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On the cover: Jennifer Lewis in her laboratory
Photograph by Jim Harrison

Cambridge 02138

Training teachers, global health, climate change

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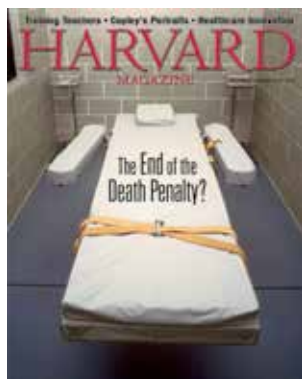
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THE DEATH PENALTY

I AM NOT familiar with the Steikers' work, other than through the comprehensive article in the November-December 2016 issue ("Death Throes," by Lincoln Caplan, page 56). However, over the years (I suppose like most lawyers), I have given considerable thought to the death penalty, and I simply do not believe that much of the scholarship is useful or relevant.

People either believe that under certain circumstances it is appropriate for the society or the government to extinguish the life of a criminal, or they don't. Trying to eliminate the death penalty under the rubric of the prohibition against cruel and unusual punishment is pure sophistry. Where the founders' intent cannot be ascertained because of subsequent factual or technological developments that they could never have anticipated—e.g., a crowded urban rather than agrarian society, automatic assault weapons, infrared surveillance tools—then there is some leeway for interpreting the Constitution other than by asking what the words mean or even might mean. It is a far more extreme argument to take a concept and its application of which the founders were certainly well aware and try to ignore the people's judgment simply because it's no longer fashionable in certain segments of American or European society to believe in the death penalty. The proper course is to treat this as the political issue that it is and work through state legislatures and Congress.

Moreover, even within the Constitutional framework, it is illogical to reach the conclusion that because the death penalty is unpredictable or rare, it therefore is within the ambit of the phrase "cruel and unusual." Is it not true that in criminal law general-



ly, in connection with both violent crimes and white-collar crimes, results can be characterized as random and unpredictable, highly subject to the discretion of prosecutors, and sometimes bizarre? That does not make the punishment unenforceable as cruel and unusual, though discrepancies and

disparities often lead to its being voided as a violation of due process or equal protection.

Finally, even if randomness is seen as a necessary practicality, and therefore normally a tolerable element of the administration of justice, one might still say that such a thing is intolerable where a person's life is at stake and a mistake cannot be corrected, but the reason lies not in the Constitution but in quite justifiable and honorable religious, moral or philosophical objections to the death penalty.

ROBERT KANTOWITZ
Lawrence, N.Y.

ONE WONDERS whether the authors' speculation recounted by Lincoln Caplan, that if the Supreme Court abolishes capital punishment in the states, abolition of the federal death penalty is likely to follow, eventually even for terrorism, would include the Obama administration's determination that it currently has the authority to impose pretrial capital punishment via drone strike on American citizens abroad who are suspected of terrorism, although outside the theater of war.

THOMAS V. GLYNN, LL.B. '68
Vero Beach, Fla.

IN HIS COMMENTARIES Blackstone traced the English common-law death penalty for murder to the Mosaic Code. He affirmed that, according to the Noahic covenant,

On Games and Goodwill

IN NOVEMBER, the Harvard men's basketball team laced up their sneakers, took to the court, and played a hard-fought game against Stanford in front of a crowd of more than 7,000 people—and countless others who tuned in for ESPN2's live broadcast. The teams tipped off not at Lavietes Pavilion in Cambridge or Maples Pavilion in Palo Alto, but at the Mercedes-Benz Arena in Shanghai in a contest co-hosted by a division of the country's Ministry of Education—the first collegiate or professional regular season contest to be played in China. Harvard senior forward Zena Edosomwan is an East Asian Studies concentrator who welcomed the crowd in Shanghai in accomplished Mandarin.

What inspired a bi-coastal match up thousands of miles from either team's home court? The opportunity, in the words of Harvard Coach Tommy Amaker, "to promote goodwill...through sport and to provide student-athletes with a transformative cultural exchange experience." The meeting between Crimson and Cardinal was the heart of a once-in-a-lifetime trip that included an exhibition game against Shanghai Jiao Tong University, visits to museums and temples, and a day at Shanghai Disney with children from the Yao Foundation, an organization founded by former NBA star Yao Ming to improve the lives of Chinese youth.

