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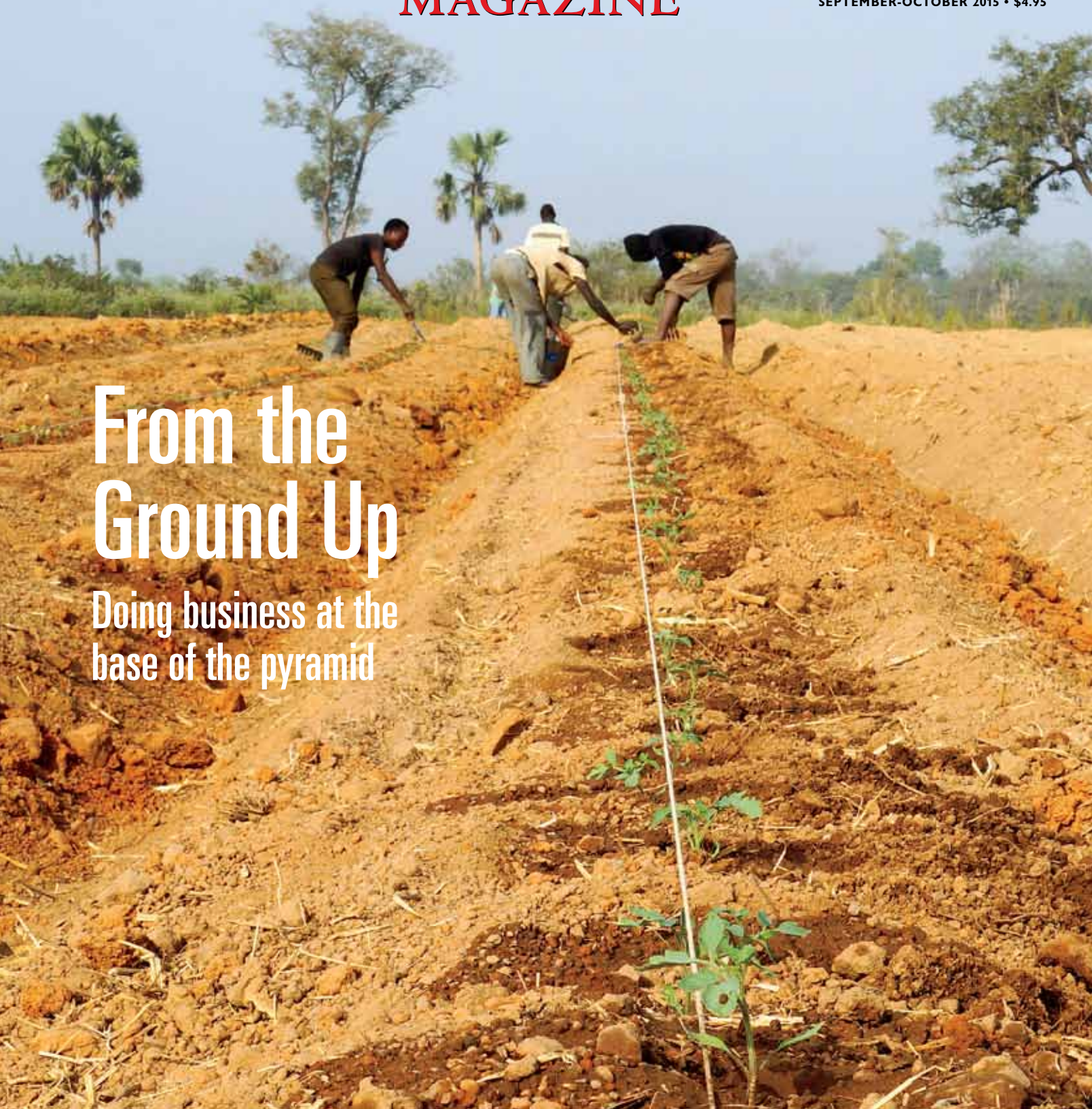
HARVARD

MAGAZINE

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From the Ground Up

Doing business at the
base of the pyramid

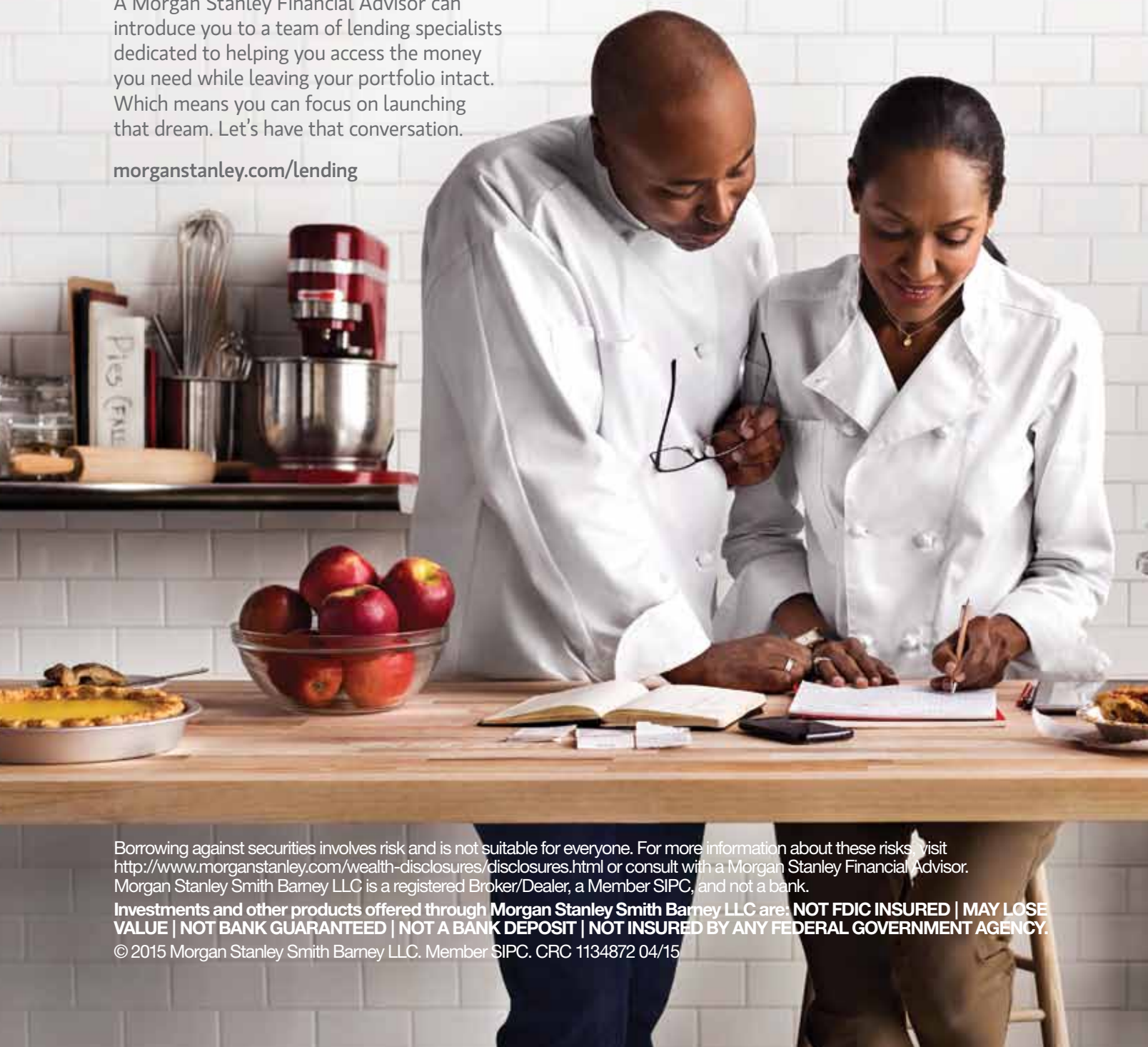


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HARVARD

MAGAZINE

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On the cover: Tomato Jos’s farm field, in Nasarawa State, Nigeria. Photograph courtesy of Tomato Jos

Cambridge 02138

Mary Sears, Gen Ed, football concussions

INFRASTRUCTURE AND OLYMPICS

I HAVE LONG FELT that a large, modern city cannot function efficiently without free public transportation (see “Why Can’t We Move?” by Rosabeth Moss Kanter, July-August, page 42). The key words here are “efficiently” and “free.” A large building wouldn’t function efficiently without vertical transportation, yet we do not charge

a person a nickel for each ride on an elevator or a penny for each ride on an escalator. Why should we expect a large city to function without similarly free horizontal transportation?

Of course there is no free lunch, and the vertical transportation in a building is free to the users only because it is paid for by the tenants as part of their rent. Simi-

7 WARE STREET

Sharing Governance

ONE SHIBBOLETH of academic life is “shared governance”: involving faculty members in shaping the direction, even the management, of their institutions. In theory, that makes the operation of the academy more consensual—if also messier and less efficient—than other sectors of society, like business.

Princeton president emeritus William G. Bowen and Eugene Tobin examine the concept in their recent *Locus of Authority* (Princeton). Their subject “is really about leadership, and how it is both constrained and exercised” in the college or university. They note, “Faculty are not generally in a position, nor are they responsible, for providing institution-wide leadership on their own.” But “faculty can either encourage (and facilitate) the wise exercise of leadership by others or...throw...sand in the wheels.”

At some universities, a faculty senate enables deliberation and voice. Stanford has one; Yale’s arts and sciences faculty recently created one—with 60 percent of members voting in the initial election, a participation rate many times that at regular faculty meetings. (That would be true in Cambridge, too.) But in a centralizing era of investing in information systems, complying with federal regulations, and mounting massive capital campaigns, no such legislature has advanced at Harvard—not

even during the governance crisis of the late 1960s and early 1970s, when a senate was discussed. Today, administrators probably wouldn’t welcome the aggravation; professors probably don’t want the extra work.

But a model for valuable, if less formal, consultation exists. MIT’s recent task force on its educational future engaged the whole community in work that has accelerated online learning, laid the foundation for involvement in K-12 education, and provided the architecture for fundraising. A “conversation on climate change committee” similarly reached constituents across campus; its suggestions may not all advance, but they broaden debate and understanding. Even when lobbying Congress for more funds to combat an “innovation deficit,” MIT put its professors’ expertise forward.

All that is shared governance, based on MITs most valuable coin, its intellectual capital. The innovation could very productively travel upriver.

* * *

ZARA ZHANG ’17, our Daniel Steiner Undergraduate Editorial Fellow this summer, contributed deeply reported, well-written articles online, on subjects ranging from the arts and humanities to urban design. Enjoy her work at the redesigned harvardmagazine.com, and in this issue on pages 7 and 8. We were lucky to have her as a colleague, and thank her for her outstanding work on readers’ behalf. —JOHN S. ROSENBERG, Editor

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Shedding Light through Social Science

Earlier this summer, I announced that Douglas Elmendorf, who most recently served as director of the U.S. Congressional Budget Office, will be returning to Harvard in January to serve as dean of the Harvard John F. Kennedy School of Government. In the course of the search, and in my many conversations with faculty, staff, and students across the School and the University, I saw how research in the social sciences is expanding understanding, informing policy, and improving lives. The new dean received his Ph.D. in economics at Harvard and is himself an example of how social science has shaped our nation. His expertise provided him with the analytic skills to bring objective, non-partisan budgetary assessment of legislation into a political environment that too often emanates more heat than light.

New capacities that have emerged in the social sciences in recent years have rendered them increasingly valuable. Staggering computational power has made it possible for researchers to collect and extract knowledge from “Big Data,” massive amounts of newly available information. More refined analyses are deepening what we know of ourselves, of the relationships we form and sustain, and of the structures and societies we choose to create. The Dataverse Network Project, created by Harvard’s Institute for Quantitative Social Science, hosts and manages more than 750,000 files—the largest collection of research datasets in the world. Utilizing everything from clicks, hashtags, and “likes” to census data, social security records, and tax files, faculty across the University are exploring issues that range from the effects of incarceration on labor markets to efforts to close the nation’s racial achievement gap to challenges to privacy and confidentiality.

Harvard is poised to align our extraordinary array of research activities with emerging and existing data science platforms, convening faculty and educating students who will continue to bring new levels of technical sophistication to their work not only in the social sciences, but also in business, law, medicine, policy, public health, the natural sciences, and the humanities. The nature of censorship in China, to give just one example, can be explored by monitoring the types of communication suppressed by the government, a project that relies on sifting through millions of social media posts.

At the same time, real-world experiments can inform economic, political, and social theory. Are people more likely to save for retirement with the help of targeted brain stimulation? Can gender bias in hiring, promotions, and work assignments be overcome by evaluating candidates jointly rather than individually? How do malnutrition and sleep deprivation among low-income individuals influence economic outcomes? Faculty supported by cross-school research programs such as the Behavioral Insights Group and the Foundations of Human Behavior Initiative are answering these and other questions by undertaking discipline-spanning research that



can shape everything from the decisions we make at the grocery store to the votes we cast in the ballot box.

The rapidly expanding social sciences landscape has also been enhanced by the increasing prominence of creative and powerful visualizations that identify and communicate important insights. Award-winning work by one of last year’s Harvard College seniors elegantly combined socioeconomic profiles of New York City residents with storm surge risk, revealing additional implications for disaster preparedness and urban planning. The acceptance of an idea, the development of a trend, or the spread of a disease: we now have new ways of seeing and understanding change across time and space. The social sciences deploy these methods to great effect, challenging long-held assumptions and sharing knowledge in dramatic and meaningful ways.

This is a time of remarkable promise for the social sciences. Yet short-sighted federal funding cuts are threatening our ability to answer questions that have the potential to inform and shape all of our lives. The last 51 of the United States’ recipients of the Nobel Prize in Economics were supported by the research divisions of the National Science Foundation’s Directorate for Social, Behavioral, and Economic Sciences, which may soon face a more than 50 percent reduction from current federal funding. If we hope to address complex and consequential issues such as climate change, global pandemics, and inequality and human rights, we cannot ignore unique insights into the human and behavioral that the social sciences alone can provide.

Sincerely,

Drew Faust

larly, the city's horizontal transportation should be paid for through real-estate taxes. Some will say they shouldn't have to pay for public transit if they don't use it, but every city dweller does "use" public transit even if they don't "ride" on it. After all, the city wouldn't exist as we know it if it didn't have public transit.

Recall what happened when public transit was unavailable during last winter's storms. The disaster goes beyond city limits, so even state subsidies for free city public transportation should be used. Illinois would not be what it is without Chicago, or Massachusetts without Boston, or Georgia without Atlanta.

ETHAN JACOBS '62
Chicago

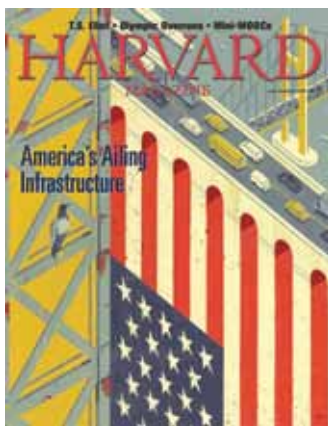
THE U.S. INFRASTRUCTURE? Apparently George Bush thought it more important to rebuild the infrastructure of Baghdad. Then there were the lost billions on similar ventures in Afghanistan.

No political will, no way.

A.E. SANTANIELLO, PH.D. '61
Dana Point, Calif.

PROFESSOR KANTER presents memorable and interesting stories to raise public awareness of the obviously poor condition of our transportation infrastructure. Although she pinpoints "chronic underinvestment" as the culprit for the condition of Boston's T and, by association, the country's infrastructure, she offers no specific funding solution other than a "national narrative." More discussion is not the catalyst to provide the "will" to invest in infrastructure. "Will" would follow if a specific long-term funding plan, i.e., a tax beneficial to all constituencies, were offered that generated the \$1.5 trillion to \$2 trillion needed to repair and enhance our bridges, roads, and water systems. Such a tax, unlike the regressive fuel tax, would take, like Robin Hood, from those most able to pay, invest in infrastructure, create millions of new high-paying jobs, and result in enhancing the investable assets of those who pay the tax.

Here's how it would work. First: remove the cap on the payroll tax (currently 6.2 percent, capped at \$118,500) for earned income



of \$500,000 and greater—which, according to the Political Economy Research Institute (PERI) at UMass Amherst, would yield \$120 billion per year. Second: invest the \$120 billion along with the current \$40 billion generated from fuel taxes to produce a world-class infrastructure. This investment would create three million jobs, based on PERI research. Third: the three million new jobs would decrease the unemployment rate 1.9 points, to 3.6 percent. Economic research reveals that a one-point decrease in the unemployment rate increases the S&P 500 by 3.4 points. Thus the three million jobs would increase the S&P 500 6.46 percent. Fourth: According to Fidelity Investments, people with earned income of \$500,000 or more have investable assets of \$5 million. Removing the payroll tax for these people will increase their investable assets by 6.46 percent or \$300,000—which would more than offset their tax increase of \$24,000. Not a bad trade!

Goodbye to potholes, congestion, and middle-class wage stagnation. Hello to world-class infrastructure and improved fortunes for all Americans. Given Kanter's communication skills, I hope she would become an advocate of this plan, or of some variation, to give it "will" through public and political exposure.

JOHN A. SIMOURIAN
Needham, Mass.

THE EFFORT to inject common sense into the current Olympic fever in Boston ("A Faustian Fiscal Bargain," by Andrew Zimbalist, July-August, page 39) and the informative article "Why Can't We Move" are both outstanding and offer an all-too-neglected dose of realism. Many thanks to the authors and the magazine.

JOHN T. HAZEL JR. '51, LL.B. '54
Broad Run, Va.

Editor's note: The U.S. Olympic Committee ended Boston 2024's bid on July 27.

MARY SEARS

As THE intelligence briefer for the commander of the U.S. Pacific Fleet, I have more than once uttered words to the effect of, "Admiral, the hydrographic survey ship

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USNS *Mary Sears* is currently conducting operations in the Western Pacific....” To my shame, I knew almost nothing of the ship’s illustrious namesake until I read Peter Denton’s wonderful pocket biography of Commander Sears (Vita, July-August, page 46). As one of a relative few Harvardians currently on active service, I am always eager to talk up Harvard’s many contributions to the national defense, particularly involving the Navy. My thanks to Mr Denton and *Harvard Magazine* for illuminating for me yet another fine example of Harvard’s links to the Naval Service.

LT. BEN CLICK ’06
Pearl Harbor

WHILE TAKING nothing away from the wartime contribution of Mary Sears and her Oceanographic Unit (OU) in preventing another World War II amphibious assault disaster after the one at Tarawa, some mention ought to have been made of the courageous men who, while reconnoitering the beaches and destroying defensive obstructions, often under fire from the islands’ defenders, actually collected the data that was later analyzed by the OU. These men were the U.S. Navy’s Underwater Demolition Teams (UDT), founded and led by Draper L. Kauffman, who were the forerunners of today’s Navy SEALs.

G.W. SCHMIDT, M.B.A. ’79
Willow Street, Pa.

IF NOBODY from the Greatest Generation has indicated that the B-29, not the still-in-service B-52, was the bomber used to bomb Japan, I wish to do so.

EUGENE LIPKOWITZ ’60
Wyckoff, N.J.

Editor’s note: Mr. Lipkowitz was the first of many correspondents to correct our obvious historical error. The B-52 entered service in the 1950s.

UNDERGRADUATE EDUCATION

FROM THE far-off “Fifties,” superstars Reuben Brower, John Finley, and John Conway (former masters of Adams, Eliot, and Kirkland Houses), Edward Purcell (1952 Nobel Prize in Physics), Sam Beer, and others would salute Professor Louis Menand’s critique of the sad state of what *Harvard Magazine* describes as “the College’s flagship general-education curriculum...” (University News Briefs, July-August, page 32). In those distant

days, every Harvard and Radcliffe first- and second-year student was required to complete one full Gen Ed course in each of three broad areas: only 18 (not 574) two-semester courses qualified for “Humanities,” “Social Science,” or “Natural Science” credit, plus a two-semester Gen Ed A writing course required of virtually all entering freshmen.

Memorable was “Hum 6” (literary classics), taught in my freshman year by humanist Ben Brower, an English professor like Menand; Brower’s edition of Alexander Pope’s translation of *The Iliad* in rhyming couplets is on my shelf. Ed Purcell’s Nat Sci 2 brought physics, astronomy, and history of science to nonspecialists; John Conway’s Soc Sci 6 discussed the English, American, French, Industrial, and Russian Revolutions through the eye of a gravely wounded Canadian World War II hero. (Conway was described in his *New York Times* obituary as “a scholar and teacher who sees no gulf between his life with books and his life with students.”) John Finley in Hum 2 and Sam Beer in Soc Sci 2 were campus-wide idols. The list goes on.

Those scholar-teachers would not have imagined Menand’s description of faculty views that Harvard College “[d]epartments don’t normally generate courses for the nonspecialist, or...prepare students for life after college.” For three close friends who pursued careers as classicist and educator, as international banker (with Harvard Ph.D.), and as international lawyer-manager, everything started in Hum 6 with Ben Brower and with the other senior faculty who—in only 18 Gen Ed courses—“prepared students for life after college.”

TERRY MURPHY ’59, O.B.E.
Bethesda, Md.

FOOTBALL INJURIES

I HAD ONE concussion playing college football, but that one was a doozy. My class notes only became legible and minimally coherent on the Friday after the Saturday game. And, like Chris Borland, I’ve read *League of Denial*.

So I found “Tackling Football Trauma” (July-August, page 7) perplexing. Why is Harvard taking money to help the National Football League change the subject and evade the issue for another 10 years?

The subject is concussions in pro football; repeated hits to the head damage players’ brains and ruin their lives. The issue is how to stop the hits to the head.

None of Harvard’s NFL-funded studies address the issue.

What’s needed is to stop the hits to the head. Abolish pro football? No. Change it.

Two suggestions: Let every player on offense receive a forward pass. The 300-pound athlete with braces on his knees would re-emerge lighter and faster. The game might somewhat resemble ultimate Frisbee, but it would still be football. And penalize any hit to an opponent’s head—purposeful or not—with immediate ejection from play. Lower-on-the-body tackling would result, with more grabbing and wrapping up instead of smashing. Lower blocking, too. The game might somewhat resemble rugby, but it would still be football.

When they abolished the flying wedge, it didn’t kill the game. Same now. Given radical reforms of the sort I suggest, pro football would be a more wide-open game. More, and more varied, offensive and defensive strategies would be possible. Thrilling to watch, but with far less damage to brains.

The NFL, with its 10-year, \$100-million Football Players Health Study, is investing in delay and evasion. Unfortunately, Harvard is helping.

DAVID BERGER, M.B.A. ’55
Madison, Wisc.

Editor’s note: The project is in partnership with the National Football League *Players Association*; the union won annual funding for medical research, among other benefits, after fractious contract negotiations with the NFL in 2011. After the article was published, the Medical School advised that the study duration and cost are in flux and have not been publicly revised since the project was announced in 2013, and that the goal of the study, since it launched in 2014, is to reach as many of the estimated 20,000 former NFL players as possible; the originally announced goal was to recruit “at least 1,000 retired athletes.”

ONLINE EDUCATION

KUDOS TO Harvard for innovating in on-line education, and kudos to Stephanie Garlock for her thoughtful article on the progress of Harvard’s early experiments in that area (“Is Small Beautiful?” July-August, page 48). Unfortunately, however, Garlock goes astray



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LETTERS

when she contends that “SPOCs” (small, private, on-line courses) are some kind of new innovation, growing out of mixed success with MOOCs (massive open on-line courses). In fact, SPOCs, some with participation by both on-line and resident students, have been used for years by institutions such as the University of Southern California, Georgia Tech, Columbia, Pennsylvania State University, and others, to teach engineering and other disciplines to distance students. These courses may not always “communicate the complex skills taught in college classrooms” (to quote her summary of Harvard’s ambitions), but they certainly have succeeded in providing high-quality education to many people for whom it would not have been easily available otherwise. That record should not be overlooked.

MIKE FOREMAN-FOWLER '91
Cambridge

T.S.E.

T.S. ELIOT was a close Harvard friend of Conrad Potter Aiken (see “The Young T.S. Eliot,” July-August, page 54). Both were grandsons of distinguished Unitarian ministers: William Greenleaf Eliot and William James Potter. The latter’s son, Alfred J. Potter, was a librarian at Harvard College. He was notoriously shy and uncomfortable in society. Eliot and Aiken were frequent visitors in the Potter home on Fayerweather Street. Eliot saw much of Uncle Alfred. Alfred J. Potter; J. Alfred Prufrock?

Ironically, as an adult Aiken discovered that Uncle Alfred had a rather raucous secret life.

REV. RICHARD A. KELLAWAY, B.D. '61
Dorchester Center, Mass.

VITAMIN D DOSAGES

I AM NOT a healthcare specialist, but read “Is Vitamin D a Wonder Pill” (May-June, page 14), by Sophia Nguyen, with interest. My wife and I have received repeated pleas from doctors to consume more of this wonder sub-

stance. New Englanders are often told that we cannot get sufficient exposure to sunlight in these “northern latitudes” for our bodies to make sufficient vitamin D in winter. Readers were spared this, and a quick look at the atlas would show that most people in Britain live at the latitude of Labrador and many Norwegians and Swedes live even further north. I am one of these northern types and have never experienced a broken bone and do not know of one in my family. Furthermore, of my many relatives who have become older than 90, I know of none with osteoporosis.

This is not to say that vitamin D is unimportant or does not play a role. Lifestyles have changed, as have diets. But I was pleased to see the qualifying note of caution in this article about the use of vitamin D supplements. It seems that the medical profession is in search of a number to define a “normal” vitamin D level. Perhaps this is a false search, because it assumes that all humans have the same requirements. Needs may vary, and the impact of a vitamin supplement may vary, too.

IVOR P. MORGAN, D.B.A. '80
Lexington, Mass.

SCARCITY AND POVERTY REDUX

SURELY THE letter in your July-August issue (page 4) from Dr. Mitchell Levin was a joke, right? His comments are so Dickensian (“poverty is a choice”) and his recitation of the “overwhelmingly broad safety net” suffers only by its omission of workhouses and prisons. Yikes.

LEE BISHOP '72
Louisville, Ky.

EDITING LAPSE

MY WIFE’S July-August issue arrived today, and I was perusing it casually when my eye fell on this passage near the foot of page 76 (“Mystery Solved,” The College Pump): “Saunders [curator at the Harvard Club of New York] cares for a collection of more than 2,000 items comprising about 100 painted portraits of Harvard men and women and some 50 mounted taxidermy specimens....”

Rather gave me pause.

BOB KITTREDGE, MIT '66
Newtonville, Mass.

INVESTMENT-MANAGER EARNINGS

FOR THE PAST 10 YEARS or more, Harvard Management Company has significantly underperformed the Standard and Poor’s 500. Yet their
(please turn to page 74)

Right Now

The expanding Harvard universe

THE UPPER RANGE

“Cowboy Doctors” and Health Costs

WHO'S DRIVING UP U.S. healthcare costs? A recent study by Harvard professors and colleagues revealed that the culprits may be “cowboy doctors”—physicians who provide intensive, unnecessary, and often ineffective patient care, resulting in wasteful spending costing as much as 2 percent of the nation's Gross Domestic Product—hundreds of billions of dollars annually. The authors, including Eckstein professor of applied economics David Cutler and assistant professor of business administration Ariel D. Stern, found that physicians' beliefs in clinically unsupported treatment procedures can explain as much as 35 percent of end-of-life Medicare expenditures, and 12 percent of Medicare expenditures overall.

Physicians treating a critically ill patient may decide either to provide intensive care beyond the indications of clinical guidelines (such as implanting a defibrillator to counter severe heart failure), or attempt to make the patient more comfortable by administering palliative care. The researchers called the former group “cowboys” and the latter “comforters,” and found that their respective concentrations in a

region closely tracked end-of-life spending as a whole. “It was absolutely amazing how strong [the correlation] was,” Cutler said. The data indicate that cowboy doctors tend to congregate in southeastern states such as Florida. They are also more likely to be male, and less likely to be specialists.

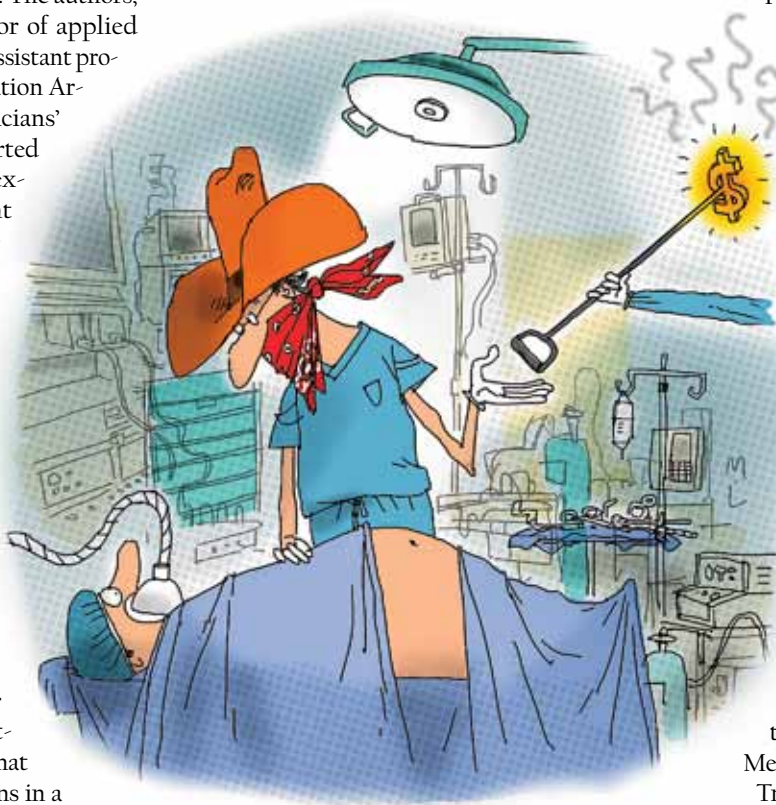
Though these cowboy doctors may be pushing the frontier of medicine by going above and beyond, said coauthor Jonathan

Skinner, a professor of economics at Dartmouth, clinical evidence showed little or no marginal benefit derived from the extra procedures, resulting in wasteful spending. Cutler suggested that doctors' beliefs in these ineffective treatments may spring from their self-perception as “interventionists”: “I think some doctors are saying: ‘I just can't accept that this patient is dying and there's absolutely nothing I can do. I've got to do something.’”

The study noted that very few doctors wanted to discuss the option of palliative care with patients, prompting Cutler to draw an analogy to auto mechanics: “You want this engine fixed, I'll fix it. I'm not going to talk to you about whether you should get a new car—that's someone else's' job.”

But as a result, he said, patients are “Ping-Ponged back and forth” between the primary-care physician, who recommends a specialist, and the specialist, who prefers to leave the question of whether certain treatments are necessary to the primary-care physician. Meanwhile, medical bills rise.

Traditionally, researchers at-



tempt to get a picture of physicians' beliefs by analyzing their actual behaviors. The problem is that other actors, such as patients, can have a say in these behaviors as well. The ability to tease out doctors' actual beliefs proved to be the study's biggest innovation, Cutler said. This was achieved by using "strategic surveys" that included vignettes of specific patient scenarios, and asking the responding physicians what they would do in each situation. Such surveys are often used in other areas of social science, Stern explained, but had rarely been used before to study healthcare economics.

Self-reports are sometimes unreliable, because respondents attempt to give the "textbook answer" rather than express their true beliefs. But this time, the researchers found that many physicians reported making decisions supported neither by clinical guidelines nor by medical literature. "Doctors are basically not relying on public scientific evidence," Skinner said. "They are relying on their own

beliefs, developed through...time."

The study also found that most doctors who recommended unnecessary procedures weren't seeking extra income—suggesting to Cutler that the lack of financial *penalty*, rather than the presence of financial *reward*, accounts for "cowboy" doctors' actions. The healthcare system's current incentives, he said, often do not prompt doctors to ask the right questions, such as whether a proposed treatment truly benefits the patient. "If doctors restrict themselves to performing what is evidence-based," Skinner pointed out, "we can save hundreds of billions of dollars a year."

According to Elliott Fisher, a professor of health policy at Dartmouth, a movement is under way to shift the healthcare-payment system toward incentivizing concrete benefits for patients. (A case in point is the hundreds of accountable-care organizations around the country, which seek to reward high-quality, low-cost care.) The new study, Fisher suggests, is important because it highlights a power

imbalance in the physician-patient relationship: doctors tend to follow their own beliefs about the right treatment to use, leaving patients little say in the process. How to treat a patient is often a multiple-choice question without a straightforward, single "correct" answer. When making these decisions, Fisher said, doctors should pay more attention to the patient's preferences, instead of relying on their own experience.

The research suggests that it's time for the cowboys to rein themselves in, and learn to listen.

