energy sources, but Iowa and South Dakota both generate more than 20 percent of their electricity from wind (as does Germany), demonstrating that fluctuations in supply and demand can be managed.

As the role of renewable energy grows, of course, the intermittency problem becomes more challenging. Supply fluctuations are potentially more dramatic when there are more renewables in the energy mix, and could thus require more fossil-fuel back-



Source: 2012 data from U.S. Energy Information Administration

Energy Use and Efficiency by Sector

Electric power generation and transportation dominate energy consumption (in quads) . . .

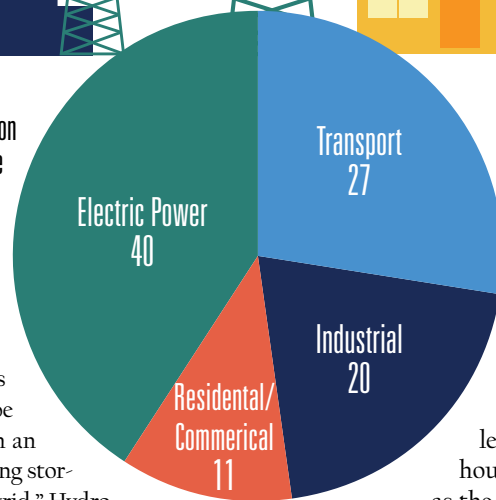
ups to compensate. The simplest solution would be a breakthrough in storage technology, but Prentiss believes the challenge can be managed even without such an advance by combining existing storage solutions with a “smart grid.” Hydroelectric power, she says, provides today’s best large-scale means of storing energy generated from the wind and sun. Water stored in reservoirs and behind dams can be released to generate electricity as needed—and excess intermittent renewable power could be used to pump water up into reservoirs, to be released later when demand exceeds supply.

Given that hydroelectric power is itself a renewable, why doesn’t the United States make it the center of a renewable energy policy? In her book, Prentiss addresses this question as another thought experiment. First, she calculates how much rain falls across the entire country, and then asks how much power all that water could generate, if every drop could be captured and stored for use. The answer, she says, is 7 percent of total U.S. energy demand: “Not enough.”

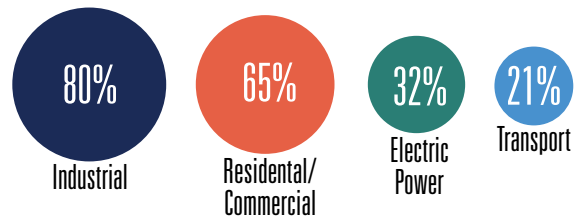
In fact, hydroelectric capacity in the United States has remained steady since 1970, because development of new generating facilities has been offset by the removal of dams, principally due to environmental concerns. As the nation’s energy use has grown, therefore, hydroelectric’s contribution to the total supply has gradually dwindled.

Because the nation’s pumped-storage hydroelectricity is limited, Prentiss suggests that, barring a technological breakthrough, meeting total U.S. power needs during the next 50 years will require combining existing storage capacity with a national smart grid.

A smart grid that uses computers to manage electricity could take advantage of regional differences in power supply and demand, thereby decreasing the need for energy storage, that third big prob-



. . . and are also the *least* efficient sectors



lem with renewables. For example, the sun sets almost four hours earlier on the East Coast than on the West (not three, as the time difference would suggest). Solar power generated in the West could be sold to customers in the East. Likewise, power demand changes seasonally, and according to different patterns in the South than in the North, creating opportunities for transferring electricity among states at different latitudes. Finally, the variability of wind averages out over distances of 1,000 kilometers or more, so a smart grid that stretched across the entire continental United States would be able to deliver a steadier flow of electricity from wind by managing long-distance transfers of power. Smart grids can also take advantage of distributed energy storage. Existing battery packs for electric cars can store approximately three times the electrical energy consumed by a household in a day. If every household had such a battery pack, the energy storage would approach the total daily U.S. electricity consumption.

Toward a Renewable-Energy Economy

WHAT is a sensible path forward? Prentiss says she wrote *Energy Revolution* out of a conviction that information is a powerful way to help people make decisions about energy use, whether as citizens or consumers.

In order to effect change, then, her decision to focus on the largest, most inefficient sectors of the U.S. economy is pragmatic. Using government data, she divides consumption into four sectors and ranks their efficiency: industry, 80 percent efficient; residential/commercial, 65 percent efficient; electric-power generation, 32 percent efficient; and transport, 20 percent efficient. The data also reveal that the most efficient sectors are the smallest. Of the nearly 100 quads of energy used in the United States annually, 20 quads are consumed by industry, and 11 go to commercial/residential uses. Transportation, the most inefficient sector by far, consumes 27 quads of energy, more than a quarter of total U.S. use, while electric-power generation uses 40 quads.

The largest, most inefficient sectors thus represent more than two-thirds of total energy consumption, and are the logical focus for moving the economy toward a sustainable future. The most wasteful example is a gasoline-powered car driven in the city. The inefficiency begins with the engine itself, subject to the Carnot limit (the thermal engine loss exceeds 65 percent of the energy in the fuel burned), and mounts from there: drivetrain losses, 4 percent; parasitic (frictional) losses, 6 percent; and other engine losses, 11 percent. In the final analysis, says Prentiss, just 16 percent of the energy actually moves the wheels. Of every six gallons of gasoline burned, in other words, only one moves the car. (In more efficient highway use, one gallon in four goes to turn the wheels—a yield of 25 percent.)

Electric cars are far more efficient. Their motors waste a negligible amount of power (efficiencies can approach 99 percent), and regenerative brakes allow them to recapture and *reuse* much of the energy that propels the car. Overall, existing electric cars have total efficiencies that can exceed 60 percent. Thus, if gasoline-powered cars were completely replaced by electric cars, the electrical energy required to fuel them would be less than one-third the energy previously supplied by gasoline. But Prentiss is not advocating that everyone buy an electric car now. That would cause demand for electricity to spike, and force utilities to burn more fossil fuels.

Getting to efficient electric vehicles, in other words, also requires *system* change. The efficiency of the car (and its impact on emissions) is only as good as the efficiency of the plant that generates the power used to charge the battery. If the power to run those cars comes from a wind turbine or a solar panel on the roof of a home, then the electric car makes sense.

An energy economy based on electricity, including electric cars, must therefore grow gradually, Prentiss argues, with sources of supply and demand expanding in tandem in order to capture the efficiencies gained by eliminating heat engines. Furthermore, utilities must carry the capital costs of fossil-fuel-burning power plants on their books even as new renewable-power plants come on line. Her data show that meeting growth in demand for electricity (energy use

grows over time) by building new renewable energy plants, *without* decommissioning fossil-fuel plants before the end of their lives, leads to the smoothest transition to a sustainable economy.

Shaping the Path Ahead

PRENTISS IS REALISTIC about the potential for change. Jets would still need to run on liquid fuel; doubling production of ethanol, a biofuel, could meet that need, she suggests. And even if the contiguous 48 states were to be linked by a single electric grid optimally combining wind, solar, hydroelectric, and geothermal power, she says that it would be more economical, in the near future at least, to burn some natural gas as part of that mix.

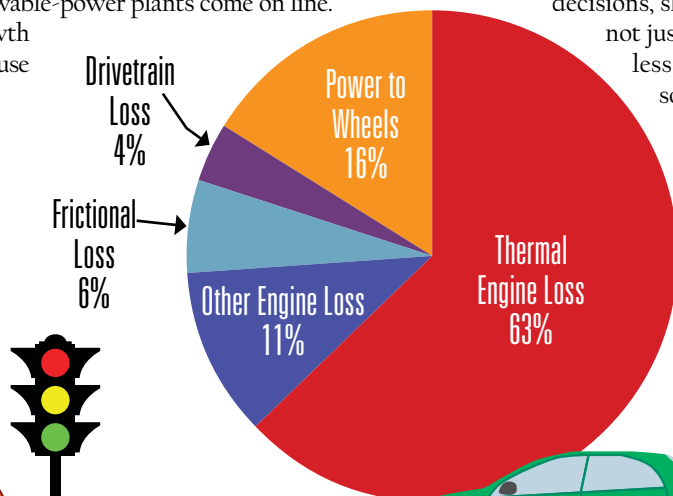
A shift to renewable energy is *already* under way in the United States. In 2012, renewables passed nuclear power in the amount of electricity generated. Most of that new power came from wind and biofuels, the fastest-growing contributors to the the nation's renewable sector. In addition, society is on the verge of benefiting from new kinds of efficiency gains. Computing advances, for example, could enable real-time modulation of supply and demand: imagine a hot summer day when air conditioning causes the demand for electricity to spike—and the batteries in electric cars provide a buffer during peak power use. Consumers could agree to run certain “smart” appliances such as dishwashers or dryers only when power demand for the day has ebbed. (Read about two alumni applying these technologies with utilities today on page 68.) Though Prentiss's calculations don't encompass this type of efficiency gain, nor the “socially wasted energy” expended heating and lighting empty rooms, idling in traffic jams, or driving around looking for a parking space, she points out, for example, that “smart” meters that signal whether parking spaces are occupied would be a win for everyone.

“Most people aren't aware of the enormous positive opportunities for change” right now, Prentiss says. “I wrote the book to encourage people to embrace some of those changes.” To make good decisions, she continues, “it helps to be aware, not just of the obvious, but of the slightly less obvious. And in the end, I make some suggestions that have a factual basis, but it's my hope that people decide things for themselves. My goal is that you don't go on faith, and that in fact, you think about it for yourself.”

Jonathan Shaw '89 is managing editor of this magazine.

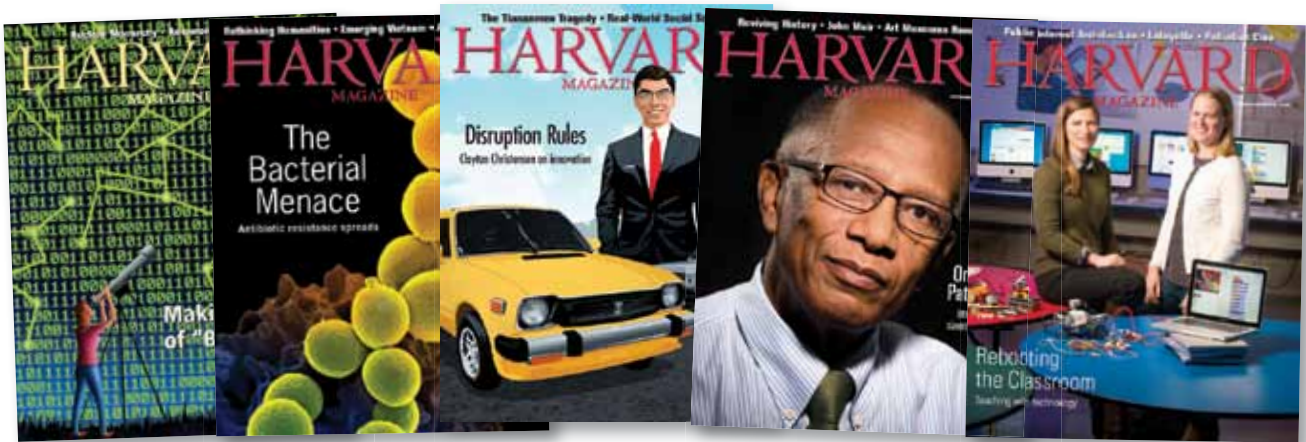
Energy Losses in City Driving

Only one-sixth of the fuel energy expended in a gasoline-powered car actually turns the wheels.



Source: www.fueleconomy.gov

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Line by Line

Poet and translator David Ferry

by Spencer Lenfield

HE IS THE OPPOSITE of a child prodigy—a writer who has reached his creative and intellectual zenith in his ninth and now tenth decades of life. When David Ferry, Ph.D. '55, won the National Book Award for Poetry in 2012 for his collection *Bewilderment* at 88, he was almost 30 years the elder of the four other nominees. Three years after that award, he is now finishing his translation of the *Aeneid*. In fact, Ferry said on a chilly, snowless January morning, he finally finished reading the *Aeneid*—for the first time—just a few weeks earlier.