At Harvard, student-athletes embrace their athletic pursuits in ways that connect the University to people and places around the world. Members of the men's and women's basketball teams have spent summers in China educating young people about higher education, in India connecting the values of athletics with success in the classroom, and in South Africa assisting the NBA with its Basketball Without Borders program—an outreach effort that brings the game to thousands of children who may not be exposed to it otherwise. I have spoken in recent years of the University as an inherently global institution that is becoming more intentionally global, and athletics play an important role in this effort.

Deep engagement with the world through sports yields remarkable—and remarkably diverse—outcomes. Love of a Swahili language course, one of more than 80 languages offered by the University, took a recent alumna to Kenya and Tanzania as an undergraduate, and back to Tanzania after graduation to write, direct, and produce an award-winning documentary about women soccer players in Zanzibar. What does it mean to be a woman, a Muslim, and an athlete? She hopes her work will ask those questions and, in her words, "[complicate] our understanding of Africa and of Islam." Other alumni have taken a different approach and launched non-profit organizations that focus on capacity building. Coaches Across



Continents, founded by a Harvard all-Ivy men's soccer player, uses sport to advance community development and youth empowerment—for more than 2.3 million girls and boys in more than 40 countries since it was founded in 2008.

Other members of the Harvard community spread goodwill through competition on the world stage. In August, ten students and alumni traveled to Rio de Janeiro to compete in the Games of the XXXI Olympiad, representing five countries—Bermuda, Canada, Nigeria, South Africa, and the United States—and demonstrating their prowess in fencing, field hockey, rowing, rugby, and track and field.

Around the globe, athletics—the devotion to practice, to competition in the context of fair play, and to connection through sport—can create a common language. The recent journey of our men's basketball team exemplifies the University's expanding global reach—and the universality of sport.

Sincerely,

Zena Edosomwan

murder was not just a capital offense but also unpardonable.

In 1976, the U.S. Supreme Court turned away from Blackstone, ruling that it was unconstitutional to require a person found guilty of murder to die. Instead, the Court

insisted that not all murders deserve the death penalty, only those that meet Court-approved guidelines.

Today, the Court is reaping what it sowed. The death penalty is unevenly and disproportionately imposed. One would think that

7 WARE STREET

Heresy

THE FALL'S fiscal news—weak investment performance and leadership changes at Harvard Management Company; the cautions in the University's annual report (respectively, "The Endowment Ebbs," November-December 2016, page 18, and this issue, page 19)—prompts a look at a heretical thought about Harvard's business model. For some years, the treasurer and the vice president for finance have been pointing with concern to the wobbliness of its three principal legs.

Research funding (about 17 percent of operating revenue). Given federal budget deficits, maintaining even level real support for basic research appears challenging.

Tuition and fees (about 21 percent of operating revenue). With families hard-pressed since the Great Recession, and a firm commitment to admitting students of lesser means, net tuition growth after financial aid in degree programs should be modest.

Distributions from the endowment (about 36 percent of operating revenue). During the past decade, Harvard's investment returns have been volatile, below planned levels, and even negative in three recent fiscal years (2009, 2012, 2016)—so reliance on that largest source of funds is increasingly problematic.

One obvious solution is philanthropy. The Harvard Campaign has secured more than \$7 billion in gifts and pledges; seems certain to yield more before mid 2018; and has, critically, boosted current-use giving to more than \$400 million per year: 9 percent of operating revenue—available now, and much of it unrestricted. But sustaining support at this level may be more a wish than a strategy, and some of the gifts (for new buildings, for example) increase operating costs.

A finer-grained look at Harvard's accounts suggests revisiting the one revenue source under University control: tuition. Funds from continuing and executive education (about 8 percent of revenue) have been growing at an annual rate exceeding 7 percent this decade, and faculties welcome more. Harvard Business School's executive-education catalog runs to more than 50 pages, and it has

invested heavily in new facilities in Allston and in teaching abroad to accelerate enrollment (some of which has evaporated during past recessions). The Faculty of Arts and Sciences' Extension School is on a roll, too. But those are the easy pickings.