~ZARA ZHANG

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ICE, NOT OCEANS?

New Light on Ancient Mars Climate

COULD LIFE ever have survived on Mars? Scientists have long thought that billions of years ago, the climate of Mars was similar to that of early Earth: warm and wet. Now, a recent study by a Harvard scientist and his colleagues has concluded that Mars was

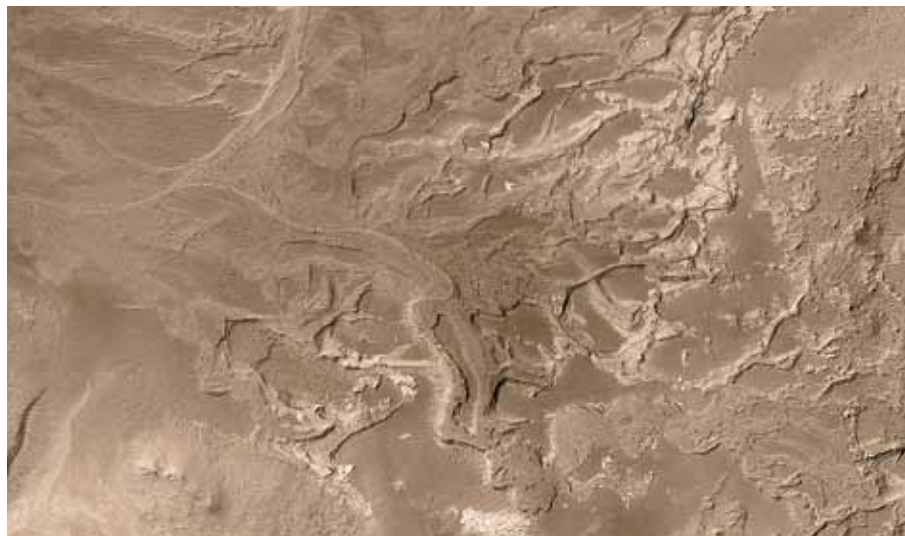
likely cold and icy instead, raising new questions about the prospects for life on Earth's closest cousin.

Assistant professor of environmental science and engineering Robin Wordsworth, along with other scientists, conducted the first direct comparison between the two

scenarios—"warm and wet" and "cold and icy"—using a three-dimensional model that ran on a super-computer at Harvard. The researchers found that the "cold and icy" model did a better job of explaining the water-erosion features that have been left behind on the Martian surface, such as the distribution of valley networks.

"The use of a three-dimensional, instead of one-dimensional model, is a technical advance from other studies in the field," said Bethany Ehlmann, an assistant professor at California Institute of Technology who reviewed the paper, "Comparison of 'Warm and Wet' and 'Cold and Icy' Scenarios for Early Mars in a 3D Climate Model" (published online on June 26 in the *Journal of Geophysical Research—Planets*). "Wordsworth et al. are at the top of the game here in terms

Fossil river deltas on Mars, such as this one in Eberswalde Crater, bear many similarities to river deltas on Earth. Such features suggest that Mars once had flowing liquid water on the surface, motivating study of the planet's early climate.





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As a separately incorporated, nonprofit affiliate of Harvard University, we have

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of pulling in the latest three-dimensional simulations, in particular for ice.”

According to Wordsworth, the period the study targeted—three to four billion years ago—is particularly fascinating because that was when life first emerged on Earth. If Mars had hospitable climate conditions during that era, then it’s plausible, he said, that it could have sustained life as well.

A cold and icy Mars would have been inhospitable to life, he explained, but does not rule out its existence: microbes still survive in some of Earth’s coldest areas, such as Antarctica. Results of the study will inform future attempts to search for life on Mars by narrowing down possible target locations. “It tells us that if we want to look for life on

Mars, looking at the surfaces may not be the best idea,” he said. “The surface would have been very inhospitable. Instead, looking at subsurface locales and specific niches might be the best approach.”

Edwin Kite, an assistant professor at the University of Chicago whose specialty is the Martian climate, said a better understanding of the planet’s historical climate can also help answer the question of how to make Mars—currently an “unpleasant” place to live—habitable again. “The better we understand Mars in the past,” he said, “the more we improve our option for changing it for a living place in the future.”

The new study raises further questions about the mechanisms that produced signs

of erosion on Mars, which suggest the presence of water. Given that Mars was likely cold and icy, any extensive melting would have required a source of warmth. Where this heat came from remains a mystery. “There are discrepancies, where neither one of the two climate scenarios tested predicts valley networks,” Ehlmann said. “So we’ve got some head-scratching to do to figure out what processes were controlling those.”

~ZARA ZHANG

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A BYE FOR BUSINESS

The Company We Keep

WHEN YOU USE Facebook, Twitter, Instagram, and other social-media platforms, are you more likely to trust the friend who constantly posts job, relationship, and vacation updates, or the friend who shares little, if any, personal information? Two recent studies by Harvard

Business School scholars delving into “over-sharing” online show surprising differences in the cost to individuals, as compared to businesses, from keeping information offline.

In “What Hiding Reveals,” assistant professor Leslie John and her co-researchers, associate professor of business Michael Norton and doctoral student Kate Barasz, found

that hiding potentially negative information may make people seem more untrustworthy than revealing it does—no matter how ugly the information. The research, John says, derived from her own curiosity about Facebook, as someone who prefers not to share much information online. She also looked at studies by Web analysts, including one by Altimeter that explored the question: Are job candidates who do not have a Facebook account hiding something?

According to John, Facebook was designed to make sharing salient. People tend to notice those who share, and neglect those who don’t, “which makes you believe that [sharing] is even more common than it is,” John says. “It made me wonder, ‘What do people think of me? Do they think that I’m explicitly hiding stuff?’”

To test this idea, she and her colleagues conducted several experiments; in one, they asked participants to decide between two potential dating partners based on online profiles. Each profile contained answers to questions such as: “Have you ever neglected to tell a partner about an STD you are currently suffering from?”; “Have you ever had a fantasy of doing something terrible (e.g., torturing) to somebody?”; and “Have you ever made a false insurance claim?” The multiple-choice reply options ranged from “Never” to “Frequently,” but also included “Choose Not to Answer.”

To their surprise, the team found that participants were much more likely to choose the person who answered all the questions, rather than someone who chose not to answer—even when the potential dating partner answered “Frequently”



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NICHOLAS BARTLETT

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EPA's Fine-Particle Pollution Standards May Be Too Loose

New public-health study finds that air pollution below EPA standards still endangers health. **harvardmag.com/particles-15**

about bad behavior. "The finding is that people view those who abstain from disclosing as very untrustworthy," John says. "This leads to some pretty interesting phenomena": in some situations, coming clean about past misdeeds makes a person appear more trustworthy.

But people generally don't hold businesses accountable in the same way. In "Is No News (Perceived As) Bad News? An Experimental Investigation of Information Exposure," assistant professor Michael Luca reported that individuals are likely to give businesses the benefit of the doubt, even when companies fail to fully disclose bad news.

For example, restaurant owners know the results of their hygiene-inspection rankings. Car manufacturers know the gas mileage of their cars. Salad-dressing companies know how many calories their dressings contain. But "when you look at the world around us," Luca says, "it's pretty

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clear” that many businesses aren’t disclosing all the information they have.

Truth-in-advertising laws, he points out, stipulate that companies must provide verifiable information to customers. But businesses can choose whether to provide such information. “When a business chooses not to disclose information,” he says, “customers must then infer whether no news is *bad* news or *good* news.”

Another example of such nondisclosure, Luca continues, occurs when movie studios release a movie they know will be panned and therefore deliberately withhold preview screeners from critics. Moviegoers, he points out, should be leery of

“When a business chooses not to disclose information, customers must infer whether no news is *bad* news or *good* news.”

a film with no reviews, but will generally go see the movie anyway. The takeaway from such examples, he says, is that, “as a consumer, you shouldn’t just think about what information they’re giving you. You should also think about what information they *could* be giving you.”

When it comes to *individuals*, John’s study shows that sharing, rather than withholding, builds trust—even when the shared information is unfavorable. When it comes to *businesses*, though, Luca’s study shows that consumers systematically embrace the notion that “no news is good news”—leaving sellers free to seize an advantage by strategically withholding detrimental data.

—LAURA LEVIS



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www.aneveningwithchampions.org

The forty-fifth annual ice-skating exhibition features ice dancers, synchronized skating

teams, and Harvard's own figure-skating club, along with enduring, new, and aspiring Olympians. All event proceeds benefit the Jimmy Fund of the Dana-Farber Cancer Institute. (September 18 and 19)

From left: *Girl in White Dress with Black Cat* (ca. 1830-35), by Zedekiah Belknap, at the Worcester Art Museum; examples of Josiah McElheny's "Walking Mirrors" at the Carpenter Center; from *Archangel*, by visiting filmmaker Guy Maddin, at the Harvard Film Archive

FILM

Harvard Film Archive

www.hcl.harvard.edu/hfa

A retrospective of the vintage-style films of Canadian artist (and current visiting lecturer) Guy Maddin includes *Archangel* and *The Forbidden Room*. (October 2-12)

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FROM LEFT: COURTESY OF THE WORCESTER ART MUSEUM; COURTESY ANDREA ROSEN GALLERY, NEW YORK; PHOTOGRAPH BY JESSICA EDKERT; HARVARD FILM ARCHIVE

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STAFF PICK: Day of the Dead

Día de los Muertos (Day of the Dead)—when families and friends remember and commune with their lost loved ones—is an annual spiritual celebration in Mexico and parts of Latin America. The concept originated with the Aztecs and now combines aspects of Mesoamerican beliefs and rituals with Catholic traditions, especially those enacted on All Saints' Day. The Peabody Museum of Archaeology & Ethnology highlights the holiday on November 1 with its own *Día de los Muertos* family event featuring Mexican folk dances, live mariachi music, sugar-skull decorating, and traditional snacks like *pan de muerto* (bread of the dead).



Traditionally, the holiday is marked by visits to cemeteries to decorate graves and sometimes to sing, play music, and dance. In homes, families adorn altars with photographs of the deceased as well as with the objects and foods they loved, flowers, incense and candles, and religious imagery. The Peabody has its own permanent altar that holds items from the Melvin collection of Mexican folk art; visitors on November 1 may contribute to a separate communal altar that will remain on display for one month. ~N.P.B.

Peabody Museum of
Archaeology & Ethnology
www.peabody.harvard.edu

Masks, mariachi music, and sugar skulls at Harvard's Peabody Museum



urban oasis to **Discover What's Alive Outside** (September 12) and **Explore the Colors of Nature** (October 10).

DANCE

Charles River Museum of Industry & Innovation

www.charlesrivermuseum.org

Of Looms and Lilies, by local

choreographer Jody Weber, examines the effects of the Industrial Revolution's material wealth on the human spirit within the context of climate change. (October 2)

The Institute of Contemporary Art

www.icaboston.org

In Faye Driscoll's **Thank You for Coming: Attendance**, five dancers embody the rigorous and often funny complexities of group dynamics. (October 8-10)

THEATER

American Repertory Theater

www.americanrepertorytheater.org

In **Waitress**, a stage adaptation of the eponymous film, a young woman has the chance

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to escape her small town and loveless marriage. Music and lyrics by Sara Bareilles. (Through September 27) **Kansas City Choir Boy**, starring Courtney Love, follows lovers who are unexpectedly separated by fate. (October 1-10)

LECTURES

Mahindra Humanities Center

www.mahindrahumanities.fas.harvard.edu
The Hauser Forum for the Arts presents "An Evening with David Grossman," the Israeli author of *Falling Out of Time* and *To the End of the Land*. (October 6)

EXHIBITIONS & EVENTS

Harvard Art Museums

www.harvardartmuseums.org

Corita Kent and the Language of Pop explores the artist's 1960s screenprints and films, along with her 1971 mural on the National Grid gas tank in Boston; learn more on page 48. (Opens September 3)

Carpenter Center for the Visual Arts

www.ccva.fas.harvard.edu

Multimedia artist Josiah McElheny has cre-

ated **Two Walking Mirrors for the Carpenter Center**—to be worn by performers who interact with (willing) gallery visitors, perhaps revealing the changeable nature of mental reflections and corporeal perceptions. (October 1-25; check the center's website for show times)

Schlesinger Library

www.radcliffe.harvard.edu

Letters, diary excerpts, photographs, and other artifacts on display in **The Women of the Blackwell Family: Resilience and Change** highlight Elizabeth Blackwell, the first woman in the United States to earn a medical degree, and her industrious relatives. (Opens October 5)

Worcester Art Museum

www.worcesterart.org

Poignant portraits of children are among more than 40 works by the home-grown artists featured in **American Folk Art, Lovingly Collected**. (Through November 29)

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

Spotlight

The Harvard-Smithsonian Center for Astrophysics (CfA) plans to open late on September 27 for a "Lunar Eclipse Party"—because "It's an astronomical party for us," quips public-affairs specialist Christine Pulliam. (Any *real* lunatic celebrants must leave their drinks and dancing outside the observatory.) A total eclipse occurs when the sun, earth, and full moon align and block the sun's rays from being reflected off the moon. Rarely—but very dramatically—the moon turns blood-red. (The next one isn't until January 31, 2018.) On September 27 visitors will go straight up to the telescopes on the roof; totality starts at 10:11 P.M. But check the sky or call 617-495-7461 before heading over. "Clouds or rain?" says Pulliam. "No event." **Harvard-Smithsonian Center for Astrophysics**
www.cfa.harvard.edu



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2015-2016 HOME SCHEDULES

BASKETBALL

MEN'S SCHEDULE			WOMEN'S SCHEDULE		
Nov. 13	vs. MIT	7:45 PM	Nov. 13	vs. Maine	5:30 PM
Nov. 17	vs. UMass	7 PM	Nov. 18	vs. UMass	7 PM
Nov. 25	vs. Bryant	7 PM	Nov. 24	vs. Boston Univ.	7 PM
Dec. 31	vs. Wofford	2:30 PM	Dec. 8	vs. Eastern Mich.	7 PM
Jan. 3	vs. Vermont	2 PM	Jan. 23	vs. Dartmouth	TBA
Jan. 9	vs. Dartmouth	2 PM	Feb. 5	vs. Penn	7 PM
Jan. 12	vs. Ryerson	7 PM	Feb. 6	vs. Princeton	6 PM
Jan. 29	vs. Cornell	7 PM	Feb. 19	vs. Columbia	7 PM
Jan. 30	vs. Columbia	7 PM	Feb. 20	vs. Cornell	6 PM
Feb. 12	vs. Brown	7 PM	Feb. 26	vs. Yale	7 PM
Feb. 13	vs. Yale	7 PM	Feb. 27	vs. Brown	6 PM
Mar. 4	vs. Princeton	7 PM	All games are played at Lavietes Pavilion. Schedule is subject to change.		
Mar. 5	vs. Penn	7 PM			

ICE HOCKEY

MEN'S SCHEDULE			WOMEN'S SCHEDULE		
Nov. 1	vs. Dartmouth	TBA	Oct. 30	vs. Clarkson	7 PM
Nov. 6	vs. Yale	7 PM	Oct. 31	vs. St. Lawrence	4 PM
Nov. 7	vs. Brown	7 PM	Nov. 13	vs. Union	7 PM
Jan. 7	vs. Boston Univ.	7 PM	Nov. 14	vs. RPI	4 PM
Jan. 9	vs. Quinnipiac*	7 PM	Nov. 18	vs. UNH	7 PM
Jan. 15	vs. St. Lawrence	7 PM	Nov. 24	vs. Northeastern	7 PM
Jan. 16	vs. Clarkson	7 PM	Jan. 8	vs. Cornell	7 PM
Jan. 29	vs. Princeton	7:30 PM	Jan. 9	vs. Colgate	4 PM
Feb. 12	vs. RPI	7 PM	Jan. 19	vs. Boston Coll.	7 PM
Feb. 13	vs. Union	7 PM	Jan. 23	vs. Dartmouth	4 PM
Feb. 19	vs. Cornell	7 PM	Jan. 29	vs. Quinnipiac	3:30 PM
Feb. 20	vs. Colgate	7 PM	Jan. 30	vs. Princeton	4 PM
*Played at Madison Square Garden. All other games are played at Bright-Lombardi Hockey Center. Schedule is subject to change.			Feb. 5	vs. Brown	7 PM
			Feb. 6	vs. Yale	4 PM

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An Ipswich Idyll

Restorations revive the grand spirit of a North Shore estate.

by NELL PORTER BROWN



BEHIND THE “Great House” on the Crane Estate in Ipswich, Massachusetts, a vast lawn rolls out half a mile to a bluff overlooking the Atlantic Ocean.

Few New England landscapes are as majestic as this “Grand Allée”—and far fewer are open, year-round, to the public. Even better, visitors to the site are encouraged to picnic, read, lounge, and play games on the grassy slopes, and explore easy walking trails, including one leading down to Crane Beach. Or they may tour the 59-room mansion, a rare survivor of America’s early twentieth-century country-estate era.

“We want people to gather here and enjoy this unique place,” says Bob Murray,



regional manager of Trustees (previously The Trustees of Reservations), which has owned the property since 1949. “Pictures and words don’t do the landscape justice: people just have to come see it.”

In its heyday, the estate on Castle Hill was an opulent showpiece and summer playtime paradise. An Italianate “Casino



HARVARD MAGAZINE/NPB

Clockwise, from top left: the Crane Estate’s palatial abode and hillside Casino Complex; Florence Crane’s marble bathroom; the Grand Allée undulates out to the bluff; and the family living room with wood-paneled walls recycled from an eighteenth-century London townhouse



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ALL IN A DAY: Hull's Lifesaving Legacy

The best route to Hull is by boat. As the MBTA's commuter ferry snakes among Boston Harbor's islands, passengers can eye the treacherous shipping route that gave rise to the town's Point Allerton Lifesaving Station in 1889. Back then, the "small, year-round community had no more than 300 residents; at least a third of them were involved in volunteer lifesaving," notes Victoria Stevens '96, curator of the Hull Lifesaving Museum housed in the former station. The first paid keeper, the highly decorated Captain Joshua James, rescued more than 540 people in 60 years, most from schooners carrying cargo like coal and lumber, along the Atlantic seaboard. In 1902, after a rescue drill, James disembarked on the beach, noted, "The tide is ebbing," and dropped dead.

The museum features the surfboat he and his brother designed, used from the "Great Storm" of 1888 until 1927, along with a 1930s "breeches buoy" cart with a cannon and ropes used (until 1952) to launch a weight attached to a rope onto the deck of a foundering vessel. Survivors were hauled in by a rope-pulley system that included wooden paddles inscribed with instructions in Portuguese, French, Spanish, or English. (The museum also hosts the sobering bostonshipwrecks.org, which maps vessels lost in the harbor.)

The nation's Life-Saving Service (1878) and Revenue Cutter Service (1790) were joined as the U.S. Coast Guard in 1915. "Coasties" replaced lifesavers at the station, before moving in 1970 to the current outpost, barely a mile away. The museum's special exhibit, *The Point Allerton Coast Guard, 1915-2015* (through November 30), celebrates the centennial with models of the Boston Lightship and a 44-foot motor lifeboat, and a four-foot image of the new National Security Cutter *James* (named for the Hull keeper). Other artifacts and oral histories reflect the integral role lifesavers have played in local life and lore. Take Roger: in 1958, the golden retriever wandered into the station, ate a steak off the counter, and never left, Stevens reports—except for joyrides on the town bus and jaunts to

Jo's Nautical Bar. The Coast Guard, with its new global-security mission, may be less of a community lifeline than in Roger's day, but the bar's walls, packed with lifesaving memorabilia and news of modern mariners, signal that Hull's 10,000 residents are still tied

Lifesaving Museum
<http://www.lifesavingmuseum.org>

to life on, and beside,
the sea. ~N.P.B.



The museum, and (clockwise) surfmen with their craft; the boat designed by the James brothers and a "breeches buoy" cart; Joshua James (left), c. 1893; Roger in 1969; the station's former sign

Complex" tucked into the allée's first hillside had a courtyard with a saltwater swimming pool that was bookended by two villas: one housing a ballroom, the other providing "bachelors' quarters" for the young men who visited Chicago plumbing magnate Richard T. Crane Jr., his wife Florence, and their two children. Nearby were a bowling green, tennis court, maze, log-cabin playhouse, golf course, and deer preserve. The Cranes also ran a self-sustaining farm, with livestock, an orchard, and lush vegetable and rose gardens, along with an on-site 134,000-gallon underground water cistern and a coal-fired power plant to supply electricity.

The Trustees can't recreate the Cranes' luxurious utopia. But a three-year, \$1.5-million restoration and improvements project has helped foster the estate's spirit of relaxed sociability and extend aspects of the Cranes' lifestyle to a much wider audience. The 2,100-acre property (which encompasses the nearby Crane Wildlife Refuge) is among 112 sites owned by the Trustees that exhibit "exceptional scenic, natural, and historic beauty" across the state; these range from vegetable farms, a creamery, and rural woodlands to wildlife sanctuaries and community gardens in Boston. The most recent fundraising campaign, spearheaded by president and CEO Barbara Erickson, has promoted improvements to

the nonprofit's "signature cultural resources": Naumkeag, a Gilded Age mansion with gardens, in Stockbridge (see "Spring Forward," March-April 2013, page 24D), and Castle Hill, which are both National Historic Landmarks.

In Ipswich, the restoration focused on the allée



HARVARD MAGAZINE/UC

and the Casino Complex, designed and planted more than a century ago by landscape architect Arthur A. Shurcliff, B.S. 1896. The Trustees pulled out swaths of unfettered growth within and around the allée that had obscured Shurcliff's original vision for decades, and replanted his orderly columns with more than 700 new trees that are growing in nicely. The restored Casino Complex now offers a fine-cut lawn for croquet (the pool was filled in long ago by Florence Crane), framed by a new brick terrace and comfortable chairs and tables. A Mediterranean feel persists, with "wonderful ornamentation: the Bacchanalian relief figures and marble statues," Murray notes. "The whole complex is beautifully integrated within the allée and the house." The former ballroom now holds a café, along with a billiards table, other games, and coloring kits. The original stone fireplace works and may help warm visitors, if needed, through October 16: the end of the season for the

Richard Crane's master bath features white marble; soothing blue and cream tones suit a bedroom with ocean views.



café and Trustees-run events like concerts, outdoor movies, scavenger hunts, and the new guided tours of the Great House. (The grounds themselves are open all year, and two special events are planned: The Crane Estate Art Show and Sale, November 6-8, and Christmas at Castle Hill, December 4-6.)

Those who tour the house as "Guests of the Cranes" are led around by a "maid" or



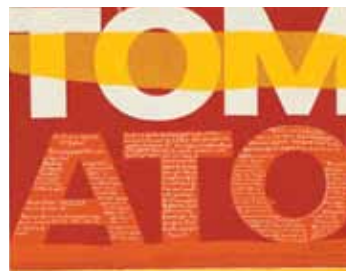
A dreamy Italianesque landscape was recreated on New England's shoreline.

Harvard Art Museums

Fogg Museum
Busch-Reisinger Museum
Arthur M. Sackler Museum

CORITA KENT

Corita Kent, the latest tomato of all, 1984. Screenprint. Collection of Jason Simon, New York, T.L. 4302. © Courtesy of the Corita Kent Foundation and the Corita Kent Foundation, Los Angeles. Photo © Frederick and Elissa of Harvard College.



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“butler” brimming with tidbits on family history and the eclectic décor. The story is that Richard Crane, a fanatical sailor, was on a yacht in Ipswich Bay when he first saw Castle Hill and decided to buy it. He snapped up the first parcel in 1910 and would amass a total of 3,500 acres before his death in 1931—including what’s now Crane Beach. (Privatizing it earned him no friends in town.)

The imposing, Stuart-style English manor—a patchwork of architectural styles such as Baroque and Palladian—was designed by David Adler and completed in 1928. The side facing the allée features a main building with an inset terrace buttressed by two symmetrical wings. Second-floor porches and bay-windowed



HARVARD MAGAZINE/NPB

bedrooms offer stunning views of the water. The interior has a surprisingly rustic and homey feel for a mansion, perhaps due to the hodgepodge of decorating styles—ornate Georgian (Adler salvaged and installed wood-paneled rooms from a 1732 London townhouse, for example), along-

Sweeping views are well worth the half-mile walk across the hilly Grand Allée.

side Greek Revival, Italian Renaissance, and Art Deco.

Most impressive, however, are the bathrooms—befitting a plumbing millionaire. Each of the seven bedrooms has its own, many outfitted with then-cutting edge Art Deco fixtures and one decorated almost entirely in Delft tiles. Richard Crane’s features a large tub with gleaming silver-plated piping and faucets, a shower with 12 nozzles, a white marble floor, and heated towel rack. His wife’s is pale green with delicate glass shelving and loads of gray-veined marble providing an archway over the sink, the tub-surround, and flooring accents.

The Crane Company manufactured iron and steel pipes, valves, and fittings, but starting in 1914, when Richard Crane inherited the top post, he expanded into modern bathroom fixtures; the company’s exhibit at the 1933-34 Chicago World’s Fair featured the “world’s largest shower.” “We like to joke,” says the butler during one tour, “that this is the house that toilets built.” In fact, it was the second one. The Cranes initially built (between 1910 and 1912) a lavish Italian Renaissance Revival mansion designed by the Boston archi-

CURIOSITIES:

Animating a New Species

PVC tubing and zip ties form the essential “bones” of Dutch artist Theo Jansen’s otherworldly yet mobile *strandbeests* (“beach animals”), eight of which are on display at the Peabody Essex Museum (PEM) starting September 19. Included is his latest and never-before-seen *Animaris Umerus Segundus*, along with sketches that offer insight into Jansen’s creative process during the last 25 years; “fossils” of creatures no longer “alive”; and video of some “beests”

traveling in gangly equine elegance along a sandy seacoast in The Netherlands. Also on view are original photographs by Lena Herzog (published last year in *Strandbeest: The Dream Machines of Theo Jansen*) who spent seven years documenting the origins and inner workings of this new kinetic species. This marks the first major American show of Jansen’s large-scale works; it moves on to the Chicago Cultural Center and San Francisco’s Exploratorium. Jansen himself will visit the Greater Boston area for a few events, such as a panel discussion (to be webcast) with Trevor Smith, PEM’s curator of the present tense, and MIT associate professor of media arts and sciences Neri Oxman, taking place on September 10 (3-5 P.M.) at the MIT Media Lab—followed by a live, outdoor demonstration of a walking *strandbeest* (5:30-7 P.M.). ~N.P.B.



LOEK VANDERKILS

Dutch artist Theo Jansen melds art and engineering in his intricate skeletal sculptures. Below, left to right: *Animaris Adulari* (2012) and *Animaris Apodiacula* (2013).

Peabody Essex Museum
Strandbeest: The Dream Machines of Theo Jansen
September 19-January 3
www.pem.org/sites/strandbeest



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architecture firm Shepley, Rutan and Coolidge, but razed it in 1924; according to family legend, Florence Crane never liked the “Italian fiasco” because it was too “cold and drafty.”

She did, however, keep the matching Casino Complex and her beloved Italian garden, both built between 1913 and 1915. Designed by landscape architects Frederick Law Olmsted Jr. and his brother John Charles Olmsted, the garden is a hidden oasis: a forest of trees was transplanted and arranged to intentionally shroud the walled tea houses, water fountain, and abundant perennial flower beds. (The garden is currently under restoration.) Crane later dismissed the Olmsteds and hired Shurcliff, their former associate, to work on the Casino Complex landscaping and to design the allée. “We can speculate that it was because they had a very different vision for a much more open landscape at the estate,” Murray adds, “and that Crane didn’t want that. But we don’t know for certain what the reasons were.”

Shurcliff (a mentee of Olmsted firm partner Charles Eliot, A.B. 1882, the son of Harvard president Charles William Eliot and the primary founder of The Trustees of Reservations in 1891) lived down the road from the Cranes. He certainly shared the Olmsteds’ naturalist aesthetic. “But one aspect of his genius,” Bob Murray notes of the allée’s meticulous design, “was the



Two views of the newly restored and inviting Casino Complex at the Crane Estate

way he took this European aesthetic and adapted it to the New England landscape.” Shurcliff enhanced the inherent hilliness and dramatized the approach to the Ipswich Bay and ocean vista: benches on the bluff overlook Ipswich’s Little Neck Harbor, Plum Island, and several beaches as well. He seamlessly tied the landscape to the formidable hilltop home by ensuring that the land was sheared down to a lawn (echoing the aristocratic grounds in English country homes) and installing a rigorously spare and symmetrical planting structure.

Florence Crane reportedly loved her new “English manor” and spent extended summers there until she died in 1949, having previously bequeathed the estate to the Trustees. Parts of the property have been open to the public ever since, according to Murray. Within the last 15 years, about \$6 million has been invested in capital improvements, starting in 2000 with the wholesale renovation of a shingle “cottage” on the estate (where the Cranes lived while the “Great House” was being built). The Trustees now run it as The Inn at Castle Hill.

Murray is now overseeing the first phase of the Italian garden restoration. Plans include reviving the water features and replicating the original Rainbow Fountain sculpture by Bela Lyon Pratt, restoring the wooden pergola that links the teahouses, and replanting the flowerbeds. By next spring, the sanctuary is slated to open for walkers, gardeners, and sun-lovers—anyone seeking a quiet and beautiful spot. Florence Crane’s former rose garden, however, will be left as is. “We envision that,” Murray says, “as someplace we can enjoy...as a romantic ruin.”

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Diverse Caribbean Flavors

The Cambridge Carnival celebrates food and culture.



Clockwise from top left: Carnival dancers on parade; Irie Jamaican Restaurant and R & S Jamaican Restaurant are among the vendors offering a wide array of fresh-cooked, homemade Caribbean dishes.

SINGH'S ROTI SHOP in Boston serves traditional Indian flatbread with jerk chicken, curried goat, or chickpeas, as well as Jamaican-style beef patties and *pholourie*, spicy fried dough balls with an addictive, house-made tamarind chutney.

This hybrid Indian-Caribbean fare, found in the Republic of Trinidad and Tobago, reflects the high proportion of islanders who are, like restaurant owner Ricky Singh, descended from Indian immigrants. Singh and his wife, Kay, opened their Dorchester business more than five years ago to serve Greater Boston's growing Caribbean population, which is heavily weighted toward Haitians and Dominicans, followed by Jamaicans. "But my base clientele," he adds, "is now American-type individuals. I am so popular that I am getting people from all over Maine, Rhode Island, and New Hampshire."

Singh, like many culinary entrepreneurs, still readily takes his food on the road. His roti, along with fresh coconut, pineapple, and soursop juice, can be found at many regional festivals, including the twenty-third annual Cambridge Carnival on September 13. The Cambridge fete is a far tamer version of the Brazilian carnivals

traditionally held before Lent, but still draws a throng to Central and Kendall Squares.

A three-hour parade kicks off at 12:30 p.m. on River Street. Streams of dancers clad in scanty satin costumes loaded with rhinestones, sequins, tassels, and faux jewels—some sporting giant feathered headdresses and masks—strut proudly like exotic birds. The spectacle ends on Main Street, where more live, loud music—from reggae, rap, and hip hop to calypso and "kompa" (Haitian pop)—is on offer, amid vendors of crafts, clothing, and food (à la carte items, \$4-\$5; combination platters, \$8-\$13).

Singh will be there. His tropical beverages come ice-cold, with a straw, in cored pineapples. "We also use fresh soursop," he says of the white, pulpy, native Caribbean fruit that tastes of lemons mixed with pineapples and a strong shot of banana.

Other carnival stalls sell more traditional Indian and Thai food. Especially worth seeking out, though, are the various "jerk" dishes and the harder-to-find Jamaican specialties that are typically offered by the purveyors below. (The list includes those vendors slated to be at the carnival; the food actually served that day is subject to last-minute changes. Retail

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HARVARD SQUARED

locations have been provided, where applicable.)

R & S Jamaican Restaurant owner Shernett Barrett cooks and sells her food at fairs all along the Eastern Seaboard. "People eat with their eyes," she says of her open-grill style. "My motto is 'Only the best is good enough.'" She typically offers jerk chicken and pork, curried chicken and goat, rice and peas, fried ripe plantains, and steamed vegetables.

The Irie Jamaican Restaurant also serves rice, peas, and steamed vegetables, but seasoned with an orange sauce that doubles as gravy in the chicken dishes. At the Boston Jerk Festival in June, owner Donna Davis also dished out spicy seafood stew with mussels, shrimp, lobster, and fish "escovitch," a seductive, pickled Scotch bonnet pepper sauce packed with strands of carrots and onions. Sides include roasted corn and a tough, chewy bun known as "festival."