That Ferry—who has translated Horace's *Odes* and *Epistles*, and Virgil's *Eclogues* and *Georgics*—doesn't read these works before sitting down to render them into English often surprises his readers. He had only a passing acquaintance with Horace before tackling the *Odes*, and had never read the *Eclogues* or the *Georgics*. He's quick to insist that he's not really a Latinist—by which he seems to mean it's not his field (his dissertation was on Wordsworth) and he doesn't read the language fluently, though he appears far more comfortable with Latin than he lets on. Maybe having less Latin makes him more attuned to English flow—less preoccupied with fussy literalism, and capable of drawing a sinuous and simple music out of ancient verse:

Time takes all we have away from us;
I remember when I was a boy I used to sing
Every long day of summer down to darkness,
And now I am forgetting all my songs;
My voice grows hoarse; I must have been seen by a wolf

Virgil, *Eclogue* 9

But he rejects this notion. “[John] Dryden obviously knew Latin extremely well,” he points out, referring to the seventeenth-century English poet's celebrated translation. (Apart from Dryden's *Aeneid*, he has tried to avoid reading others' translations of the Latin poets; thus, he hasn't read their works in full until he has finished translating them himself.)

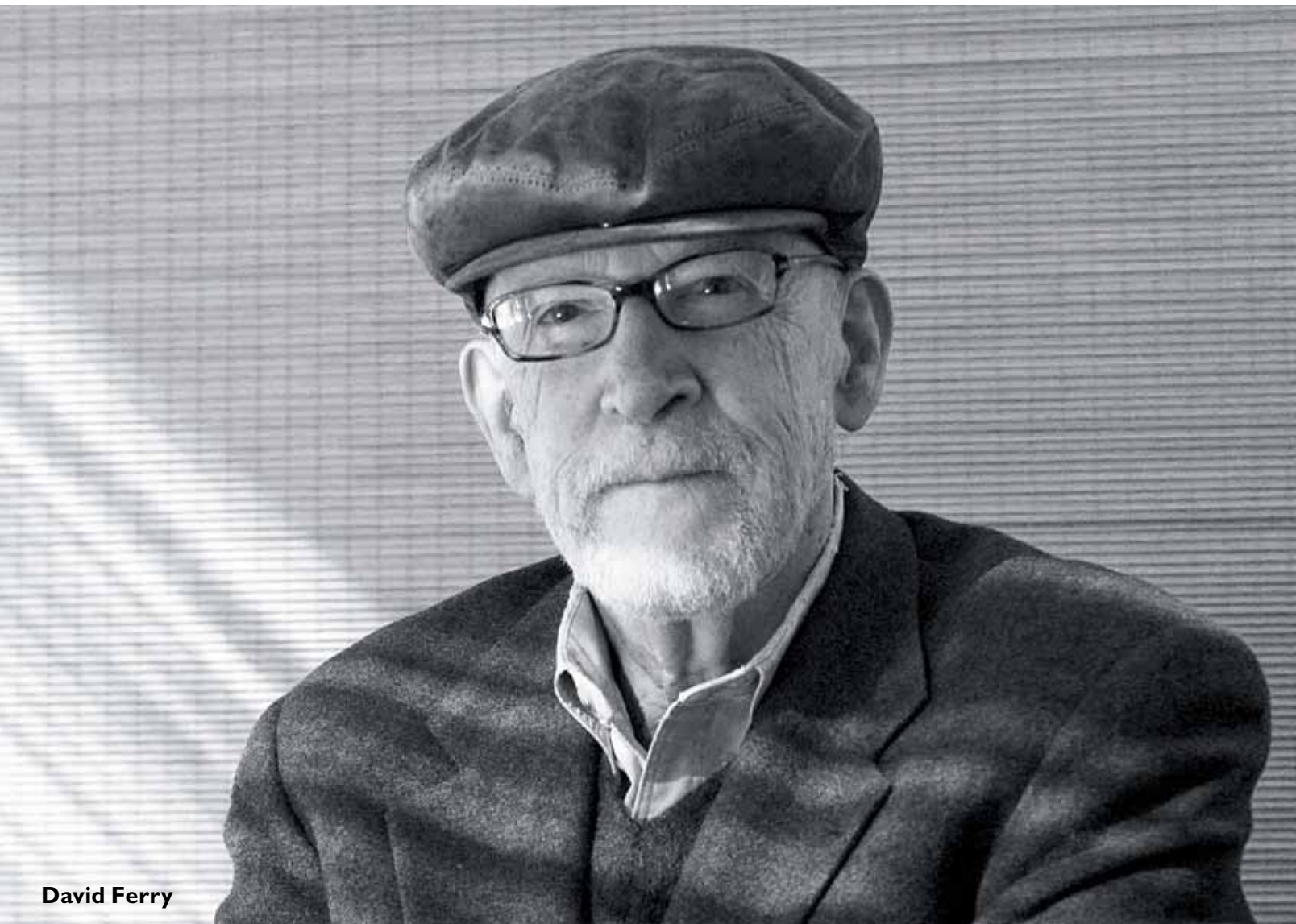
A professor emeritus at Wellesley, Ferry answers the door at his home in Brookline, Massachusetts, looking the part: he wears a tweed jacket over a turtleneck sweater and corduroy trousers,

glasses perched on his nose. He is tall, only barely bowed by age, and it is easy to imagine a younger, swifter version, bookish and lanky, crossing a New England college quad. His voice is gravelly and confident; he speaks slowly and measures out his thoughts with care—it's a voice born for poetry readings. The kitchen, where he offers toast and tea, seems new; he hasn't been here long. He lived in Cambridge for almost half a century with his wife, Anne, until she passed away in 2006; now he lives next door to the family of his daughter,

Elizabeth, an anthropologist at Brandeis. The walls are decorated with large prints of pictures taken by his son, Stephen, a photojournalist working in South America and New York City.

Bewilderment is a book of elegies, many for the loss of Anne. In it, Ferry has raided all his past translations of master poets, as well as some of his own past poems, to set alongside the poems that came in the wake of his wife's death—to find company in the afterlife. He casts himself as a mythological adventurer through the underworld, channeling the voices of poets past (including the ancients, but also the Anglo-Saxons and Wyatt, Rilke, Cavafy, Montale) until their translated voices blend into his own. The wall between translation and composition breaks down: “I can't clearly tell the difference between translating and writing a poem of my own,” he explains, “because in a way, I'm writing a poem of my own *when* I'm translating. Everybody is.” But even though legions of poets, as far back as Catullus, have woven translations into their books, the passages Ferry curates come together with a fierce expressive urgency: finding in another poet, writing in a different language, a text that voices what he most needs to say himself, the way a musician might *need* to play a certain score, or a dancer perform certain steps. Alan Shapiro, a poet and close friend who teaches at the University of North Carolina at Chapel Hill, says *Bewilderment* “deals with the most devastating losses. So the challenge of the losses he had to deal with forced him to up his game, so to speak. He always did this, but never quite to the same extent: it's like he's calling in all the forces of the past to help him come to terms with the loss of his wife and the way that she died.”

“What am I doing inside this old man's body?” Ferry asks in



David Ferry

"Soul," early in *Bewilderment*. "I feel like I'm the insides of a lobster, / All thought, and all digestion, and pornographic / Inquiry, and getting about, and bewilderment...." It's a poem where he seems to speak as himself, but also as many others: if there is a Latin predecessor to this poem, it would be some passage from Ovid—age as metamorphosis into some strange creature, sloughing off one's armor as the tender inner life hardens into one last enormous exoskeleton. His poetry seems almost too soft to touch; his biography, too. "I'm aware of and embarrassed by my ways / Of getting around, and my protective shell," he writes:

Where is it that she I loved has gone to, as
This cold sea water's washing over my back?

FERRY HAS LONG HAD the respect of colleagues and poets: the Poetry Foundation awarded him its lifetime achievement award, the Ruth Lilly Poetry Prize, the year before *Bewilderment* was published. He has published in all the best journals; his Latin translations earned no small praise; and his 1999 collection *Of No Country I Know: New and Selected Poems and Translations* won multiple prizes and distinctions. People are finally writing

about him at length in big magazines, and *PBS NewsHour* interviewed him after the National Book Award was announced.

Still, many casual readers of contemporary poetry might not have recognized his name before *Bewilderment*. It's easy to forget that Ferry—born in 1924, he turned 91 this past March—is a contemporary of Maxine Kumin '46, RI '61 (born in 1925), James Merrill and W.D. Snodgrass (both born in 1926), John Ashbery '49, Litt.D. '01, and W.S. Merwin (both born in 1927), and Anne Sexton, BF '62 (born in 1928). In part, this is because those writers published their most celebrated books in the 1960s and '70s, at a point when Ferry was a working professor focused principally on teaching. But Ferry may also have been less talked about because he's hard to fit into the schools, trends, and preoccupations of contemporary poetry. (He professes to be uninterested in these matters.) "David has always marched to the beat of his own drummer," says Jonathan Galassi '71, president and publisher of Farrar, Straus and Giroux (FSG), which has published all his book-length translations.

Ferry has spent much of his career perfecting an ability to write in colloquial iambic pentameter, leavened with a sprinkling of anapests (as in the lines from "Soul" above); the diction can come out

sounding a bit like Robert Frost, whose influence he cites gladly. But he is quick to point out that he does write in free verse sometimes, and he insists, “I’m not some kind of neoformalist.” He dislikes being tagged as conservative just because he often writes in meter. He has seldom rhymed since his first book, published in 1960.

Still, he feels he has lived his life as an apprentice to what he calls “the measured line”: one line following another, unspooling on the page. “It’s so much like what you experience in Beethoven and Mozart: the measure, then the line,” he explains. “The game is to keep it continuous. But your experience of it has to be an experience of line endings, measured.” That discipline has made him a perfect translator of the classical Latin hexameter verses of Virgil’s works and Horace’s letters. Poet and critic Dan Chiasson credits those translations with “teaching American poets (I’m one of them) the Horatian tones—the modesty, civility, and gossip; the swift, fly-by urbanity—that went missing from much of the best American poetry of the seventies and eighties.”

“My criterion is that [the accuracy of a translation] should always be *arguable* in some way,” Ferry says. “But they can never be the *same* music.” FSG has published Ferry’s Virgil and Horace translations with the Latin *en face*, like the Loeb Classical Library texts. The effect, for a reader who knows Latin, is to turn the translation into a performance, highlighting how Ferry chooses to render a phrase, smooth out syntax, hem a metaphor. The Latin language fosters involuted sentences whose multiple nestings of subordinate clauses can weigh down overly literal translations; part of Ferry’s skill lies in unknotting those, working oxygen into the rich earth of Horace and Virgil. When Virgil writes about beekeeping at the beginning of *Georgics* 4, a less deft translator might render the Latin too literally, ending up with something like: “At first, a place and station must be sought for the bees, where there is neither an approach for the winds, because the winds prevent them from carrying food back home, nor....” Ferry’s English shares the grace of the Latin, but he creates it by departing intelligently from the original Latin grammar:

First of all, find a protected place for the bees
To make their home, a place that’s safe from the wind
That might prevent them from getting back with their
food...

Robert Frost once said that poetry is what gets lost in translation, but Ferry shows that a translation can illuminate a poem like an interpretation. He brings out the patience, sensuality, and affection for detail in Virgil, doing more than any number of journal articles to counter among lay readers a received notion of the Roman as merely a bombastic, militaristic epic bard.

FERRY DOES NOT like to make too much of himself. He has an endearing habit of stopping to worry about whether he is talking too much about himself in interviews—“Because you get invited inadvertently to brag, and I don’t like that,” he explains. He’d rather speak impersonally: “I’m always trying—as in poems—to say things that are true for everybody insofar as I can.”

Still, the story of his life starts to unfold eventually. He was raised in Maplewood, New Jersey, a suburb west of Newark, with his father’s extended family scattered across neighboring towns. Robert Ferry was a businessman, first in textiles and later run-

ning trade associations. His wife, Elsie Russell, grew up in Norfolk, Virginia. She met Robert when he was sent South on textile business. “She always claimed she fell in love with him when he was playing Schumann’s ‘Träumerei’ on the piano,” Ferry recalls.

The house was filled with music as he grew up; Robert took on extra work as a church musician during the Depression, and often rehearsed singers from New York, desperate for work, through full oratorios at home. Ferry describes his father as a kind but not openly emotive man—a taciturnity that he evokes in his poem “Ancestral Lines,” remembering his father playing Schumann’s enigmatic song “*Warum?*”:

And the nearest my father could come to saying what
He made of that was lamely to say he didn’t,
Schumann didn’t, my father didn’t, know why.