The politically incorrect subject is *undergraduate* tuition (\$43,280 of this year's \$63,025 term bill), which has been compounding at a 3 percent to 4 percent rate recently. Attacking universities for their tuition bills is a staple of political discourse, and Harvard, with its \$35.7-billion endowment, makes an irresistible target—particularly among people who don't delve into how research, libraries, and other essentials are supported.

In this environment, administrators and the Corporation have not seemed eager to stick their necks out. But a bloodless analysis might lead toward the unthinkable. Demand for admission is at a record level (39,041 applicants to the class of 2020), and acceptances are minute (5.2 percent of candidates got offers). The College's financial-aid spending has grown minimally during the past five years, suggesting that students' need is being at least relatively better met—and the campaign has endowed more of that cost. Critically, the financial-aid formula is *highly progressive*: families with incomes below \$65,000 pay nothing, and those with higher incomes (up to \$150,000) pay a graduated amount, rising to 10 percent of income—so for those families, setting a higher sticker price does *not* mean more money out of pocket. The College is upgrading the Houses, investing in fields from performing arts to engineering and applied sciences, tweaking the curriculum, etc. Thus it can talk about enriching an experience for which demand is already off the charts. If it can charge eager, upper-income applicants more tuition, the result, after added aid costs, would be a larger flow of unrestricted funds to invest in research and teaching.

Politically, this is a pipe dream. But financially—and in terms of explaining the value of a residential undergraduate education at a world-leading university—the case for raising tuition to a level more commensurate with peers' assumes a more than theoretical allure.

—JOHN S. ROSENBERG, *Editor*

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in response to this sorry record of discrimination, reformers like the Steikers would at least consider the possibility that what has gone wrong is the abandonment of the Noahic principle that the death penalty must be uniformly imposed, the life of every victim being equally precious in the sight of God. See Genesis 9:6.

Instead, the victim is forgotten. Death-penalty critics like Lincoln Caplan fuss over “botched executions,” causing unnecessary pain to the convicted murderer, without regard for the pain suffered by the victim. His myopic approach is typical of the incestuous work on capital punishment promoted by the elite American Law Institute.

Providentially, the American people know better. On November 8, the people of the deep-blue state of California defeated Proposition 62, calling for the end of the death penalty, but instead voted for Proposition 66 that would close the time gap between conviction and execution, restoring the natural deterrent effect of the death penalty: *Because sentence against an evil work is not executed speedily, therefore the heart of the sons of men is fully set in them to do evil.* Ecclesiastes 8:11.

HERBERT W. TITUS, J.D. '62
Chesapeake, Va.

IT HAS ALWAYS mystified me why intellectuals think it is good to expend much thought and energy trying to save the lives of individuals who have done vicious and inhuman things to innocent people. Yet these same intellectuals are happy to expend thought and energy trying to kill innocent infants in the womb who have never done anything bad or criminal.

Civilizations rest on a foundation of laws and commonsense. An almost universal understanding across different cultures is that individuals who greatly harm their fellow man should be prevented from ever doing any further harm.

DON BOYD, PH.D. '68
Greenwood, Ind.

SPEAK UP, PLEASE

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

TEACHER FELLOWS

HAVING GRADUATED from the College and the Graduate School of Education, I am long gone from the difficulties faced by teachers in their first weeks in a classroom (“Educating Teachers,” November-December 2016, page 34). I was fortunate to have had a thoughtful mentor and to have begun my career in a supportive school system (in Newton, Massachusetts). Several years later I had the good fortune to visit an elementary school in Pittsburgh that demonstrated how local school administration can pave the way toward excellence in an underprivileged area. I recall very clearly how its brilliant principal did it.

First, no new teacher was allowed to teach full-time for the first two or three months. Instead, they were required to sit in the classrooms of experienced teachers for half of their otherwise scheduled classes.

Second, every teacher was assigned a route from his or her home to the school with stops along the way to inquire if any untoward events had occurred that might affect students. If any such event had occurred, any student from that area was met at the door and escorted to a special room where a parent would meet and talk with him, let him talk, and offer modest treats before sending him off to his classroom.