Flames Restaurant (flamesrestaurant.com) is a larger outfit with three locations in Boston that serve "Caribbean and American food." That includes classic Jamaican dishes plus the occasional specialties (when available): curried conch and ackee. The latter is the island's national fruit—although when cooked it looks and tastes like scrambled eggs. Careful harvesting is required: what's eaten are actually the yellow arils that grow on the toxic black seeds found inside the ripe red fruit. (Unripened ackee is poisonous).

East Somerville's *Some Ting Nice* (www.sometingnicesomerville.com) has an extensive menu, but co-owner Susan Puckerin plans to serve only jerk chicken and rice and beans, along with Jamaican-style roti, at the carnival. Dhal roti, she says, is a closed, or wrapped, roti stuffed with a mixture of split peas, garlic, and spices; aloo roti holds potatoes. The "buss-up-shut" roti (as in "busted up") means the bread is pulled apart and used, like Ethiopian *injera*, to gather bites of goat stew, for example, and a dollop of mango *kuchela*. The Indian-Caribbean chutney is bold: unripe green mangoes, mustard oil, and hot peppers.

Visitors to Singh's can try his own, handmade version of chutney—or take home a bottle of his more proprietary pepper sauce. As he notes: "It's the hottest sauce in New England right now."

—NELL PORTER BROWN

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Teaching and learning at Harvard are more exciting than ever. Students are examining paintings in the spectacular new galleries of the Harvard Art Museums. A “smart” classroom in Quincy House’s renewed Stone Hall enriches 21st century House life, and interactive maps and other digital tools are mainstays in many classes. Students in engineering and applied sciences courses build robots, apps, and so much more to solve real-world problems.

Some of the most effective new approaches in education require significant investment—to update technology, reconfigure classrooms to encourage teamwork, or support faculty as they develop new courses. Thanks to donor generosity, flexible innovation funds are enabling Harvard to push the boundaries of teaching and learning across disciplines.

Ten years ago, Peter J. Crowley ’81 and his wife, Gretchen Kaye-Crowley, of Westchester County, New York, established an innovation fund to help faculty transform the introductory life sciences 1a and 1b course sequence by making it more interdisciplinary, compelling, and relevant. “It’s been a resounding success,” Crowley says of the revamped courses, which now integrate biology, chemistry, genetics, and evolution.

With Peter’s 35th reunion approaching, the couple—whose oldest son, Matthew, is a member of the Class of 2018—wanted to continue that momentum. They augmented their support for cutting-edge life sciences instruction, and they created a second innovation fund to expand undergraduate studies on sustainability and the environment.

“Each of these areas [health and the environment] has a profound impact on humanity, whether it’s diagnosing and treating disorders in people or the planet,” says Crowley, who lived in Quincy House and is a dedicated alumni volunteer. “We need to educate the next generation of critical thinkers and leaders so they’ll be informed, passionate, and ready to make a real difference.”



ADVANCING THE HUMANITIES

Also among Harvard's enthusiastic supporters are Peter Joost MBA '84 and his wife, Lindsay, who contributed to the Harvard College Fund while their son, Oliver '14, studied history at the College. The Joosts consider the humanities "fuel for the mind," and they recently established an innovation fund to advance humanities teaching and research.

"We want to support things that are working well at a high level," Peter Joost says. "There are many curious minds and motivated people at Harvard. It's also important to us to derive pleasure from the things we support. We have gotten back so much more than we have given." One of those pleasures has been meeting Michael McCormick, Francis Goelet Professor of Medieval History, a historian using science to understand the human past—for example, analyzing ice cores to reconstruct European climate over the centuries. "It's infectious to be around him," says Joost. "He epitomizes the great scholar, and he can also make the material come alive for a complete newcomer."

The couple, who live in San Francisco and have three children, hope Harvard's commitment to teaching and studying literature, art, music, classics, and other humanities will underscore the important roles these disciplines play in enhancing individuals' lives and society.

FUELING PROGRESS

With their innovation fund, Bob Doris '74, JD/MBA '78 and his wife, Mary Sauer, are supporting the spirit of discovery and invention that permeates the Harvard John A. Paulson School of Engineering and Applied Sciences. Here, faculty and students are tackling some of the greatest challenges in medicine, big data, the environment, and beyond.

Their innovation fund, along with a scholarship they have established, honors the memory of their first daughter, Clare Marie, who passed away at 16 months after treatment for a rare liver disease. Recalls Sauer, "Clare was a beautiful, brave, and happy child. We feel very fortunate to be able to help young scholars in Clare's name."

"The School is on a roll, and we're delighted to contribute to that," says Doris, who studied government but has focused his career on technology development. He and Sauer (also longtime business partners) reside in California with their teenage daughter, Annie. They hope their gift will help Harvard Paulson School Dean Francis J. Doyle III kick-start promising research projects. Says the couple, "We look forward to learning about upcoming initiatives, knowing that Clare's innovation fund helped make them possible."

ABOVE: RAPHAEL CHERNEY (RIGHT), STAFF ENGINEER AT HARVARD'S WYSS INSTITUTE FOR BIOLOGICALLY INSPIRED ENGINEERING, DEMONSTRATES ROOT, AN EDUCATIONAL ROBOT DESIGNED FOR THE CLASSROOM WHITEBOARD.

LEFT: REBECCA CHEN '16 WORKS ON A RESIN CAST OF AN ASSYRIAN RELIEF. THE RELIEFS WILL ADORN THE WALLS OF THE HARVARD ART MUSEUMS' MESOPOTAMIAN GALLERY.

JOHN HARVARD'S

JOURNAL





CAMPUSES UNDER CONSTRUCTION.

At least for members of the Boston-area building trades, the recession and Harvard's belt-tightening are in the rearview mirror. Major projects under way during the frenetic summer season included the wholesale reconstruction of the Kennedy School campus (opposite), beginning with excavation of the somewhat-sunken courtyard; it will be raised to street level, accommodating future kitchens, loading docks, and other utilities underneath (see harvardmag.com/hks-15). Across the Charles River, Harvard Business School's Ruth Mulan Chu Chao Center, a replacement executive-

education facility, took shape (top; see harvardmag.com/chaocenter). The reconstruction of Dunster House (center), part of the College's House renewal, drew to a close in time to welcome students back from swing spaces for the fall semester. Exterior work began on Winthrop House (bottom), to prepare for full renovation and expansion in 2016-2017. And in early August, scaffolding was erected to begin the exterior refurbishment of the former Holyoke Center, now the Smith Campus Center, in Harvard Square (not shown); pending regulatory review, it will be extensively renovated and, at street level, repurposed, and debut in 2018.

Rethinking the Medical Curriculum

HARVARD MEDICAL SCHOOL (HMS) is reforming its four-year curriculum structurally, pedagogically, and philosophically. The new curriculum, which builds on the New Pathway curricular reform of 1987 and

an iterative update in 2006 called the New Integrated Curriculum, further emphasizes the process of *learning to learn*, rather than rote memorization, and represents one of the most complete curricular reforms at a U.S. medical school since the scathing Flexner Report of 1910 led to the closure of many medical schools in the country.

As dean for medical education Edward Hundert explains, ever since the Flexner Report put an end to for-profit schools that relied solely on apprenticeship to transmit knowledge from one generation of physicians to the next, medical schools have operated largely on what is called a "two plus two model." It begins with two years focused on basic science taught in the classroom; students have some patient exposure but are mainly involved in patient care only during the second half of their schooling. Nationally, all of this is changing. Some medical schools have moved the hospital clerkships into the first two years, and some

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H A R V A R D P O R T R A I T



Catherine Brekus

“Let your women keep silence in the churches,” declares Paul in Corinthians 14:34. Catherine Brekus specializes in hearing the voices of America’s early female religious leaders, nearly lost to history—a casualty of neglect, or sometimes a more deliberate excision from the historical record. Her work has required some sleuthing—finding manuscripts scattered across libraries and antiquarian societies—and deep dives into material history, learning about everything from eighteenth-century medicine to laundry. Always striving for “empathetic engagement with the past,” Brekus easily gets swept up in describing past events. Her voice drops as she describes the revival leader at the center of her most recent book, *Sarah Osborne’s World*, noting the irony that a “free will person” should be the historian to delve into these fiercely Calvinist writings. In an interview upon winning the 2013 Aldersgate Prize (which annually recognizes works of Christian scholarship), Brekus said that in imagined debates, Osborne has “tried very hard to convince me”—though without success. “I did not like studying history in high school,” the Warren professor of the history of religion at Harvard Divinity School confesses, smiling. “I was always good at it...but the idea is that you memorize a lot of facts, mostly about political history, and what happened when.” When she taught the subject to high-school students for two years, Brekus noticed that textbooks “have this narrative of political events...and then you have this little human-interest thing in a box. That was where the women would appear. My goal as a historian,” she adds, “is to get women out of those boxes and into the main texts.”

~SOPHIA NGUYEN

have shifted to team-based learning, or to flipped classrooms in which students absorb material on their own time by watching videos; a number of schools have also asked their students to complete a scholarly research project after their clerkship year, says Hundert. But HMS is unusual in that “We’re making all of these changes at once, and in an amazingly integrated way.”

The changes, the result of a three-year, faculty-led process, were deemed necessary at least in part because both biomedical science and the practice of medicine itself are changing rapidly. Hundert tells arriving students that “half of what we teach you during four years of medical school is going to turn out to be wrong or irrelevant by the time you graduate.” Or as Gordon professor of medical education Richard Schwartzstein puts it, “Facts are necessary, but they are not sufficient. And there are too many facts for everybody to learn anyhow, so let’s get away from this notion that you could possibly learn them all, even if you wanted to.”

The institution of a scholarly research requirement, beginning with the class of 2015, created the opportunity for students to work closely with a faculty member in a focused area of interest, but under the two plus two model, the research took place during the summer after the first year. This timing meant students had to choose a project mentor just months after arriving on campus, says Keenan Mahan, president of the class of 2018 and president of the HMS and Harvard School of Dental Medicine (HSDM) Student Council. “It felt a lot like speed dating.”

Mahan, a member of the last class under the old curriculum, says that some of his peers are involved in their summer internship now, but others haven’t been able even to start them because of Institutional Review Board (IRB) deliberations over research involving human subjects. By the time his classmates write up their research projects in their third or fourth year, their biomedical interests may have turned elsewhere. In the new curriculum, the project will start at the end of the third year and continue into the fourth. All the students Mahan has talked to think this shift is “excellent.” (The exception to the new curriculum: the 30 or so students enrolled annually in the Health Sciences & Technology program jointly run with MIT will continue in the two plus two format,



On the first day of the new curriculum's launch, Richard Schwartzstein leads an orientation in a large group classroom equipped with interactive technologies that facilitate case-based collaborative learning.



enhanced with other innovations designed for physician-scientist training.)

With the previous course of study, Schwartzstein says, faculty leaders observed a “perception among students that the curriculum was mostly about memorization of facts, as opposed to development of reasoning and thinking skills. We had a sense that students were learning differently and were resistant to the lecture format: instead of

coming to class, they would watch video of lectures at double speed. Showing up wasn't adding value relative to watching at home. The answer to that is not to compel them by various means to come to lecture. It's to rethink how we add value to the learning process.”

Given that “student-faculty contact time is the most precious resource you have in the University,” Schwartzstein continues,

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"we have to make the best use of that time. The way I sum that up: that time needs to be spent on things that you can't Google."

From Classroom to Clinic

THE NEW CURRICULUM therefore gets away from lectures. Called "Pathways" (not to be confused with the "New Pathway" curric-

ular reform of 1987 that introduced problem-based learning in the first two years), it begins with an intensive, 14-month pre-clerkship program, designed to give students the core medical knowledge they will need to work in hospitals. Students acquire critical knowledge before class through modular faculty-developed "concept videos," each roughly five to eight minutes in length, in addition to assigned readings and questions to investigate. Class time is used to develop the thinking and reasoning skills needed to solve difficult problems; teams of four or six students are assigned to share their findings with the rest of their 40-plus-person class in a discussion that generates a consensus answer.

Four mornings a week, students grapple with a variety of biomedical subjects, such as genetics, anatomy, pharmacology, pathology, and immunology. All day Wednesday, they take "Practice of Medicine," co-led by assistant professor of medicine Fidencio Saldana, which is designed to give them hands-on skills for working with patients, such as conducting an oral interview and performing a physical exam. As part of this pre-clinical preparation, students will spend every other Wednesday morning working in a primary-care office. One advantage of introducing students to work in medical settings right away, says Saldana, is that it leads to "better integra-

tion of the basic, social, and clinical sciences." That way, students will "have context for everything they are learning in class," and be well-prepared for their clerkships.

That "principal clerkship experience," in which students enter hospitals to begin working with patients on the wards, will now begin in October of their second HMS year. Planners reasoned that they should put students in contact with what they love—working with patients—as soon as possible. And to maintain continuity with patients and doctors they have come to know, students will continue to spend a half-day every other week in the same primary-care office where they worked the year before.

By the time students return to the classroom for their third and fourth years, they will have a better idea of what they want to do next, says McKenzie professor of cell biology Randall King, an active researcher who serves on the academic planning committee. The curricular change "will allow students to develop their clinical interests earlier, which will help them in thinking about residencies. Pedagogically, they will be in a position now to really take advan-



Edward Hundert

ular reform of 1987 that introduced problem-based learning in the first two years), it begins with an intensive, 14-month pre-clerkship program, designed to give students the core medical knowledge they will need to work in hospitals. Students acquire

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COUNTER CLOCKWISE FROM TOP LEFT: LULU CHUA-RUBENFELD; HARVARD UNIVERSITY ARCHIVES; DEBORAH LOPEZ; SARAH P. REID

Teacher Training

The Harvard Graduate School of Education has named Eric Shed and Stephen Mahoney director and associate director of the Harvard Teacher Fellows program, launching this fall to prepare interested undergraduates for teaching careers (see harvardmag.com/fellows-15). Shed, most recently at Brown University, was a New York City high-school teacher. Mahoney was previously founding principal of Springfield Renaissance School in western Massachusetts....Through its new PK12 research initiative, MIT has partnered with the Woodrow Wilson National Fellowship program (its president, Arthur Levin, formerly led Teachers College, Columbia University) to offer online teacher training and master's degrees. MIT's participation derives from its engagement in the online edX venture, and its recent commitment to engage more deeply in elementary and secondary education. HarvardX research fellow Justin Reich departed in July to become executive director of PK12 and a research scientist in MIT's office of digital learning.

Tech U

Even as The Harvard Campaign bolsters engineering and applied sciences, similar investments are being made elsewhere. With Microsoft as a significant financial backer, the University of Washington and Tsinghua University (China's leading engineering institution, based in Beijing) have partnered to create an institute called the Global Innovation Exchange, based in Seattle, where there is voracious demand for computer programmers and technical workers. It will offer a master of science in technology innovation beginning next fall, and over time intends to enroll more than 3,000 students, in multiple programs.... Separately, as mayor of New York, Michael R. Bloomberg, M.B.A. '66, LL.D.

Brevia



GOVERNMENTAL GOVERNMENT DEAN. Douglas W. Elmendorf, Ph.D. '89, who concluded his service as director of the U.S. Congressional Budget Office (CBO) last March, has been named dean of the Harvard Kennedy School, effective in January. A macroeconomist, Elmendorf was an assistant professor at Harvard from 1989 until 1994, before serving on the staffs of the CBO, Federal Reserve Board, Council of Economic Advisors, and U.S. Treasury Department. He had a second tour of duty at the Fed, was a senior fellow at the Brookings Institution, and then assumed leadership of the CBO in 2009. In a statement, the dean-designate said, "Together, we will honor and extend the school's commitment to confronting hard problems in ways that enhance public policy and improve people's lives." Read a full account at harvardmag.com/elmendorf-15.

'14, prompted the competition that is spawning Cornell Tech, nearing construction on Roosevelt Island. Now his philanthropy has committed \$100 million to the first academic building on the new campus.

Race in Admissions, Reheard

The U.S. Supreme Court has decided to consider anew the most recent case on

the use of race in higher-education institutions' admissions decisions. *Fisher v. University of Texas at Austin*, decided in 2013, essentially addressed the scope of a lower court's review of issues surrounding carefully tailored admissions programs in which race is considered as a factor, leaving prior rulings on the substance intact (see harvardmag.com/action-15). Now, it will hear a further challenge to the underlying policy in place at the University of Texas, raising the possibility that following arguments during its 2015 term, the court may limit or define more strictly consideration of race in admissions, or prohibit such consideration.... Separately, the U.S. Department

of Education dismissed a complaint filed in May alleging that Harvard College discriminates against Asian-American applicants; the department cited a lawsuit filed against Harvard and the University of North Carolina last November, making similar claims (see Brevia, January-February, page 31), as the reason for its action. Given the pending review of *Fisher*, Harvard has moved to delay the November lawsuit.

On Other Campuses

John L. Hennessy, president of Stanford since 2000, has announced that he will step down next summer. A computer scientist who cemented his university's relationship with Silicon Valley (he is lead independent director of Google), he presided over a \$6.2-billion capital campaign, major investments in the performing arts, and expansion of Stanford's interdisciplinary research and teaching programs and its campus facilities.... The University of Michigan, the epitome of big-school athletics, has signed an agreement—valued at up to \$169 million in cash and equipment—with Nike for the rights to outfit Wolverine teams from 2016 through 2027 (with an option to

2031), according to a *Detroit News* report... Michigan's Ross School of Business has received a \$60-million gift from Samuel Zell to support entrepreneurship studies and student ventures....Yale announced in June, nine months into a \$200-million financial-aid campaign, that half the goal had been raised.

Nota Bene

DIVESTMENT DEVELOPMENTS. Several institutions moved toward disposing of certain carbon-fuel investments, or banning new holdings. Oxford University has decided that it will not invest in companies whose operations focus on coal or oil sands (it owns no shares in such producers now). Georgetown also determined not to invest directly in coal producers (a step Stanford took earlier). The report of MIT's Climate Change Conversation Committee (comprising faculty and staff members, administrators, and students), released in June, recommended, among many other measures, that it divest shares in extractors of coal and tar sands. And Norway's sovereign wealth fund, enriched by long-term production

of North Sea oil, will also divest coal-related stocks.

HUBWEEK HUBBUB. HUBWeek (envisioned as a *Boston Globe*-Harvard-MIT-Massachusetts General Hospital mashup of TED talks,

Aspen Institute, and World Economic Forum) announced some programs for its initial run, October 3-10. Among the events is a presentation on global health threats, based on the four priorities identified in the Harvard T.H. Chan School of Public Health's capital-campaign announcement (pandemics, social and environmental threats, poverty and humanitarian crises, and failing health systems), and a Fenway Park "master class" on ethics hosted by Bass professor of government Michael J. Sandel, of "Justice" fame.

HOWARD HUGHES HONORANDS. Three faculty members were among the 26 researchers nationwide named Howard Hughes Medical Institute (HHMI) investigators. The award pays especially productive researchers' salary, benefits, and research costs during an initial five-year appointment. The new Harvard investigators are: Levi Garraway, associate professor of medicine, who studies melanoma and prostate cancers; Pardis Sabeti, associate professor of organismic and evolutionary biology and associate professor in immunology and infectious diseases, who has been much in the news for studies on the most recent Ebola outbreak in Africa; and Tobias Walther,



LOSS OF A LEADER. Harvard Corporation member James F. Rothenberg '68, M.B.A. '70—past University treasurer, and chair of the board of Harvard Management Company (which oversees the endowment)—died suddenly on June 21. A detailed report of his service appears at harvardmag.com/rothenberg-15.

professor of genetics and complex diseases and professor of cell biology, who studies lipid storage in cells. Walther is the first Harvard T.H. Chan School of Public Health faculty member to be appointed an HHMI investigator.

MISCELLANY. With the departure of Thomas W. Lentz as director of the Harvard Art Museums, deputy director Maureen Donovan and Clay chief curator Deborah Kao are serving as interim co-directors....Yosvany Terry has been appointed director of jazz ensembles and visiting senior lecturer in music, and Mark Olson has been promoted to director of the Harvard University Band and Wind Ensemble. The appointments fill the openings created when longtime director of bands Tom Everett retired two years ago....Professor of landscape architecture Anita Berrizbeitia has been appointed chair of that Graduate School of Design department, and Diane Davis, Norton professor of regional planning and urbanism, has been appointed chair of the department of urban planning and design....Margot Gill, formerly administrative dean of the Graduate School of Arts and Sciences, has been appointed administrative dean for international affairs, a new post within the Faculty of Arts and Sciences. She will serve as liaison with foreign governments, international corporations, foundations, and nonprofit organizations....HBX, the Business School's online-learning initiative, has unveiled HBX Courses, aimed at the executive-education and leadership-training market. The first is "Disruptive Strategy with Clayton Christensen," Clark professor of business administration (profiled in this magazine's July-August 2014 cover story).



ACKNOWLEDGING ALICE. Houghton librarians, in a puckish mood, welcome visitors to *Such a Curious Dream!* (the sesquicentennial exhibition in honor of *Alice's Adventures in Wonderland*) with a reproduction of the MBTA's Blue Line subway route: it culminates at Wonderland Station. The treasures on display, through September 5 (online at hcl.harvard.edu/libraries/houghton/exhibits/alice), range from versions in Greek and Pitman shorthand to Alice-themed blotter paper to hold doses of LSD—and the Harvard Lampoon's wicked parody. Read more at harvardmag.com/alice-15.

tage of the richness and the depth that the medical school has to offer”—basic scientists and clinicians working in many different fields. “By allowing students to tailor their post-clerkship curriculum a bit more,” he adds, “we think these advanced courses will become a place where students can meet with faculty in more of a seminar-type format and really pursue” cutting-edge questions.

From the faculty perspective, and “as a person running a lab,” King continues, “the real opportunity is to get our basic-science faculty engaged in the teaching of medical students, because they can teach in a way that integrates with clinicians. I could get involved,” for example, “in co-teaching a session on novel cancer therapies together with an oncologist.”

Teaching Thinking

THE RE-ORDERING of the course of study is important, says Schwartzstein, “but a lot of curricular reform is like shifting the chairs on the *Titanic*. The essence of *this* reform is giving students the tools to think differently. The challenge is going to be: How

A damp lab, with multi-user microscopes, in one of the four new “learning suites” in the school’s Tosteson Medical Education Center

do I now work with [my factual knowledge]—most of which students will learn on their own—to solve clinical problems? Because that’s the task of a doctor.”

For this reason, CBCL—case-based collaborative learning—will now be at the core of first-year classes. Schwartzstein describes it as a combination of case-based, team-based, and problem-based learning—all recently tested in a physiology course. “What we’re trying to do,” he says, “is take elements of all three of those teaching formats and blend them together” for use in the pre-clerkship-year courses. In a randomized study of the new teaching technique (forthcoming in *Academic Medicine*), students perceived CBCL as more engaging and interactive, he reports, and students who’d done relatively poorly in

earlier courses did better compared to the control group. There were no differences in outcomes for “high performers,” he says, “but it didn’t hurt them.”

Adds Hundert, “Since medicine is practiced in teams, we’re trying to start that from the beginning. You have responsibility for your peers’ learning, the same way you’re going to have shared responsibility for patients. And we are simultaneously reinvigorating our advising system to help students take advantage of the tailored ‘Pathways’ through their third and fourth years.”



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Assessment and improvement of the new curriculum will be continuous. A two-year grant from the Harvard Initiative for Learning and Teaching will enable a comparison of the last class in the old curriculum to the first class under the new one. "In a sense, I feel like the deck is stacked against [the reform], because the first year of the new curriculum is going to be challenging for a whole bunch of reasons," Schwartzstein says. "Nonetheless, we're making efforts to study it and improve it, and will continue to study it; we're committed to this notion of evidence-based curriculum development and revision."

Hundert concurs that he doesn't expect everything to work perfectly from the start, even though "faculty have spent hundreds of hours preparing each hour of the curriculum. We've partnered with a student group called the Medical Student Medical Education Interest Group...to make sure that in real time, the students will be giving constant feedback to faculty, who will be doing continuous improvement as we go—not just saying, 'We'll fix that next year,' but 'We'll fix this next session and next week.'"

Longer-term, Schwartzstein hopes the curriculum will be organized to address questions that need to be answered, rather than merely to present a body of knowledge. And he hopes to teach students to think about *how* they are thinking. "We have to help teach our students not only how to reason, but how to avoid the pitfalls associated with cognitive biases," he emphasizes—because relying on intuition or pattern recognition may cause errors in clinical practice (see "Toward Precision Medicine," May-June, page 17).

The Reform Embodied

ON AUGUST 3, the first day of orientation for the HMS class of 2019, students immediately got a taste of case-based collaborative learning, working in teams of four to reason their way to explanations for a difficult clinical situation—all in brand-new classrooms equipped to facilitate learning under the new curriculum. In the Tosteson Medical Education Center, 10,800 square feet of space has been renovated this summer at a cost of \$5 million to create four new "learning suites," each equipped with three different types of rooms. The largest room is designed to support interactive group learning. An adjacent "damp lab" features multi-user microscopes where students can work with human tissue

or anatomical specimens. The third connected room in each suite supports the use of patient simulators that allow students to see what happens to blood pressure, for example, when they administer a particular drug.

Developing the best curriculum possible matters, says HMS dean Jeffrey Flier, because the school is seen as a model elsewhere: "We know we are not just doing it for ourselves. We also have some responsibility for how it will be seen and possibly reflected in many other schools."

The ultimate test of the new curriculum, says Schwartzstein, will be whether stu-

dents "learn how to work with principles that are evolving, and knowledge that continues to grow and expand, so that they'll be able to function at a high level throughout their entire careers." Concludes Hundert, "Medical education is not about the transmission of information, but about the transformation of the learner. In order to achieve that, you need a transformative learning environment, and that's what we're trying to do both with the physical spaces, but also with the way the curriculum is structured and taught."

~JONATHAN SHAW

A Case for Women

WHEN NITIN NOHRIA became Harvard Business School (HBS) dean in mid 2010, he detailed five priorities, ranging from innovation in education and internationalization to inclusion. In setting out the latter goal, he said in a recent conversation, he aimed not at numerical diversity, but at a broader objective: that every HBS student and teacher be enabled to thrive within the community.

A decanal missive in early 2011 further defined the work required to make HBS genuinely inclusive. "I have launched an initiative that will focus...on the challenges facing women at the school," Nohria wrote. He created an institutional home for the work—a senior associate deanship for culture and community—and appointed Wilson professor of business administration Robin J. Ely to the post: a logical choice, given her research on race and gender relations in organizations. (Making progress, he noted, has entailed work by other faculty colleagues, too, including Youngme Moon, then in her capacity as senior associate dean for the M.B.A. program, and Frances Frei, senior associate dean for faculty planning and recruitment. Frei, he said, has played a vital role in helping women faculty members—sometimes "given a shorter runway" in adjusting to their new responsibilities—succeed at the school.)

Ely's role, he explained in the interview, was initially intended to help HBS look at itself and evolve practices that might make it a role model for other institutions. The school's W50 summit in 2013, which ex-



Robin J. Ely

amined the first half-century of women enrolled in the M.B.A. program, provided an opportunity, he noted, to "come to terms with our own history"—not all of it welcoming or inclusive (see "The Girls of HBS," July-August 2013, page 55, and the linked report on W50).

A complementary strand would involve HBS's academic life: "Who gets represented?" in the teaching cases professors develop, as Nohria put it. In his annual letter to faculty colleagues this past January, he wrote, "I know that of the dozens of cases I have written, fewer than 10 percent have had a woman in a leadership position." Moreover "[T]he most effective cases are not necessarily those where women protagonists are dealing with gendered issues like work-life balance, but rather leading change and other strategic initiatives within an organization." Just as M.B.A. cases have become increasingly global in the past decade, he aims for at least 20 per-

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Yesterday's News

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

1910 Thanks to the local construction company building the Cambridge portion of the new subway system, several thousand carts of earth are secured to fill in the lower part of Soldiers Field, which will be used as playing fields by Harvard teams.

1920 The Business School adds regular instruction in labor relations to its curriculum.

1930 A carillon of 21 Russian church bells, weighing 27 tons, has arrived in Cambridge to be installed in the Lowell House tower as a gift from an anonymous donor.

1940 Concern over Nazi victories in Europe prompts the creation of a 400-member Faculty Defense Group, the Harvard Student Defense League organizes military-drill practices, and more than 130 undergraduates apply for a pilot-training course. Harvard announces that students enlisting in the armed forces or drafted are liable only for the portion of tuition and fees incurred prior to their departure.

1955 Harvard College welcomes its first Advanced Placement freshmen, and the Divinity School registers its first women graduate students.

1960 Leverett Towers and the Loeb Drama Center open for business.

1985 The newly created Harvard-Radcliffe Grocery Society, or "Grocery Table," organizes petitions for the return of Classic Coke in House dining halls. The group's charter mandates that members "promote student awareness of an appreciation for the grocery sciences, especially produce, dairy products, and other foodstuffs" and guide their actions by the official motto: *Vivere Melius Per Condimenta* ("Better Living Through Groceries").

1995 Boylston professor of rhetoric and oratory Seamus Heaney, "a frizzy-haired man of great amiability, for whom many at Harvard feel warm affection," wins the Nobel Prize in Literature "for works of lyrical beauty and ethical depth, which exalt everyday miracles and the living past."

cent to "feature a female" leader within the next three years. (And because HBS sells cases to schools worldwide, that shift will radiate far beyond Allston.)

Writing such cases is part and parcel of HBS professors' research, and in a natural development, Ely's initial role has evolved toward the externally focused perspectives Nohria described. HBS's new Gender Initiative, under her leadership, is a research forum for faculty members who examine gender issues in businesses and other organizations.

ELY RECENTLY RECALLED the concerns that prompted Nohria's initial interest, including persistent underrepresentation of women among M.B.A. students earning highest academic honors. To address such issues, she said, she wanted to look at the school's culture broadly, to determine whether possible group differences in how students, faculty, and staff members experienced the culture affected their ability to succeed. (She noted that Cahners-Rabb professor of business administration Kathleen L. McGinn's prior work with students had explored how HBS's cultural dynamics might have contributed to a gender gap in grades—helping to pave the way and set the agenda for the culture initiative.)

HBS academic honors, for instance, are based strictly on grades, which are heavily influenced by classroom participation. Exploring the culture, Ely said, made issues such as students' willingness to express their views, professors' patterns of calling on them, and the operation of student study groups "discussable"—the precursor to change. (In fact, achievement and satisfaction gaps have narrowed.) Airing these matters has also shaped student conversations about social dynamics and extracurriculars.

Given these fruitful discussions, raising HBS's scrutiny of gender upward and outward was a natural next step. Nohria's January letter asked: "Can we conduct work that will accelerate the advancement of women leaders who will make a difference in the world and promote gender and other types of equity in business and society?" The Gender Initiative, with Ely as faculty leader and Colleen C. Ammerman as assistant director, now serves as a locus for research among professors in units across HBS.

It is anchored by a core group includ-

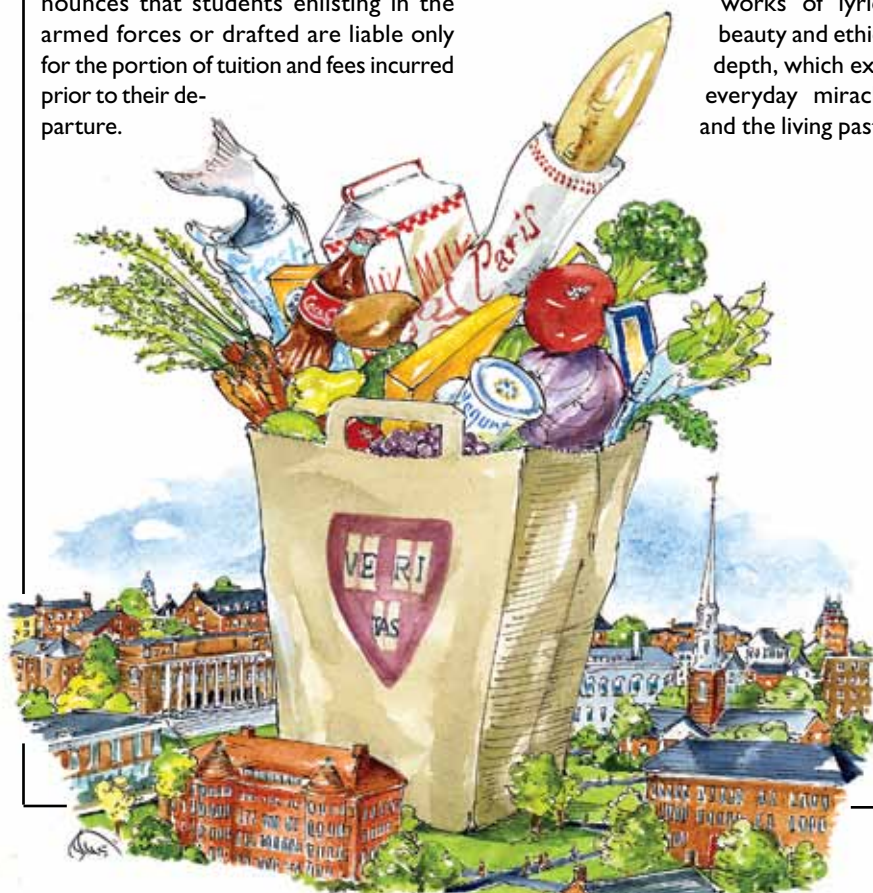


Illustration by Mark Steele

ing Ely herself; McGinn (now exploring the impact on school performance, age of marriage, and other outcomes of teaching African girls negotiating skills); Chapman professor of business administration Boris Groysberg (author of *Chasing Stars: The Myth of Talent and the Portability of Performance*, which uncovered a significant gap in financial analysts' ability to maintain their "star" status when they move to new firms—unexpectedly, in women's favor); associate professor of business administration Amy J.C. Cuddy (who is looking at gender stereotypes across cultures); assistant professor of business administration Lakshmi Ramarajan (who examines how individuals' cultural and personal identities affect their engagement and performance in organizations); and others.