Ferry was not especially literary or bookish as a child. He went to a good public high school, on the track leading to college. He insists, “I wasn’t a jock,” but was not yet writing or reading at length. He took only a little Latin, focusing mainly on French, which he still reads fluently. He remembers occasional encounters with poetry at official church and town occasions: how in Maplewood in the 1930s, they read William Cullen Bryant’s elegy “Thanatopsis” aloud every Armistice Day. (Ferry is probably one of the last poets alive for whom a civic reading of “Thanatopsis” was a formative event, and who can quote from it by heart. At one point, he also recites at length from Pope’s *Epistle to Dr. Arbuthnot*.)

But it was as a freshman at Amherst that Ferry experienced “a perfectly clear vocation” to poetry as he was working on an essay for an expository writing class taught by Reuben Brower, whom he calls “vocationally, the most important person in my life.” (Brower would become Cabot professor of English literature at Harvard in 1953.) The assignment was simple: to write about two poems by Robert Frost, “Once By the Pacific” and “Spring Pools.” Ferry was looking at them carefully, reading the lines of iambic pentameter aloud, when he stumbled over a line that sounded different:

...it looked as if / The shore was lucky in being backed by cliff...

“Lucky in”: the two words step out of the meter, an anapest taking the place of an iamb for the first time in the poem—like a quick apprehensive shudder, as if the speaker were looking nervously back to the safety of land in the face of the crashing ocean waves. That a writer could use the sound of words and the structure of meter to make a point, to evoke a feeling—that was the moment when he realized, *This is what I want to do!* “I’m really surprised by it,” Ferry recalls.

At the end of his freshman year in 1942, he was drafted into the army. He spent the war in northern England; those years gave him time to read. He wrote a note to Brower from overseas thanking him for changing his life; decades later, Brower—by then an old friend—returned the note. Ferry was touched. He returned to Amherst after the war and finished his English degree; he wrote his senior thesis on Wallace Stevens.

He then enrolled in the doctoral program at Harvard, where he found that the coursework and research mattered less to him than the colleagues and the teaching. There were a few memorable courses—he studied eighteenth-century literature with Walter Jackson Bate—but Ferry found just as much to learn from teaching, which gave him a chance to read, reread, and think through poems, one line at a time. He almost ended up writing his dissertation about William Congreve’s verse dramas—“It was all about sentences, all



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extras to hear David
Ferry read two of his
poems.

about lines”—but switched to Wordsworth, a project that eventually turned into his first and only book of criticism, *The Limits of Mortality*.

By 1952, three years before completing his doctorate, Ferry had begun teaching English at Wellesley. As the resident Romanticist, he was able to teach and read Wordsworth, Coleridge, and the others at length; he had the freedom to teach Shakespeare, Milton, and twentieth-century poetry as well. Most important was the introductory poetry class. “I mainly wanted to turn people on about lines of poems!” he says—to create for others that moment of insight he’d had writing about Frost at Amherst under Brower. Teaching the poems kept giving him more of those moments, too—small realizations about the machinery of syllable and syntax at work in making meaning, line by line, in Wordsworth, in Shakespeare, in Stevens. He was at work on revising his dissertation, and also on the poems that would turn into his first collection, *On the Way to the Island*. The *Kenyon Review* published his very first poems in 1955, another group in 1957, and the book appeared in 1960. Ferry now says he thinks only about half the poems are any good (“and that half is very good!” he says, laughing); still, writing in *Poetry* in 1961, James Wright described it as “light lyric which suddenly flares with poetry because of the depths of feeling which are deftly, and yet inevitably, exposed.”

FERRY MET ANNE DAVIDSON when she arrived at Wellesley’s English department to teach in 1956. Born a New Yorker, she had graduated from Vassar in 1951 and studied for her Ph.D. in English at Columbia under the seventeenth-century specialist Marjorie Hope Nicolson; she wrote on John Milton (the dissertation would become a book, *Milton’s Epic Voice*, in 1963). She and Ferry married in 1958; beginning that year, she taught sixteenth- and seventeenth-century English literature at Harvard for eight years, but spent the majority of her career as a professor of English at Boston College. She wrote seven ambitious and engaging books, all on poetry, including *The Inward Language*, on the Renaissance sonnet; *The Title to the Poem*; and *By Design: Intention in Poetry*, released posthumously. Anne Ferry’s poetic scholarship complemented and furthered her husband’s poetic practice: “Like mine,” he says, “her work is almost always in one way or another about lines.” They had a literary marriage, a working marriage—both teachers, both writers, he a poet, she a critic. Anne appears in some of his poems—quietly, to the side, as if in cameo—and always in his dedications, often with epigrams. In dedicating his collection *Of No Country I Know*, he writes simply, “For Anne,” and then translates a brief excerpt from the sixteenth-century collection of Scottish poetry known as the Bannatyne Manuscript:

My married heart shall never turn from her
 Unto another so long as my five wits
 Shall last, whose whole consent is given to her
 Until death’s rage shall cleave me to the root.
 So shall I love her ever, in spite of what-
 Soever circumstance can do to us.
 God grant I go to the grave before she goes.

Teaching poems
 kept giving
 him more small
 realizations about
 the machinery
 of syllable and
 syntax, making
 meaning in
 Wordsworth, in
 Shakespeare,
 in Stevens.

A long interval fell between Ferry’s first book and his second, *Strangers*, published in 1983. He was young, he was married, and when *On the Way to the Island* appeared, so did the couple’s son and then daughter. They lived in a house in Cambridge on Ellery Street that they bought after Anne left Wellesley; Margaret Fuller had been its first renter, and Emerson once came to chat in the living room. Ferry was writing during these years, but very slowly—a poem or two a year, he reckons. But he always thought of himself as a poet by vocation. “I don’t know what else to say except that I was busy,” he says. “A lot of the writing I was doing was commenting on papers. And that was a terrific part of my life, writing comments on people’s papers about poems.”

Both books included a few translations of others’ lyric poems. But it wasn’t until he was approached by William Moran, Harvard’s long-time professor of Assyriology, that he consid-

ered translating anything longer. Their children knew each other as teenagers; the Ferrys and the Morans ended up close friends. (He writes about Moran’s health troubles in old age, wracked by Parkinson’s, in the poem “Brunswick, Maine, Early Winter, 2000.”) Moran wanted to see if Ferry might be able to make poetic English out of the *Epic of Gilgamesh*. He gave Ferry a word-for-word translation of the opening passage of the epic—“where the goddess Ishtar hits on Gilgamesh and Gilgamesh turns her down”—and the poet started to smooth it out, to turn it into real English. It felt stilted at first. But he realized that breaking it up into two-line stanzas of iambic pentameter—a kind of marriage of blank verse with heroic couplets—gave it life and drive. It isn’t quite translation, he disclaims: “I call it a really dodgy word: a rendering.” The rendering ended up being published by FSG after Ferry’s Wellesley colleague Frank Bidart, A.M. ’67, introduced him to Jonathan Galassi; it appeared just before Ferry’s third book of poems, *Dwelling Places*.

He might have stopped translating there, but his *Gilgamesh* caught the eye of the classicist Donald Carne-Ross, then at Boston University; he asked if Ferry would be interested in translating a few of Horace’s odes—and eventually, the poet decided to translate them all. He asked for help from Wendell Clausen, Pope professor of the Latin language and literature and professor of comparative literature emeritus; by the time Ferry was nearing the end of the *Odes*, Clausen suggested that he might enjoy translating Virgil’s *Eclogues*. Knowing them only secondhand through English pastoral, Ferry said yes. Then, with the *Eclogues* done, his curiosity brought him to the *Georgics*. He contacted Lane professor of the classics Richard Thomas for help, and Thomas—who had just finished a two-volume commentary on the *Georgics*—obliged. The help of all the consulting classicists shows in the translations themselves, which often reflect the most recent academic understanding of the poetry. His genially erudite introductions also manage to condense a good deal of scholarship into a small space.

Thus within just a decade, Ferry found that he had wandered into translating some of the most substantial texts in Latin literature—texts that had badly needed a poetic rather than literal-minded hand attending to them. Fellow poet Peter Campion

praised Ferry's *Georgics* in a review for *Poetry*: "Hearing such genuine poetry through our current drone of Translationese feels like [a] shock...It's alive!" At Harvard, Richard Thomas now uses Ferry's version of the *Georgics* as readings in his General Education course on translation: "I've found the way he uses his own poetic brilliance to give a version of the original [is] a good way of talking about the difficulty of translation," he writes in an e-mail. "That poetry is untranslatable is of course a truism, but a poetic version gets you talking about the ways in which that might not be entirely true." Ferry describes the process as "the English itself inventing ways of reading, as best it can, the original." He cites an example from one of his German translations, of Rilke's "Song of the Drunkard." The poem ends in German with "*Ich Narr*"—which Ferry translates as a single blunt word: "Asshole." "That, I take it, is a close translation," he insists. "It could also be argued that it's not...But I think it comes closer to the tone of the Rilke than a literal 'I, fool.'"

The weave of translations and original poems in Ferry's collections—which began in *Dwelling Places* and flowers fully in *Bewilderment*—creates a sense of wandering among the dead with the help of a channeler, all the more so because he does *not* switch voice drastically to become Horace or Virgil, Baudelaire or Rilke. Themes from other poems slide into his own: in *Bewilderment*'s "To Where," after presenting a translated excerpt from the *Aeneid*, he casts himself as a kind of Aeneas, carrying his mother and father on his back, searching for Anne. Elsewhere, he writes: "Orpheus, I, stepped back in nameless fear," echoing against the Orpheus myth that he translates just pages earlier:

Alone he roamed the Hyperborean North
And wandered along the snowy banks of the Don
Or through the barren frozen fields on the sides
Of Rhiphaean mountains, in grief for his lost wife
And Hades' empty promise...

Virgil, *Georgics* 4

The book follows logically from all his earlier work, and yet somehow surpasses it. Rather than an impulse merely to invoke a favorite poem, there is an ache to speak through what has been said by others once before; poetic ego dissolves.

GRADUALLY, IT EMERGES that Ferry still keeps a busy schedule. Earlier this spring, he went to Ireland to give a talk and a reading at a Dublin literary festival; he continues to make the circuit around the Boston area, and is of course working on his translation of the *Aeneid*. From the conversation at his home, he proceeds to lunch with his daughter and son at Matt Murphy's, a self-consciously Irish pub in Brookline Village. Ferry's poem "Lake Water" is stenciled around the pub's walls in a single continuous line, tracing a ring around everyone inside. This is an old Irish tradition, he says: paint your local poet's verses on the walls of your local pub.

"Lake Water" was first published in *The New Yorker* in 2008; it's also one of the poems in *Bewilderment*. The lake of the title is Lake Waban, on the Wellesley campus, where the weather is wrong for its dramatic time of year:

It is a summer afternoon in October.
I am sitting on a wooden bench, looking out
At the lake through a tall screen of evergreens,
Or rather, looking out across the plane of the lake,
Seeing the light shaking upon the water
As if it were a shimmering of heat. ...

The lines look like iambic pentameter, but they're actually more flexible (it's hard to scan "Or rather... lake" without six stresses); they gently undulate and bend, first straining at what the meter will allow ("At the lake | through a tall | screen of | ever | greens"), then snapping back to regularity ("As if | it were | a shim | mering | of heat"). Pastoral tranquility is undermined by the sense that there is something subtly wrong because it is out of season, as the speaker goes on to say:

Yesterday, when I sat here, it was the same,

The same displaced out-of-season effect.

Seen twice it seemed a truth was being told.

The poem, read in full, goes on eloquently, unhurriedly tracing the features of the day: the breeze, the rhythm of the waves, the flicker of cloud. The scene is too unsettling to become sentimental. The speaker keeps noticing strange disturbances: despite its small size, the lake seems almost to have a tide; the sunlight on the water is like "emotions / That had been dispersed and scattered and now were not."

Suddenly a single analogy extends dramatically, and the poem starts to speak of itself:

... The surface of the page is like lake water,
That takes back what is written on the surface,
And all my language about the lake and its
Emotions or its sweet obliviousness,
Or even its being like an origination,
Is all erased with the changing of the breeze
Or because of the heedless passing of a cloud.