Third, the principal dictated that no parent was ever to be summoned to the school to hear bad news. Instead, he made it his business to bring the news to the parent himself, at home, sitting on the doorstep to await the parent's return if necessary.

And perhaps most important, he organized parents to invite new teachers home before school began, to meet neighbors and talk about the school and their concerns.

What a man! What a school!

RANDOLPH BROWN '51, M.A.T. '56, A.M. '61
Bay City, Mich.

GLOBAL HEALTH AT HOME

THANK YOU for publishing “Global Health at Home: Harvesting innovations from around the world to improve American medical care” (by Howard Hiatt, Charles Kenney, and Mark Rosenberg, November-December 2016, page 49). In 2010 I founded the Moms2B program in Columbus, Ohio, in order to help pregnant women living in poverty have healthy babies. We are a weekly group pregnancy and parenting program located within four impoverished neighborhoods. There is such a need, we are

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2. In-county as stated on Form 3541	0	0
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E. Total free or nominal distribution	373	86
F. Total distribution	259,599	260,468
G. Copies not distributed	1,491	1,470
H. Total	261,090	261,938
Percent paid and/or requested circulation	99.86%	99.97%

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Irina Kuksin, Publisher

expanding every day. We have over more than 100 pregnant and parenting women plus their partners and children every week. They participate and receive a heart-healthy meal and connection to services to address their social and medical determinants of health. And we train community health workers.

Dean Hiatt (who was serving as dean when I attended the School of Public Health) champions this model outreach worker. We agree. Our community health workers graduate from our Moms2B program and then train to earn a community health worker certificate. Our community health workers are invaluable. They understand the needs and reach out to pregnant women living in poverty. They make a difference

in reducing our unacceptably high, Third World-country levels of infant mortality.

PATRICIA TEMPLE GABBE, M.P.H. '74, M.D.
Clinical professor of pediatrics, Ohio State University and Nationwide Children's Hospital Columbus

McNAMARA AT HARVARD

I DO NOT RECALL Secretary of Defense Robert McNamara having been "shouted down" when speaking to an anti-war crowd during his visit to Harvard in November 1966 (John Bethell, quoted in *The College Pump*, November-December 2016, page 80). I could hear him pretty clearly.

McNamara was spending two days at Harvard, in a series of closed-door meetings with various individuals and groups. The antiwar-

movement had about 1,800 signatures on a petition asking that he stand up and defend his policies in public if he thought he could. This petition was rejected. We then caught him on his way from one closed-door meeting to the next, and demanded that he speak to us. I felt, and most of those in the crowd with me seemed to feel, that if the point of the exercise was to get him to speak to us, shouting him down would not be helpful.

EDWIN MOISE '67
Clemson, S.C.

THE COLLEGE PUMP recalls a 1966 visit to Harvard by then Secretary of Defense Robert McNamara, during which he was confronted by a large antiwar demonstration while on his way to participate in a seminar.

I was one of the graduate students in the seminar, which was taught by then-professor Henry Kissinger. When McNamara arrived, the first thing he did was ask if someone could find out if any of the demonstrators were hurt. (They weren't.) He then proceeded to answer all the questions which time permitted, albeit in the quiet atmosphere of a Law School meeting room.

RAY SOIFER, M.B.A. '65
Green Valley, Ariz.

ACCORDING to *The College Pump*, John Bethell quoted McNamara as shouting at antiwar demonstrators in 1966, "I was tougher then, and I'm tougher now." I was a Quincy House sophomore and was drawn to the commotion when McNamara climbed up on a car. As I recall, he actually said something to the effect that "I was tougher and more courteous then, and I'm tougher now."

JONATHAN HUBBARD '69
Evanston, Ill.

CLIMATE CHANGE

A LETTER in the November-December 2016 (page 8) issue stated: "I am embarrassed by your editorial policy regarding climate change. You are supposed to represent one of the greatest intellectual institutions on the planet, and you continue to promote the obvious partisan big lie that Earth's climate isn't stable enough and that it is determined by trace gases rather than by the sun."