Since its unveiling in May, the initiative has already publicized several findings:

- HBS graduates are an elite cohort of above-average means. A survey of women and men who earned M.B.A. degrees reveals that they value careers and professional success equally. But as Ely, sociologist Pamela Stone of City University of New York, and Ammerman reported, although "about 50 percent to 60 percent of men across the three generations [said] they were 'extremely satisfied' or 'very satisfied' with their experiences of meaningful work, professional accomplishments, opportunities for career growth, and compatibility of work and personal life, only 40 percent to 50 percent of women were similarly satisfied on the same dimensions."

- A survey of 24 developed nations, led by McGinn, revealed that—far from being harmed—women whose mothers worked outside the home are themselves more likely to work, assume greater professional responsibilities, and achieve higher earnings than women whose mothers were at home full time.

- And although women's underrepresentation in the most senior ranks of business leadership is often attributed to the lack of "family-friendly" workplace policies, an in-depth analysis of a consulting firm, co-conducted by Ely, pointed to a more intractable problem: a culture of being at work or on call around the clock—the new norm in lucrative professions like law, finance, and consulting, and one that firms are loath to restrain. Both men and women suffer in these cultures, but women are more likely to avail themselves of part-

time options or otherwise adapt to care for family members, derailing their careers.

Interest in gender-related questions, Ely said, also "bubbles up from the faculty" at large. Thus, for instance, a faculty member who focuses on entrepreneurship is determining the antecedents to women's interest in pursuing entrepreneurial ventures.

In addition to encouraging and publicizing research, the initiative convenes an annual conference to focus scholarship and learning from practice, engaging participants from within HBS and beyond.

Like the school's other interdisciplinary initiatives, Ammerman said, this one provides a locus for faculty members to test ideas with colleagues, learn about pertinent research, and address new questions to data already collected for other purposes: a place to go when those queries "bubble up." As Nohria hoped, the fledgling venture is becoming an intellectual home for women and men from the HBS faculty who want to understand how gender affects organizations' operations—and individuals' trajectories. ~JOHN S. ROSENBERG

THE UNDERGRADUATE

Running Over Murphy's Law

by OLIVIA MUNK '16

HAD ANYONE ASKED ME a year ago about my biggest pet peeves, I would have said I hated running (too many bad memories of middle-school gym) and getting wet in the rain (nothing can tame my hair in the presence of humidity). It was not entirely surprising, then, that I was feeling contemplative this past Father's Day as I ran the Boston Athletic Association's annual 10K race in the midst of a torrential downpour. It wasn't the running or the rain that prompted me to evaluate my life as my sneakers squished down Commonwealth Avenue, but the way the combination of these formerly "negative" activities made me feel that Sunday morning: I was happier than I'd felt in as long as I could remember.

Many of my friends had complained about "sophomore slumps," but junior year was my personal pitfall. On paper, I did just fine: I passed all my classes, secured a summer internship, and participated in all my extracurricular activities. Day to day, though, I sometimes felt that I had unwittingly wandered into a psych experiment on the effects of Murphy's Law on a 20-year-old's precarious emotional health. That fall, I felt constantly on the brink—

of what, I couldn't quite tell you, but each night's sleep felt just a little too short, each reading assignment just five pages too long, each conversation with a friend a hair too tense.

This unrelenting apprehension, coupled with a few of those unfortunate life experiences that friends tell you just take time to mend (though they never explain how to pass the time in question), left me feeling completely apathetic by second semester. I had a hard time finding my former joy in classes and daily activities. Though I'm the first to admit that my natural state is overcommitment, over-cafeination tends to see me through. But when I began to choose *Girls* reruns to cope with my extended existential crisis instead of hangouts and meetings, I knew I was letting down the people around me even more than I was letting down myself.

Although being a statistic is not often a comfort, the numbers tell me that I was certainly not alone in my gloom: *The Harvard Crimson's* Class of 2015 Senior Survey reported that 20 percent of this year's graduating class sought treatment for depression, and 16 percent for anxiety. You don't need a survey to know that a

high-pressure environment like college is the recipe for academic and social stress. Both the Harvard administration and its students come prepared: with mental-health options at University Health Ser-

vices (UHS), Stressbuster massages run by students, House-run yoga classes, and relevant offerings from the Bureau of Study Council, just to name a few, the wellness opportunities on campus themselves

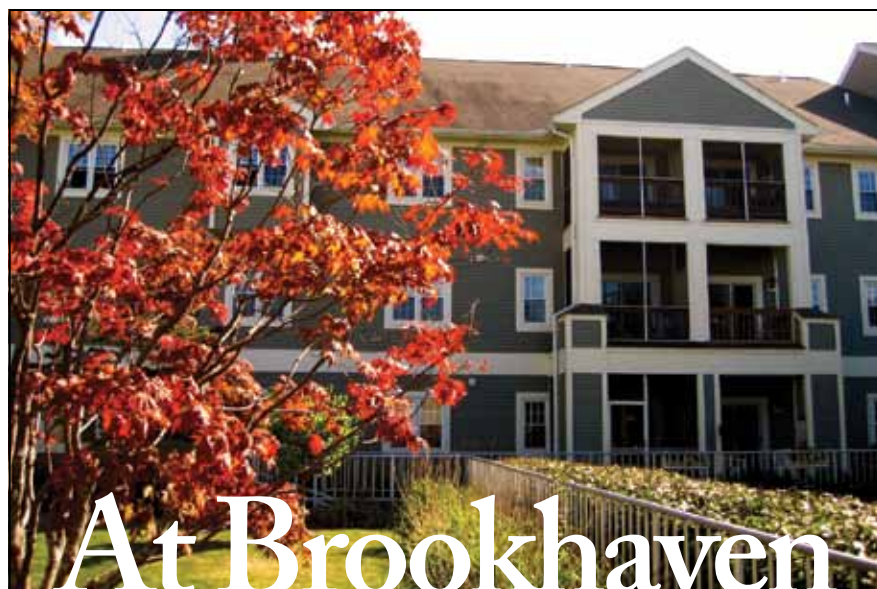
can sometimes feel overwhelming.

After subtracting the hours spent in classes, libraries, and meetings, how does a busy student choose among the options? The difficulty is that taking care of your mental health is not the same as booking a UHS visit online to get a prescription for antibiotics. It takes time to determine what course of treatment is right for you, and more time for emotions to heal. Taking a meditation class instead of joining a club or completing a fifth course is not generally seen as productive for a student's GPA or résumé. But taking the time to figure out which strategies can help you de-stress is a lifelong skill that will aid your productivity in any job. And more importantly, it'll make you a happier person.

Had that *Crimson* survey controlled for seasonal treatment of depression and anxiety, I would not have been surprised to see a jump in patients this past winter: record-breaking amounts of snow turned Cambridge into a continuous snowbank that teetered high above my five-foot-one head, the perfect storm for seasonal affective disorder. It felt almost comical to be



SUSAN HANSON



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in a such a funk while my environment exhibited weather more suited to Arctic explorers. On one of the rare mornings devoid of actual snowfall, I layered three thermal shirts, a sweater, two pairs of leggings and wool socks, and went for a run along the Charles. I'm not quite sure what prompted this unusual burst of activity, but there was something beautiful about the way the early-morning sun glinted off the ice floes in the river, and how I had no choice but to trudge through ankle-deep, untouched snow. The long stretches of white (and the finger-numbing cold) distracted me from my dilemmas enough to clear my mind, even if only for half an hour.

In college, we're rightly taught to constantly critique and analyze: our work, our situations, ourselves. But what I needed in those cold months was a way to shut off my brain: to do something without constantly having my current state informed by my past and my future. As I warmed back up in my room under my favorite purple blanket that winter morning, it occurred to me that running could be just what I needed.

I should note that I'm a terrible runner. I've been told I kick my legs too high, my ankles and back hurt after five minutes, and for some reason I cannot run in a straight line, making me the bane of every speeding biker in Boston. So I suppose this essay is partly an extended apology to the dedicated exercisers frequenting the paths along the Charles, who have had to sprint around the novice jogger huffing and puffing in mismatched running gear during the past four months or so.

My initial routine was to bolt out of my room in Leverett House around 8:30 A.M., make it across Weeks Footbridge, slow down to a light jog as I ran past the boathouse, trot over Eliot Bridge, and limp back to the F Tower elevator before getting ready for my 10 A.M. class. This route was only about two miles, but left me exhausted for the rest of the day.

Which is why I surprised myself one random Sunday, when, as I crossed the footbridge, I made a snap decision to take a left along the river, rather than my usual right. Enticed by the new sights, I kept going, and going, and going. Without even

realizing it, I had soon gone more than three miles along Storrow Drive, all the way to Back Bay's Esplanade, and had the same distance to return. Though my minutes per mile were embarrassingly high, and I could barely move my legs for the rest of the day, I felt delighted.

The spontaneously long run made me realize how trapped I had felt in my usual haunts on the other side of the bridge, where some of my least energetic days meant I didn't even make it above Mount Auburn Street. Using my own legs to take me to a previously undiscovered part of a city had made me feel mobile, in my motions and my mood. I was running away from my problems in a way that actually worked.

During the next few months I explored new routes, got a better pair of running shoes, and made pump-up playlists. I learned how to pace myself and stretch so that the strain of a run didn't last for days. Running continued to be my best form of therapy as the snow melted, my mood lifted, and Boston and I collectively remembered the sun and the color green.

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I especially loved people-watching as I sped along the river. Though a few people brought books or laptops to entertain themselves on park benches, those who sat alone mostly just stared out at the river. I felt a kind of secret kinship with these people, who I liked to believe had brought themselves to the water's edge for the same reason I had, to heal.

I, too, often sat on the edge of a dock on the Esplanade before making the three-mile return to my cinderblock dorm room. It's hard not to feel existential, in a good way, about how small you are compared to everything else, how even the most challenging classes or relationships will eventually fade and flow away. Sometimes, it's okay to not be okay. It took me a long time to realize that I deserved to find my "happy place"—not a theoretical white sandy beach, but a physical place I could go to when I felt overwhelmed, and a mental state in which I could be content. But when I found it (on the banks of the Charles, no less), I still felt like I was unwittingly involved in an experiment about Murphy's Law, though this time in reverse. What happens to a 20-year-old college student when she stops noticing that everything goes wrong, and pays attention instead to the little things that go right? The answer is that she laces up her shoes for a jog.

Perhaps it was this fortuitous reversal that brought me to the 10K that rainy Sunday morning. A friend's mother had signed up for the race but couldn't make it, so I used her bib and ran in her stead. There was something incredible about racing in such inclement weather with thousands of people. Given the ubiquity of indoor exercise equipment, something about pounding the pavement must draw each runner for a different reason. Were some of these folks the lone river-watchers I had observed on my own journey to a clear mind? I ran the race without headphones, eager to process the sights and sounds of a real race uninterrupted. And yet, I often found my mind floating away for a mile or two at a time, and I couldn't place where it had gone along the route. What I did know is that it made the burning in my legs and the raindrops down my face disappear. It may have taken me an hour and 20 minutes to run the 6.2 miles, but I didn't stop to walk once. Somehow, I had found the peace and rest my body needed while continuing to move forward.

Once I'd finally dried off after the 10K, I



New Fellows

The magazine's Berta Greenwald Ledecy Undergraduate Fellows for the 2015-2016 academic year will be Jenny Gathright '16 and Bailey Trela '16. The fellows join the editorial staff and contribute to the magazine during the year, writing the "Undergraduate" column and reporting for both the print publication and *harvardmagazine.com*, among other responsibilities.

Gathright, of Bethesda, Maryland, and Lowell House, is concentrating in economics and also pursuing East Asian studies and Mandarin. An active member of Kuumba Singers and a peer advising fellow, she is also a former columnist for *The Harvard Crimson* and during spring semester helped to found *Renegade*, an online magazine for Harvard students of color (renegade-mag.com). Following prior summer experiences in Shanghai and on an organic farm in Hawaii, Gathright worked in Washington, D.C., this past summer—at the suitably named 1776, a venture seed fund and incubator of start-up enterprises.

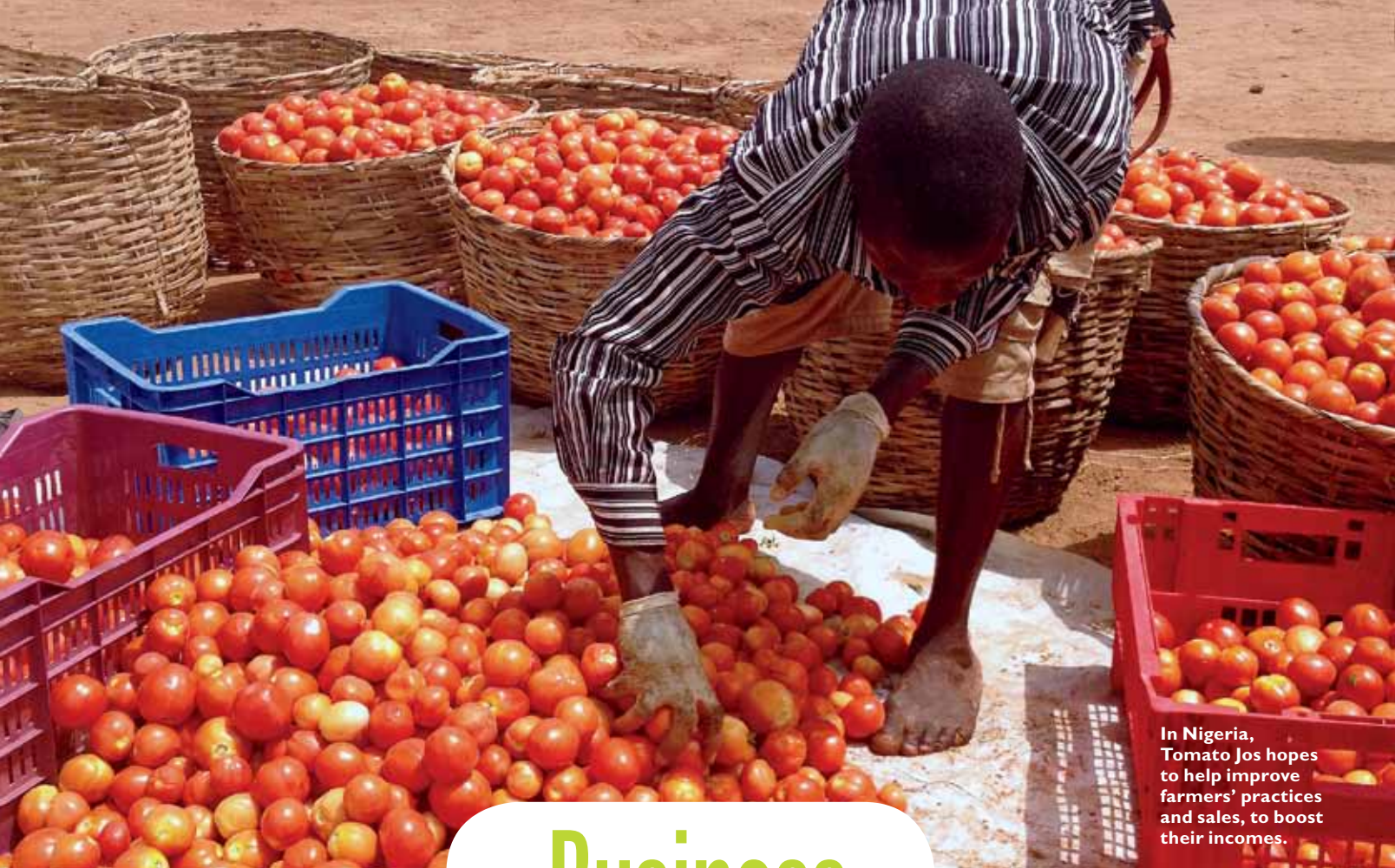
Trela, of New Harmony, Indiana, and Currier House, is pursuing a concentration in English. He is board co-chair of *Fifteen Minutes*, the *Crimson's* magazine, and a features-board member of *The Harvard Advocate*. During the summer of 2014, he interned at Dumbarton Oaks; this past summer, he was assistant technical director of the Harvard-Radcliffe Dramatic Club.

The fellowships are supported by Jonathan J. Ledecy '79, M.B.A. '83, and named in honor of his mother. For updates on past Ledecy Fellows and links to their work, see harvardmagazine.com/donate/special-gifts/ledecy.

met my parents for a mid-afternoon lunch. (They did a great job of pretending not to be very confused that their daughter had run six miles of her own volition.) Though I was aching more than I let on, when the waiter brought me a plate of eggs sunny

side-up, I couldn't help but beam right back. I had earned them. ▢

Berta Greenwald Ledecy Undergraduate Fellow Olivia Munk plans to run a half marathon this October, and will need all the luck she can get.



In Nigeria, Tomato Jos hopes to help improve farmers' practices and sales, to boost their incomes.

Business for the Other Billions

Addressing human needs at the
base of the economic pyramid

by John S. Rosenberg

SINCE LATE LAST AUTUMN, Mira Mehta and Shane Kiernan have lived in converted chicken coops on a farm in Nigeria's Nasarawa State—a two-hour drive, when roads are passable, northeast of Abuja, the capital of Africa's most populous country. On December 23, they started transplanting tomato seedlings from their bare-bones greenhouse to a model plot on a hectare of leased land. Just as they began irrigating the plants, their new well collapsed, and they had to divert supplies and use storage to deliver 80,000 liters of water a day while a replacement well was drilled. Seven weeks after transplanting, voracious borers began to prey on the plants; Mehta and Kiernan had to scramble to get licenses to import traps for the pests. Although their own demonstration field was guarded, the plots of other smallholders, whom they hope to enlist in their venture, were not; nomadic Fulani tribesmen drove their cattle over those fields unhindered, complicating the pair's plans to expand planting.

After the fraught growing season, Kiernan said later, processing

the harvest presented “an equally fascinating learning curve.” When he and Mehta sought to turn the fruit into tomato paste (a national cooking staple) packaged for retail sale—the key to boosting farmers' income—their second-hand packaging machine, bought in Lagos, did not work. Parts and service were unavailable during Nigeria's heated elections, so the produce had to be sold fresh, for low market prices. Once the machine began running, after the growing season, early paste samples were submitted as part of the process to register as a Nigerian food-processor. Said Kiernan, “It's crazy.”

But despite its ambitions, their modest enterprise, Tomato Jos (www.tomatojos.net), is not crazy. Nor are the adventuresome co-founders, Mehta,

M.B.A. '14, and Kiernan, who plans to complete his last credits for a master's in health policy and management from the Harvard Chan School remotely this year. Both have finance experience. Both worked in Africa for the Clinton Health Access Initiative (Mehta in Nigeria, Kiernan in Ethiopia). In preparation for a Harvard Business School (HBS) new-venture competition, and



Clockwise from upper left: Shane Kiernan and Mira Mehta; “home” is a series of converted chicken coops; better seeds, fertilizer, and irrigation will help farmers boost yields; the model farm; planting inside Tomato Jos’s greenhouse

with their \$25,000 runner-up prize, they studied the transportation bottlenecks and market asymmetries that kept farmers from selling their crops at a fair price, and the resulting waste of fruit, despite obvious demand. (Even with ample tomato supplies, Nigeria annually buys \$360 million of paste. A June report in *The Economist* highlighted the country’s dysfunctional agriculture, citing the perverse imports of tomato paste.) They learned about the technologies used by the world’s most efficient paste producer, in California. They identified where they might farm, ways to raise growers’ yields, and how to start funding the business.

For Tomato Jos is a *business*, not an aid organization. Mehta and Kiernan are entrepreneurs with an acute tolerance for discomfort and risk. They have raised capital and plan to raise more, while aiming to earn revenue by penetrating a large market—generating returns to finance reinvestment and growth.

Equally important, the business is deeply rooted in a *social mission*. Mehta keeps in mind an image of driving along roads “literally full of tomatoes” drying in the sun, for local use, because markets are inaccessible and farmers have no means to process their perishable harvest for sale later. With the country poised for

economic reform and investment, will those people in Nasarawa State participate, or be shoved aside? Articulating her company’s goals, Mehta aims high: “If we can set up something sustainable that’s good for the smallholders before the multinational companies turn their eyes to Nigeria, which they will in five years, we’ll be in a position to change the conversation.”

Tiny and entrepreneurial, Tomato Jos is at one end of a spectrum that extends to multibillion-dollar, multinational corporations. What they have in common is pursuing profits *and* social objectives at the base of the economic pyramid—a pursuit full of promise and new challenges for businesses worldwide.

Beyond the Fortunate, Familiar Few

IMAGINE A SIMPLE triangle diagram of the planet’s population. A fortunate couple of billion upper-income people—in the United States and Canada, much of Europe, Japan, Australia, and prospering urban centers in parts of Asia and Latin America—occupy the apex. The invisible hand of market capitalism supplies this prominent minority with bountiful goods and services. But that leaves a lot of people out. At the very *bottom* of the pyramid, a billion or more humans live in poverty (on less than \$1.25 per person per day), often

depending on government programs and charitable aid to subsist.

In between, pointed out V. Kasturi (universally, “Kash”) Rangan, live the low- and low-middle-income majority of mankind: perhaps four billion people who are entering or are already in the cash economy—but barely, with incomes of up to \$15 per day. In a conversation, he compared the lives of these people, the *base* of the pyramid, with those at the top. Because they likely do not own property, and lack rent or tax receipts, they are not bankable, so they turn to exploitative money lenders for credit to stock a shop or start a small business. For medical care, they choose among local healers, vendors of patent nostrums, or queues at public clinics (where it may take a bribe to advance in line). Their labor, often interrupted by those queues or long bus trips to remit cash to a rural family, may be seasonal, itinerant, and legally unprotected. Functioning markets, he noted, imply a level playing field between consumers and producers, but most of these people aren’t getting a remotely fair deal. It is as if the broad base of the pyramid were an alternate universe where familiar rules don’t apply.

Rangan quickly credited the late corporate strategist C.K. Prahalad, D.B.A. ’75, of the University of Michigan, for saying (most prominently in *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*, published in 2004) that the same rules *ought* to apply. Shortly thereafter, Rangan, who is McNair professor of marketing and co-chair of HBS’s social-enterprise initiative, began drawing on his own interests and expertise, colleagues’ perspectives, and the experiences of alumni active in developing economies to refine and deepen Prahalad’s ideas.

For example, he has collaborated closely with Michael Chu, M.B.A. ’76, who returned to HBS in 2003 as a senior lecturer to think systematically about business and poverty, after years of founding and leading microfinance institutions that lend to the poor. In a 2007 essay, “Commercial Returns at the Base of the Pyramid,” Chu examined “why the bulk of humanitarian responses to poverty alleviate its effects while failing to significantly reduce it,” a Sisyphean outcome. Even that may be generous: as Rangan has observed, development aid worldwide totals perhaps \$35 billion per year—enough to support the people at the base of the pyramid for a few weeks.

“To actually win against poverty requires interventions that can simultaneously” reach hundreds of thousands of people, sustain themselves, improve operations to assure efficacy, and apply resources efficiently, Chu wrote. Philanthropic and development agencies tend not to scale or sustain themselves, he found, and public entities often fail to assure efficacy and efficiency. In contrast, “Through the ages, one actor has proven consistently able” to satisfy these criteria: competitive private industries. But that powerful “protagonist...traditionally has stood by the sideline.” Engaging business at the base of the pyramid requires overcoming “strong prejudices” about a sector “so closely associated with social work and philanthropy.”

To dispel that prejudice, Rangan applied his scholarly perspective to suggest inverting the telescope through which companies view prospective lower-income markets. “Typical marketing sells the organization to the customer,” he and research associate Arthur McCaffrey wrote a decade ago. (Need a car? We at GM/Mercedes/Toyota make good ones.) Within the base of the pyramid—devoid as it is of cash, roads, and gas stations—there *are* no such customers. But enormous demand exists for carts to ease the burden of hauling loads along muddy paths or cheap pumps to

irrigate fields. Here, the proper paradigm is to “sell the customer to the organization.”

In a 2011 *Harvard Business Review* article, Rangan, Chu, and Djordjiga Petkoski of the World Bank extended the analysis further, explaining how businesses might segment the developing low-income market by needs and resources. They noted that companies might even have to view their lowest-income prospects as *co-producers*: hence Tomato Jos’s aspiration to introduce new growing and sales systems in order to knit farmers into a more rewarding economy. As base-of-the-pyramid *consumers*, people “often turn out to be paying premiums for, and wasting a great deal of time on, products and services that are shoddy at best” (those money lenders and healthcare queues), so openings exist for better, profitable businesses. In fact, scarce funds make the poor highly receptive to better quality, lower cost, time-saving offerings—but such products and services must be designed for customers who may differ significantly from those at the high-income apex.

How to Address Basic Human Needs

BEYOND JOURNAL ARTICLES, these issues have been aired during the past decade in conferences on economic development and philanthropic impact, and in businesses’ engagement with new markets. One important locus for exploring how this framework informs practice, and is in turn enriched by managers’ decisions, is “Business at the Base of the Pyramid” (BBOP), an elective HBS course created and led by Rangan and Chu. The expanding cohort of M.B.A. students who enroll—one-fifth of the class of 2015, in three sections taught by Rangan, Chu, and professor of business administration Shawn A. Cole, from HBS’s finance unit—suggests wide interest in applying the power of capitalism to this unfamiliar domain. The course is pertinent not only for entrepreneurs (Kiernan enrolled), Rangan noted at its first meeting last September, but also for investment and finance professionals, consultants, and managers in global corporations that increasingly do business from Mumbai to Johannesburg.

The general-management course explores business models for successful operation in a vast, emerging, underserved market. “Thirty years from now,” Cole noted in a conversation, “when these M.B.A.s are at their career peak, the [combined] Indian and Chinese economy will be three times the size of the U.S. economy. The U.S. will really be a special case, rather than the standard or default then.” Whatever the students’ motivation, he continued, “Even if all you care about is success or getting rich, this is still the class for you”—it doesn’t deepen finance or other skills, but it introduces students to ways to use them in “the two-thirds of the world many knew nothing about, going in.”

Conditions in these emerging markets are not the only unfamiliar content they encounter. As the course progresses (from considering how to meet basic needs like sanitation or access to healthcare, to financial inclusion for the poor and financing socially oriented businesses, and ultimately to corporate efforts to reach beyond high-income consumers), students contend with existential questions. What are fundamental needs versus consumer satisfactions? Are there trade-offs between social impact and financial return? Is a business’s social benefit intentional, or tangential? The course does not adopt a position on such issues. Nor do students—whose perspectives range from strict return-on-investment principles to a primary focus on social welfare—

converge on a point of view. But in discussing cases, and engaging with visiting managers from the subject organizations, they address issues that rarely arise so vividly in business education.

- *Privatizing basic services.* For instance, is it useful to privatize a basic good, like the supply of water, and if so, how? In the guise of a case about a potential expansion, the class explores the successful privatization of much of Manila's water system. The hallmarks of Manila Water Company's model are close collaboration with community groups to install common taps and communal billing; deft operations that cut off thieves who stole water and peddled it to the poor by the jerry can, at exorbitant prices; and higher rates for more affluent, larger users to subsidize the cost of supplying the rest of the population—while improving service for all. It is a clear case of creating significant social value *and* profits.

As a chastening counterexample, students dissect *New Yorker* writer William Finnegan's "Leasing the Rain," a report from Co-

chabamba, Bolivia, where Bechtel Corporation's capital-intensive plan to modernize the water system, beginning with much higher rates, led to street protests, political chaos, and its de facto expulsion from the country: a sobering reminder that ignoring the external operating "ecosystem" carries real risks, and that success extends beyond projected cash flow and return on equity (ROE).

- *Weighing social value.* What of businesses' relative social value? At the time the case on Grupo Elektra was written, the Mexico-based retailer of electronics, appliances, furniture, and clothes was profitably serving lower-income shoppers (including by extending credit), but faced dilemmas such as what sales lines to emphasize and what new countries, if any, to enter. It was a sound business, which enlarged customers' consumer sovereignty.

During the same period, Farmacias Similares, a chain of drugstores in low-income Mexican neighborhoods—associated with a generic-drug manufacturer, and co-located with physician clin-

A Founder's Dilemma

Sustaining a start-up social enterprise

LAST FALL, after a lively class dissection of a nonprofit organization's options for earning revenue and securing funds to grow, McNair professor of marketing V. Kasturi Rangan, head of "Business at the Base of the Pyramid," called on Saima Hasan, M.B.A. '15, who told her fellow students she was living the same dilemma.

As a Stanford undergraduate, Hasan explained in a conversation, she conceived and began piloting Roshni (www.roshniacademy.org), a program to enhance the skills of secondary-school girls in India through a free or low-cost, 110-hour supplementary course of instruction in basic employment and academic skills (from English and computer proficiency to workplace etiquette and interviewing and résumé support). The goals were simple: to enhance their prospects for jobs or higher education—on the way to boosting their families' incomes and, in turn, ability to afford medical care, schooling for siblings, and more. It is a small

front in a larger battle; as *The Economist* recently put it, "South Asia is one of the worst places in the world to be female."

Having developed a training model, Hasan, by then a graduate and resident in India from 2009, had to call at schools, without introduction, to find a risk-taking principal who would give Roshni access to the building to pilot its after-hours curriculum (it took 20 cold calls to gain initial entry)—and then persuade parents to allow daughters to participate. A hard-won government endorsement in 2009 (India's human resource development minister told a nervous Hasan, "Good for you!") has eased expansion. To date, Roshni has reached some 15,000 girls, and has measured their gains in getting jobs and rising from poverty. Compared to peers, Roshni trainees have also deferred their age of marriage, an important social change.

Roshni weathered its transition to a new CEO, once Hasan enrolled at Harvard in 2013, but its finances still depended on philanthropy from Silicon Valley's Indian-American community. And so, during her M.B.A. studies, Hasan worked after hours to explore other options: fee-based partnerships with U.S. high schools and universities sending students abroad for global experiences; job-placement fees from local employers who recruit Roshni trainees. But those were insufficient. "There are lots of paths we can take," she said. Might a Roshni for-profit affiliate for higher-income students subsidize the core program? Could the occasional field-immersion experiences become a bigger, corporation-focused business? Perhaps Hasan's own planned, post-M.B.A. mobile-technology startup could underwrite Roshni, or rely on it for its workforce?

In the end, Hasan said this spring, a partial solution emerged: Roshni has partnered with Tata Group (among India's best-known global enterprises) for funding and expansion to 20 new schools, with a curriculum broadened to include vocational and

entrepreneurship training currently unavailable in rural areas. If this pilot, extending into next spring, succeeds, and Hasan's planned company can meet her hiring aspirations, she will have found a way to sustain Roshni—and perhaps to train successor social entrepreneurs in India.



Saima Hasan (left center) poses with girls in Rampur who have completed Roshni Academy's skills program.

ics that offered \$2 doctor visits—made huge inroads in the nation's health system. By combining these services, Farmacias offered cost savings on medicines and invaluable *time* savings for customers who might otherwise have to invest a day to visit a distant clinic, and then find it difficult to fill a prescription elsewhere.

Juxtaposing two such cases, on financially robust companies, invited BBOP students to weigh the social value created by each enterprise and to think about the social intent, if any, embedded in their business plans. In his classes, Michael Chu offered pragmatic rules of thumb for sorting among proposed enterprises. First, he suggested identifying the need being addressed: for low-income people, access to pediatric primary care, for example, comes before access to Mozart. Second, invoking psychologist Abraham Maslow's hierarchy of innate human needs, how might the proposed intervention affect an individual? Fulfilling survival needs (primary education) precedes self-actualization (purchasing soft drinks). Finally, as he reiterated in a conversation, "Will it be able to lead to systemic change?" A slum school might have a dramatic effect on an underserved neighborhood, "But it's a one-off": high individual scores, low systemic ones. Given the urgency of reaching most of the world's population, Chu suggested focusing on ideas that score high on all three criteria, not just businesses that promise high ROEs by selling consumer goods.