The allusions grow denser; the poem calls to mind Catullus ("one ought to write it in running water"), Keats ("Here lies one whose name was writ in water"), Matthew Arnold's sea of faith, Yeats's troubled stream. But even apart from that invocation of literary heritage, this long comparison suddenly explains the sense that there is something not right in the day's being so warm. That warmth is at odds with the poet's state of mind. He has been inscribing his feelings on the lake as he watched it—the lake that is too calm, too unrippled to preserve emotion or meaning on its surface. It is an elaborate turn of thought: it's the failure of the lake to hold a memory stable that makes it an appropriate metaphor for his current troubled state of mind. Everything is painfully temporary, vulnerable to the lightest of touches—that "heedless passing of a cloud."

On the walls of the pub, the poem ends there. But the published version adds one final stanza. It describes the loss of life as a loss of meaning, a kind of erasure:

When, moments after she died, I looked into her face,
It was as untelling as something natural,
A lake, say, the surface of it unreadable,
Its sources of meaning unfindable anymore.
Her mouth was open as if she had something to say;
But maybe my saying so is a figure of speech.

What Ferry says about verse at large comes back to mind: "The game is to keep it continuous. But your experience of it has to be an experience of line endings, measured." It's just as he says about his own life: writing poetry has been a matter of one line after another, meaning unfolding bit by bit, even as it also disappears behind him. ▢

Spencer Lenfield '12, a former Ledecky Undergraduate Fellow at this magazine, is a Rhodes Scholar studying classics and philosophy at Oxford.

Montage

Art, books, diverse creations



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Net Effects

Janet Echelman's urban sculptures take to the skies.

by OLIVIA SCHWOB

THE WORKS of Janet Echelman '87 tend to take on lives of their own. Installed in public spaces from Amsterdam to Sydney, her sculptures are essentially massive fishing nets that float high in the air, somewhere between taking off and coming in to land. Tucking and weaving into themselves, they reveal organic forms; projected colored light makes them appear internally luminescent. They have a biological essence, but seem more expansive than any organism. Gazing up through the bright, rippling screen of one of Echelman's installations, viewers

might imagine themselves at the center of a distant galaxy.

Echelman herself is remarkably grounded: she speaks in full sentences; her desk is very neat. To make nebulae out of string is, she says, "damn hard." That's why nobody had tried it before—the technology has evolved as Echelman has required it to. The completed pieces that reach her in wooden shipping crates are the result of a finessed industrial-design process. In her studio in Brookline, Massachusetts, four young designers tap away at customized state-of-the-art software programs, ma-

Skies Painted With Unnumbered Sparks (2014), in Vancouver, allowed viewers to choreograph its lighting using their mobile devices.

neuvering computer-generated models in digitally rendered space. They are part of an international

team that includes dozens of others: structural engineers, lacework artisans, fabricators at a net factory in Washington state who produce the sculptures from digital plans. Each work has two major components: the top, a web made of triple-braided ultra-high-molecular-weight polyethylene (a lightweight fiber 15 times stronger than steel), gives shape and support to the bottom, hanging net panels spun from polytetrafluorethylene (ensuring color quality and ultraviolet resistance). The two halves are then hand-spliced for

strength; the whole is carefully calibrated for extreme wind loads and weather conditions. If the Department of Defense starts producing fishing nets or abstract art, it will look to Studio Echelman for pointers.

Paradoxically, perhaps, Echelman's route has been charted by chance and adaptation. Suffering an eye condition that made reading difficult, she took up painting at Harvard as a break from paper-heavy government classes. She became enamored of a story about Henri Matisse, who, unable to hold a brush in his old age, came up with a cut-paper technique that produced some of his most radical and lasting work. The origin myth of Echelman's current method echoes that story—a painter deprived of paints. While she was stationed in the Indian village of Mahabalipuram on a Fulbright fellowship, a shipment of her art supplies was lost en route from Cambridge. Pressured by the ticking clock to finish pieces for an exhibition, she looked to the village's fishing industry for inspiration, and began to fashion volumetric, contemporary forms with traditional net-making techniques.

Those first sculptures were fabricated by a group of local fishermen, and rigged up with rope pulleys. In the move to machine-fabrication, Studio Echelman's signature style loses the artist's literal, physical touch.

Day and night renderings of the sculpture that will hang over Boston's Greenway from May to October 2015. Its colored banding evokes the lanes of traffic that ran through the neighborhood before the Big Dig.



Echelman and another 2014 work, *Allegory*, that hangs in the University of Oregon's basketball arena. Its five distinct forms are meant to suggest the teamwork between players on the court.



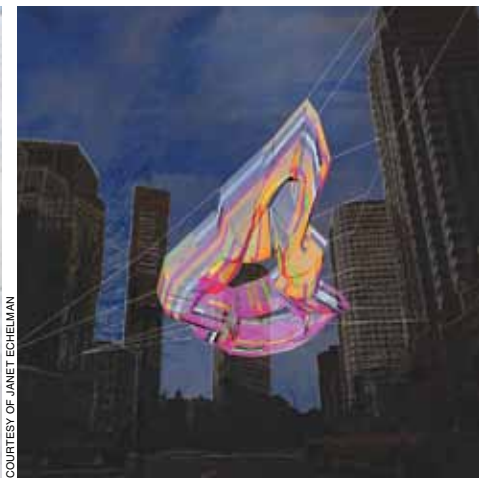
Echelman acknowledges this limitation of her process: "I'm no longer the hands; I can't be," she says. (A new commission in Boston will involve nearly half a million knots.) But to her, this development fits within a broader history of public structures: "I think of cathedrals," she explains: "the multiple generations of workers collaborating to create something bigger than themselves."

Dynamism is found elsewhere: once installed in its site, and juxtaposed with unyielding urban architecture, her work comes to life. Echelman wants to create improbably soft forms that challenge the monoliths surrounding them. In scale, her work reflects the influence of artists she characterizes as "the big boys from the '60s": a "punch you in the face" school of public intervention that includes Richard Serra, whose minimalist sheet-metal monuments seem more at home on a city block than her own nets do. Echelman's tone is closer to that of Eva Hesse, whose intimate

rope and textile sculptures evoked the human body. Indeed, Echelman's handmade mock-ups look like the work of a more joyful Hesse: magnified, manufactured, and buffeted by wind, they become gestural. Echelman's nets draw energy from the tension between these two inspirations: structure and body. "Point and counterpoint," she explains. "Without the city, it becomes less interesting to me."

Their flexibility and physicality allow the nets to respond to forces of wind and other weather—sometimes even changing color—but just as important, their design reflects social context. The commission due to hang above Boston's Rose Kennedy Greenway for six months, starting in May, draws on the site's specific history: the Greenway fills part of the crater left by the Big Dig, which sought to reverse the damage of earlier urban renewal but disrupted city life for a decade. Critics remain skeptical about the Greenway's ability to reactivate the area as a human environment, but Echelman is giving it her best shot. She hopes, through the net's design, both to acknowledge that history and to "knit the city back together," providing a landmark around which the healing process can organize itself.

Ultimately, Echelman is driven by what she calls a work's "social potential." She is always looking out for new ways to make her installations interactive: Vancouver's *Skies Painted With Unnumbered Sparks* (2014) incorporated software that gave viewers control over the light projections via their mobile devices; another recent collaboration used dancers' bodies to control the nets' movements, opening up future kin-



COURTESY OF JANET ECHELMAN

UPPER LEFT: TODD ERKSON; UPPER RIGHT: EVA PETER
BOTH COURTESY OF JANET ECHELMAN



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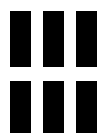
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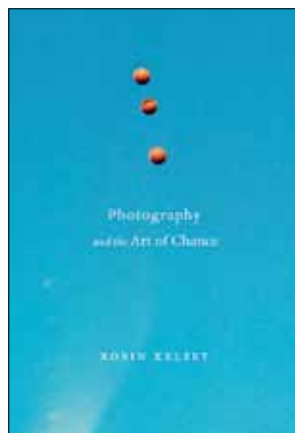
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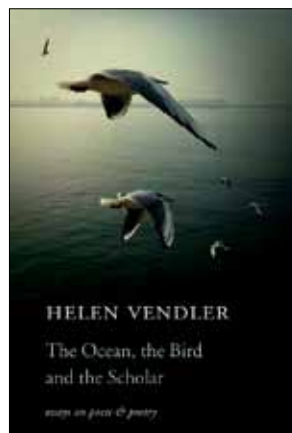
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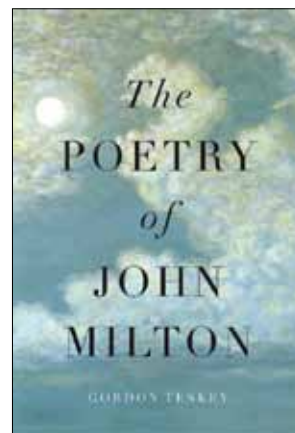
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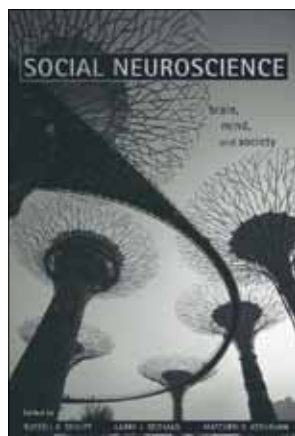
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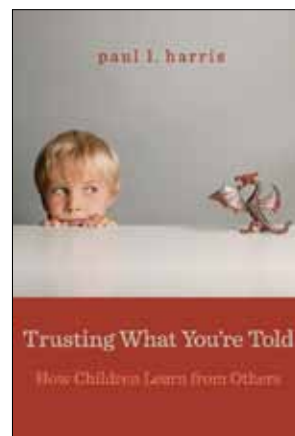
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esthetic possibilities. Only when viewers make a work their own does she consider it a success. One early installation, a permanent red and white vortex billowing over a traffic circle in Porto, Portugal, is

called—depending on whom you ask—the “Anemone”, the “Fishermen’s Monument”, or the “Patron Saint” of Porto. Echelman’s favorite photograph of the installation features men in dark business suits sprawling

on the grass underneath: pedestrians darted across three lanes of traffic just to lie under it and look up at the sky. “The work’s not alive in the white box of a gallery,” she says. “The public completes it.”



Matthew Aucoin

“Wrestling at Every Moment”

A young composer, finding his next notes

by SOPHIA NGUYEN

MATTHEW AUCOIN ’12 is unsparing toward his past work, especially the operas. Half-kidding, he claims, “I’d love to just burn all of it.” He has youthful assurance that he’ll write more and better pieces, but also more fuel for the flames than most people his age: he’s composed music since childhood, and his pieces have been performed in venues from Zurich to Salem, Massachusetts; he’s also conducted orchestras across America and in Europe.

Already he knows his creative rhythms: “I compose in the morning, and I go until I’m dry.” He tries to write every day, and always at the piano. “I find that if I’m engaging physically with this box, this hunk

of wood and metal, it pushes back at me. If I’m just sitting at my desk composing, I’m doing what I want rather than what the music wants,” Aucoin explains. “I don’t think I would be able to honestly discover a new space without engaging physically.”

Within a single conversation, he will alternate between describing music as something to “wrestle” with, and as something elusive, even delicate, vulnerable to injury through carelessness. Casually defying the old truism “Writing about music is like dancing about architecture,” he would reject its premise that the world of literature and the world of sound are essentially separate. At Harvard, Aucoin concentrated in English and wrote a cre-

ative thesis in poetry, while maintaining an active presence on the extracurricular music scene. Afterward, he matriculated in Juilliard’s composition program, but was by his own estimate “a derelict grad student.” Opportunities beckoned beyond the classroom—assistant conducting at the Metropolitan Opera and the Rome Opera, an apprenticeship with the Chicago Symphony Orchestra—and so, feeling confined by conservatory culture after four years of the liberal arts, he says, “I ran away screaming.” (He still managed to complete a graduate diploma.)

Composing opera allows him to pursue both language and sound, but he takes them one at a time. Aucoin always starts with the libretto: “I want to approach it as a stranger, who slowly becomes intimate with how the language works.” He hopes to upend a few commonly held beliefs—that English is a bad language for opera; that lyrics should act as “the subservient wife” to music—and cites the example of W.H. Auden and Igor Stravinsky’s *The Rake’s Progress*. In it, he says, “There are two rhythms, and two kinds of music, wrestling at every moment. A lesser composer might have said, ‘Give me something sweet, and flowing, and easy,’ and that’s what a lesser poet would have done. And a lesser composer would have done what the words want.”