Harvard Magazine replied: "The magazine does not have a policy on climate change, or other issues. It does cover the research of faculty members active in this, and other, fields."

The existence of climate change and the impact of trace gases on global tempera-

Honoring Our Contributors

We take great pleasure in saluting four outstanding contributors to *Harvard Magazine* for their work on readers' behalf in 2016, and happily confer on each a \$1,000 honorarium.

Jane Kamensky joins scholarly prowess—professor of history and Pforzheimer Foundation Director of the Radcliffe Institute's Schlesinger Library—with unusually winning prose, both amply on display in "Facing Harvard," her November-December feature on John Singleton Copley's portrait commissions from the College. We're very pleased to award her the McCord Writing Prize, named for David T.W. McCord '21, A.M. '22, L.H.D. '56, in recognition of his legendary prose and verse composed for these pages and for the Harvard College Fund.



Jane
Kamensky



Lincoln
Caplan

Contributing editor Lincoln Caplan '72, J.D. '76, is widely considered one of America's leading legal journalists. His expertise, carefully deployed to make complex issues fully accessible to lay readers, resulted in two cover stories during the year: "Rhetoric and Law" (a profile of Richard Posner, January-February), and "Death Throes" (on the searching capital-punishment scholarship conducted by Carol Steiker and Jordan Steiker, November-December). We recognize this distinguished work with the Smith-Weld Prize (in memory of A. Calvert Smith '14, a former secretary to the Governing Boards and executive assistant to President James Bryant Conant, and of Philip S. Weld '36, a former president of the magazine), which honors thought-provoking writing about Harvard. Happily, Caplan appears again in this issue, on page 69.

Illustrator Erwin Sherman's cover image brought Posner—jurist, prolific author, and contentious legal thinker—winningly to life. And



Andrew
MacGregor

Andrew MacGregor's multilayered interpretation of Colson Whitehead (accompanying Jesse McCarthy's fine profile, "A Literary Chameleon," September-October) introduced a complex figure on the verge of the much wider recognition that has since come his way with publication of *The Underground Railroad*.

It is a privilege to work with imaginative, expert artists like Sherman and MacGregor on readers' behalf, and a pleasure to recognize their superb craftsmanship.



Erwin
Sherman

~The Editors

A woman with long brown hair, wearing a plaid shirt, blue jeans, and a yellow sweater tied around her waist, is hiking through a field of tall grass. She has a backpack on and is looking off to the side. The background shows a forested hill under a cloudy sky.

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tures are not policies, but scientifically established results. The magazine or the featured researcher should have corrected the correspondent's claims.

That there are relatively small amounts of trace gases does not prove they cannot have a big effect; germs were also once considered too small to be dangerous. Climate researchers have been led to the same, consistent, result via many different tests and models. If one wants to claim otherwise, in the face of all evidence and logical analysis to the contrary, one needs to show evidence and logical analysis to explain the observed facts in some other consistent way. Ideally one would also show why the other conclusions are wrong.

Having a strong feeling or opinion does not make it true, even if many other people share that opinion. The truth remains, no matter whether we believe it or not. This is why scientific analysis, such as that reported in your article, is so valuable.

Climate change is happening, and we ignore it at our peril.

JOANNE COHN '83, RI '97
Berkeley, Calif.

Editor's note: Other correspondents weighed in similarly. To clarify the note in the prior issue: the magazine does not *editorialize* on such topics. It *has* devoted many tens of thousands of words to covering climate change and global warming in the past decade and more (likely more than on any other topic covered during that period). The articles report on the work of Harvard scholars—scientists, public-policy researchers, law professors, and so on—who focus on climate change and warming. None of their research suggests even slightly that climate change is not real or significant.

7 WARE STREET notes the virtues of reconsideration, even when doing so is difficult or comes at a cost (“Do-Overs,” November–December 2016, page 4). One such challenge—and opportunity—is presented by the ongoing fight over fossil-fuel divestment [Editor's note: mentioned in that column].

After years of letters, meetings, debates, and protests, the Harvard Corporation and divestment proponents are locked in a war of attrition. Is the end game for our fair Harvard a perpetual civil war until climate becomes a

non-issue or fossil fuels are no longer available for investment? That war may be a long one, and may not serve the University well.