- *Capitalist conundrums.* But businesses with a strong social mission prompt further questions. Several BBOP cases involve microfinance institutions (MFIs), lenders that provide small, short-duration loans to low-income groups (which assume collective responsibility for repayment) and individuals. Alongside a critique of MFIs' efficacy in supporting nascent businesses like village stores or repair shops (a major goal of such loans), class members contend with their operating costs. One of these is simply outreach: where people are widely dispersed, making and servicing loans is expensive. A vivid video shown in class follows a lending officer visiting a borrower who raises guinea pigs (a Peruvian delicacy), conversationally eliciting data on sales, prices, and other elements for a *de facto* income statement.

Another real expense for such lenders is their cost of funds. A case on the 2007 initial public offering of Banco Compartamos, the pioneering Mexican MFI, disclosed that its average interest rate on loans at mid decade was 87.5 percent, the highest in Latin America, and that it earned more than 50 percent on its equity. Was this usury—or something else? The rates, the discussion revealed, reflected Compartamos's costs; they should go down as its access to cheaper funds grows and its operations become more efficient. The

Michael Chu, Kash Rangan, and Shawn Cole bring research from around the globe to "Business at the Base of the Pyramid" classes.



costs were acceptable to its more than 600,000 clients: they could use the money well (the bank had minimal nonperforming loans); and their alternative was *infinite* cost (no loan, and thus no inventory or working capital) or a loan shark who might charge that rate *monthly* (and make collections coercively)—vividly demonstrating Rangan's advice to see the market as customers do. Moreover, this bank professed a very *untraditional* capitalist goal: rather than trying to monopolize its market, one executive explained, "[W]e want more competitors to enter," with their billions of dollars of lending capacity, to bring less expensive financial services to millions of low-income people—a goal far beyond Compartamos's reach. (Evidence on attaining such effects is mixed.)

- *Failing to scale.* Students also contended with the constraints on nonprofit enterprises. A case about ApproTEC portrayed a social entity that helped subsistence farmers and small entrepreneurs enter the cash economy by providing them with inexpensive, locally made equipment: an oil press; a construction-block press; and foot-powered irrigation pumps—enabling farmers to grow multiple cash crops, and use the time formerly required for hauling water to market their produce directly instead. (Many nonprofits distribute such pumps; see "Sowing Seeds," January-February 2014, page 18, on Myanmar.) On a \$2-million annual budget, ApproTEC had helped 28,000 families, principally in Kenya, raise their incomes an estimated \$500 to \$1,500 per year.

Yet it was stymied. Sales contributed only one-quarter of revenue, and donors were averse to risk and unwilling to support the long-term investments ApproTEC needed to expand to lift many more people out of poverty. (See "A Founder's Dilemma," opposite, on funding a social enterprise.) Absent recurring revenue, ApproTEC's options seemed counter to its mission: outsource production to a cheaper supplier, rather than develop local ones; or raise the price of the pumps sharply, to reflect their

When Everything Goes Right Until...

A successful business's growing pains

the model of a successful business at the base of the pyramid. The company, established in 2005 by José Vicente Aguerrevere, M.B.A. '02, with his wife, Lucia Brower (an MIT Sloan School M.B.A.; both have consulting experience in retailing), and colleagues, had become a fast-growing chain. Its stores offered lower-income consumers reliable, clean access to essential food and other consumer goods, at fair prices, with convenient hours and locations. Remarkably, DD had prospered in Venezuela, one of Latin America's most inhospitable environments for private enterprise. (For example, DD had to secure permission for every shipment of goods to its distribution center, subject to weekly audits.)

"Poor people were paying the most," Aguerrevere said in a recent interview—a recurrent theme of "Business at the Base of the Pyramid." They shopped most often at *bodegas*: family-run mom-and-pop stores, with limited merchandise and hours, and prices far above those at Walmart-style retailers. But doing so was "entirely rational for small purchases," he continued.

ON PAPER, as students encounter the Harvard Business School (HBS) case about Día Día Práctimercados (DD; day-to-day shopping for practical goods, rendered in a Spanish neologism), it is

Why? "It's not price. It's the total transaction cost"—including the time to travel to a distant discount store and the fares for transportation. "Time is money for low-income people, because they have to sell their time," he explained. Big-box stores' lower prices don't offset those costs for cus-

tomers whose incomes limit them to daily shopping for small quantities of goods. In effect, "Your competition is the bus." The customers are "buying on a day-to-day basis because they are earning on a day-to-day basis," he said: Día Día's concept.

DD deployed the tools of modern retailing—central distribution, efficient supply chains, information technology to manage inventory—in attractive neighborhood stores (each staffed with 14 employees), with lower costs and better stock than *bodegas*. Customers responded to its business model: by 2009, there were 32 stores, with sales on a \$45-million annual pace.

But from the start, DD was stretched for capital, particularly given its ambition to serve the market with hundreds of outlets. Absent bank loans or other sources of funds (unavailable to a company of its size and relative youth), Aguerrevere and his colleagues considered acquiring another chain of stores—the financial decision at the heart of the HBS case.

Although the deal seemed fine on paper, the result, as he described it, was almost suicidal. Within weeks, the enlarged company was nearly bankrupt, as the newly acquired units, with inferior systems and controls, were "bleeding money." The local business environment foreclosed what would be an automatic response elsewhere: there is no provision for a bankruptcy reorganization, Aguerrevere said, and when management approached authorities about laying people off or closing stores, they were told, "If you do that, you will go to jail." Grinding years of asset sales and slow improvement in operations followed, restoring DD's health, even as planned growth that would have benefited low-income consumers was deferred.

In recent years, cash flow recovered enough for DD to open one new store every two months. Aguerrevere hoped to raise that pace to 10 in 2015.

But heightened *business* risks are not the only challenge at the base of the pyramid, where the rule of law, he noted, cannot be taken for granted. In a cruel coda, *political* challenges emerged vividly last winter. As the price of oil fell by half, Venezuela's petroleum-dependent economy neared collapse, making essential goods like milk powder and corn flour scarce. Amid political rhetoric about an "economic war" being waged on Venezuelans from abroad, the government called in DD's local leaders (Aguerrevere and Brower now live near Boston, and he was commuting to Caracas), declared its inventory evidence of hoarding, and placed the senior manager under arrest.

Día Día has somehow operated under these extreme circumstances, Aguerrevere said (in part because customers demonstrated to keep the stores open), but "on a whim"—at the government's pleasure. Although the chain was not nationalized, he said, it has functioned "under occupation," with his partner still detained six months later. As Aguerrevere ran DD from abroad, his partner's status casting a dark pall over the company's tenth anniversary, he now knew that the enterprise could be "expropriated at any time"—compromising, if not destroying, its prospects for expansion, and its value to founders and customers alike.



Día Día's distinctive store design and convenient arrangement of basic goods have won loyal customers in hard-pressed Venezuela.



Among the companies in IGNIA's portfolio of venture-financed enterprises for the base of the pyramid in Mexico are Ver de Verdad, for low-cost vision care; Barared, which operates banking-services kiosks in neighborhood stores; and Provide, which restores foreclosed lower-income housing developments.



true value to users. The latter plan, readily understood by HBS students who can easily calculate the present value of future cash flows, seemed likely to be a much harder sell in Kenya.

Financing Frontier Businesses

LIKE ITS PLANTS in central Nigeria, Tomato Jos is a seedling of a company, financed to date by the winnings from the HBS competition; a Kickstarter campaign; and individual angel investors. That's appropriate for a new venture of its scale. It faces large business risks compared to those assumed by, say, a U.S. biotech startup. The rural African ecosystem would bewilder most developed-world entrepreneurs, who take roads, banking, and overnight-delivery services for granted. (See "When Everything Goes Right Until...," opposite, for a Latin American retailer's experience.) Mehta and Kiernan will face further hurdles in securing the larger sources of capital they need to get from the greenhouse to the grocery store.

That layering-on of external operating risk, atop the usual challenges for business success, raises real obstacles to financing base-of-the-pyramid enterprises. BBOP introduces students to examples of "impact" investors who aim for varying degrees of social benefit and financial return despite such hurdles. Among them: Bridges Ventures, a private-equity firm that makes investments in enterprises with social missions; Omidyar Network, created by

eBay founder Pierre Omidyar, to make impact investments; and new tools like social-impact bonds, used to address such public problems as prisoner recidivism while yielding a return to investors (see "Social Impact Bonds," July-August 2013, page 11). All are promising in theory, but their current scale is imperceptible. And at least some early analyses suggest that high social impact is at odds with high financial returns (the latter more often in the upper layer of the base of the pyramid)—implying continued reliance on philanthropy to meet social goals.

Other cases in the course touch on internal strategies to finance service to lower-income people. For example, the world-renowned, nonprofit Aravind Eye Hospitals have treated millions of indigent Indians' cataracts at little or no cost to patients. How? Aravind provides its world-class service to upper-income patients on a fee basis, and then applies the revenue to subsidize pro bono care.

Still, if the sector is to flourish, proven financing techniques will have to be adapted to make capital more readily available. One of the most interesting, IGNIA (www.ignia.com.mx), a base-of-the-pyramid venture-capital firm operating in Monterrey and

Mexico City, is not part of the course curriculum, but its experience is at hand: BBOP teacher Michael Chu is a co-founder.

Launched in 2007 and initially funded with \$102 million from private individuals and institutional investors, IGNIA aimed from the start to be a “proof of concept to bring capital to this area,” said Álvaro Rodríguez Arregui, M.B.A. ’95, managing director, in

a telephone interview. Some 70 to 80 percent of the population in emerging economies, like Mexico’s, live daily lives “very, very foreign” to those at the top of the pyramid: “It’s not a good recipe for attracting capital.” Most investors, he said, are “more comfortable investing in a building on Madison Avenue than investing in a project in Queens,” even if the latter is more profitable. By seek-

Measuring Impact in the “Missing Middle”

New metrics for a mixed business model

the products and services they want, and companies measure their sales, cash flow, profits, and return on capital—financial metrics that managers and investors alike can assess.

But how should *social* impact be evaluated? In “Business at the Base of the Pyramid” (see main article), students contend with the relative worth of enabling lower-income people to exercise consumer sovereignty (buying a television) versus securing their access to medicines. They consider research suggesting that microfinance—a high-profile tool in development economics and a vehicle for base-of-the-pyramid “financial inclusion”—often appears to bolster consumption more than it enables entrepreneurship, arguably a higher-impact goal.

A broad, deep effort to develop methods for measuring so-

cial impact exists in Cambridge’s Central Square, just down Massachusetts Avenue from Harvard Yard. Root Capital (www.rootcapital.org), a nonprofit founded in 1999, lends to small agricultural enterprises—for example, Latin American coffee cooperatives—that need

funding beyond the smaller loans offered by microfinance institutions, but are not yet served by commercial banks. Such enterprises provide vital rural services to hundreds of member growers, but are financially stuck in the “missing middle.” To date, Root Capital has disbursed more than \$900 million in loans, focusing on producers of high-value, traded products such as coffee, cashews, and cocoa, but also extending of late to smaller growers of local, staple crops in Africa.

Does Root’s lending make a real difference? Brian Milder ’01, M.B.A. ’07, the senior vice president who oversees strategic planning, financial advisory services for clients, and innovation, also directs impact assessment. He outlines three principles. The deepest in-field assessments (see below) ought to be *client-centric*: not merely generating information for external parties, but engaging clients in a process that results in better growing and operating practices. Assessment also aims at determining “*additionality*”: measuring the real impact from, say, Root’s agricultural lending versus what would happen in the market were Root not making funds available. Finally, in Root’s vision, there ought to be a *balance* between impact and financial investment decisions, with both considerations playing a role at a loan’s inception. (For Root, that balance has been shifting in interesting ways; as its clients have grown to need larger and longer-term loans—not just to finance a season’s crops but to build processing facilities, for example—hoped-for bank financing has not been forthcoming, so Root has stepped in. On such loans, it aims to make a profit, following the commercial model, in order to subsidize lending to smaller borrowers—where it is not able to cover its costs.)

Mike McCreless, M.B.A.-M.P.A. ’10, director of strategy and impact, says those principles shape the criteria loan officers use in the field. Given Root’s goal of supporting rural entrepreneurs and rapid economic growth, he said, “We had to figure out how to direct money to where it has the most impact” on local investment: boosting farmers’ income by obtaining higher prices for their produce, and so on. Root’s website and quarterly and annual reports display data on the number of producers affected, women farmers benefited, acreage under sustainable cultivation, and so on—alongside accounting for loan balances and performance.

Of late, those analyses have been supplemented by deeper, almost ethnographic studies. Impact officer Asya Troychansky ’07, for example, visited four Root client coffee cooperatives in Guatemala, interviewing their managers and staff, and training four local consultants who in turn surveyed 407 farmer-members and 233 *nonmembers*, seeking to tease out their relative incomes, pro-



Asya Troychansky and researcher Henry Caba Escobar (center) interview a farmer in Guatemala; Troychansky and Antonio Alberto Tzep López examine coffee plants at Nahualá Cooperative.

ing out high risk, even for venture capitalists, and creating “extraordinary returns,” he continued, IGNIA hoped to have a demonstration effect on other investors: “Once you are able to show the numbers of a successful endeavor, then you can open people’s eyes” about the sector.

Finding entrepreneurs has “been the least of our problems,”

duction practices, and other outcomes—and the connection to Root-supplied financing. She found that in effective cooperatives with Root funding, membership was associated with higher incomes, in part because the co-ops could pay growers a base price *during* harvest—reducing dependence on intermediaries that customarily buy at prices less advantageous to the farmers. Enabling co-ops to pay farmers earlier contributed to a virtuous cycle of higher membership, with member farmers able to take advantage of the cooperatives’ services, including agronomic training that promoted wider use of sustainable practices. Troychansky also gathered evidence on gender inclusion and agricultural environmental impacts—data in place of suppositions, facts by which to direct lending.

Beyond its Root-focused work, Milder’s team works to advance assessment tools generally. One locus is the Global Impact Investing Network, with its impact reporting and investment standards (IRIS): an effort to evolve what he calls an impact “taxonomy” equivalent to Generally Accepted Accounting Principles for financial statements. McCreless, who has driven, and disseminates, some of this work through a blizzard of journal articles and papers on impact assessment, says the measures get at *types* of impact (income, for instance); *scale* (the affected population); and *depth* (the level of impact on each person). Much of Root’s information on impact types and scale comes from loan officers’ reports; depth metrics are least developed. That is where Troychansky’s studies come in. “The metrics are the *starting point*,” she says. The field studies aim at a “more holistic impact profile” of lives likely changed.

Whatever tools are finally evolved, Milder puts their importance in a larger context. “Business at the Base of the Pyramid” (which he took in 2007) describes the world as a triangle, but from Root’s perspective, he says, the relevant image is a snowman—perhaps ironically so, given the warm regions where Root works. “Think of the 450 million to 500 million smallholder farm families in the world,” he explains: the 2 billion to 2.5 billion people who till less than 5 hectares, and who are perhaps three-quarters of the world population living on less than \$2 per person per day. The top 10 percent of this group (the small head) are in organized supply chains for cash crops like coffee or cocoa—and Root and similar organizations are beginning to get them the capital they need. Mid-body are the 150 million to 170 million semi-commercial farmers who grow and sell staples. And at the bulging bottom are the marginal, subsistence farmers, who just manage to survive working their land.

In agriculture, Milder says, the need for investments with beneficial social impact is far greater than anyone envisioned when Root was founded. In human needs, business opportunities, and prospective impact, the same holds true across the entire base of the pyramid.

Rodríguez Arregui continued: IGNIA made 11 investments in its first fund, choosing from among 300 opportunities. But those entrepreneurs’ profile could not differ more from the prototypical American coder in a garage. The average founder in whom IGNIA invested is 45 years old, with at least some experience serving the base of the pyramid. A successful IGNIA CEO is not the “polished M.B.A. with the perfect PowerPoint and funding model,” as principal Christine Kenna, M.B.A. ’05, put it in a separate interview. That seasoning is crucial, Rodríguez Arregui said, because “The opposite of the word ‘frictionless’ doesn’t exist, but that’s the environment you operate with in Mexico.”

Investments range from a chain of optical centers where customers can get exams and low-cost eyeglasses within 45 minutes, to a company that buys groups of foreclosed homes in low-income developments and revitalizes them with community groups to stabilize the neighborhood. IGNIA is also backing a kiosk-based, online, correspondent-banking system that serves customers in the small stores where base-of-the-pyramid customers do most of their shopping—banking without branches, which increases the stores’ traffic. The rapid rise of smartphones (which Rodríguez Arregui estimated are now used by 20 percent of lower-income customers in Mexico) “opens a whole set of windows” for entrepreneurs, he said, even since IGNIA began committing funds in 2008.

Emerging opportunities aside, IGNIA has learned from failures, too. Two of three investments that did not work involved agriculture, where—as Tomato Jos recognizes—business risk and the risks of the underdeveloped rural ecosystem may be complicated by the need to change partners’ *behavior*: how growers farm; how they pack produce for sale. “Business models that have an underlying assumption that ‘If people only did this, everything would be great,’” can work, Rodríguez Arregui said, but need more time to do so than the financing horizon allows. “Facebook changed the way we interact,” as he put it, “but it didn’t have to build the Internet.”

Although it is too early to know the returns on IGNIA’s initial portfolio, the companies are “performing very well,” he said, and the firm is raising a second fund. Mexican venture capital remains in its infancy, but indigenous pension funds are considering investing—a first for such institutions. Nonetheless, after traveling the world to promote the idea of high-return investing in businesses with a large social impact, Rodríguez Arregui cautioned about progress to date. Compared to the wave of investors in 2007, he said, “There’s basically nobody new.” Philanthropists and backers of social enterprises remain interested, but the finance industry overall still views “impact investing as a spin-off of not-for-profit activity.” Nonprofit organizations, short of capital, have naturally tried to present themselves as pursuing “market solutions to social problems,” but unconvincingly.

Nor have measurements of social impact evolved to the point that they can be applied as usefully as metrics like profit margin and ROE (see “Measuring Impact in the ‘Missing Middle,’” opposite). Mariana Mazon Gutierrez, who directs IGNIA’s industry and institutional relations, noted that prospective portfolio companies undergo “social due diligence” before investments are made, and comply with annual reporting requirements such as those developed by the Global Impact Investing Network. Compliance is time-consuming for the entrepreneur-managers, she said, and it is still difficult to know (please turn to page 74)

MUMBLECORE'S *Maestro*



by SOPHIA NGUYEN

IF THIS INTERVIEW with Andrew Bujalski—in a chichi Manhattan hotel, the morning of the theatrical release of his latest movie, *Results*—were a scene in one of his films, it might go something like this.

The camera would measure every inch of awkward distance between the interlocutors, each seated on the edge of a high-backed leather chair. With an amused eye, it would take in the wall of blown-glass sculptures along the stairway, and the elevators showing black and white movies on tiny screens to keep guests entertained between floors. But the essential focus would be the conversation's turns and tics: how the journalist tries and fails to talk around the “m-word”—“Well, no one uses the term *mumblecore* anymore”—and how the filmmaker equably interjects: “And yet I’ve been asked about it in every interview.”

Writer and director Bujalski ’98 acted in his first two features, as the guy who couldn’t get the girl in *Funny Ha Ha* (2002), and the one who couldn’t keep her in *Mutual Appreciation* (2005)—meek types, congenitally unable or unwilling to say what they meant. In person, and 10 years older, he comes across as soft-spoken but forthright; the habit of pushing up his glasses at the bridge, or wiping the lenses on his shirt, carries over into real life.

In *Esquire*, essayist Chuck Klosterman once described Bujalski’s work as “the films that make 10 percent of America annoyed and 90 percent of America bored,” adding, “These are the films that are always my favorites.” Made deftly, on the cheap, and without marquee actors or discernible plots, they are seismographs for tracking emotional fits and starts. The audience for such fare has been narrow—mostly made up of festivalgoers and film journalists—but what that viewership lacks in size, it makes up for in the intensity of its scrutiny. In the years when his work circulated on press screeners and DVDs sold on his website, those who sought it out rarely came away neutral, dividing into avid supporters and scathing detractors. His debut feature, *Funny Ha Ha*, was the first of a wave of talky, naturalistic cinema made by and about young people in the early aughts. Zooming in on microclimates of emotion, films in this vein captured the feel of postgrad, pre-adult existence. In their cheap digs, the characters drifted through daily life, chatting and canoodling on crummy couches. If these white, straight, middle-class, twenty-somethings seemed a little too sanguine about their sporadic employment, well, it was pre-recession America. No one knew how to panic.

There’s another, more literal sense in which Bujalski helped to define a subgenre. In 2005, his sound mixer Eric Masunaga coined the term “mumblecore” over drinks at a bar in Austin, Texas. Off the cuff and on the record, the director repeated it to the film site *Indiewire*, and ever since, “mumblecore” has followed him like a bad penny. (Even as the buzzword has become passé among critics, it reliably resurfaces. Last May, none other than *Indiewire* ran an editorial, self-defeatingly headlined: “The Word Mumblecore Turns 10 Years Old This Year. Can We Stop Using It Now?”)

Over the years, other filmmakers tagged with the label, like Joe

Swanberg and Mark and Jay Duplass, have gained more mainstream attention. They have expanded their ambitions to producing, while racking up nearly twice as many acting, writing, and directing credits. They’ve been quicker to bring Hollywood names on board their projects; they’ve got TV shows on premium cable. While consistently championed by critics, Bujalski has remained less known, less visible, than these peers.

Results visibly departs from his previous work, and at first glance seems crafted to have an appeal that’s less cult, more commercial. It’s a romantic comedy, and has a concrete plot. It’s his first film shot on digital video, and the images feel distinctly contemporary, the colors brighter and sharper. *Results* also has two bona fide action stars for leads, Guy Pearce and Cobie Smulders, both of whom have shown up in the Marvel franchise. But even the presence of more obscure talents, like Kevin Corrigan, Giovanni Ribisi, and Constance Zimmer, is a change.

“If I’m not mistaken, *Results* is the first movie I ever made in which no one in the cast is someone I’ve lived with,” Bujalski affirms. Then he reconsiders. “I’ll tell you what, actually, my dad is in *Results*. He’s a roommate! Roommates in all of them.”

Edmund Bujalski ’74, M.B.A. ’76, appears on a TV playing in the background of a scene: he’s a talking head discussing healthcare. Along with some two dozen of the film’s cast and crew, he attended its premiere at the 2015 Sundance Film Festival in January; that night, his son called everyone involved in *Results* onto the stage, naming and thanking each of them personally. Not long after that celebratory mo-

ment, the director confided to his father that he worried people would think he’d sold out.

Months later, in May, Bujalski is a little easier on himself. He terms aspects of the film his “olive branches” to a wider audience: “Okay, I’ve got your movie stars now, I’ve got a happy ending.” Of all his projects, it’s had the widest theatrical release, and the most funding. While on the press junket for *Results*, orchestrated by a professional public-relations firm, Bujalski notes, bemused, that this is the nicest hotel he’s ever been put up in. “Maybe they’re blowing the whole publicity budget on it,” he speculates, gesturing behind him: “They’re playing *Alphaville*” (Jean-Luc Godard’s sci-fi dystopia, which begins in a hotel) “in the elevators.”

Yet some things about his filmmaking may never change. Bujalski says, “I think I have the same experience over and over again.” He gets deep into a project, directing it according to what feels most natural and exciting to him, and by the end, “It’s just not...conventional. I’m always surprised by that. I’m always rather shocked that what I’m doing is *not* mainstream.” He goes on, “I’m not a provocateur. Everything I’ve done is quite—*gentle*. I’ve never made a movie that walks up to you and slaps you.” Still, Bujalski and a wide popular audience may always find each other a little befuddling.

BUJALSKI GREW UP in Newton, Massachusetts. His parents weren’t big film buffs, but they consented to be dragged to theaters on the weekends, and sat with him as he watched up to three features,

The perfect pitch of filmmaker Andrew Bujalski

back to back. His mother, a visual artist, mostly stopped drawing and painting when he was born; Bujalski vividly remembers her work hanging around the house. “I was always, as a child and now, so envious of that talent,” he recalls, “and so *angry* that I hadn’t inherited it.” (In a required drawing course for his concentration at Harvard, he ended up with a B-minus.) Nor did he inherit the business acumen of his father, a healthcare executive: “I don’t know if they dropped me on my head when I was baby or something, but I have an extraordinary mental block about business.” As early as age six, though, Bujalski announced that he wanted to make movies when he grew up. Soon after, he got a Sony camcorder as a Christmas present, and with it, made little movies with his friends in the backyard—a precursor, perhaps, to his way of working as an adult.

Bujalski’s approach has been to make everything as natural as possible. Everyone should feel as though they’re living the scene, rather than acting in it. The director always had a written script, revised several times over, but the actors rarely did. Instead, he’d outline the scene for them, laying out key dramatic beats and lines of dialogue, and they rehearsed until they got the feeling they wanted. The actors had no assigned marks to guide their movements; the lighting equipment on set was minimal; and—in part because they had limited film stock to work with—there were only a few takes. Myles Paige ’98, who played a love interest named Dave in *Funny Ha Ha*, remembers the shoot feeling as if “All the parties we had gone to, all throughout college, built up to this filmed party. People didn’t really pay too much attention to the camera.”

Matthias Grunsky, the cinematographer on all Bujalski’s films, and his closest collaborator, remembers that when they first met in Los Angeles in 2000, they watched the raucous and bruising John Cassavetes drama, *Faces* (1968), as a reference for *Funny Ha Ha*, which they hoped would showcase performances with a documentary approach. On set, even in tight spaces, Grunsky tried to keep a decorous distance—to capture the delicate interplay among the actors without intruding. His guiding principle when working with Bujalski has always been that “The intimacy and sensitivity of what was going on in front of

the lens was a very precious thing that needed to be protected.”

This was especially key for working with nonprofessional actors, some of whom were nervous about participating. Tilly Hatcher, M.U.P. ’12, was reluctant to take the lead in *Beeswax* (2009)—“It was a scary thought, really”—and remembers feeling relief after shooting wrapped each day; she agreed to the project mostly to have an excuse to spend five weeks with her sister, Maggie Hatcher ’97, who’d played a small role in Bujalski’s thesis film. In Tilly’s favorite scene, her sister gave her a piggyback ride, and the camera hung back: “It just felt like me and Maggie,” she says. In a couple of takes, they accidentally called each other by their real names.

Until *Results* (“a much larger military operation”), most of Bujalski’s productions were what he calls “guerilla filmmaking,” a strategy that involved reaching out to everyone he knew in the area—Boston for *Funny Ha Ha*, New York City for *Mutual Appreciation*—and asking favors of friends and family. Everyone was a volunteer: they acted as extras; they let members of the cast and crew stay in their homes; they lent their cars for errands, or scouted locations. Bujalski paid the bills with a part-time job teaching high school, and then with temp work.

Marshaling resources for *Beeswax*, in 2007, he called up an acquaintance, a novelist and *Texas Monthly* editor who’d graduated from Harvard in 1993: “She was a few years older than me. She had great posture. She was smarter than me, and—intimidating.” There hadn’t been even a hint of romance when they’d first met a few years ago in Austin, and so, “I distinctly remember having a beer with her and being very surprised to think, *Am I flirting with Karen Olsson?*” They began dating shortly afterward, were married in 2009, and have lived there ever since.

FUNNY HA HA, *Mutual Appreciation*, and *Beeswax* can be viewed as exemplary of the genre that dare not speak its name. They have sham-bolic narratives, befitting lives in transition; the characters fumble (and yes, mumble) through their temporary relationships and jobs. Yet Bujalski has always approached his subject matter with a mor-



The love triangle in *Results*—Kevin Corrigan (at top, left), Cobie Smulders, and Guy Pearce—on the lookout for good form



Bujalski is a master of the middle depths of feeling, where most people swim.

dant sensibility. He's a master at navigating the middle depths of feeling, where most people swim day-to-day: doubt and embarrassment; surges of attraction, tenderness, and aggression. His movies map the tiny eddies and unspoken undercurrents. The neorealism is low-key and up-tempo.

The interpersonal dynamics of any given scene have such specificity and clarity that they're nearly impossible to describe. This paradox is at the heart of his work. A single, quiet interaction requires many more words to unpack than are ever uttered on-screen, by, say, the radio DJ in *Mutual Appreciation* who invites the alt-rockster into her bed by handing him a beer and the flimsy excuse that she doesn't have any chairs. Bujalski has perfect pitch: an instinct for how language meanders, and the lacunae it circles around. His scenes find meaning in each awkward pause, every dilatory "like." A character says, "you know," and weirdly, you do.

Writer and show-runner Lena Dunham is arguably Bujalski's most famous admirer. One of the characters on *Girls* is named Marnie, after the heroine of his movie *Funny Ha Ha*. After seeing that movie at age 18, Dunham peppered the director with e-mails asking about film equipment, and he responded to all of them. When, in 2012, they co-introduced a new 35-mm print of the film at the Anthology Film Archives in New York, Dunham called it the "tenth anniversary of my awakening to the idea that our own developing lives are worth examining." Nevertheless, in her work, exuberant ego always has always come with a self-lacerating edge, even cruelty.

There's no hint of that in Bujalski's work. "I've never made a movie where I didn't basically love the characters, and the actors," he says. "I don't know how to write characters that I don't essentially like, even if they're doing nasty things once in a while."

His movies have often been designed with particular friends in mind. Bujalski wrote *Funny Ha Ha* with Kate Dollenmayer '97 as the lovelorn Marnie; *Mutual Appreciation* had to have Justin Rice '99 as Alan, a singer newly arrived in New York; and *Beeswax* couldn't proceed without the Hatcher sisters, as a tense, controlling boutique owner and her free-spirited twin. Myles Paige says he cried out in mock indignation, "What do you think of me, Andrew?" when offered the part of a sleazy, visionary programmer in Bujalski's fourth movie, *Computer Chess* (2013). But he describes himself as feeling a bit "frayed" at that time in his life, and brought that energy to the character of Michael Papageorge and his disconsolate wanderings through motel corridors.

"With nonprofessionals, you're starting with this kind of raw honesty—if it's there, and it isn't always—and shaping it into

something that tells a story," explains Bujalski. Ordinary people are often opaque in their intentions. "With actors, you really kind of go in the opposite direction. They're very, very well-conditioned to make sure that every story point comes across crystal clear, and it's a kind of clarity that I'm always trying to muddy up."

His approach to directing actors has been informed by his own acting in friends' movies—Joe Swanberg's *Hannah Takes the Stairs* (2007) and David Zellner's *Goliath* (2008), among others—and he likens the process to the dance lessons he took for his wedding: "When you're dancing with somebody who knows what they're doing, and can lead you, it's kind of an amazing feeling, to get carried by somebody's vision and confidence." He still thinks that his best acting work was for his own movies, where he was too concerned with other aspects of the shoot to get anxious. "There's a lot of downtime

for actors, and usually they're treated nicely. So you kinda sit around and somebody brings you coffee. I think they have to learn to really contain or focus their energy in those moments, because what I end up doing is just sit around and think, aw, jeez, I'm really fat. And I'm really stinking in this movie, I'm really messing this up. And then you get up and do your thing and feel very self-conscious about it."

Bujalski quipped to the *Austin Chronicle*, in

2009, "There was a time in which I thought that half my friends were mad at me for putting them in a film, and half my friends were mad at me for not putting them in a film." His movies are populated by Harvard alumni, and for many of them,

his project is their sole film credit, a blip in their careers. Christian Rudder '97, who plays Alex, the main love interest in *Funny Ha Ha*, is far better known as the co-founder of OkCupid (his band with Rice, Bishop Allen, has provided music for several of Bujalski's movies); Keith

Gessen '97, a founding editor of *n+1*, briefly appears in *Mutual Appreciation*. Paige, a roofer, recently got his Realtor's license in Washington state. Tilly Hatcher is a real-estate developer and urban planner.

Maggie Hatcher, an emergency-room doctor, was in the middle of her residency when *Beeswax* was released. The medical and indie-movie spheres of her life had little overlap, but when *The New York Times* gives a rave review, acquaintances notice. Laughing, she reports, "I remember people teasing me, 'Oh, A.O. Scott thinks you have nice arms!' and me telling them, 'Oh, shut up.'" Unlike with professional actors, when Bujalski's stars claim to feel embarrassed about seeing themselves onscreen, you believe them.

HARVARD ALSO SHAPED Bujalski's craft in other ways. The strong documentary leanings of the visual and environmental studies department trained him to begin from an interest in observing the world. He learned to work with what was available,



In *Funny Ha Ha*, Mitchell, played by the director (top), confesses a crush on his co-worker Marnie, a role crafted for Kate Dollenmayer (below).

and be alert to what was out of his control. In nonfiction filmmaking, “There needs to be intention, but then your intention gets thwarted at every turn.” By the end, he says, the experience proves invaluable for filming fictional narratives, too: “You’ve tried to learn to make chaos your friend.”