Aucoin has been drawn to American poets as operatic subjects: in *Hart Crane*, the protagonist duets with his lover on the Brooklyn Bridge; in the one-act *From Sandoz*, James Merrill and his partner listen to a ghostly voice through a Ouija board. The American Repertory Theater will premiere *Crossing*, about Walt Whitman, at Boston’s Shubert Theatre in May. During a Harvard lecture and recital to introduce the work, Aucoin spoke of how, in his senior year, “I was very much in love with someone. Worried that my feelings would be unrequited, I came to see music as unrequitable love, and to see that it gains power by its very unrequitability.” His opera imagines Whitman in the midst of a midlife crisis, writing mostly journal entries or letters on

Off the Shelf

Recent books with Harvard connections

After a punishing winter, time for spring themes: **Baseball Maverick**, by Steve Kettmann (Atlantic Monthly Press, \$25), a portrait of the New York Mets' general manager, Richard ("Sandy") Alderson, J.D. '76. It would be fun to eavesdrop on his Law School reminiscences with Robert D. Manfred Jr., J.D. '83, now the commissioner of Major League Baseball. For those tending greenery other than infields, **The Tao of Vegetable Gardening**, by Carol Deppe, Ph.D. '74 (Chelsea Green, \$24.95 paper), is a confidence-building guide to the karma of kale.

Strategy Rules, by David B. Yoffie, Starr professor of international business administration, and Michael A. Cusumano (Harper Business, \$29.99). Yoffie, of the Business School, a member of Intel's board of directors, and Cusumano, of MIT's Sloan School, tease out lessons from Bill Gates '77, LL.D. '07 (Microsoft), Andy Grove (Intel), and Steve Jobs (Apple). The leaders' distinctive traits shape their companies still: Gates as the pragmatist (hence all those tinkering software releases); Grove, the precise engineer and manufacturer (ideal for computer chips); and Jobs, the design perfectionist.

Two sobering analyses of deteriorating economic prospects and the wrenching conditions of work for many Americans: In **Our Kids: The American Dream in Crisis**, by Robert D. Putnam, Malkin professor of public policy (Simon & Schuster, \$28), the author of *Bowling Alone* considers the Port Clinton, Ohio, of his boyhood, when socioeconomic barriers "were at their lowest ebb" in a century—and how the rich and poor now face "radically disparate" opportunities. Allison J. Pugh '88, G '91, associate professor of sociology at the University of Virginia, conducted deep interviews for **The Tumbleweed Society: Working and Caring in an Age of Insecurity** (Oxford, \$27.95). Precarious and part-time employment affects not only life

on the job, she finds, but also the demands placed on intimate relationships—deepening insecurity and tensions.

Matters of faith: How to Read the Bible, by Harvey Cox, Hollis research professor of divinity (HarperOne, \$26.99), combines literary, historical-scholarly, and activist lenses to engage with the foundational text. Kevin J. Madigan, Winn professor of ecclesiastical history, has termed **Medieval Christianity: A New History** (Yale, \$40) a textbook, but it reads as something beyond that dreary genre; medieval Christianity, he notes briskly, was by the early seventh century "the distinguishing and unitive religious and cultural mortar of European society."

Move, by Rosabeth Moss Kanter, Arbuckle professor of business administration (W.W. Norton, \$26.95). The subtitle, "Putting America's infrastructure back in the lead," points beyond filling potholes and mending bridges. Kanter describes smart transportation systems that could boost competitiveness and prosperity.

Something Must Be Done about Prince Edward County, by Kristen Green, M.P.A. '09 (Harper, \$25.99). A veteran journalist revisits her Virginia hometown to recount its extreme reaction to *Brown v. Board of Education*: closing its public-school system rather than integrating it. A vivid reminder of how things were, not so very long ago.

The Antibiotic Era, by Scott H. Podolsky, associate professor of global health and social medicine (Johns Hopkins, \$34.95). The director of the Center for the History of Medicine at the Countway Library comprehensively reviews the "wonder drugs"; attempts to limit their overuse; and the ever-looming issue of resistance (see "Superbug: An epidemic begins," May-June 2014, page 40).

The Ocean, the Bird, and the Scholar, by Helen Vendler, Porter University Professor (Harvard, \$35). In this collection of essays on poets and poetry, the nation's leading critic begins by accounting for "the three most intense episodes of

my own learning," and then engages with W. B. Yeats, Jorie Graham, Allen Ginsberg, Seamus Heaney, Wallace Stevens, A.R. Ammons, and many others. New readers of her reviews will discover a firm guide in an era when American culture remains "as yet too young to prize poetry."

Speak Now: Marriage Equality on Trial, by Kenji Yoshino '91 (Crown, \$26). The author (Warren professor of constitutional law at NYU, a member of the Board of Overseers, and a married gay man) plumbs *Hollingsworth v. Perry*. The case struck down California's ban on same-sex marriage and was the first federal trial on the subject. Timely, given the Supreme Court's current docket.



Tao-think: all that winter snow was moisture for your summer beans.

Muse, by Jonathan Galassi '71 (Knopf, \$24.95). A debut novel, focused on publishing rivals and a poet, by the poet, translator, and president and publisher of Farrar, Straus and Giroux (profiled in these pages in "High Type Culture," November-December 1997, page 38).

The Cherokee Rose: A Novel of Gardens & Ghosts, by Tiya Miles '92 (John F. Blair, \$26.95). The author (a MacArthur Fellow and University of Michigan professor in American culture, Afro-American and African studies, Native American studies, and more) turns to fiction to explore Cherokee ownership of black slaves, a subject of her scholarship, too.

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behalf of soldiers, as he serves as a nurse at a Union hospital. The lyrics borrow from his poetry only in snippets—a bit from “The Sleepers,” a verse from “Crossing Brooklyn Ferry” at the show’s climax—and Aucoin’s restless melodic line makes the familiar words unfold anew. They don’t feel preordained, but like thoughts in open search of answers.

Aucoin counts himself lucky to have received a steady stream of commissions thus far. Classical-music institutions are known to be conservative, leaning on tried-and-true repertory rather than seeking out the work of living composers. “If you’re working in the classical tradition, it’s like you’re born rich,” he says. “Your great-great-great-great-grandparents came on the *Mayflower*. You’re that kid. You don’t need to work. If you’re an administrator born today, you can get fat off Tchaikovsky forever. So the question becomes, is that any way to live? Do you really feel 100 percent alive that way? Take a chance!” he urges, and points out that on Broadway—or, for that matter, at Venice’s Teatro La Fenice in the nineteenth century—a single season might produce many forgettable flops, but also *La Traviata*. “How do we expect people to make great work if the condition of every new work is that it must be great?” he asks. “Of course it’ll be bad sometimes. It’s supposed to be.”

Enough have taken a chance on him—

Boston’s Gramercy Trio, San Antonio’s SOLI Chamber Ensemble, the Metropolitan Opera’s New Works program, the composing residency at Dumbarton Oaks—that Aucoin feels able to take one himself. Introduced to conducting in college, he’d found it was “a total narcotic experience. I got into it so fast that it precipitated a quarter-life crisis”—he knew it was steadier, better-compensated work than composition. Though he says, “I’d go slightly crazy if I did only one or the other,” he can now accept fewer orchestra gigs, and allow himself unbroken time to sit at his piano and write.

That narrative of risk and discovery runs through his recent pieces. In *Crossing*, Whitman’s intimacy with a wounded Confederate soldier in disguise is electrified by the possibility, or threat, of romance. *Second Nature*, a one-act children’s opera premiering in Chicago this summer, also has heroes who dare to venture beyond what’s safe. (Asked if he changed his style for younger listeners, Aucoin remarks, “I think kids are more musically open than many opera audiences—they’re less likely to complain that I don’t sound like Puccini.”)

Set on a wrecked Earth where humans live in zoo-like protective enclosures, *Second Nature* tells a dystopian fairy tale in which two children meet a monkey who’s been growing a real, illegal fruit tree. Aucoin calls it a “reverse Garden of Eden”

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A New Life for Heaney’s Home at Harvard

Adams House members, past and present, dedicate a suite to the Irish poet who lived among them. harvardmag.com/heaney-15



Visas and Visions

Kavita Shah makes music in many idioms.

by SAMANTHA MALDONADO

“GET STOPPED A LOT at borders,” says Kavita Shah ’07, laughing. “I think they think I’m smuggling drugs because they see my passport and they’re like, ‘You travel a lot. Why? Where do you go, and what do you do?’”

A jazz singer, composer, and arranger, Shah plays gigs around her hometown, New York City, and has performed throughout North America and Europe. She spent childhood summers in India, her parents’ native country; as a Latin American studies concentrator, she stud-

ied Incan architecture in Peru and worked in Brazilian favelas. Reflecting her varied experiences, her sound challenges the boundaries of geographic territories and musical genres.

She first experienced different musical structures and traditions as a member of the Young People’s Chorus of New York City, which performed folk songs, gospel, Western classical music, and children’s opera. Today, Shah sings in a number of languages, including English, Portuguese, Cape Verdean Creole, and *sargam* (Hin-

story: “Biting the apple is what saves you.” Fitting for a composer at the start of his career, these songs of innocence and experience relish the first taste of fresh fruit, and how it instills a restless urge to explore.



Kavita Shah

dustani solfège); the Indian tabla (a hand drum similar to the bongo) and West African *kora* (a type of lute) appear in the instrumentation of her debut album, *Visions*. On it, the suite “Rag Desh” begins with a rhythm from the tabla and spoken vocals called *tabla bols*, used in Hindustani classical music to vocalize the different sounds of the instrument, then concludes with “Meltdown”: a bluesy, moody tune that deconstructs the traditional raga, or

O P E N B O O K

An Oxford Efflorescence

Their massive portrait enfold the Christian writer (Lewis), mythmaker and Old English scholar (Tolkien), historian of language (Barfield), and publisher and supernaturalist (Williams), among others. From the prologue:

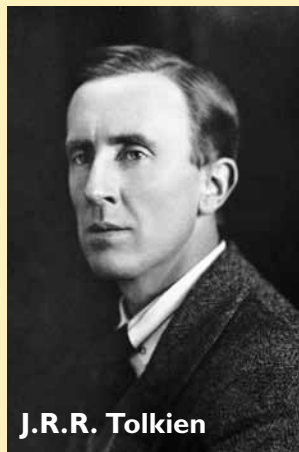
During the hectic middle decades of the twentieth century...a small circle of intellectuals gathered on a weekly basis in and around Oxford University to drink, smoke, quip, cavil, read aloud their works in progress, and endure or enjoy with as much grace as they could muster the sometimes blistering critiques that followed. This erudite club included writers and painters, philologists and physicians, historians and theologians, soldiers and actors. They called themselves, with typical self-effacing humor, the Inklings.

Novelist John Wain, a member of the group who achieved notoriety in midcentury as one of England's "angry young men," remembers the Inklings as "a circle of instigators, almost of incendiaries, meeting to urge one another on in the task of redirecting the whole current of contemporary art and life." Yet the name Inklings, as J.R.R. Tolkien recalled it, was little more than a "pleasantly ingenious pun...suggesting people with vague or half-formed intimations and ideas plus those who dabble in ink." The donnish dreaminess thus hinted at tells us something important about this curious band: its members saw themselves as no more than a loose association of rumpled intellectuals, and this modest self-image is a large part of their charm. But history would record...that their ideas did not remain half-formed nor their inkblots mere dabbings. Their

polyvalent talents...won out. By the time the last Inklings passed away on the eve of the twenty-first century, the group had altered...the course of imaginative literature (fantasy, allegory, mythopoetic tales), Christian theology and philosophy, comparative mythology, and the scholarly study of the *Beowulf* author, of Dante,



C.S. Lewis



J.R.R. Tolkien

Spenser, Milton, courtly love, fairy tale, and epic; and drawing as much from their scholarship as from their experience of a catastrophic century, they had fashioned a new narrative of hope amid the ruins of war, industrialization, cultural disintegration, skepticism, and anomie.... They were...lovers of *logos* (the ordering power of words) and *mythos* (the regenerative power of story), with a nostalgia for things medieval and archaic and a distrust of technological innovation that never decayed into the merely antiquarian. Out of the texts they studied and the tales they read, they forged new ways to convey old themes—sin and salvation, despair and hope, friendship and loss, fate and free will....