The world has changed since divestment first became a topic of discussion in Harvard Yard. First, with the ratification of the Paris Agreement we have an official global consensus on where the boundary of unacceptable climate harms lies. Second, and crucially, we are obtaining a clearer understanding of the resource economics implied by that boundary.

In particular, it is now clear that investing in additional fossil-fuel exploration is not consistent with the Paris climate goals. Perhaps more surprising, a growing literature shows that investing in additional fossil-fuel development and infrastructure (e.g., new pipelines and power plants) is also not consistent with those goals. If Harvard supports the Paris goals, then it would be logical to draw down its investments in new fossil-fuel exploration, development, and infrastructure at this time, including both new equity and outstanding stock. If the Corporation continues to invest while professing support for the Paris climate goals,



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then it is either not being honest about its support, or it is not fulfilling its fiduciary duty to seek sound investments.

Harvard can take a do-over on divestment with little to no moralizing, only the question: is this investment economically consistent with climate goals?

BENJAMIN FRANTA, PH.D. '16
Palo Alto

CHARTER SCHOOLS, REDUX

THE SIX LETTERS responding to Paul Peterson's article (November-December 2016, page 2, regarding "Post-Regulatory School Reform," September-October, page 37) fascinated me because none of them mentioned the *sine qua non* for the success of any school system—and the necessity has been made crystal clear both in charter schools and the Catholic parochial school system: viz. concerned, caring, and, above all, interested parents who will spend the time to work with the school for the betterment of the child, which includes homework and discipline.

For example, in New York, charter schools, drawing from the same demographics as the balance of the public schools, regularly outperform and have, in some instances, literally five times the amount of applications as space available. Those parents applying wish to see their children succeed and are prepared to do what is needed to accomplish this.

You need to start at ground level; you need to understand this and your systems must implement it. Then, the comments and their differing points of view become relevant and interesting.

HOWARD G. SEITZ, LL.B. '66
New York City

IT'S A TRUISM THAT "You're entitled to your opinion but not to your facts." The letters piling on Peterson for his article holding out charter schools as an increasingly sound solution to the failure of American K-12 education all (with one exception) claim there is no difference in outcomes between charters and traditional public schools (TPS). False.

The best detailed work comparing charters and TPS is from CREDO (Center for Research on Education Outcomes), at Stanford. It compiled exhaustive data from 27 states for its National Charter School Study 2013. Measures were taken to nullify the charge that charters skim the best by discharging underachieving and difficult students.

It shows that while white students, Asians and non-poverty blacks and Hispanics do

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not improve in charters (indeed, whites do worse), minority students in poverty do substantially better. And where there is concentrated poverty, there are wonderful positive outcomes from charters: in Washington, D.C., 99 days of additional learning equivalent; in New York City, 92 days.

The KIPP organization has 11 schools in Brooklyn, Bronx, Harlem, and Washington Heights, areas of minorities in poverty. They get near-incredible results: 96 percent graduate; 89 percent enter college (nearly twice the rate for low-income students); and 44 percent get a B.A. or equivalent (versus 9 percent for low-income students nationally). They must be doing something right.

Yes, as the letter writers claim, we do not respect teachers, do not train them effectively, and do not pay enough to attract the talented. Yes, many students come to school with tremendous learning deficits, due to parents in poverty who failed to instill a love of reading and the like. Pervasive poverty is a problem. But KIPP and like charters are meeting those problems head on and prevailing. Let TPS schools learn from those successful charters, as Peterson urged.

WINTHROP DRAKE THIES, J.D. '59
New York City

DEMOCRACY AND EXCEPTIONALISM

ARGUMENTS about U.S. exceptionalism are dangerous ("Toward Democracy in America," a review by Alan Wolfe of a book by James T. Kloppenberg, November-December 2016, page 74). To say that the United States of America was "the world's first democratic nation" is factually incorrect. It is not all just a story about English and Scottish writers and U.S. Founding Fathers. Moreover, it is not all just a matter of being a "republic" rather than a "constitutional monarchy." Representative democracy has antecedents in European history at least a century before the Declaration of Independence. Does Kloppenberg mention the Netherlands and Belgium? If so, Wolfe should have made note of that. If Kloppenberg himself failed to do so, Wolfe should have mentioned the Netherlands as a nation-state. The Kingdom of the Netherlands (which initially included Belgium) was created in 1815 but, like the United Kingdom and other constitutional monarchies, the Netherlands and Belgium are still highly democratic nation-states.