For a course taught by Robb Moss (now professor of visual and environmental studies [VES] and chair of the department), students had to collaborate on a group documentary. Bujalski’s cohort made a movie about the various restaurants and karaoke bars along Route 1 in Massachusetts. The assignment posed the inherent challenge of uniting everyone’s aesthetic and ethical sensibilities. Moss remembers that “Andrew always fell on the side of, ‘It’s fine.’ Yes, maybe it pushes a little bit against the polite—but he was always so delighted by what the world can do, and what was possible in front of a camera. He really helped to get the class to enjoy themselves, to enjoy the things they were filming, and to think they were interesting and delightful.”

A white line running up his right pinky is the closest Bujalski comes to having a tattoo (or so he writes, in his notes for the Harvard Film Archive’s collection of his work)—an honorable scar from an accident in senior year, when he reached too quickly over a film splicer’s razor blade. He made and cut his first three movies on film, and with nowhere safe to put the boxes of negative and other physical materials, began depositing his work with the HFA in 2005. In addition to his features, the collection includes two shorts he made as a student: *My Life as a Cliché*, from a freshman-year class with Richard Rogers (then associate director of the Film Studies Center), and his thesis, *Close for Comfort*.

The latter tracks the evasive maneuvers of Caitlin, who impulsively abandons her boyfriend to get engaged to a mutual friend, Mike, and then hides out in the suburbs while her new fiancé waits, forlorn, in their apartment. In it, Bujalski seems to be working out his ideas about how people speak to each other. Even as they imagine themselves the tempestuous *dramatis personae* of a grown-up affair, the characters suspect that the words sound stilted in their voices. Cruising up to Caitlin in his car, Mike tells her, “Get in.” She’s skeptical, amused: “Are you kidding me?” He shrugs, half-apologetic, “I thought it sounded good.” The story is funny and tender; projected onto the big screen in the Carpenter Center, its little hilarities and heart-breaks somehow expand to fill the auditorium.

WHEN AT LAST Bujalski capitulated to video for his fourth feature, it was with a retrofitted Sony AVC 3260, a rare and unstable black-and-white tube camera that required two backups and an engineer on standby. “The camera would just have its own life,”

says Grunsky. “We never had to stop the shoot, but we were close. There were moments where I didn’t know what to do anymore.” The glitches and light smears produced by the set-up had a conceptual appeal, but the cinematographer worried about testing viewers’ tolerance: “Is this going too far? If people will see this on a big screen, is this too much to ask?”

Ironically, Bujalski had first planned to make something more conventionally appealing. When he and Olsson had their first child, Alexander, in 2010, he decided he’d need to shift out of the guerilla mode; a subsistence paycheck wouldn’t cover the mortgage. But when financing for that project failed to come through, he opted to develop what then seemed like his least lucrative idea: an eight-page treatment for a sweetly loony 1980s period piece about the early days of artificial intelligence.

By the end, he says,
“You’ve tried to
learn to make chaos
your friend.”



Bujalski’s actors sometimes contribute other talents: Justin Rice, cast as a singer in *Mutual Appreciation*, has written music for several Bujalski movies; Tilly Hatcher (on left), the lead in *Beeswax*, created collages for its closing credits.



Computer Chess follows a tournament in which techies vie over who’s designed the smartest chess program. Bujalski filled his cast with actual experts: film editors, software experts, and two professors (one in cinema studies, and the other in computer science). In the movie, it feels natural when the characters speak in jargon, smoke pot, and sneak into the rooms of rival teams to tinker with their machines—on breaks, says Paige, people really did play chess together—but the surreal story only grows stranger, with episodes involving a New Age cult, an abortive threesome, a room full of cats, and a computer displaying signs of consciousness.

The 92-minute slice of deep-dish nerdery was his first feature accepted by the Sundance Film Festival, and somehow, his biggest critical and commercial success. At its premiere, Bujalski’s mentor Rob Moss gushed to his former student, “This is so weird and so funny, and so great—I just hope you can continue to make this.”

“I have a family,” Bujalski replied. “I hope I can, too.”

“Mumblecore” always had a ring of intergenerational grievance about it—like parents, indulgent and irritated, wondering aloud about when their beloved offspring will move out of the basement. To critics as well as fans, *Computer Chess* demonstrated its director’s creative range, hinting at the stranger depths of imagination not plumbed in his early work. And in it appears a type previously absent from Bujalski’s filmed worlds: a young father who, at nights between competition, has to attend to his crying infant.

RESULTS also arose out of a kind of panic, Bujalski confesses. As he got ready for his first Sundance in 2013, “People kept telling me, ‘Oh, you’ve got to have your next thing ready.’ That seems to be industry

lore. I got nervous. I thought, 'I have nothing to pitch, I haven't even really finished *Computer Chess* yet.' So I was sitting there, panicking—but also, for all kinds of practical reasons, I wanted to get my head around what it would be like to go do something that was really designed for professional actors. At a molecular level, I wanted to do something that worked differently."

In a city conscripted into self-improvement culture—the Austin of Whole Foods, where restaurants have gone paleo (or extinct) and residents are relentlessly CrossFitted—Bujalski finds a natural showcase for Hollywood talent. Guy Pearce plays Trevor, a gym owner who dreams of starting his own wellness franchise called Power 4 Life. He has an undiscussed, complicated history with his abrasive employee, Kat (played by Cobie Smulders), a personal trainer so intense she will sprint after the minivan of a client who hasn't paid up.

"It kind of makes me nuts when you see movies where these gorgeous people play down-on-their-luck schlubs," Bujalski says. "Because I *know* down-on-their-luck schlubs, and that's not right." He was intrigued by the overlap between the unpredictable careers of actors and personal trainers: "For both those jobs, there's pressure to look terrific all the time," he comments, though for the latter group, "It's very hard to string together any kind of reasonable living. You are in the service industry, and you're putting your schedule together hour to hour," with clients moving sessions or canceling altogether.

Stumbling into the midst of this lean and hungry lot is Kevin Corrigan as Danny, a transplanted, freshly divorced New Yorker who's come into more money than he knows what to do with. He spends his days alone in his rented McMansion, getting high and eating pizza. Upon starting an exercise regime, Danny develops an ill-fated crush on Kat, and forms the other side of the love triangle.

In old Hollywood flicks, vocal resonance was a sure sign of true love: the loud patter between Rosalind Russell and Cary Grant in *His Girl Friday*; the low purr of Bogart and Bacall in, well, anything. In *Results*, the characters have a lot to learn from each other's language. A taut body has suave words to match: Trevor draws on a vocabulary cobbled together from sports metaphors and life-coaching mantras. But it's too inflexible for the gymnastics of difficult emotions. "I think you have no idea what's going on in your own brain," Kat accuses him. "You know optimal, and you know sub-optimal, and clearly I'm suboptimal for you." Danny, on the other hand, is blunt by nature, but loneliness has made him taciturn. He

and Trevor, both hobbyist musicians, can only find true expression nonverbally, through late-night noodling on electric guitars and sleepless drum solos—and Bujalski edits them into a duet, suggesting the men's deep kinship. (In a running visual gag, each cares for a hilariously fat pet, a furry daemon that embodies—and can't quite fulfill—a buried need for affection.) Eventually, Trevor finds Danny a weight-lifting gym, and encourages him to start dating again; Danny pushes Trevor into a business partnership with Kat, to make them realize that they want a romantic one to go with it.

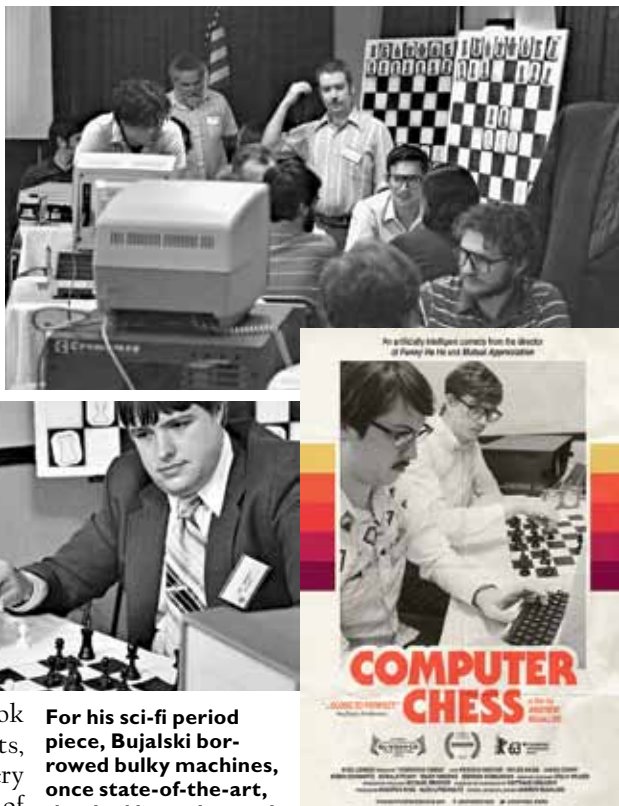
Moss says that Bujalski's proven talents as a writer and director mean that "He has marketable skills." He adds, "And I hope he can survive having marketable skills." What would an Andrew Bujalski film look like if he didn't write it, Moss asks, or if he were directing someone else's scripts? (Bujalski has written scripts-for-hire—an adaptation of *Indecision*, the modish novel by Benjamin Kunkel '96, as well a couple of romantic comedies—but the projects never went forward.)

"What I want is just for Andrew to have the chance to make more movies. I think he's *earned* the right to make *a lot* more movies, and to make them the way he wants to," Moss says emphatically. "But I don't think it's simple, and the pressures of a certain kind of success..." He pauses, then concludes: "It's hard to maintain one's own identity."

Bujalski, whose second child, Irina, was born just as *Results* wrapped, sees his position a little differently, but not by much. "If there was such a thing as middle-class filmmaking, where you could do work like this, and get by okay, that would be great, and I've been trying to carve that out. It's easy to get yourself into a panic state thinking, 'Oh my God, the only way I will ever make a living is to do Marvel.'" He continues, "The two worst things that can happen to an artist, I think, are failure, which is bad, and success, which is much worse." He hopes to carve out a career in which he can maneuver between them, and which affords the freedom to experiment. "It's daunting now that I keep trying to rewire myself, because I do have a mortgage and I do have children. And so, like—maybe just a *little bit* of conventional success. I could use it." Then he trails off: "But—uh—I don't know."

At the midpoint of *Results*, Trevor says, "It's not about the money, brother," making Danny nearly double over with laughter, the sound ringing through his huge, empty house as he wheezes, in disbelief, "*It's not about the money, brother!*" It is, and it isn't. Power 4 Life may be Trevor's sincerely held dream—but as Bujalski knows, nothing runs on love alone. ▽

Sophia Nguyen is associate editor of this magazine.



For his sci-fi period piece, Bujalski borrowed bulky machines, once state-of-the-art, that had been donated to Goodwill and collected in a museum in Austin, Texas.

William Cranch Bond

Brief life of Harvard's first astronomer: 1789-1859

by ALAN HIRSHFELD



TWO HUNDRED YEARS AGO, during the late summer of 1815, 26-year-old William Cranch Bond unexpectedly spent a night on the steps of St. Paul's Cathedral in London. Harvard's emissary to Britain's astronomers had gone to fetch travel funds from the University's local agent, only to learn the man was away. But next morning, Bond managed to borrow money and took up his mission: inspecting the kingdom's observatories and telescopes to help Harvard build a world-class astronomical facility.

Bond was an unlikely embodiment of Harvard's cosmic aspirations: a grade-school dropout, he had spent workdays in his father's modest Boston shop, fabricating and repairing timepieces. But at night, he was a skilled amateur astronomer: the first U.S. observer to sight the faint, white blur that swelled into the Great Comet of 1811, a feat that led to his Harvard commission.

The young nation was an astronomical wasteland. President John Quincy Adams, A.B. 1787, complained to Congress in 1825 that Europe had more than 130 observatories, while the United States had none. Harvard had prodded wealthy Bostonians four times to underwrite a research-grade telescope, without success.

Meanwhile, Bond's clock-making business flourished, its precision chronometers prized by New England shippers and the U.S. Navy. In 1819, his fortunes secure, he married his cousin Selina Cranch and settled into a large clapboard house at 158 East Cottage Street in Dorchester. The family parlor was sacrificed to astronomy, with a multi-ton, granite telescope pier emplaced in the floor and an observing aperture sawed through the ceiling. Smaller telescope-mounting stones dotted the yard, topped by Bond's growing array of instruments obtained from Europe or lent by Harvard.

By the mid 1830s, his observatory had become the U.S. nexus of precision astronomy. So accurate was his celestial-based determination of his latitude and longitude that the navy's 1838-1842 South Pacific exploration mission referenced the geographic coordinates of foreign ports not to Washington, D.C., but to Bond's house.

In 1839, Harvard president Josiah Quincy came calling. Seeking to capitalize on public interest stoked by the recent passage of Halley's Comet, he invited Bond to move his family into Dana House, on the school's Cambridge campus (where Lamont Library now stands). Bond was to bring his astronomical equipment, turning the building into Harvard's de facto observatory, with Bond as "Astronomical Observer." Quincy offered no salary, later explaining, "It was the day...of pennies, not dollars, in the college treasury."

Bond agreed. But the site, hard up against buildings and trees, proved far from optimal. Bond had to bore a sighting hole through a nearby barn to align his specialized meridian telescope to a masonry pylon 12 miles south, atop Great Blue Hill in Milton. One Harvard wag described a revolving turret added to the Dana House roof as

"a caboose...with a telescope that commands an unobstructed view of all the chambers in the neighborhood."

Four years into Bond's appointment, the spectacular Comet of 1843 appeared, brightening until its tail could be seen in broad daylight. In its wake, Bostonians poured \$35,000 into Harvard's coffers to establish an observatory. On Bond's recommendation, Harvard ordered a top-quality, 15-inch refractor telescope from Germany and acquired acreage for the facility on Summer-House (now Observatory) Hill, northwest of Harvard Yard.

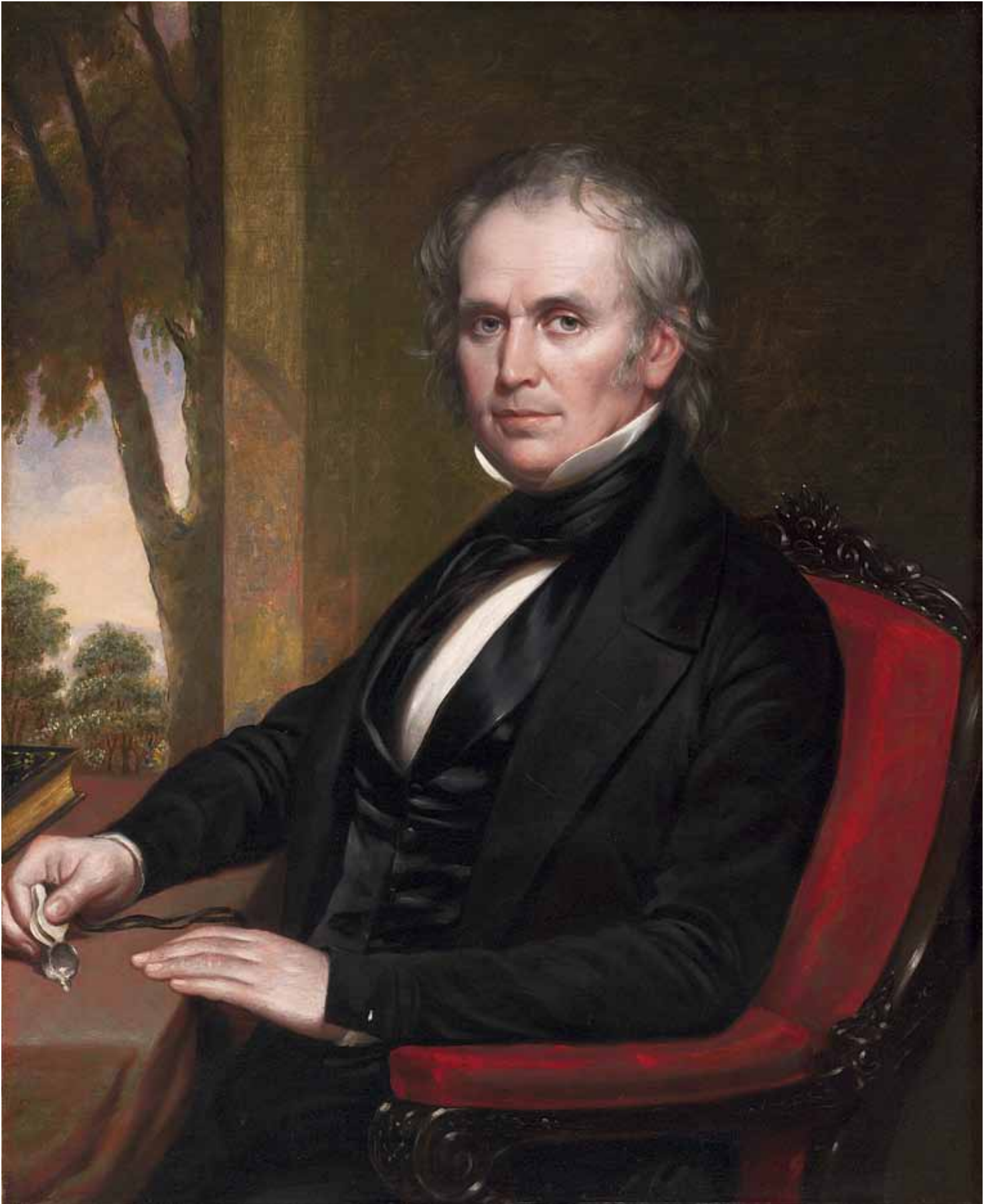
In 1844, the 55-year-old Bond transferred his family and his instruments to the bucolic grounds of the new Harvard College Observatory. He continued to work without pay until Harvard learned in 1846 that the Naval Observatory was trying to recruit him. He promptly received an annual salary of \$1,500, plus a \$640 stipend for his son George, by this time his devoted assistant.

Harvard's gleaming new telescope lens arrived from Germany soon after and was installed in a sleek, mahogany-faced tube. In June 1847, the instrument was secured to a massive granite pier, sheltered under a 30-foot, copper-clad dome that revolved on eight cannonballs. The crystal-clear views of heavenly bodies exceeded expectations. "The revelation was sublime," Bond wrote of his first glimpse of the Orion Nebula. "It is delightful to see the stars brought out which have been hid in mysterious light from the human eye, since the creation." For two decades, the "Great Refractor" reigned as the nation's largest telescope. Among its discoveries were Saturn's eighth moon, Hyperion, and that planet's diaphanous crepe ring.

Equally significant were Bond's seminal experiments in celestial photography, at the behest of Boston daguerreotypist John Adams Whipple. In 1850, a 90-second exposure of Vega yielded the first photograph of any star other than the sun. The following year, Bond and Whipple's daguerreotype of the moon created a sensation at the international exhibition held in London's Crystal Palace.

When Bond died, his son George became director of the observatory, remaining true to his father's credo: "An astronomical observer to be useful in his vocation should give up the world, he must have a good eye, a delicate touch, and above all, entire devotion to the pursuit." Today's Harvard-Smithsonian Center for Astrophysics is the legacy of a Dorchester clockmaker who selflessly strove to make Harvard the hub of scientific exploration of the universe. ▢

Alan Hirshfeld, professor of physics at the University of Massachusetts Dartmouth, is an associate of the Harvard College Observatory and the author most recently of Starlight Detectives: How Astronomers, Inventors, and Eccentrics Discovered the Modern Universe.



Portrait courtesy of Harvard University Portrait Collection, H180. Image: Imaging Department © President and Fellows of Harvard College
Daguerreotype courtesy of Harvard College Observatory
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the time is always
out of joint....

If we are provided with
a sign that
declares,
DeMonte
Tomatoes
are juiciest
it is not desec-
ration to add:

Mary Mother is the juiciest
tomato of them all.

Perhaps this is what is meant when
the slang term puts it, "She's a peach,"
or "What a to-
mato!"

A cigarette
commercial
states: "so
round, so firm,
so fully picked,
and we are
strangely
stirred, even
ashamed as
we are to be so
taken in.
We are not
taken in.
We yearn for
the fully pack-
ed, the uncle

that is so juicy and perfect that not an
ounce more can be added. We long for the
"groaning board," the table overburdened
with good things, so much we can never
taste, let alone eat, all there is.

We long for the
heart that over-
flows for the art
accepting of the
bounteous, of
the real and
not synthetic,
for the armful
of flowers that
continues the
breast, for the
fingers that
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and that person
teaches others, an
then everyone ca
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But someone
be burned
everyone
up to me

one's own ridiculousness, as our being symbol, with a become blood, we feel like
and somehow we have been taken from the pleasure scene of hater and burger, from unadorned to suburban dance
saturated part of the dance, with the whole heart
and the spread flames like bright

Whole: The rage of all the world becomes, for awhile, and in our own terms, the pause that refreshes and possible

The juiciest tomato



Corita Kent

Nun with a Pop Art Habit

by JONATHAN SHAW

CORITA KENT was a Catholic nun who went straight from high school into a convent in 1938, and then, improbably, became a Pop artist in the 1960s. She taught art at the Immaculate Heart of Mary, a teaching college run by her order in Los Angeles, often taking her students to local galleries and museums. “In 1962,” says art historian Susan Dackerman, “at the nearby Ferus Gallery, a then practically unknown artist named Andy Warhol showed his soup-can paintings for the first time, and Kent saw them.”

Warhol’s work, Kent said later, changed the way she saw everything. In 1964, she created a screenprint in response to Warhol’s soup cans titled, after a Del Monte Foods slogan, *the juiciest tomato of all*. This print, graphically powerful even from a distance, includes in a cursive hand too small to read from afar the provocative phrase, “Mary mother is the juiciest tomato of all.” The work kicked off a decade of Pop art-making, Dackerman adds. The former Weyerhaeuser curator of prints at the Harvard Art Museums has now, as a consulting curator, arranged an exhibition—*Corita Kent and the Language of Pop*—that will open September 3 at the museums.

After Kent’s death in 1986, her papers went to the Schlesinger Library at Radcliffe, and in 2005 the art museums bought a group of 70 of Kent’s



With her 1964 screenprint *the juiciest tomato of all*, Corita Kent created a word portrait of the Virgin Mary as a tomato. This print seems to establish the artist nun as an apostate: in fact, she was responding both to liberalizing changes taking place within the Catholic Church as part of the Second Vatican Council and to Pop art’s appropriation of commercial language, images, and symbols to create fine art. Andy Warhol’s 1962 *Campbell’s Soup Cans* series, shown in a gallery near her convent, proved transformative. (A 1968 example, *Chicken Noodle Soup*, from the portfolio *Campbell’s Soup I*, appears here.)

All images courtesy of the Harvard Art Museums/
President and Fellows of Harvard College



In her 1967 work *handle with care* (above; detail at left), Kent layered slogans—including words from a button (bottom left) and from a Chevrolet ad (“See the man who can save you the most”)—so that reading them “becomes an act of mental and physical calisthenics, that calls for slow rigorous scrutiny,” says curator Susan Dackerman. Kent also began experimenting with fluorescent inks, likely inspired by the color experimentation and theories of fellow artist Josef Albers; his screenprint of layered squares, *Wide Light; Tenuous; Full* (1962) appears above.



prints, aiming to make Harvard the site for scholarly investigation of her work and its place in the Pop art movement. Interest in her work has grown recently: a retrospective organized by the Tang Museum at Skidmore is traveling now, and “edgy New York and L.A. artists such as Julie Ault and Aaron Ross have revived it in many ways,” Dackerman explains.

She and Agassiz professor of the humanities Jennifer Roberts, together with a group of graduate students, have spent the past four years researching Kent’s work in preparation for the show, and writing detailed entries for the accompanying catalog. The Harvard exhibition, which includes prints by Warhol, Ed Ruscha, Roy Lichtenstein, Frank Stella, and Josef Albers, among many others, focuses on the period of Kent’s strongest work, from 1964 to 1969—putting it in “a broader cultural and art historical context,” says Dackerman, “to show where it comes from [and]...the motivations behind it.”

WHAT DID KENT INTEND in *the juiciest tomato of all*? At the same time that Warhol began showing his soup-can paintings, in 1962, the Second Vatican Council began a project to modernize Catholic liturgy all over the world. Among the changes introduced by Vatican II was a shift from Latin to local, native languages when saying Mass; in the United States, priests turned around, faced the congregation for the first time, and spoke in English. The idea, explains Dackerman, was to “take away the intimidating, formal

COUNTERCLOCKWISE FROM TOP: HARVARD ART MUSEUM/FOGGS MUSEUM, MARCGARET FISHER FUND, 2019/105. © CORITA ART CENTER, IMMACULATE HEART COMMUNITY, LOS ANGELES; CORITA ART CENTER, HARVARD ART MUSEUM/FOGGS MUSEUM, GIFT OF WARREN ROBERT STONE, M15382. © THE JOSEF AND ANNI ALBERS FOUNDATION/ARTISTS RIGHTS SOCIETY (ARS), NEW YORK.



COURTESY OF MARY ANNE KARIA (NEE MIKULKA)

The turn to a vernacular language in the church paralleled what the Pop artists were doing: appropriating consumer culture for their own use.

qualities of Catholicism and make it friendlier,” and this turn to a vernacular language in the church, she points out, exactly paralleled what the Pop artists were doing: appropriating the

es, he rings a ring of bells.” Kent’s print thus likens communion wafers to potato chips, suggesting that “the divine can be present anywhere”: even in a potato chip.

Sparks flew. Although Kent’s aspirations for her work aligned with the liberalizing aims of Vatican II, “the ambitions of Vatican II didn’t really come to pass in the 1960s,” says Dackerman. In Los Angeles, “the archdiocese was outraged.” Kent and the convent came under pressure. In 1968, exhausted by the criticism, and perhaps dispirited that the goals of Vatican II hadn’t come to pass, Kent moved to Boston, where she had friends and connections to a gallery that exhibited her work. There, in 1971,



slogans, jingles, logos, and images of consumer culture for their own use. Kent, having seen Warhol’s work and eager to enable the goals of Vatican II, “crosses these wires.”

In *handle with care*, for example, she transforms a slogan from a Chevrolet ad—“See the man who can save you the most”—to deliver a distinctly spiritual message. Just as in *the juiciest tomato of all*, she uses small, handwritten text as a key to unlock the meaning of the words rendered in large type: embedded in the upright of the terminal letter “t,” she has scrawled, “There is only one man.”

Over time, Kent developed a rich Pop art iconography for the depiction of Catholic subjects. In *bell brand*, the colors, words, and logo (a ring of bells, from the packaging of a Southern California brand of potato chips) became the inspiration for a print intended to evoke the Eucharist. “In the most important moment in the Catholic Mass, the moment of transubstantiation when the bread and wine are turned into the body and blood of Christ,” explains Dackerman, “the priest rings a bell. In some plac-

Sister Mary Corita, as Kent was also known, uses *LIFE* magazine (above) to hone her students’ visual-design skills, circa 1965. In her 1967 print *bell brand* (right), Kent adopts the vivid packaging color combinations and catchy jingles (“Happiness is a thing called fiestas” and “Why not put a little snap in your life?”) of a supermarket product to “modernize and make accessible the language, imagery, and practices of the church,” writes doctoral student Eva Payne in the catalog. Kent took the text in the leftmost bell—“would it embarrass you very much...if I were to tell you that I love you”—from *The Nazz*, a 1950s performance piece retelling the life of Jesus.



she gave her new city its most famous Pop art landmark, familiar to any Boston native: the rainbow mural on an enormous natural-gas holding tank visible from the city's Southeast Expressway, painted in swaths of primary and secondary colors.

The gas tank painting represents “the culmination of a decade of work on Pop art,” Dackerman explains. In the 1960s, she continues, Pop art turned not only to commodity culture, but also to the products and processes of art-making itself: Roy Lichtenstein starts making a series of brush strokes, Jim Dine draws paint brushes and experiments with pure color, and “Corita Kent is very much aware of that.” Kent had also witnessed first-hand the transformative power of art. Ed Ruscha’s famous depiction of the Hollywood sign took a dilapidated icon erected by a Los Angeles real-estate company in 1923 and rehabilitated it. Although the letters were falling off the actual sign, Ruscha depicted it as if it were brand new, and moved it from the side of the hill to the top of the ridge. “Once Ruscha has made the Hollywood sign an icon of Pop art,” says Dackerman, “the sign is rehabilitated and itself becomes a Pop art monument, a landmark in Los Angeles.” Kent, living in the convent below the Hollywood sign, saw how Ruscha reimagined it, and in 1970, when asked by Boston Gas Company to decorate its gas tank,

Dackerman argues, “she sees this as an opportunity to transform it into a Pop art landmark for her new city.”

Clearly, Kent’s art was in profound dialogue with that of other Pop artists in the 1960s, the curator declares—but Kent herself had no personal connections with any of her peers. Warhol sometimes went to her openings, and Ruscha, whose studio was nearby, told his students to go to print sales at the convent, but “Corita Kent in her habit couldn’t very well go hang out at The Factory with Warhol. There wasn’t really room in Pop art’s macho style for women artists.” The announcements for the artists who exhibited at the Ferus Gallery (they were known as “the

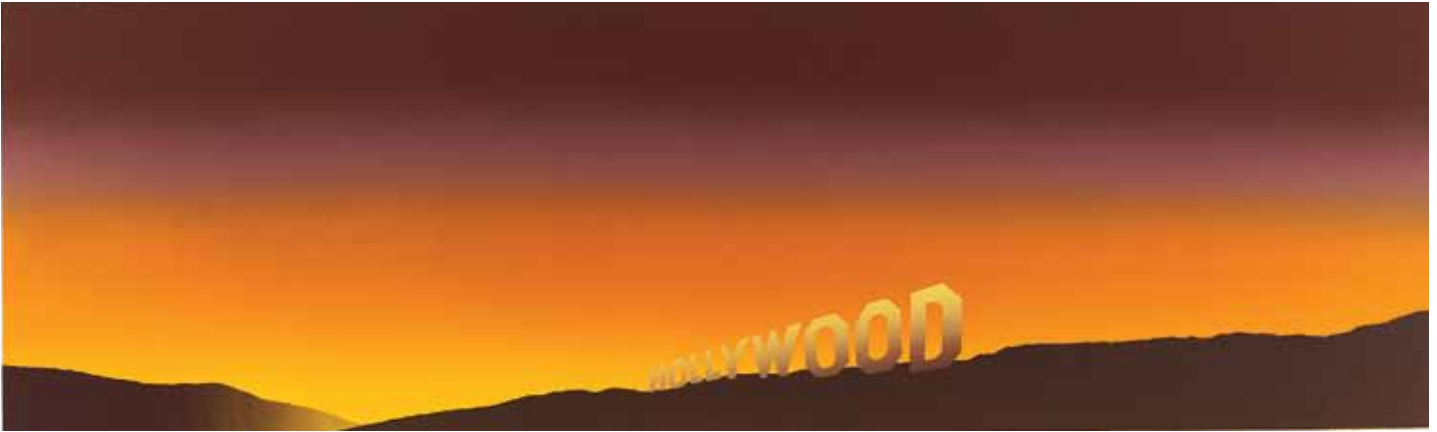


HARVARD ART MUSEUMS/FOGG MUSEUM, BEQUEST OF WILLIAM S. LIEBERMAN, 2007.66. © ESTATE OF ROY LICHTENSTEIN



“The Ferus studs” were shown “shirtless on surfboards or sitting on motorcycles. You can’t put a nun in that picture and convey the same message.”

HARVARD ART MUSEUMS/FOGG MUSEUM, TRANSFER FROM THE STUDENT PRINT RENTAL COLLECTION, M20239. © EDWARD J. RUSCHA/IVGAGOSIAN GALLERY



Kent lived in the shadow of the decaying 1923 Hollywood sign, and saw how Pop artist Ed Ruscha reimagined it (above) in his 1968 screenprint, *Hollywood*. In 1971, her *Boston Gas Tank (Rainbow Tank)* transformed a colossal industrial form into a much-loved landmark (bottom left). Using the Pop art palette of primary and secondary colors, Kent painted bright stripes onto a seven-inch-high model (left) provided by Boston Gas; sign-painters then transferred the design onto the tank. When the tank was replaced in the 1990s, a public outcry led to restoration of the mural. Roy Lichtenstein's satirical 1965 work *Brushstroke* (top left) likely inspired Kent's overt homage to the mechanics of art-making.