At certain moments, creative sparks fly. How this came to pass at one such moment is the subject of *The Fellowship: The Literary Lives of the Inklings: J.R.R. Tolkien, C.S. Lewis, Owen Barfield, Charles Williams* (Farrar, Straus and Giroux, \$30), by Philip Zaleski and Carol Zaleski, Ph.D. '84, professor of world religions at Smith College.

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melody, introduced earlier.

Shah was on a college study-abroad program in Brazil, working in a rural town that was previously a *quilombo*, a runaway slave community, when she was asked the question that has shaped her career ever since. A resident whom Shah had befriended turned to her one day and said, “You, now that you’ve seen all these things, what are you going to do about it?” Although she’d thought they had a lot in common, she realized she would return home to a reality starkly different from his, and that her ability to travel—around the globe, and back to the United States—brought responsibility to tell stories that conveyed what she’d seen. After graduation, she held a series of jobs in journalism and the nonprofit sector while she considered graduate or law school, but music was always on her mind. “I think I always knew in my heart that this is what I wanted to do,” she says, “but it took some time to muster up the courage, and also the know-how, to take that plunge.”

A chance encounter on the subway with legendary jazz singer Sheila Jordan provided the push she needed. “The train doors opened and she was literally right in front of me. I started talking to her. It was so serendipitous,” Shah says. Along with words of encouragement, Jordan gave her music lessons and introduced her to other young musicians. Soon after, Shah enrolled in a master’s program in jazz performance at the Manhattan School of Music, where she refined her technique and explored her voice, asking herself what experiences and ideas she could bring to jazz that others couldn’t. For her pre-graduation recital in 2012, she gathered an ensemble that included a string quartet, a jazz rhythm section, a tabla, and a *kora* to perform her arrangements. Later, she reached out to Lionel Loueke, an African jazz guitarist who’s performed on two of Herbie Hancock’s albums; he became a mentor and collaborator, as well as a co-producer of *Visions*, released last year. The album’s sprawling, multilayered sonic landscape was praised as a “sparkling debut” by *The Boston Globe* and said by Connecticut’s WNPR to reflect “the insatiably curious mind of an ethnographer, the soul of a poet, and the eye of a painter.”

To Shah, her album answers the question posed to her in Brazil: by creating complex but accessible arrangements, she wants to expand her audience’s conception of what jazz can be, while connect-



ing them to music from around the world. Her interpretations of jazz standards like Wayne Shorter’s “Deluge,” and pop songs like Stevie Wonder’s “Visions,” and Joni Mitchell’s “Little Green,” can reach audiences otherwise uninterested in jazz, or unfamiliar with the instruments she uses. Her version of the rapper and pop singer M.I.A.’s “Paper Planes” reimagines the 2007 hit, pulling in saxophone and having a tabla beat replace the final word of the first

Shah recently toured with the ensemble for *Visions*, which included piano, bass, guitar, and mridangam, a two-headed drum from southern India.

few lines. Shah sings, “Fly like paper, get high like—/catch me on the border I’ve got visas in my—”: the music speaking for her. Where the original is sung with unapologetic confrontation, Shah’s tone is playful and welcoming, as if she’s inviting listeners to traverse the boundaries with her.

Grow Up!

A philosopher’s take on individuals and maturity, in a world of institutions

by HARRY R. LEWIS

WRITING IN THE *Harvard Monthly* in 1894, philosophy professor George Santayana, A.B. 1886, tried to account for the peculiar appeal of athletics in institutions of higher learning. The usual explanations were too facile, he thought—that sports are good for the health of the participants, that watching a game is better than doing nothing when we have nothing else to do, and so on. “Motives are always easy to assign, unless we wish to get to the real one....We make ourselves cheap to make ourselves intelligible.” The paradox required a philosophical analysis.

The real appeal of athletics is that “we

have in the United States seventy millions of people seized with the desire of absolutely resembling one another in dress, speech, habits, and dignities, and not one great or original man among them, except, perhaps, Mr. Edison.” Athletics are a form of resistance to the machine that grinds us up and homogenizes us as we reach adulthood. They are “the most conspicuous and promising rebellion against this industrial tyranny....While we are young, and as yet amount to nothing, we retain the privilege of infinite

Why Grow Up? Subversive Thoughts for an Infantile Age, by Susan Neiman ’77, Ph.D. ’86 (Farrar, Straus & Giroux, \$18)

potentiality. The poor actuality has not yet taken its place, and in giving one thing has made everything else for ever unattainable. But in youth the intellectual part is too immature to bear much fruit; that would come later if the freedom could be retained." The chief value of athletics, Santayana argued in "Philosophy on the Bleachers," is that "they are the first fruits of that spontaneous life, of which the higher manifestations are not suffered to appear."

Why Grow Up? by Susan Neiman '77, Ph.D. '86, now director of the Einstein Institute in Potsdam, Germany, is another philosopher's take on questions of maturation and obligation, of mass conformity and individual freedom. In spite of the birthday balloons on the cover, this is not a book aimed at loafing college students. It neither preaches self-improvement nor goads readers into acting like grown-ups. Nor is it a guide for frustrated parents about talking to their spoiled post-adolescent children. There is some advice (of questionable wisdom, as we shall see) about how to grow up. But for the most part the book is more an analysis of why we should bother, when we seem to idolize people with the most time and money to enjoy grown-up toys (or even, in the case of Michael Jackson, childish toys).

The book is a treatise on the relevance of the Enlightenment tradition to this question, as stated on the second page: "Can philosophy help us to find a model of maturity that is not a matter of resignation?"

Neiman's argument is opposite to Santayana's. It's not, as Santayana has it, that the "atrophy of the spontaneous and imaginative will" is inevitable when we "sell our birthright for a mess of pottage, and the ancestral garden of the mind for building lots" soon after leaving college. Neiman argues instead that we let social forces, advertising in particular, trap us in a permanently puerile state—and if we had the courage to grow

up properly, we would remain free forever.

She takes a dim view of the cultural idealization of youth, and the denigration of adulthood as a series of compromises. In fact, she says, we do no one a favor by pretending that youth is the best time of our lives. "By describing what is usually the

in some detail," she gravely forewarns us. "I will show how Rousseau and Kant set the terms of discussion, before exploring what makes growing up even harder in the twenty-first century."

This is not the place for a counter-critique of Rousseau, Kant, or any of the others Neiman interprets with some reverence (Simone de Beauvoir, Margaret Mead, Hannah Arendt, and Paul Goodman in particular, with occasional nods to Hume and Locke). But she selectively forgives the obvious problems with their educational prescriptions. Emile gets his education from a tutor who is extremely careful to keep *all* culture—all books, everything—away from his pupil. The boy is supposed to figure everything out for himself, because "every step in an education for freedom should be freely chosen," as Neiman tells us. By the same token, children should not be chastised, but left to wail about the consequences of their own actions. "If the child is to be educated for freedom," she explains, "he must be educated to submit to nothing but the demands of nature." Though Neiman acknowledges that such tutelage is wildly dissonant with Rousseau's abandonment

of his own five children, all that proves to her is that the man was imperfect, not that his ideas were wrong. Rousseau, Neiman tells us, "was the first who dared to ask: what if we could have it all?"

JUMP to the present day. Education is the first of Neiman's three instruments of maturation, and she waxes rhapsodic over progressive schools—they rarely outlast their founders, but "tireless and hopeful educators and parents continue to create new ones." Of course, she notes, there is an alternative: parents can educate their own children. "Those with time and resources may choose to educate their children at home," she blithely offers, "but most of us will scrounge for the best



hardest time of one's life as the best one," she writes, "we make that time harder for those who are going through it."

Instead, Neiman says, we need to reach back to Jean-Jacques Rousseau's *Emile* to understand how the West came to understand childhood. The *Gedankenexperiment* Rousseau set himself in *Emile* is "raising an ordinary boy under conditions that will lead him to become a genuinely free adult." Neiman gives us a careful parsing not only of Rousseau on maturation, but of several others. The "historical backgrounds" chapter is professional but ponderous. "The problems and promise of Rousseau's *Emile*—philosophy's only full-length attempt at a manual for coming of age—will be examined later

alternative at hand. We'd prefer a school that cultivates our children's autonomy," following Kantian principles—free in all matters (though it's okay to stop a child from grabbing a knife), and so on.

Is this advice harmlessly idealistic? Surely the time and resources required are not the only problems with home schooling; even parents who are skeptical of the curricula of traditional schools think their children learn *something* from being socialized with others, if only the useful skills of compromise and cooperation. In actual practice, home schooling sounds like a terrible way to develop autonomy. And I am skeptical that 12-year-olds, let's say, socialized in the culture of ordinary 12-year-olds, should really be left alone to make serious life choices on their own.

Similar problems challenge Neiman's advice about travel, her second instrument of maturation. Travel is essential, she says, but must be carried out freely—not, for example, in college study-abroad programs, which “send young people abroad with the promise of learning in and from another culture, and keep them in conditions under which they cannot possibly do so.” Fair enough; as Horace put it in the first century B.C.E., *aelum non animum mutant qui trans mare currunt* (those who go running across the sea change their climate but

Taking a dim view of the cultural idealization of youth, Neiman says we do no one a favor by pretending that it is the best time of our lives.

not their mind). But are fences and overpopulation really, as Neiman suggests, the main problems with young people sleeping in haylofts half a world from home, as she describes de Beauvoir doing? It's debatable whether youth travel is less safe today than it used to be or whether we are simply more risk-averse, but surely assault, robbery, abduction, terrorism, and so on are reasonable worries.

Work, finally, is the hardest instrument of maturation to square with personal freedom, and here Neiman's political sympathies become apparent. She rues “the alienation of labor,” “planned obsolescence,” and “weakened unions,” and defines *neo-liberalism* as “the view that free unregulated markets producing ever-increasing amounts of shoddy goods are

the basis of human happiness.” Carpentry is her canonical example of good work, though she acknowledges that we can't all survive by making tables for each other.

Neiman has nothing good to say about institutions of any kind (except labor unions, perhaps). We tell children that their questions will be answered in school, she says, “and we send them to institutions

that will dull their desire to pose questions at all.” Corporations are bad, too. Neiman imagines what Kant would have thought about Coca-Cola funding “public” schools in exchange for exclusive pouring rights—indeed a startling and absurdist image, reminiscent of the scene in *Dr. Strangelove* in which Colonel Guano warns Group Captain Mandrake that he's “gonna have to answer to the Coca-Cola Company” if the soda machine is damaged in the course of preventing nuclear holocaust.

I failed to notice a single positive characterization of any enduring institution—no state, business, or long-lasting educational institution comes in for admiration. We can grant the exaggerated importance of soft drinks in contemporary society, while still wondering how children raised

liable) is that one of the ancient Greek philosophers may have been the author.”

Luis Harss hopes someone can identify a poem, vaguely remembered and possibly Arabic, that describes how “The bird of sleep / came down to nest in your eyes / but seeing your lashes / thought they were nets / and took flight” (or possibly “fright”).

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

for freedom rather than tradition will keep alive such stabilizing institutions as the universities that preserve philosophical analysis, or “those wise restraints that make us free” that our law graduates are supposed to fashion.

To be sure, the spirit of youthful freedom is too often corrupted commercially: as Neiman wonders about Kant and Coke, I can well imagine what Santayana would think of the Ohio State-Oregon football championship game. But the maturational tension never discussed is between stability and spontaneity, between respect for tradition and the impish urge for creative destruction. These are, in my experience, the challenging part of university life in what Neiman rightly calls an infantile age, and she gave me no help with them. ♡

Harry R. Lewis, interim dean of the School of Engineering and Applied Sciences and past dean of Harvard College, is Gordon McKay professor of computer science. Long involved in undergraduate admissions and athletics, among other aspects of College life, he has written popularly on such subjects in *Excellence Without a Soul: Does Liberal Education Have a Future?* and was coeditor, with Ellen Condliffe Lagemann, of *What Is College For? The Public Purpose of Higher Education*.



Visit harvardmag.com/extras to read George Santayana's “Philosophy on the Bleachers.”

“The Risk of Inaction”

Alex Laskey and Daniel Yates want to transform the electric industry.

by NELL PORTER BROWN

ARE YOU a “Steady Eddy,” “Twin Peaker,” or a “Night Owl”? A software company called Opower has identified what times of the day a large swath of American households typically use the most electricity—and is helping consumers change their usage in order to save power and money. Steady users tend to be home all day, whereas Twin Peakers’ demand spikes in the morning and then again shortly after dinner.

The ultimate payoff for this combined use of big data and behavior science, in economic and environmental terms, could be enormous. “To date we have reduced consumption by six terawatt hours,” says Opower president Alex Laskey ’99, who co-founded the Arlington, Virginia, company with CEO Daniel Yates ’99 in 2007. “Last year alone we saved close to three terawatt hours. Just to compare, the Hoover Dam—one of the country’s largest hydroelectric power sources—produces 3.9 terawatt hours a year. So we are catching up in terms of impact.”

The behavioral patterns among electric-

An office blackboard reflects Opower’s effort to encourage creativity.



ity users came from Opower’s analysis of what is probably the world’s largest dataset of residential electricity use, together with information derived from such sources as the U.S. Census and weather statistics. The data encompass more than 40 percent of American homes and have also shown that one commonality—past interactions—correlates with energy reduction across all demographic segments. Customers who have interacted with the utility, e.g., called to question a bill or report loss of power, “are far more likely to interact the next time,” explains Yates, a computer scientist; in other words, “we have found that everybody will respond—that is, reduce consumption—if they are engaged.”

Understanding energy use by time of day, place, and household (and probably more personal parameters in the future), enables Opower’s nearly 100 electric-utility clients in the United States, Great Britain, Japan, and other countries, to more precisely target their customers. They can promote customized information and timely messages about how to reduce consumption—the day *before* that 95-degree heat wave starts, for example—and also thank customers: thus building positive relationships, the critical engagement factor that spurs more energy savings.

If consumers save, the utilities and power generators can potentially save even more. Opower does not work directly on the issue of power generation, nor does it “go beyond the meter,” says Yates, as in installing smart devices that record electric energy consumption and send the information back to a utility, or engage in any other hardware solutions. Instead, the company figures out the best ways to measure and manage demand for electricity, and persuade people to change habits, largely by creating lively, gratifying ways to communicate with users. This, in turn, helps their

utility clients better maintain reliability, comply with efficiency mandates now in effect in more than 30 states, *and* spend a lot less to fire up primarily coal-burning generators to meet periods of peak demand. In time, ideally, these interventions will enable the utilities to build fewer new generating plants (whether coal- or natural-gas-burning)—and thus save the companies, their owners, and electricity customers billions of dollars while lessening environmental degradation.

Opower has 580 employees and went public last April (and expects to turn a profit in 2017). Like competitors such as C3Energy and Tendril, it is at the forefront of helping traditionally stolid, regulated monopolies transform how they do business and stay viable in the face of multiple threats: flat U.S. demand, public pressure on rates and on the siting of new facilities, challenges of managing intermittent renewable-energy sources and distributed generation (such as rooftop solar panels on homes), and the increasingly complex and uncertain energy markets around the world. Yates would add one more inhibiting factor: “the industry itself.” The resistance is generally the result of “massive installed bases and capital investments built out over almost a century that they are loathe to watch the value deteriorate on,” he adds. (See Harvard scholar Mara Prentiss’s perspective on these issues in “Altering Course,” page 46.) “They are struggling. And they don’t have a ton of regulatory support to help them transition or to allow innovation. So what we are seeing is that the risk of inaction has now, in most cases, eclipsed the risk of action.” Their effective, efficient operation obviously matters to the economy and society at large.

Opower is allied with the old incumbents, yet Yates and Laskey compare their company to upstarts in other industries

such as Zipcar, which can help people forgo car-ownership, and Airbnb, which may ultimately mean that fewer hotels are built. “Instead of producing new power plants and new electricity,” says Laskey, “we are helping utilities use their own customers as an asset and changing the way electricity is used and when.”

Their brand of more personalized communications is already helping client Baltimore Gas and Electric (BGE) manage what’s called “demand response”: the goal, to reduce peak-use among customers on the hottest days, when air conditioners are blasting. A pilot program there yielded a 5 percent decrease among participating households in 2013 (2014 results have not been released). This summer, the campaign will be extended to more than one million customers. It works like this: the evening before a peak-use day, customers are alerted by text, e-mail, or a phone call and provided with information on their usage compared to their neighbors’, and what they can do to cut consumption (and their bills) during peak hours. The day after the peak event, if a reduction occurred, BGE recognizes the behavioral change and credits a rebate. The system depends on BGE-installed smart meters, which measure and report almost real-time electricity usage, but do not (yet) link use to specific actions, like turning on the air conditioner.

“The follow-up is critical,” notes Laskey, a former political strategist who is particularly adept at persuasive communications. “It reinforces the habit, says thank you, and ensures they notice the \$8 rebate when the high bill comes in a few weeks.” Opower has helped run other peak-use pilot programs in Vermont, Michigan, and California in which the utilities did not offer monetary incentives. Instead, the firm bolstered communications and “engagement” and made good use of what Laskey calls their “time-tested social-norms model,” which shows that people will change to fit in with the surrounding norm: they will keep up, or down, as in this case, with the Joneses. “What we found was an average of 3 percent reduction at peak *without* financial incentive,” according to Laskey, “and during the hottest day—in September in Glendale, California—we got a 5 percent reduction, which was remarkable.”

YATES AND LASKEY originally teamed up to find a way to help mitigate environmental

degradation. That’s still their overarching goal. They would like to see the big, for-profit utilities be allowed to aggressively compete in the renewables markets (solar, wind, hydroelectric, and other alternative sources of electrical power), Laskey says, if only because those companies already have the distribution system and could potentially operate products and services on a large scale. “The planet and country need them to be in a place to do that,” he explains. “It’s one thing for Tesla electric-car

participate in providing new, larger-scale renewable sources of supply. There are some exceptions; Opower clients, including Sacramento Municipal Utility District and Southern California Edison, are progressively grappling with how to move forward. Shifting business to distribution and customer service (versus generation) at least puts utilities in a better position to “accommodate new kinds of energy resources,” he explains, “because you are going to need a more sophisticated grid



Yates (left) and Laskey have merged their talents—computer science and political communications—in Opower.

owners to buy their own charging stations, but if we are going to make a dent in climate change, utilities need to be a part of the solution.” A handful of states have required utilities, including some of the bigger, investor-owned companies, to decouple generation from distribution. “Eversource and National Grid, for example, which serve Massachusetts, own very little if any generation,” says Laskey. “So they make their business on maintaining a reliable grid and helping the customer use energy at appropriate times and using less of it, if it’s appropriate.” Whether and how utilities compete in renewable energy remains to be seen.

Many utilities still view renewables—at least household, rooftop solar panels—as taking money out of their pockets. And yet the companies generally have not pushed for restructuring of regulations that would allow them to more fully

to handle the ebbs and flows of more intermittent renewable resources.” (A solar-based system works when the sun shines, and not otherwise—presenting problems that do not arise from running fossil-fueled or nuclear-power plants in response to demand.) “You may need district storage facilities for neighborhood batteries, essentially,” Laskey adds, “and those are the things that right now the disruptive providers are doing.”

Laskey, the son of a former, longtime Brooklyn district attorney and a public-school teacher, had also planned on a career in public service. “I had no interest in becoming a business person,” the former history of science concentrator notes. He and Yates first met at a freshman-year ice-

cream social, were friendly throughout their years in Lowell House, but became close only after reconnecting years later when both were living in San Francisco with their future wives, Rachel Abi Farbiarz (Laskey) '99, an artist, and Tobie E. Whitman (Yates) '00, who founded and

runs Little Acre Flowers, an environmentally and socially conscious florist.

Yates, the son of a U.S. Air Force pilot and a Hebrew-school teacher, was raised largely in California; his parents had grown up poor and "were extremely conservative with resources," he says. The

computer-science concentrator and his classmate Jay Kimmelman co-founded and ran Edusoft, which developed a Web-based, standardized-test performance-assessment tool. After they sold that company to Houghton Mifflin in 2004 for \$40 million, Yates took a year off to drive the

Overseer and HAA Director Candidates

THIS SPRING, alumni can vote for five new Harvard Overseers and six new elected directors of the Harvard Alumni Association (HAA).

Ballots, mailed out by April 1, must be received back in Cambridge by noon on May 22 to be counted. Election results will be announced at HAA's annual meeting on May 28, on the afternoon of Commencement day. All holders of Harvard degrees, except Corporation members and officers of instruction and government, are entitled to vote for Overseer candidates. The election for HAA directors is open to all Harvard degree-holders.

Candidates for Overseer may also be nominated by petition by obtaining a prescribed number of signatures from eligible degree-holders. (The deadline for all petitions was February 2.)

For Overseer (six-year term):

R. Martin Chavez '85, S.M. '85, New York City. CIO and partner, The Goldman Sachs Group, Inc.

Fernande R. V. Duffly, J.D. '78, Boston. Associate Justice, Massachusetts Supreme Judicial Court.

Sandra Edgerley '84, M.B.A. '89, Brookline, Massachusetts. Nonprofit strategist and community volunteer.

Brian Greene '84, New York City. Professor of physics and mathematics, Columbia University.

Beth Y. Karlan '78, M.D. '82, Los Angeles. Director, Women's Cancer Program, Samuel Oschin Comprehensive Cancer Institute; director, division of gynecologic oncology, department of obstetrics and gynecology, Cedars-Sinai Medical Center; and professor of obstetrics and gynecology, David Geffen School of Medicine at UCLA.

Carl F. Muller '73, J.D.-M.B.A. '76,

Greenville, South Carolina. Attorney.

David B. Weinberg '74, Chicago. Chairman and CEO, Judd Enterprises, Inc.

John Silvanus Wilson Jr., M.T.S. '81, Ed.D. '82, Ed.D. '85. Atlanta. President, Morehouse College.

For elected director (three-year term):

Krzysztof Daniewski, M.B.A. '99, Warsaw. President, Ivy Poland Foundation.

Paige Ennis, M.P.A. '10, Washington, D.C. Vice president, office of external relations, Atlantic Council.

Ellen M. Guidera, M.B.A. '86, Santiago, Chile. Investor and director, Portillo Ski Resort and Tierra Hotels.

Andrew Herwitz '83, J.D. '90, New York City. President, The Film Sales Company.

Sharon E. Jones '77, J.D. '82, Chicago. President and CEO, OH Community Partners.

William R. Koehler '87, Shaker Heights, Ohio. Senior financial services executive.

Tracy "Ty" Moore II '06, Oakland, California. Co-founder, MindBlown Labs.

Anders Yang, J.D. '94, Irvine, California. Assistant dean, office of external relations, The Paul Merage School of Business, University of California, Irvine.

Ariel Zwang '85, M.B.A. '90, New York City. CEO, Safe Horizon.

OVERSEER



R. Martin
Chavez

Fernande
R.V. Duffly

Sandra
Edgerley



Brian Greene

Beth Y.
Karlan

Carl F. Muller



David B.
Weinberg

John Silvanus
Wilson Jr.

DIRECTOR



Krzysztof
Daniewski

Paige Ennis

Ellen M.
Guidera



Andrew
Hervitz

Sharon E.
Jones

William R.
Koehler



Tracy "Ty"
Moore II

Anders Yang

Ariel Zwang

Pan-American Highway with Whitman—listening to *Collapse: How Societies Choose to Fail or Succeed*, by Jared Diamond '58, in the car—and saw former Guatemalan rain forests that are now prairies.

He returned home with a sense of urgency about climate change around the same time that Laskey, fresh from finishing a political campaign in which energy issues played a role, felt equally inspired to act. While researching potential nonprofit and for-profit businesses, they came across research by Robert B. Cialdini, author of *Influence: The Psychology of Persuasion*, on what motivated people in Southern California to save energy. “They showed conclusively that if you gave people information about their energy use that was grounded in these principles of normative—or neighbor—comparison, and provided targeted recommendations, then people would change their behavior,” Yates recalls. “We did the math

and realized there was this big efficiency market,” historically focused on subsidizing “light bulbs and refrigerators, that we could potentially disrupt with information services.” They quickly learned that “Nobody has deep familiarity” with the notoriously complex morass that is the energy industry, but they persevered. (Today, Yates does say he’s finally “over the learning curve.”)