Ferus studs”) “show them shirtless on surfboards or sitting on motorcycles,” Dackerman explains. “You can’t put a nun in that picture and convey the same message.” But with *Corita Kent and the Language of Pop*, the artist’s prints finally find their place in Pop art’s pantheon. The former nun hangs with Warhol. ▢

Jonathan Shaw '89 is managing editor of this magazine.

The Harvard Art Museums will host a panel discussion, lectures, films, screenprinting workshops, and other events in conjunction with Corita Kent and the Language of Pop. The exhibit runs from September 3 to January 3, 2016, before traveling to the San Antonio Museum of Art. For details, see harvardart-museums.org/visit/calendar.

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Montage

Art, books, diverse creations



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Not Holding Out for a Hero

A comics artist tries his hand at a new story.

by SOPHIA NGUYEN

CLIFF CHIANG '96 can still name the first four comics he ever read—*Uncanny X-Men*, *Alpha Flight*, *Cloak & Dagger*, and *Fantastic Four*—the adventures of caped crusaders and mutant teens which, in the summer of 1983, he pored

over in the back seat on a family road trip to Florida. Back then, he could get his hands on only a few issues at a time, even at 60 cents apiece; the nine-year-old was “on a limited budget,” and distribution was spotty.

“The hunt to find the next one made

Chiang's Wonder Woman uses iconic skills—like deflecting arrows and bullets with her bracelets—alongside new, divine, allies, like Hermes (above), Artemis (left), and Hesperaestus (opposite page).

you really savor each issue when you got it,” he recalls. The wait, he adds, “made it this very mysterious thing that you could never have all at once. You only got a

piece of it at a time, which just made you a bigger addict.”

As a comic-book artist—drawing for DC Comics for more than a decade, before going freelance—Chiang is now the dealer, at a time when everything about con-



The artist in his Brooklyn studio; a page from *Paper Girls*, which he and Brian K. Vaughan describe as “*Stand by Me* meets *War of the Worlds*”



sumption has changed. Readership has expanded and intensified: fans can get new issues and entire back catalogs digitally, without ever leaving the couch; the books are studied in the ivory tower, and the movies crash through the

multiplexes nonstop (and in IMAX-3D). It was during this cultural moment, in 2011, that he and writer Brian Azzarello took on the series for which Chiang is best known: *Wonder Woman*.

Their 35-issue run largely skirted the comic's historic gender politics (rooted in twentieth-century American feminism, and kinkily fascinated with strength and submission, as recounted by Kemper professor of American history Jill Lepore in her 2014 book on creator William Moulton Marston '15, LL.B. '18, Ph.D. '21). The reboot gave the iconic character a new origin, as the daughter of Zeus and Hippolyta, and a new mission, protecting a single mother

and her infant. Surrounded by allies and foes from Greek myths, *Wonder Woman* became the new God of War.

The Princess of Amazons still went without pants. But Chiang worked to avoid what he calls a “cheesecake” aesthetic. He drew her as thick-limbed and broad-shouldered, with olive skin and a strong jaw. Although her outfit was cut like a bathing suit, it had the hard gleam of body armor. Where past cover images tended to depict the character in the grip of the monster of the month, Chiang liked to show *Wonder Woman* in action, not imperiled. She stood at least a head taller than everyone around her. She had the solidity of a refrigerator.

Working in a studio in Brooklyn, which he shares with two other artists and his wife, Jenny Lee, a film editor and producer, Chiang drafts digitally and inks by hand. His style is strikingly crisp and open. “A lot of comics art looks too precious,” he says—as if it's been fussed over by “someone with a pen, hunched over a page, putting more lines down without any regard to whether they mean anything.” Even in his early jobs, as one of several artists with a hand in Brian K. Vaughan's *Swamp Thing*, his work stood out for its sleek lines and clarity, its subtle confidence.

“Comics is such a weird artform,” Chi-

ang muses. “It can't be as wordy as prose.” In his view, there's a poetry to the interdependence of words and pictures in comics, and to how panel breaks govern the emotional beats; they can feel leaden and predictable when transferred to the silver screen. “There are times when rhythm and pacing are such a part of it, but at the same time it's so—still,” he explains. “And you lose that in the cinema, because of the rush forward into the next frame.”

Chiang and Vaughan have reunited for a new series called *Paper Girls*, at the publisher Image, where creators own the books and characters they work on (unlike at DC and Marvel). Drawing a wholly original comic is new territory for Chiang, who admits, “It was a challenge to rethink a lot of the habits I'd gained from doing superhero stuff over the years.” World-building and character design are unconstrained by fan expectation. The work feels intensely personal.

Set in 1988 outside Cleveland, *Paper Girls* stars a quartet of everyday 12-year-olds who deliver the news each morning, and stumble on a supernatural mystery. “A lot of us are maybe a little embarrassed of who we were when we were 12,” reflects Chiang. But kids—whatever their fears or insecurities—are uninhibited. “In a way, at that age you're a much purer character

than you are as an adult. And in drawing them, it's a little bit of wish fulfillment. I want to draw these characters the way they think they are."

In the preview for *Paper Girls* #1, it's Halloween, and a pre-dawn glow washes the

town in blue. Nothing's out of the ordinary but a comet, slashing pink through the sky. Pedaling through the suburbs, a girl is stopped by a group of teenage guys, masked for a night of no good. They close in menacingly—their ringleader has

a claw, à la *Nightmare on Elm Street*—when who comes to the rescue but a trio of girls? "Cool costume," one of them taunts. They wear leg warmers, Doc Martens, and steely expressions, but there's not a cape in sight.



Forrest O'Connor (at left),
Kate Lee, and Jim Shirey

WAYNE EBINGER

Lonesome No Longer

A Nashville folk trio with Harvard roots

SWEET-TALKING THE CROWD, the musicians of the contemporary folk trio Wisewater bought time, tuning up for their next song. Fiddle ready, Kate Lee turned to Forrest O'Connor '10, who was intently focused on his mandolin; Jim Shirey '11 stood by, on guitar. "Forrest, do you have the story about—"

"Do I have the story?" O'Connor repeated good-naturedly, eyes and ears on his task.

"Sorry, that was really awkward..." Lee started again, her delivery jokingly stagey: "Forrest, tell us the story about the creeks we saw in Alabama!"

During their performance in late April at Club Passim (the historic venue that once hosted Joan Baez and Bob Dylan), the group seemed winningly unaccustomed to canned concert banter—earnest about their craft, easy with each other—as their set swung from an aching ballad to a blazing, breakneck cover of "Johnny B. Goode." In the past few years, Wisewater's members have made their living by playing gigs around the country—at local breweries, coffee houses, clubs, and music festivals, but also at Nashville's Grand Ole Opry

and Station Inn. Surprisingly in the age of Spotify, half their income comes from in-person CD sales of their five-song EP, titled, fittingly, *The Demonstration*.

"All the Pacific Northwest crowds are really great," O'Connor reports. "The Midwest is...tough. The Northeast can be pretty hit or miss. We've really liked playing in the South a lot—it's been great, really receptive." But in their home city of Nashville—country music's company town—where O'Connor and Lee first connected in 2013, it's hard to be heard, he says: "Everybody and their mother is playing."

Uniting the couple of O'Connor and Lee with the duo of O'Connor and Shirey, Wisewater can also trace its roots to Cambridge: the two men befriended each other on Shirey's first day of freshman year. Two longhaired undergrads sharing a deep love of American roots music, they wrote songs and performed together at campus events and open mics, sometimes sneaking into Holden Chapel at night to jam. ("Oh, you boys were so *bad*, sneaking into the *chapel*," Lee ribbed, when they told the story at Club Passim. "It's a great dynamic," Shirey

says of the group, "because nobody has to be the third wheel for very long.")

Growing up, O'Connor was exposed early to Americana stars from Dolly Parton to mandolinist Chris Thile, who collaborated with his father, the virtuosic violinist and fiddler Mark O'Connor. He started teaching himself the mandolin at age 13, and at 23 pursued singing through a regimen of vocal exercises gleaned from books—seeking partly, he says, to differentiate his career from his father's. O'Connor, his bandmates agree, is naturally "intense," a trait that dovetails with his entrepreneurial streak: after graduation he co-founded Concert Window, an online platform that enables bands to livestream their shows, and considered attending Harvard Business School. Much of the managerial work involved with promoting Wisewater comes naturally to him, and he often drives the group's recording and video projects.

Shirey, in contrast, loved writing and performing music—he sang in church choirs growing up, and joined the Kuumba Singers at Harvard—but pursued teaching after college. He was about to start a master's in education when he got the call asking if he would join Wisewater, in August 2014. Though he asked for 48 hours to decide, "I thought about it for about six minutes and called back and said I'd do it." He bought a one-way ticket to Nashville, and the trio rehearsed

for four days (in what a friend later described as "a musical cage match") before hitting the road in Lee's Dodge Caravan.

Though all of them play instruments, sing, and compose, each has a strong sense of what they bring to its sound: Lee's supple voice, Shirey's songwriting, O'Connor's intricate mandolin and Greek bouzouki. At some point, each entertained the idea of pursuing a solo career, but that's a lonely life, and Wisewater's music feels fuller than the sum of its parts. Some of their songs, like "Old Black Creek," have what bluegrass pio-



Visit harvardmag.com/
extras to hear a song
from Wisewater's first
album.

neer Bill Monroe called “the high, lonesome sound”—but even the obviously contemporary works like “Always Do” seem instantly familiar. The richly textured arrangements build into a warm, enveloping sound that invites listeners in.

The musicians balance tour commitments with outreach to radio stations, booking agents, and producers; they plan to release a second, full album later this year. “Especially in Nashville,” Shirey says, “you get sold this myth of getting discovered.” As O’Connor puts it, “We try to take as much as we can into our own hands.” Wisewater is named for an imaginary ocean, on a made-up map, that he drew during a childhood Tolkien phase. Now, two more people share in that dream, and they’ll chart the course together. —SOPHIA NGUYEN

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Bodies Electric

Harvard Art Museums’ installation and film series by Jesse Aron Green ’02 harvardmag.com/green-15



Empathy and Imagination

What animals can teach us

by NELL PORTER BROWN

ONLY THE ANIMALS, by Ceridwen Dovey ’03, is a beautifully wrought, disconcerting collection of stories told by the souls of dead animals. A cat is picked off by a sniper on the Western Front; a blue mussel drowns in Pearl Harbor; a courageous tortoise is launched into Soviet-era space; and a self-mutilating parrot is abandoned in Beirut amid the 2006 Israeli air strikes. Yet Dovey lightens and layers these tales with humor, imagination, and an ingenious literary construct. Most of the animals are connected to writers—Colette, Jack Kerouac, and Gustave Flaubert, among others—who have featured animals in their own fiction, and can emulate their literary voices. (The Kerouacian mussel saying good-bye to a friend: “We didn’t understand but we let him go, hurtling, as the flames of a hot red morning played upon the masts of fishing smacks and danced in the blue wavelets beneath the barnacled

docks.”) Thus, what Dovey says began as “an experiment” in retelling historic incidents of mass suffering through voiceless, vulnerable beings “to shock readers into radical empathy” became, instead, “this weird mix of short story, literary biography, and essay—with lots of details that are true to life—and then also a sort of love-letter tribute to these authors who fascinate me.”

Published last year in Australia (Dovey lives in Sydney), *Only the Animals* elicited a helpful blurb from J.M. Coetzee, along with several awards; it was due out in the United Kingdom in August and Farrar, Straus and Giroux will release the American edition on September 15.

Some of the book’s themes—conflict, abuse of power, and the amorphous origins of cruelty, inspiration, and empathy—also surface in Dovey’s very different debut novel, *Blood Kin* (2007). Set in a nameless country during a military coup, the slim, edgy

Ceridwen Dovey



COURTESY OF CERIDWEN DOVEY

book mines the complexities of collusion, with an undercurrent of danger and eroticism, through the first-person accounts of the ex-president’s barber, cook, and portraitist, all of whom are imprisoned at a remote country estate.

No doubt Dovey draws from her childhood in apartheid-era South Africa. There was, she says, “a sense of being complicit [in the system] at some level because your



A Magnet for Old Men

Alexandra Petri '10 has been funny as an amateur (a co-writer of two Hasty Pudding Theatricals, a writer for *On Harvard Time*, and a Class Day Ivy Orator) and professionally (as the ComPost opinion columnist for *The Washington Post*). In a self-important era, her humor is winningly self-deprecating. It now assumes longer form in *A Field Guide to Awkward Silences* (New American Library, \$25.95). From the sixth chapter, about an unusual older acquaintance who shares Petri's passion for the stage:

I have a strange affinity for old men. Not "older men," the type who are fortyish but still in their prime, men like Mr. Big, who notice that you are stumbling along the sidewalk and stop their limousines....

No, not older men—*old men*. I must exude an oddly specific musk, like mothballs and racism.

I guess you could say this is my superpower. I can't fly or freeze things with my breath...but I can summon elderly men from great distances. For instance, every Monday afternoon for months, I managed to attract visits from an octogenarian named Mr. Oliver.

Mr. Oliver and I met laboring under the same misconception. My high-school history teacher had telephoned me and insinuated that Mr. Oliver would "get me on Broadway." As an aspiring playwright, I thought this sounded amazing! Eagerly I awaited the arrival of this Mr. Oliver, whom I pictured as some kind of old-timey theater magnate, chomping a large cigar. "It ain't Noël Coward," he would say, perusing my first script, "but I think it's the real Tabasco, kid!"

Instead, what I saw when I came down to the lobby of the Post was an old man wearing shorts with a Band-Aid over his forehead at a rakish angle. He was carrying a large bag of old newspaper clippings.

"I hear you're going to get me onto Broadway," he greeted me.

It took us several meetings to sort out this confusion, and by then it was too late. We had gotten into the habit, and, more important, the lady at the front desk had become convinced that he was my long-lost grandfather and would buzz me immediately whenever he showed up....

Mr. Oliver turned out to be quite an accomplished gentleman. A retired lawyer, he had written dozens of plays, one about Hitler (a light comedy entitled "How Much Time Do We Have?!"), one about a happy housewife who talked some sense into Simone de Beauvoir, and another one about how, as far as he can recollect, everyone in his college fraternity was gay but no one thought anything of it at the time.

The basic plot of the Hitler play was... *Springtime for Hitler* but not on purpose.

privilege is conferred through the pain other people are experiencing. But you were too young to have been held fully accountable." Her parents, Teresa Dovey, a pioneering scholar of Coetzee's works, and Kenneth Dovey, an educational psychologist, were politically active. Political and personal reasons led the family to shuttle between South Africa and Australia five times between 1982 and 1987. By 1995 apartheid had ended, and the Doveys took sabbaticals in Sydney. When the time was up, however, Dovey and her sister—Lindiwe Dovey '01, now an African film and culture scholar, teacher, and filmmaker in London—were so happy at school that they chose to stay on, alone. "It was a very brave decision for my parents to make," she says. "They came and visited whenever they could. We were not abandoned at all."

At Harvard, she concentrated in visual and environmental studies and anthropology, and for her senior thesis made a documentary film, *Aftertaste*, about changes in labor relations and cultures on South African "wine farms." After graduation she moved to Cape Town, where she wrote *Blood Kin*, which was first published by Penguin South Africa. She returned to the United States for graduate studies in social anthropology at New York University, earned a master's but left without a doctorate, then eloped in 2009 with her now-husband, Blake Munting, and moved back to Sydney, where their son, Gethin, was born in 2012. (They are expecting another child by the end of the year).

Writing has always been among Dovey's "creative outlets." She has actually completed eight novels (six of which, in her mind, don't merit publication), but, despite positive reviews for *Blood Kin*, she continued to work as an environmental researcher and on ethnographic film projects until *Only the Animals*, which she readily calls "a strange book," was published. "I never expected that. I was writing characters that were dead animals," she



explains, “and had no idea if I had gone completely nuts.” Rising confidence, along with a growing preference for the solitude and autonomy that literary art affords, led her to commit to writing full-time last year, including freelance nonfiction for *The New Yorker*’s blog.

Motherhood also played a role: “It made me more grateful for the time I have to write,” she adds—and ultimately more creative, especially while finishing *Only the Animals* in 2013. The nature of pregnancy, nursing, and caring for a newborn intensified her kinship with “the whole family of mammals.”

The book’s title stems from the work of Boria Sax: “What does it mean to be human? Perhaps only the animals can know.” Like Coetzee, Sax, an author and academic best known for his writings on animal-human relations, has influenced Dovey, who also admits to feeling “bewildered to the point of inaction in terms of the ethical responsibilities we have toward animals and the obligations we owe them as the dominant species on earth. We treat animals in the most appalling ways right now.”

Chapter & Verse

Correspondence on not-so-famous lost words

Aron Golberg requests a source for “I don’t mind your thinking you are a poached egg, as long as you don’t make me sit on pieces of hot buttered toast.” He notes that “the first few words may be in error, but the rest is accurate.”

David Rigney hopes someone can provide a source (Gandhi has been suggested) and original wording for the assertion, “Always act in such a way as to not reduce the self-respect of the opponent.”

“...this is supernuts” (May-June). Daniel Rosenberg located an attribution to the mathematician Richard Courant in a June 4, 2000, *New York Times* article, “There’s One Born Every Minute,” by the same Ed Regis who wrote *Who Got Einstein’s Office*.

“A generalization is useful” (July-August). Bernard Witlieb identified one potential—but less elegantly phrased—source, tracked down not in a work by Henry James but in his brother William’s lecture series published as *The Variety of Religious Experience: A Study in Human Nature*. The relevant text, from “Lecture X: Conversion,” states, “One must know concrete instances first; for, as Professor [Louis] Agassiz used to say, one can see no farther into a generalization than just so far as one’s acquaintance with particulars enables one to take it in”—suggesting Agassiz as the original source.

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

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Off the Shelf

Recent books with Harvard connections

Imperial Gamble: Putin, Ukraine, and the New Cold War, by Marvin Kalb, Murrow professor of practice emeritus (Brookings Institution, \$29). Amid other geopolitical concerns, it is easy to overlook Ukraine. Kalb explains the history leading to the current conflict; keeping the current confrontation “cold” might be a fortunate outcome, in a fraught part of the world.

Two more takes on the world and management of its perceived trouble spots: **The Guardians: The League of Nations and the Crisis of Empire**, by Susan Pederesen '81, Ph.D. '89, RI '95 and '03 (Oxford, \$34.95). A sweeping global history of the League of Nations and the “mandates” (World War I territorial conquests) that it oversaw, as the modern world took shape—up to the resumption of global war.



The author is professor of history at Columbia. **Kissinger's Shadow: The Long Reach of America's Most Controversial Statesman**, by Greg Grandin (Metropolitan Books, \$28). A critical interpretation, by a New York University historian, argues that Henry A. Kissinger '50, Ph.D. '54, as national security adviser to President Richard Nixon, created a militarized, imperial presidency. The book opens with a stark confrontation with former Harvard colleagues over the U.S. invasion of Cambodia.

The Graduate School Mess, by Leonard Cassuto, Ph.D. '89 (Harvard, \$29.95). A Fordham professor of English—one of those humanities fields afflicted with long times to the Ph.D., vanishing academic job prospects, antiquated requirements, etc.—draws attention to universities' relative inattention to an ethic of teaching and preparation of students for life, likely largely *outside* the research university.

Leadership: Essential Writings by Our Greatest Thinkers, edited by Elizabeth D. Samet '91 (W.W. Norton, \$35). The newest Norton anthologist, a professor of English at West Point (and faculty adviser to Army Baseball), draws incredibly widely (from Virgil and Lao Tzu to Eugene Debs and Zadie Smith) to illuminate the essential tasks of leadership: from studying a system to cultivating trust—and beyond.

Frederick Law Olmsted: Plans and Views of Public Parks, edited by

Charles E. Beveridge '56, Lauren Meier, M.L.A. '83, and Irene Mills (Johns Hopkins, \$74.95). Beveridge, the preeminent Olmsted scholar (and editor of his collected *Papers*, working here

Top: View from Longwood Bridge (1920) along the Olmsted-redesigned Muddy River, Boston and Brookline.

Bottom: 1867 plan for “Fort Green or Washington Park, in the city of Brooklyn,” New York

with colleagues on the project) gathers in a sumptuous, gorgeous volume the designs that defined what made many American cities great, and livable.

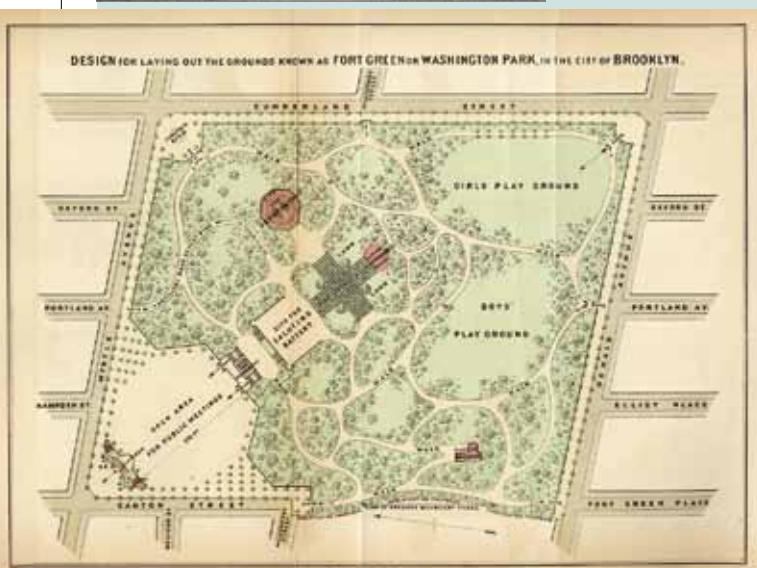
Climate Shock: The Economic Consequences of a Hotter Planet, by Gernot Wagner '02, Ph.D. '07, and Martin L. Weitzman, professor of economics (Princeton, \$27.95). The Environmental Defense Fund's lead senior economist and a Harvard professor explain, in lay terms, why uncertainty about the degree of global warming, and the possibility of catastrophic change, ought to induce action, much as one would insure against any other kind of risk. In **Harness the Sun** (Beacon Press, \$32), Philip Warburg '77, J.D. '85, past president of the Conservation Law Foundation, makes the case for solar power as a mainstream solution.

All the Wild That Remains, by David Gessner '83 (W.W. Norton, \$26.95). A nature writer immerses himself in the lives and visions of Edward Abbey and Wallace Stegner, two writers who conjured the modern West, in radically different ways.

Beethoven's Symphonies: An Artistic Vision, by Lewis Lockwood, Peabody professor of music emeritus (W.W. Norton, \$29.95). The leading Beethoven scholar introduces each symphony in turn, presenting them as “individual works of art” placed in the context of their “historical, biographical, and creative origins.”

The Rise of the Right to Know, by Michael Schudson, Ph.D. '76 (Harvard, \$29.95). An examination of “Politics and the Culture of Transparency, 1945-1975” (the subtitle), by a Columbia journalism professor, emphasizes the relative infancy of the right to know, from the Freedom of Information Act to fuller disclosure on product labels and environmental-impact statements.

Strange Tools: Art and Human Nature, by Alva Noë, Ph.D. '95 (Hill and Wang, \$28). Lest the intersection of art and philosophy seem daunting, the author, professor of philosophy at Berkeley (where he also works on cognitive science), writes with brilliant clarity about the intersec-



AT LEFT, TOP: COURTESY OF THE NATIONAL PARK SERVICE, FREDERICK LAW OLNSTED NATIONAL HISTORIC SITE
BOTTOM: PLAN FROM DESIGN FOR LAYING OUT GROUNDS KNOWN AS FORT GREEN OR WASHINGTON PARK, IN THE CITY OF BROOKLYN, 1867 COURTESY OF THE PROSPECT PARK ALLIANCE

tion of the scientific (why can humans see much from such limited neural data?) and artistic (why do humans see so little) perspectives. Stimulating throughout.

Car Safety Wars: One Hundred Years of Technology, Politics, and Death, by Michael R. Lemov, LL.B. '59 (Fairleigh Dickinson University Press, \$85). In a year of record recalls of exploding air bags, a consumer-product-safety lawyer reviews the history of automotive design and regulation.

My Beautiful City Austin, by David Heymann, M.Arch. '88 (John Hardy Publishing, \$24). The author, an architect and University of Texas professor of that craft, here writes seven stories about a young practitioner who cannot dissuade clients from rotten decisions—hence, as the first tale puts it, “the scar tissue of a city.”

After Nature: A Politics for the Anthropocene, by Jedediah Purdy '97 (Harvard, \$29.95). On a planet increasingly shaped by human action (climate change, industrial emissions laid down in geographical strata), Duke's Everett professor of law explores how to proceed in an era where people and nature, far from being separate, are increasingly one and the same.

Birth, Death, and a Tractor, by Kelly Payson-Roopchand '92 (Down East Books, \$24.95). From Somerville, Maine, “Connecting an Old Farm to a New Family,” as the subtitle puts it, from the early 1800s to the arrival of newcomers in 2008. **The Point of Vanishing: A Memoir of Two Years in Solitude**, by Howard Axelrod '95 (Beacon Press, \$16 paperback), is a differently situated (Vermont) northern New England memoir, by an occasional contributor to these pages, who focuses on cultivation of the self, rather than the land.

Married Sex: A Love Story, by Jesse Kornbluth '68 (Open Road, \$12.99 paper). A Manhattan divorce lawyer, his wife (a Barnard dean), and lover. A first novel by the cultural counselor who created Head Butler (see “Passionate Concierge, September-October 2006, page 21).

Yet *Only the Animals* is apolitical. It engenders empathy, shame, and sadness, but also wonder at these spirited creatures. They face what life and death bring with enviable presence of mind and body, as visceral beings. “What choice did she have,” asks the parrot in Beirut, “but to hook my cage to the awning overhead and leave as quietly as she could, before I realized I was alone?”

“I am very aware that we are all creatures who suffer together, and that existence is hard for us all,” Dovey reflects. “There is something, also, about the bond we have

with animals, the care and connection that we don't appreciate or see the magic in as much as we should.” Animal guides, she points out, have graced children's literature throughout the world. “They are like oracles, there at our very earliest attempts to build empathy and imagination.” And that takes work, she says: those capacities “do not come automatically, in the sense that cruelty is a failure of the imagination. Something happens in reading through these animal guides that is very tied up in what it means to be a good human being.”

Mathematics from the Inside Out

A practitioner on the human enterprise of pure mathematics

by AVNER ASH

IN 1940, in the shadow of World War II, G.H. Hardy, one of the great mathematicians of the twentieth century, published a short book called *A Mathematician's Apology*. Hardy argued that the great bulk of higher mathematics—and in particular his branch of it, number theory—while useless, derives its worth from its enduring truth and beauty.

Hardy was dogmatic in his thinking and style. For example, here is what he said about his own endeavor in writing his book:

If then I find myself writing, not mathematics but “about” mathematics, it is a confession of weakness, for which I may rightly be scorned or pitied by younger and more vigorous mathematicians. I write about mathematics because, like any other mathematician who has passed sixty, I have no longer the freshness of mind, the energy, or the patience to carry on effectively with my proper job.

The world is now much changed. Advanced number theory is crucially applied to cryptology, enabling, among other things, fairly secure transmission of credit card, financial, and other data over the Internet—and presumably the spying activities of the National Security Agency. The

attachment to Truth and Beauty felt by Hardy has been shaken to its foundations by postmodern thought.

It is high time for Michael Harris's book, *mathematics without apologies*. Note, for starters, the lack of capital letters in the title. Harris, also a great mathematician past the age of 60 (he is a professor at Columbia and the Université Paris Diderot), has written a very interesting, very peculiar, and very timely essay on the “what” and “why” of pure mathematics.

Unless you are also a mathematician, you are not likely to have much understanding of the inner professional life of a mathematician, even if you have studied the subject for many years in school. Why is that? And should you care? If you do care, then this book may help explain why the essence of mathematics is so foreign to most people, how the practice of mathematics feels to the working research mathematician, and what attracts mathematicians to their work.

By mixing memory and desire with mathematics, Harris has provided fresh responses to all the standard questions: “What do mathematicians do, actually?”

mathematics without apologies: portrait of a problematic vocation, by Michael Harris, Ph.D. '77 (Princeton, \$29.95)



talist finance (especially in the crash of 2008), and the relation between mathematics and the human body, with special attention to love and sex. (This treatment begins with Archimedes in his bath, exposes the rather sexy image of the mathematician in the Enlightenment, and ends with a discussion of some mystical Russian mathematicians of the early twentieth century.)

THE CORE CHAPTERS of the book describe how intuition functions in advanced mathematical research. Outsiders often think that mathematics is all cut-and-dried logic. Not so. Harris shows how many of the most important ideas that drive the subject forward are nebulous, suggestive, not strictly logical at all.

There is a powerful difference between lived, addictive mathematics and its dead logical effigy. In logic, any correct argument is as good as any other. But in mathematical practice, different sorts of arguments have different psychological and cognitive appeal. For instance,

“tricks” are surprising arguments that go “from peak to peak” and somehow avoid a deeper study that would reveal more of the terrain or structures that lie beneath the theorems discovered by “tricks.”

Harris rounds out this argument with an autobiographical account of a three-month period of research inspired by a fuzzy dream. The dream hinted at an unexpected way to study certain profound number-theoretic properties of groups of matrices by transferring well-known techniques from related areas of algebra and geometry to the case at hand. The account shows how some mathematical research is influenced by unconscious thought processes—perhaps, Harris speculates, driven by envy—even as he documents discussions with other people, e-mails, research papers, lectures, and seminars. Unfortunately, despite the personal approach, this chapter and its footnotes present the mathematical material at a very high level, with all the jargon and ideas intact, and my guess is, this may sound mostly like white noise for readers lacking background in the field. That’s regrettable, because it is an authentic account of research performed at a high level of competency

“Hasn’t all mathematics already been discovered?” “Do you just add up numbers all day?” “Can you explain to me a little about your research?” Only a mathematician could have written these answers from the inside out. Harris also has a well-furnished vocabulary from outside mathematics with which to theorize about the sociology and psychology of mathematical practice.

An analogy between mathematics and religion is apposite. In both, problems come first: in religion, problems of life; in mathematics, problems about patterns of numbers and shapes. Then a tradition, rooted in a human community, shapes responses to the problems, formulates refinements of the problems, and sometimes raises whole new issues.

Harris takes Max Weber’s concept of charisma as basic in understanding the role of the “great” mathematicians in history and in our times. These “giants” both shape the field as to contents and methods and inspire their lesser contemporaries and all who follow to healthy emulation. Harris thus understands mathematics as a result of human beings’ mathematical activity, observed from the viewpoint of an amateur social scientist. He treats any

ultimate connection between mathematics and “truth” either skeptically or elides it. As for “beauty” or “utility,” he explicitly denies that the pursuit of either can be the fundamental motivation of a pure mathematician.

This approach embodies a postmodern perspective, which avoids ultimates. Instead of Hardy’s high-minded dictates, Harris focuses on mathematical research as a lived experience. His aim is to describe to a general audience the human experience in pursuit of pure mathematics.

As a result, he tends to undercut most mathematicians’ conviction that their subject matter is objective and in fact “True” with a capital T. Harris calls that concept “Mathematics” with a capital M, which leads philosophically or logically minded people to seek irrefragable “foundations” for the subject. He regards “Mathematics” as a figment of the imagination and instead places the stress on “mathematics” as the output of a tradition mediated by the series of actual human mathematicians, leaving the question of truth—capitalized or not—somewhat vague.

From this sociological starting point, Harris discusses a wide variety of topics, including the role of mathematics in capi-

and creativity, so one hopes a sense of the ideas' complexity and connections will come across nevertheless.

Other, interspersed chapters of mathematical exposition explain, in an entertaining and elementary way, some problems in number theory extending from ancient Greek examples to the most up-to-date. These ideas, problems, and theorems include basic properties of prime numbers, solutions of algebraic equations in one and two variables with integral coefficients (rational, irrational, and transcendental), and congruences among the integral solutions. They culminate in recently solved and currently unsolved problems involving elliptic curves (cubic equations in two variables.) These explanations should be accessible to anyone who knows high-school math.

IN TWO AND A HALF PAGES of the "afterword," Harris quotes or mentions Nietzsche, David Hilbert, Goethe, Wilde, Richard Strauss, Schiller, Kant, Schlegel, Novalis, Felix Hausdorff, Mongré (Hausdorff's literary pseudonym), L.E.J. Brouwer, Georg Cantor, Schopenhauer, Alexander Grothendieck, Alexander Beilinson, Nikolai Luzin, Dmitri Egorov, and Thomas Pynchon. For better or worse, this gives an inkling of his wide range—and of the breakneck speed at which he operates. (Elsewhere in the book, Harris often brings up the Vedas and later Indian philosophy to give perspective on the Western philosophical attitudes that are his main subject. He also discusses Arab mathematicians and briefly remarks on other non-Europeans, like Omar Khayyam and Brahmagupta.)