Initially, Opower helped its clients send out user-friendly home-energy reports that explained how much energy customers were using compared to their neighbors. Smiley faces reinforced good behavior. They began to see results, and such energy-efficiency campaigns remain a major part of the company’s work: detailed home-energy reports go out to 15 million households. It has since added digital services and improved its behavioral-science methodology for peak-use programs, such as the initiative in Baltimore. In February, Opower announced plans to move further into customer services: longtime client Puget Sound Energy, which serves tech-savvy consumers, will use the company’s consumer data at its call centers to let people know specifically how they are using energy and how they can change to save, like running the dryer at off-peak times.

Opower, which will also operate Puget’s billing system, anticipates that this feedback will both improve relationships and allow the company to anticipate and cut down on call volume.

Managing demand and expectations go a long way toward smoothing industry transitions such as those that utilities anticipate in California, where state regulations will now require a shift to a “time-of-use pricing scheme.” That’s “essentially a nights-and-weekends package,” says Yates: it offers incentives to use energy at off-peak hours. He and Laskey think utilities anxious about compliance could benefit from having a company like Opower organize communication efforts that will give consumers advance notice

“Nobody has deep familiarity”
with the notoriously complex
morass that is the energy
industry, but they persevered.

of pending changes and peak-use alerts. Yates says reducing California’s peak use by even 3 percent would “significantly reduce the carbon footprint of power plants that California needs to meet its energy demands.” If utilities don’t figure out how to do this, he adds, “They will inevitably do what they have done before, which is ask for a three- to five-year delay [in implementing the new regulations], and that’s a delay” in improving the environment.

Utilities are often portrayed as the villains in climate-change scenarios: the image is Montgomery Burns, from *The Simpsons*. But the picture is more nuanced, Laskey and Yates have found. “For more than 130 years we have depended on them to be reliable, safe, and cheap,” Laskey says. “Now, we’re telling them that what they’ve been doing is destroying the planet.” Not surprisingly, he has become more sympathetic to his clients’ plight. “The folks who run these utilities went into it because they are providing a public service; they also went into it to make money,” he suggests, “and they’ve helped transform our economy and the way we live and made each of our lives better.” Utilities “are not innocent bystanders,” he adds, “but neither are the rest of us.” ♡

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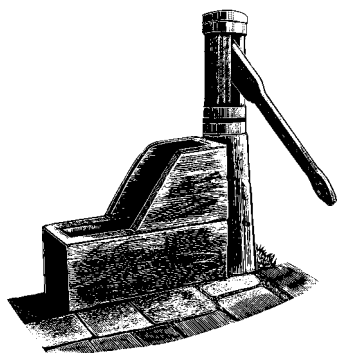
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Loot, Vinegar, Blisters



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

CALL HIM a preservationist, certainly not a thief. This magazine got an explanatory note recently from John Altrocchi '50, retired as a professor of behavioral sciences at the University of Nevada School of Medicine and as a clinical psychologist. He enclosed a photograph in which he holds a five-foot-long segment of the goalpost that he and three co-conspirators "took from grasping Yale fans after our big win at home in '48," he wrote. Their names are painted on the relic: classmates and fellow Lowell House denizens Bob (Carl Robert Wesen), Dick (Richard B. Covey), and the late Bill (William L. Mobraaten).

"I have carried this with me," Altrocchi wrote, "when moving from Cambridge to Berkeley, to North Lake Tahoe, to Reno

(background is the view of Reno from our house). We are moving to Laguna Beach, California, and I think it may be time to throw it away—but it is too big for our garbage service to take. Do you think the athletic department might have any interest in the piece of goalpost as a memento?"

The editors forwarded Altrocchi's letter to Warren M. "Renny" Little '55, curator (pro bono) of the Lee Family Hall of Athletic History. He conferred with various other powers-that-be in Harvard's athletic establishment, among them director of athletics Robert Scalise, executive director of the Harvard Varsity Club Robert Glatz, and football coach Tim Murphy. They deliberated. They weren't sure just where they would put the piece. Little observed that it could be positioned somewhere so as to point toward the Stadium. In the end the conferees decided that yes indeed, they wanted that hunk of history. It's coming home.

"By the way," Altrocchi added, "if you are interested in my bona fides on goalpost shenanigans, here is a picture of me from the *Crimson* (11/21/49) attempting to paint the Yale goalpost crimson after our disappointing loss there in '49. We couldn't pull the goalpost down because it was made of metal pipe—and covered with lard! The New Haven police were much less tolerant than the Cambridge police and we *barely* got away."

Altrocchi noted that Harvard's first game of 1949, his senior year, was an away game against Stanford in which Harvard lost 11 starters, and as a result was "creamed" by all the Ivy teams, including Yale, so "the only fun we had was tearing down the goalposts."

GONE BUT NOT FORGOTTEN: The main Cambridge Public Library has in its second-floor local-history reference room a case filled by the Historical Commission with products once manufactured in Cambridge. There are the paper collars, later replaced by innovative paper-and-cloth, made close to Harvard Yard on Arrow Street by the Reversible Collar Company. Catching the eye also is a bottle that once held Harvard Vinegar (marked by a red pennant with an H for a trademark), made by the Harvard Pickle Works, Inc. The label promises vinegar pressed from fresh apples and "reduced to legal strength."



RITE OF PASSAGE: If history repeats, many of this year's graduating women will have entered the real world with sore feet. Athletic curator Renny Little is also a stalwart of the Harvard Alumni Association's Committee for the Happy Observance of Commencement, and does color commentary in the broadcast of the proceedings on the afternoon of the day. He reports an encounter he had at the grand pageant last year. "I got to talking with a middle-aged woman who had a stethoscope around her neck and wore an EMT badge. I noted that I didn't think she would be needed as much as in the past because the weather was pretty cool. She replied, "Oh, I'm here with the bandages. These young ladies have been wearing flip-flops for four years and this is the first time many of them have worn high heels."



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~PRIMUS V



Altrocchi at his home in Reno. The goalpost has to go.

Photograph courtesy of John Altrocchi

LETTERS

(continued from page 10)

years and touched the life of nearly every American,” Faust wrote in *This Republic of Suffering*. “A military adventure undertaken as an occasion for heroics and glory turned into a costly struggle of suffering and loss.” We regret if the abbreviated account in *The Pump* led to any misunderstanding; Faust has written extensively on many aspects of the Civil War, and her scholarship is widely acclaimed.

GRIFFITH AND TROTTER

I READ with interest the reference to the new book by Dick Lehr '76 on the film *Birth of a Nation* (Off the Shelf, March-April, page 64). The blurb says, “The hitherto unreported confrontation between the Hollywood director D.W. Griffith and Monroe Trotter, A.B. 1895, A.M. '96.”

I found this wording curious. In the fall of 1974 I was one of the leaders of a protest against the showing of the film *Birth of a Nation* at Adams House. We surrounded the projector and insisted that if the film was to be shown that there should be a discussion

rather than the film shown as entertainment. Those who originally arranged the showing decided, as a result, to cancel it.

Beginning the following day there was a major debate that unfolded around the film and the protest. There were those who said that we challenged freedom of speech. Dr. Ewart Guinier, chairman of the Afro-American Studies department, came to our defense. In an op-ed published in *The Harvard Crimson*, Guinier compared what we had done with the protests organized by William Monroe Trotter in Boston in 1915 when the film was first shown.

I wanted to bring this to the attention of *Harvard Magazine*. While I am excited to hear about the publication of Dick Lehr's book and wish to take nothing away from him, I think that it is critical to set the record straight. The struggle led by Trotter against the film may not be well known, but it was known. Guinier made sure to remind us of Trotter's role and why the stand that several of us took that fall evening in 1974 was the right thing to do.

BILL FLETCHER JR. '76
Mitchellville, Md.

AMPLIFICATIONS

THE ARTICLE “Good Design” (March-April 2015) referred incorrectly to the nonprofit with which Toshiko Mori Architect (TMA) partnered in Senegal as “Le Kinkeliba.” After the French medical nongovernmental organization Le Kinkeliba ceased operations, its American affiliate changed its name from American Friends of Le Kinkeliba to American Friends of Le Korsa—TMA's partner. The article also described the brickwork patterns in TMA's Senegal project as reminiscent of Bauhaus tapestries; they were in fact meant to evoke the brickwork of Bauhaus faculty member Josef Albers. The article stated as well that a public interest design certificate program at the University of Minnesota launched last fall. That program's timeline has been pushed back, and a similar program—the first of its kind—has since launched at Portland State University.

Vijay Iyer (Harvard Portrait, March-April, page 23), is Rosenblatt professor of the arts.

An editing error caused the misspelling, in a caption, of the name of education professor Tina Grotzer (“Computing in the Classroom,” March-April, page 49).

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Pre-Pixel Portraits

An exhibition of College class albums

LONG BEFORE SELFIES, Harvard graduates had a powerful instinct to preserve their class identities in portraiture: 85 of the 88 members of the College class of 1852 traveled to Boston to sit for daguerreotypes, unique images captured on silvered copper plates, collected in a wooden chest (see “Class Act,” *Treasure*, May-June 1999). That first class “album” and successor albums of paper-based salt prints, through 1864, and the 1865 images using a new technology, are explored in “We Carry with Us Precious Memorials,” on display in Pusey Library through May 29. (The title derives from the heartfelt sentiments of Charles Carroll Tower, A.B. 1855, reflecting on “college associations.”)

Although meant to preserve cherished moments, the albums also reflect a period of dynamic change. The year after the inaugural daguerreotypes, photographer John Adams Whipple improved upon fibrous salt prints (which enabled multiple copies of an



James M. Freeman wrote in his diary about having his picture taken in 1859; **Aaron Molyneux Hewlett** (bottom left), from an album image, with gear, was an instructor and curator of the Harvard Gymnasium, 1859-1871, and thus one of the first African-American faculty members.

image) by coating glass-plate negatives with albumen, from hens’ eggs, and honey: the “crystalotype.”

At once, the album morphed to paper form: small notebooks, initially, that expanded quickly to massive tomes, finely bound, embossed, with marbled endpapers and gilt edges, to which classmates added successor images later in life. They were also embellished with prints of Harvard buildings like Gore Hall, the new library built in 1844 (shown left); professors (Henry Wadsworth Longfellow, Louis Agassiz, Oliver Wendell Holmes); and such figures as the “good-ies,” as housekeepers were then known (above). Happily, the Harvard Archives, created in 1851, was there to receive the first albums.

Harvard itself boomed, with Gore Hall and other new buildings like the College Observatory—the fruits of that era’s philanthropy. Entrepreneurship blossomed, too, as George Kendall Warren, the commercial photographer who made the portraits from 1861 on, distributed order forms for customizable albums, and peddled his services to Brown, Dartmouth, Princeton, Williams, and Yale.

The albums show the College also at-

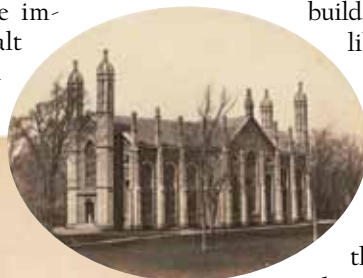
tracting students from beyond New England—and the world, in turn, intruding on Cambridge. Alongside the baby-faced William Yates Gholson, of Cincinnati, in the 1861 album, a later correspondent wrote, “killed at Hartsville Tenn. 7th Dec 1862 aged 21,” leading a Union infantry unit.

Beyond its human interest, the exhibition, produced by the Archives and the Weissman Preservation Center, documents photographic technology evolving, and is part of the center’s effort to preserve and enhance Harvard’s holdings of salt prints.

The class of 2015 will be amazed not only by the albumen, but also by the pervasive treacle, as in this Senior Dinner Poem, cited from the *Harvard Advocate* of January 14, 1889: “Just hand me my album, the class one, my dear, It’s a long time since I’ve seen the old faces, I fear. My honest old class-mates, dispersed far and wide, Drifting ever apart on eternity’s tide.” Pixel self-portraitists may not match what the exhibition organizers call the “remarkable detail and tonal rendition” of these formal 1800s images—but can surely improve upon the poetry. —JOHN S. ROSENBERG



Visit harvardmag.com/extras to view coverage of the 1852 class “album.”



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Netflix has grown to over 57 million streaming members in nearly 50 countries, as disclosed in its SEC filing on Form 10-K for the fiscal year ended December 31, 2014. © 2015 Morgan Stanley. CRC1122255 04/15