I learned something new on almost every page. For example, Harris endorses the ancient Greek mathematician and philosopher Eudoxus's association of the pursuit of mathematics with the pleasure it brings practitioners. In his modern formulation, Harris writes, "The short answer to the 'why' question is going to be that mathematicians engage in mathematics because it gives us *pleasure*"—very much of a piece with his larger account of mathematics as human enterprise, rather than as any greater quest for an abstract truth.

Comparing mathematical activity and play, Harris says that "there is no need to seek the meaning of mathematics elsewhere than in the practice constituted by tradition; and the *telos* of mathematics is to

develop this meaning as a way of expanding the relaxed field [a field not subject to normal pressures of material gain and productivity....This book's] goal is to convey... what it is like to be a mathematician, freely choosing a tradition to which to adapt, not to serve the Powerful Beings of market rationality nor the metaphysical Powerful Beings of our own creation."

Granting the book's pleasures and insights—there is rarely a dull moment—Harris's writing is at times choppy, jumping from one level of discourse to another. It can be hard to follow the nuances and

consequences and connections among the ideas in their rapid flow.

With that caveat, I would recommend *mathematics without apologies* to anyone curious about what it is like to be a modern practitioner of this ancient field. You will encounter a unique, unapologetic account of the being (or Being?) of mathematicians.

Avner Ash '71, Ph.D.'75, is professor of mathematics at Boston College, specializing in number theory. His forthcoming book *Summing It Up* (with Robert Gross) will be published by Princeton University Press.

ALUMNI

A Broadcast Cornucopia

For 75 years, WHRB has moved beyond the "warhorses."

by CRAIG A. LAMBERT

THERE may not be another radio station in America that would air a show like the one WHRB (95.3 FM) broadcast in February of 2013: an hour and a half of music with no song longer than one minute. "It was the most stressful 90 minutes of my life," says Peter Menz '15, a former rock director for the Record Hospital department at Harvard's WHRB, who produced and deejayed the broadcast. "A minute can seem like a very long time. This was not one of those times. I had pulled 80 or 90 songs, and played 60 or 65": a torrent of music, with barely time in between to announce titles and segue to the next tune. "At the station, people subject themselves to ridiculous dares," he says. "Like this one."

Even more amazing, perhaps: many of the brief songs were musically complex works. "The station has always been *serious* about radio," says David Elliott '64, chairman

of WHRB's board of trustees since 1996 and an anchoring presence at the station for 50 years. "It is not a 'college radio station,' but a radio station run by college students, who knew from the very beginning that it takes only a second to change the channel. They had to compete on the air with their professional counterparts."

Indeed, the station that began in 1940 with a signal carried by the electrical system in Harvard's dorms has evolved into a 24/7 radio presence that matches the reach of the Greater Boston's commercial stations. WHRB (www.whrb.org) beams music, news, and sports from a tower atop One Financial Center in Boston to an audience roughly circumscribed by Route 495, a beltway about 30 miles from downtown. In an average year, about 150 DJs sit at its microphones in a warren of studios in the basement of Pennypacker Hall.

This fall, WHRB



WHRB's Bruce Morton '52 interviews freshman Henry Lorrin Lau '54 of Hawaii.

celebrates its seventy-fifth birthday on October 2-4, bringing together many of its 3,000 alumni, known as “ghosts” in the station’s lingo. There will be a reunion banquet, ghost panel discussions, and audio and video presentations. Although WHRB is staffed and run by students, ghosts sit on its board, help the station financially, and contribute expertise to its operations. Trustee Bill Malone ’58, for example, is a broadcast-law expert who, as an under-

graduate, helped shepherd the station’s application for an FM license through the Federal Communications Commission. Trustee Marie Breaux Epstein ’90, an accountant, watches over business procedures. Richard Levy ’58 and trustee Robert Landry ’79 are professional broadcast engineers living in the Boston area who provide invaluable help with technical problems, including the rare emergency fix-it call.

Some would argue that WHRB is the best classical-music radio station in the United States: an audacious, if untestable, claim. But WHRB (“whirr” to fans) airs nearly 70 hours a week of classical music, and does certain things no other station does. In the “real world,” nearly all “CM” (WHRB shorthand for “classical music”) stations deploy a rather limited playlist. Most selections are “warhorses”—familiar compositions like Beethoven’s Fifth or Ninth Symphonies, Tchaikovsky’s Piano Concerto No. 1, or Mozart’s “Jupiter”

From top: Lynn Joiner, the host of *Hillbilly* at Harvard; a glimpse of WHRB’s collections and organizational style; Record Hospital veteran Peter Menz tests a rock-and-roll 45.

Symphony. “Warhorses are fun,” says Louise Eisenach ’16, a former co-director of the CM department. “These pieces are famous for a reason.” Yet listeners rarely hear them on WHRB except as part of a *Warhorse Orgy* during one of its famous “Orgy®” periods.

“What makes us great is our extensive library,” notes Eisenach, “and our rule that we never play the same piece of CM twice in one academic year.” WHRB’s catalog contains 49,000 CM items (80 percent on CDs); the station also draws on Harvard’s vast Loeb Music Library, and thus can cue up just about any recording of anything. It doesn’t even air consecutive pieces from the same historical era, so there is no “Baroque Hour,” only shows like *Afternoon Concert* or *Special Concert*, plus thematic programs dedicated to the Cleveland Orchestra, say, or the *British Choral Tradition*. For sheer diversity and depth of repertoire, WHRB is unrivaled.

The same ethos also enlivens the jazz department as well as shows called *The Darker Side* (soul, hip hop, R&B), and *The Record Hospital* (known as “RH,” which doesn’t treat ailing vinyl discs, but airs punk and its indie successors). “We try to play things that will surprise people,” says Menz. “People can open up Spotify, Pandora, iTunes, or YouTube and play whatever song they want at that moment. So you have to keep them engaged by playing stuff they’ve never heard before. Someone like Kurt Cobain is a punk warhorse. In the RH lounge, you might see a sticker on his records that says, ‘DO NOT PLAY THIS.’”

“Sometimes I play stuff that is so weird that either [listeners] turn off the radio immediately, or find that they *can’t* turn it off,” Menz continues. “We have some compilations that are really out there. There’s a CD called *Incredibly Strange Music*, for example, with a track by a Swedish Elvis impersonator who sounds *nothing* like Elvis Presley: he slurs all his words and has a thick Swedish accent. If you heard it on the radio with no context, you’d think you were in a demented fun house.”

The orgy tradition, another hallmark, began in the 1940s with Harold van Ummersen ’44, A.M. ’48. Exhilarated after having nailed some “major academic accomplishment, like turning in his thesis or finishing exams,” says Elliott, he dashed over to the studio and celebrated by playing all nine of Beethoven’s symphonies, rounding up a passel of 78 rpm discs and



some help for the party. Orgies have become a staple of Harvard exam periods, when students can use some good listening while they study.

Orgies now embrace a wide range of nonstop broadcasts spread over hours or days and organized around composers, performers, periods, whimsical themes, or almost anything else in classical and popular music, from a weekend devoted to the viola to an orgy musically recalling the court of Catherine the Great. In the winter of 1985, Michael Rosenberg '85 made WHRB the first station anywhere to air the complete works of J.S. Bach, in a nine-day, round-the-clock orgy that celebrated the tercentenary of the great composer's birth. The station, says Elliott, "has done all kinds of composers complete, from

the traditional greats to moderns such as Schnittke and Ligeti." The winter 2013 orgy period included celebrations of Cuban House (a genre of electronic/house music), jump blues, jazz guitar, and a festival of music from the Tremé neighborhood of New Orleans—all within its first week. Fans can be highly enthusiastic: in 1998, Elliott recalls, a Canadian couple drove to Boston and checked into a hotel for three days just to hear an orgy devoted to pianist Sviatoslav Richter.

In 1948, Dwight Benton Minnich '51 ("Pappy Ben" on air) launched *Barn Howl* on WHRV (the AM predecessor of WHRB-FM), feeding the appetite for country music shared by many Southern World War II veterans at Harvard. His early effort evolved into the longest-running, most highly regarded country/bluegrass program on Boston radio, *Hillbilly at Harvard*, a Saturday morning fixture now hosted by Lynn Joiner '61 ("Cousin Lynn").

Joiner arrived at WHRB as folk music



WHRB members in action during the 1950s



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was taking off in 1959 and came to host the weekly *Balladeers* program—one night featuring a local teenager named Joan Baez. “We may have been the first to air her,” he says. Typifying the playlist, he says, are artists like “the Stanley Brothers [a bluegrass group, *floruit* 1946-66] and George Jones, the greatest singer in the history of country music,” Joiner adds, “with the possible exception of Hank Williams.” Joiner co-hosted with Brian Sinclair ’62 (“Ol’ Sinc”) from 1976 until Sinclair’s death in 2002. Their formula was one bluegrass, old-timey, or Cajun cut for every two country numbers. “Now it’s just me,” Joiner says.

He has carried on with gusto plus input from a loyal, knowledgeable audience. *Hillbilly* promotes local concerts and often brings in musicians for live interviews and performances. Joiner plays contemporary country artists, but doesn’t do “pop country” with its lush arrangements, sticking

to the fiddles rather than the violins. In 2014, the International Bluegrass Music Association gave *Hillbilly* its Distinguished Achievement Award, its highest honor outside Hall of Fame induction.

WHRB began streaming its programs in 1999, connecting the station with a global audience—and now with a local one: as Menz notes, “I’d be hard pressed to find a current Harvard student with a radio in his room.” Online, the station’s newly refurbished website “allows us to post more Harvard-specific content,” explains Martin Kiik ’15, a recent WHRB general manager, “and also to communicate in a medium that college students can conveniently access—and do! The focus is the music, but our DJs have an opportunity to write something insightful *about* the music on the website—to tell a story about how they found this artist, and how this piece might relate to

the rest of the genre.” (The site’s Spintron listing gives the full names, composers, and artists for every cut “spun,” together with its airtime, and even enables clicking to buy the recording.)

Jazz and many other forms of popular music have always been part of the station. *The Jazz Spectrum*, broadcast in the contrarian slot of 5 A.M. to 1 P.M. weekdays, has long offered sophisticated programming as a refreshing alternative for commuters on the “morning drive” shift. From 10 P.M. until 5 A.M., *The Record Hospital*’s DJs expose listeners to “the latest in punk, hardcore, emo, noise, psych, new wave, no wave, post-punk, garage, indie, crust, and whatever else we can damn well get our hands on,” as their Web page announces. On Friday nights, local bands play live on air.

Regardless of genre, WHRB’s underly-

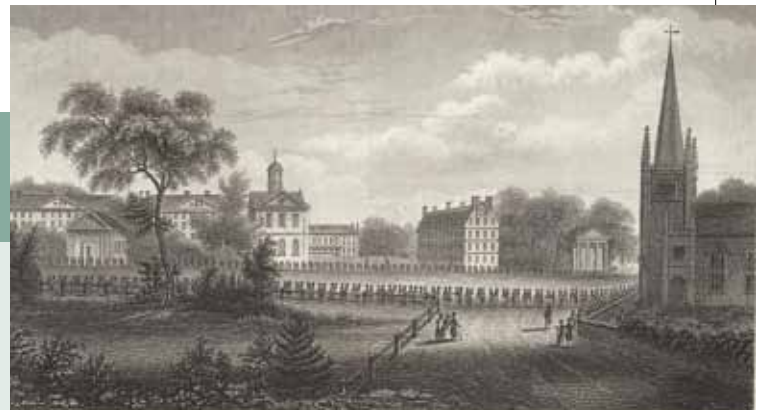
175 Candles

On Commencement Day, August 26, 1840, a small group of Harvard College graduates established what is now known as the Harvard Alumni Association (HAA)—but only after drafting former U.S. president John Quincy Adams, A.B. 1787, LL.D. 1822, to

lead the organization. Adams accepted, according to Harvard historian William Bentinck-Smith ’37 (“Aid and Light in Great Objects,” September-October, 1990, page 74), “though he had worries about his ‘inefficiency’ for the office.”

Clockwise from upper right: An 1840 etching of the alumni procession during Harvard’s bicentennial celebration in 1836; Professor

Edwin O. Reischauer at the second annual meeting of the Associated Harvard Alumni in 1967; a poster promoting an Associated Harvard Clubs’ gathering in 1910; Harvard president Derek Bok and Radcliffe president Linda S. Wilson greet alumni at the 1991 Commencement



From the start, Adams said that the organization would “embrace all alumni without discrimination” and “have a happy influence in promoting mutual friendship and union among the graduates of the College.” Those are still the association’s top priorities—even as it counts more than 325,000 University alumni across the globe—and as it celebrates its 175th anniversary this academic year.

The HAA has benefited from the heritage embodied by earlier alumni and alumnae groups: the Associated Harvard Clubs (which merged with the alumni association in 1965 to form the Associated Harvard Alumni; the name reverted to the Harvard Alumni Association in 1982) and the Radcliffe College Alumnae Association (which held its last formal meeting in 2003). HAA staff members are now collecting archival images and stories that will help highlight the role alumni have always played in sustaining the University, for celebratory events. “Alumni have made Harvard what it is today, and will continue to shape Harvard into the future, in terms of governance, volunteerism, interviewing and recruiting potential students, in philanthropy, and any number of other ways,” says HAA executive director Philip W. Lovejoy. “Alumni care about Harvard more than anybody.”



ing musical mission is to uncover fresh, high-quality material—and to share such discoveries with its audience. Undergraduate membership renews steadily; everyone who completes the comp gets on. Many compers bring an impressive store of knowledge with them—RH's Sam Wolk '17, for example, had done significant work at commercial radio stations in Los Angeles before college—which keeps the mix

musically erudite and percolating. Elliott hosts occasional CM programs as well as one on opera singers of the past that follows the station's live Metropolitan Opera transmissions on Saturday afternoons.

"The people who've come to the station have gained an appreciation of what a radio program is and can be," Elliott says. "It's a special presentation of words and music. It isn't about using focus groups to

figure out 'what people like' and checking the ratings every 15 minutes. You try to discover the really great music for yourself, and your discoveries will be the listeners' discoveries—and they will love you for it."

Craig A. Lambert '69, Ph.D. '78, former deputy editor of this magazine, is the author of Shadow Work: The Unpaid, Unseen Jobs That Fill Your Day (Counterpoint).

Global Alumni Fan

"Diversity of talents and people in fields everywhere"

THE NEW PRESIDENT of the Harvard Alumni Association (HAA), Paul L. Choi '86, J.D. '89, plans to promote "University-wide, global citizenship" on his travels this coming academic year. "As alumni," notes Choi, a Chicago-based partner in the international law firm Sidley Austin LLP, "we are part of this global network with an incredible diversity of talents and people in fields everywhere." He hopes to link that diversity to the work of his immediate predecessor, Cynthia A. Torres '80, M.B.A. '84. She focused on building ways for alumni to connect with undergraduates—as mentors, through internships and job-shadowing, and—especially during Harvard's Winter session—in career workshops and panel discussions. Such connections, Choi says, are "an important, very practical benefit of the alumni network, not only for students struggling to get summer internships and developing a career, but also in thinking about how to help [mid-career] alumni who may want to change jobs or move to a new geographic area."

The proud Pforzheimer House alumnus also wants to bolster ties between fellow alumni and their own Houses. He has already met with peers and with some House masters to figure out ways for alumni to develop relationships with undergraduates and each other—again, particularly in the professional realm. "If there were students interested in talking with a practicing lawyer," he explains, "it would be great if a House had its own network of alumni who work in the field." In general, he adds, surveys show that Harvard alumni want to interact with students and share their knowledge and expertise. They

also want to stay in touch with "Harvard's intellectual resources, promote access to cutting-edge scholarship, and reach out and join with other alumni through HarvardX" (the University's digital learning initiative).

Choi himself has a long history of involvement in alumni activities. As a current board member and former officer and president of the Harvard Club of Chicago, he has helped attract more graduate-school and young alumni to new networking and social activities there. Previous roles at the HAA include secretary and elected director of its board and vice president of engagement and marketing. In addition, he has served in reunion leadership positions for his College and Law School classes.

Born in Seoul, South Korea, Choi was three when his parents immigrated to

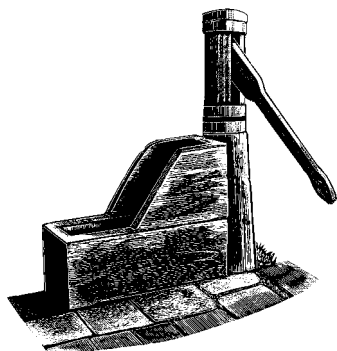
Chicago for his father's medical residency at Northwestern. Choi assumed he would also become a doctor, but he discovered at Harvard a preference for economics ("an insightful tool to analyze a breadth of problems") and pursued law because he was drawn to examining systems of government and policy. Now a partner in his firm's corporate group, he is the global co-leader of the mergers and acquisitions practice. A "true believer" in the value of a liberal-arts education, Choi says that "the analytical approaches to reasoning and the communication skills, written and oral, are the kinds of fundamentals that drew me to Harvard College and Harvard Law School—and those are the skills I draw upon every day." What makes the Harvard global community so vital, he adds, is its array of such applied knowledge and talents. "And the fundamental reason our alumni network is so strong," he points out, "is that it's filled with people who want to maintain a connection to Harvard—throughout their lives."

~NELL PORTER BROWN



Paul L. Choi

Thrills, Baseball & Other



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

WITH THIS TALK of thrills we are not of course referring to the 2015 Red Sox. We are harking back to the happier days of the 1927 Crimson baseball team—"one of the best of all time," according to *The Second H Book of Harvard Athletics*.

Isadore Zarakov '27 was the captain, Fred Mitchell the coach. Izzy Zarakov never got his degree (he failed his general examinations), but before he didn't, he left his mark on the Harvard record books. He played football, hockey, and baseball, lettered eight times, and in 1968 was inducted

into the Harvard Varsity Club Hall of Fame.

"It seemed fitting," the *H Book* sums up, "that the most thrilling moment of the exciting 1927 season was saved for the very last inning of the last game. Harvard was trailing, 5-4, with two outs and [William] Lord on first. Captain Isadore Zarakov '27 picked out the heaviest bat in the rack, strode to the plate, and walloped a home run to beat Yale, 6-5. The ball, it is said, rolled to the huge wooden back-stop on the freshman diamond, and to this day both the back-stop and 'Zarakov's home run that beat Yale' have been targets for Crimson clouters to reach."



INTERROGATION: James N. Connor '60, a musician who lives in Boaz, Alabama, writes in his fifty-fifth anniversary class report: "After football season of my junior year at Gadsden (Alabama) High School, my home-room was visited by three men in neat Sunday suits with rep ties and perfectly ironed

sparkling white collars that had absolutely none of those microscopic wrinkles ironed into them like my white cotton collars always had when Mother made me iron my own Sunday shirts. And, yes, each pair of shoes were shined so bright that I thought I could comb my flattop in their reflection. They asked Mrs. McWilliams for permission to take me to the principal's office. I knew then that these three guys were special police investigators who had come to take me to juvenile hall because, when I was thirteen, I had stolen a roll of tools from Sears and Roebuck Co., which I'd been using to keep my Cushman Motor Scooter running so I could deliver my morning paper route.

"Principal Dobbs told me that Mother was also on her way to his office," Connor continues. "I then knew my goose was cooked. I had prayed for forgiveness of my sin, but, apparently, to no avail. We walked through the main school office into a smaller private office and they closed the door. The three men all sat down in a row on a World War II surplus olive drab vinyl couch. I glanced to see if they were armed. The principal offered me a brown metal folding chair facing them. I then knew that the interrogation had begun. All four were quiet for a minute or so, looking at me; Mother had not yet arrived. Mr. Dobbs said, 'Jim, these gentlemen would like to ask you a few questions.'

"The man in the middle," Connor writes, "the one with the most gray hair, spoke first and, without a smile, he said, 'James, have you ever considered going to Harvard College?'"

~PRIMUS V



The 1927 baseball team. Zarakov is fourth from left in the front row, elbow to elbow with Mitchell.

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THE PUMP OVERFLOWS: For more of this bracing interview, and to learn how Connor's Granny told the fortune of one of the three men, visit harvardmag.com/extras.

LETTERS

(continued from page 6)

officers are paid like superstars—10 times what the president of the University is paid. Does the Board of Overseers not have access to the same data as *Harvard Magazine* (Brevia, July-August, page 33), or do they choose to ignore it?

CHARLES RESNICK '48, LL.B. '50
Longboat Key, Fla.

THE FOREMOST RABBI?

THE JULY-AUGUST obituary for Rabbi Aharon Lichtenstein (Ph.D. '57) characterized him as “a rabbi considered to be the foremost intellectual and spiritual guide of Modern Orthodox Judaism.” Although he certainly ranked up there among the leading lights of non-haredi Orthodox Judaism, I seriously doubt that he would be universally regarded as the foremost among them. Indeed, there are even some who would not associate him with the “Modern” strand of Orthodoxy altogether. What, then, was the basis/source/rationale for this exalted wording?

STANLEY COHEN, G '81
Baltimore

Obituaries editor Deborah Smullyan replies: I fear I accepted uncritically the appraisal of the gentleman who submitted Rabbi Lichtenstein's obituary. He did refer me to two websites for corroboration, containing the obituaries in *Haaretz* and the *Jerusalem Post*, which certainly didn't cast any suspicion on his exalted assessment. But I must remember to be cautious in accepting the opinions of others. Thank you for keeping me honest.

ERRATA

“SURGERY FOR ALL” (July-August, page 26) misidentified the affiliation of Lars Hagner, who is at Lund University, in Sweden.

Susan C. Seymour writes that the Off the Shelf item describing her biography of Cora Du Bois (July-August, page 68) incorrectly stated that Du Bois conducted fieldwork in Sri Lanka; that work took place in India. In addition, although the Zemurray chair that Du Bois held was funded by Radcliffe, the professorship was at Harvard.

The title of a work in “The Young T.S. Eliot” (July-August, page 54) should have been *The Complete Prose: The Critical Edition*; the text inadvertently rendered it as the “Collected Prose.”

BUSINESS FOR THE

OTHER BILLIONS (continued from page 39)

what to measure and its value to the company. A customer who can now afford prescription eyeglasses surely benefits; but can the impact on her income be quantified?

IGNIA's experience to date suggests that affecting the lives of lower-income people by financing base-of-the-pyramid businesses that serve them “takes time,” as Rodríguez Arregui put it. “The biggest element is patience. It's *hard*.” (It may be even harder in rural Africa and Asia, where the challenges are more daunting than those in urban Mexico, IGNIA's base.)

Moreover, given the business risks and external challenges in the sector, deep knowledge of local circumstances matters—as Rangan's marketing insights and the experiences of IGNIA's entrepreneurs suggest. “This is not an activity about writing checks,” Rodríguez Arregui said. “That's the easy part. It's about how you support entrepreneurs in their endeavors.” Impact investors can no more “defy the laws of gravity” than can their strictly financial peers. Global social-impact investors, he observed, are based in Geneva and financial centers where it is easy to access funds, “but they are investing in Pakistan, Nairobi, and Peru. No venture-capital investor in the world does that. In Cambridge, a VC investor thinks a deal across the river in Boston is too far from his office.” Base-of-the-pyramid investing will mature, he said, when people “raise the money in Nairobi to put it to work there.” Paraphrasing a Spanish proverb, he said, “Under the eye of the owner, the horse is healthy.”

How to Create Value

WHAT BUSINESS MODELS, then, can work at the base of the pyramid? Anyone who delves into the debates about impact investing, or peruses a course like BBOP, learns that such models are a work in progress. Entrepreneurs may approach the base of the pyramid with an innovative idea, only to founder financially. Developed-world pharmaceutical giants differ on how to deploy their research when applied to diseases endemic in low-income, developing nations. (Students in BBOP encounter both Novartis, which has distributed billions of tablets of a malaria drug at its manufacturing cost, but struggles

to develop revenue to sustain further research, and Sanofi's vaccine unit, whose dengue vaccine is embedded more deeply in its business operations.)

Given that sense of flux, it is not surprising that the three faculty members who taught the sections of BBOP last year hold distinct views of this nascent field. By design, HBS professors principally guide student discussion of cases during class meetings, but in conversation and in their writing (cited earlier), they open up about their perspectives.

Michael Chu, who more than his academic colleagues professes from practice, approaches the problem pragmatically. “I find it interesting,” he said, “to apply commercial models, particularly high-impact ones,” to enable people “to live closer to their potential.” He proceeded from that almost spiritual tone to a bright line, with clarifying appeal for the financially minded.

Among his fellow teachers, Chu said, “I'm the most aggressive in saying, ‘If you're achieving high impact *and* high financial returns, that's the magic combination.’...Because if you want to move the needle” for billions of people, “the way to guarantee it is to create an industry via an economic activity with above-average returns.” In this view, “A 60 percent return on equity is better than 50 percent, and 50 percent is better than 40 percent”—not because it is an extraordinary profit margin that rewards investors, but because “That's when you can really disrupt and reinvent an industry.”

Eye-popping profitability, in other words, is the way to attract competition into markets where the low-income majority of humanity today is served poorly, if at all, with intolerable consequences. “Competition is precisely what reconciles profitability and the creation of social value,” he wrote in 2007. “The social role of profit is in fact creating an industry,” he said now.

The faster that can happen, the better life will be at the bottom of the pyramid. But as Bechtel learned in Bolivia, that approach might not always be politically palatable. As IGNIA's investments have shown, the work of identifying and nurturing those pioneering companies can itself be difficult and time-consuming (and the universe of possibilities for extraordinary returns may be limited). Still, applied to urgent social needs, Chu argued, the animating incentive of profitability—part of HBS students'

DNA—is the best agent for betterment at the base of the base of the pyramid.

Shawn Cole approaches the issue from an academic finance perspective—one informed by deep work in the developing world, most recently on projects like providing agricultural-extension services in India via mobile phones, and insurance for farmers against weather disasters. Economic development, he said, is the most important problem facing the world. It is not susceptible to solution through discrete efforts to improve the delivery of government services, or manage nonprofit organizations better, or target aid more deftly. “It’s really private-sector growth that raises living standards,” he noted, pointing to the near halving of the world poverty rate in recent decades, driven by growth in China and India. The challenge becomes, “How can we take the tools, skills, and frameworks that have made American capitalism so successful and apply them in very different contexts and settings?”



Visit harvardmag.com/ extras for a sidebar on the mobile revolution at the base of the pyramid, including Vodafone’s burgeoning money-transfer business and a Mexican cardiac primary-care start-up.



Teaching the course has added market and consumer perspectives to his background in development economics and finance, Cole acknowledged. But business remains business: “This thing will only work if revenues exceed costs.” Rather than pursue an expanded vision for companies’ mission, he said, “I could see a ton of progress being made simply through businesses becoming more efficient and motivated to serve customer needs while seeking a profit.” That is, a corporation that pursues a social mission might be more successful than either a social enterprise or a purely profit-focused private business—even without advances in theory. He continued, “I’m not persuaded it will be easy to convince large corporations to focus meaningfully on other goals beyond their primary one of profitability.”

He offered the analogy of climate change: instead of urging businesses to

The challenge of advancing most of mankind economically, Rangan thinks, depends on business students and leaders finding new ways of doing business—with a positive impact on meeting social needs, profitably, at the center of corporate strategy.

reinvent themselves as sustainable enterprises, a lot of progress can be had simply by imposing a carbon tax. Companies would respond at once to that market signal, like any other cost or regulation, in the normal course of operations.

However humanity pursues economic development, Cole said, even though “it won’t solve all the world’s problems, private enterprise is probably the most important solution to those problems,” alongside aid and “other tools in our tool kit.” This is, in other words, an opportunity within reach, with existing techniques more skillfully applied.

Rangan, expert in marketing and in social enterprises, believes some new synthesis between the logic of conventional, profit-maximizing businesses and social-mission-driven entities is required to meet basic human needs—particularly in the least-developed settings. There, he said, businesses will have to be engaged to provide nutrition, clean water, shelter, and healthcare, enhancing individuals’ opportunities as *customers* (not aid recipients or clients). When that happens, customers can increase incomes; accumulate assets; and progressively operate as economic agents seeking products and services that improve their quality of life. In other words, in low-income markets, business functions first as an engine of economic development—operating profitably but, for political reasons, not enormously so.

Addressing social needs, he elaborated, is *not* about “corporate social responsibility”: a business’s nonprofit activities, lodged to the side of its operations, intended to benefit host communities and please employees. Instead, his quarry is generating value for the population at the base of the pyramid through the enterprise’s core, profit-making work. That opens a whole universe of new business metrics; of fresh thinking about the fundamentals

of finance and marketing; and of long-term partnerships with government, the public, and nonprofit entities to build an ecosystem for enterprise (the public goods that low-income countries can’t afford).

The work is not easy, he cautioned, nor are the circumstances for success universal. Given the required investment and the knowledge of local conditions that so many of the cases highlight, Rangan said, “There is no fortune lying on the ground waiting to be picked up.” The optimism in Prahalad’s famous title has been tempered as evidence grows about the problems from which much business research and teaching, and many CEOs, have heretofore kept distant. But the challenge of advancing most of mankind economically, Rangan thinks, depends on today’s business students and leaders, and tomorrow’s, finding new ways of doing business—with a positive impact on meeting social needs, profitably, at the center of corporate strategy.

• • •

TOMATO JOS is a long way from profitability, let alone market-altering scale. But its founders’ motivations remain clear. Mira Mehta recalls vacationing on the Kenyan coast when she was working in financial services, and realizing that she wanted to do something “more impactful than handing out pens” to children orphaned by HIV/AIDS. After her nonprofit experience in Nigeria, she enrolled in business school because she was eager to pursue “being a good employer and providing jobs and increasing incomes.”

Animated by that vision, as CEO she necessarily returns to the realities of achieving it through Tomato Jos, the business: balky machinery, tender seedlings, farmer partnerships, money. Like any good manager, she says, “There are *tons* of moving pieces.” ▽

John S. Rosenberg is editor of Harvard Magazine.

“Seeking Strange Flowers”

A botanist like none other

AS TALES of adventure go, his had it all: treacherous passages through snow-covered mountains; escapes from gun-wielding marauders; grand dinners alongside tribal princes; and religious rituals virtually unknown to the outside world.

In 1924, Harvard dispatched Joseph Francis Rock on a treasure hunt through China's southwestern provinces—the Wild West of their day. But gold and silver weren't his mandate: Rock, a renowned botanist, sought only to fill his satchels with all the seeds, saplings, and shrubs he could find. During his three-year expedition, he collected 20,000 specimens for the Arnold Arboretum; some, such as the Beijing lilac (*Syringa pekinensis*), still bloom nearly a century later.

Botany, though, was just one of Rock's fortes. As an ethnologist, he took hundreds of photographs of the Naxi, an indigenous tribe in Yunnan province, recording their now-lost way of life for both Harvard and *National Geographic*, and took notes (held by Harvard-Yenching Library) for an eventual 500-page dictionary of their language. His hand-drawn map of his travels through China's “Cho-Ni” territory, in the Har-

vard Map Collection, includes more than a thousand rivers, towns, and mountains denoted in both English and (now antiquated) Chinese, and was so well made, the U.S. government used it to plan aerial missions in World War II.

Scientist, linguist, cartographer, photographer, writer (his expedition missives, at the Arboretum Library, are captivating)—Rock was not a wallflower in any sense. Haughty and self-possessed, he would saunter into a village or warlord's lair “as if he owned the place,” said Lisa Pearson, the Arboretum's head librarian and archivist.

In proclaiming his triumphant return under the headline “Seeking Strange Flowers, in the Far Reaches of the World,” the *Boston Evening Transcript* ran a large photo of the daring explorer voguing in a woolly parka and fox-skin hat. “In discussing his hair-raising escapes from death either from

mountain slides, avalanches or brigand armies, he gives all the praise to his caravan,” the paper declared, adding that at any suggestion of his own heroism, “He waves the idea away as if it is of no importance.”

The Arboretum and Rock parted ways after 1927, mainly because his trip cost Harvard a fortune—about \$900,000 in today's dollars. Fortunately, many of his specimens, many of his stunning photos, and his great stories remain.

—PETER DEMARCO



ARNOLD ARBORETUM



SHEET VII



Visit harvardmag.com/ extras to view Rock's complete map of the Cho-Ni territory.

HARVARD MAP COLLECTION



HARVARD YENCHING LIBRARY



ARNOLD ARBORETUM

Expedition treasures (clockwise from top right): sheet VII of Rock's map of the “Cho-Ni” territory; a Naxi man in traditional armor; the great shi-men (rock gate) in Gansu province; and a specimen of *Rhododendron rufum* Batal

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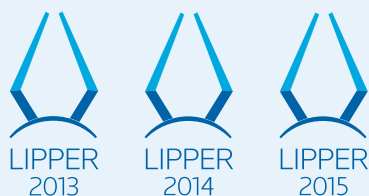
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