J. I. ("Hans") Bakker
Professor (retired), University of Guelph
Guelph, Ontario, Canada

FINAL CLUBS AND GYNOPHOBIA

IN THE November-December issue (page 6), admirably respecting the First Amendment, the editors chose to print a nicely phrased but ultimately intemperate letter about President Drew Faust and what one might summarize as a perceived conspiracy against final clubs under the false flag of political correctness. Rape (not to mention alcoholism, social discrimination, etc.), the letter alleged, isn't really a problem, merely a red herring. The problem is "correctness cabals" limiting personal freedom that have infected Harvard and other institutions of higher learning.

I remember the hubbub at the New York Harvard Club that night, years ago, as to whether the time had come to make de jure, the de facto reality that Radcliffe students were as much Harvard students as the young men who were officially so.

Much has rightly been written about the problems of homophobia. I think it is time, however, for scholars, doctors, and researchers to tackle head on the problems of gynophobia—the pandemic of distrust/fear/hatred of women, and the subsequent violation of their physical, personal, social, and economic rights. Gynophobia is deep, pervasive, and seen in a global dimension: as destructive as any mosquito-borne plague. It is unquestionably among the greatest failings of humankind in the twenty-first century.

JAMES LICHTENBERG '62
Beacon, N.Y.

Editor's note: For more on final clubs and other gender and sexism issues, see page 23.

POLITICAL PINS

THE November-December Treasure, "Pins for Women" (page 96), referred to "the Cosmos Club, an elite Washington social club that didn't allow women to enter through the front door (a policy it would end, begrudgingly, in 1988, after the city found it in violation of anti-discrimination law)."

Virtually every assertion in this statement is false. According to Tedson Meyers [LL.B. '53], a former club president, the "front-door



policy" for women entering the club was eliminated long before he became a member in 1974. Women were admitted as full members on June 18, 1988, not "begrudgingly" but by a membership vote of 775 in favor, 12 abstentions, and 14 opposed. The club was never found in violation of the District of Columbia's anti-discrimination law, no hearing was ever conducted on such a charge, and no penalty was ever imposed. Eighteen women were admitted within months of the vote and a number have served as presidents of the club.

DANIEL A. REZNEK '56, LL.B. '59
Washington, D.C.

Editor's note: The Cosmos Club voted to open its front door to women in 1973, but rejected proposals to grant them membership in 1973, 1975, and 1980. According to a 1991 *Washington Post* report, the club in 1985 "reprimand[ed] retired economist Samuel P. Hayes for his activities as leader of the movement to admit women." According to a 1988 *New York Times* account, the club's vote to admit women followed a Washington Human Rights Office ruling the prior fall that "there is probable cause to believe" that the club's men-only policy violated the city's anti-discrimination law. The office was ready to order public hearings on the case, which could have resulted in the loss of all city licenses and permits if the all-male policy had continued."

THE ARTICLE about the library's political pin/button collection has born fruit! Forbes Maner '74 just sent us a Votes for Women pin in beautiful condition and a little stick pin with a tiny gold hatchet on the end that reads "CARRY A NATION" in teeny tiny letters. He thinks the Votes for Women pin belonged to his Southern grandmother, who, according to family lore, wore it to a meeting with the governor of Georgia and suffered the ignominy of having her photograph in the paper. The hatchet pin, he thinks, belonged to a great-great-aunt in Richmond, Virginia. Another great-great aunt (who drank sherry) claimed the pin's owner "gave piety a bad name."

KATHRYN ALLAMONG JACOB
Curator of Manuscripts, Schlesinger Library
Radcliffe Institute

Editor's note: Treasure should have identified Jacob as the library's curator of manuscripts.

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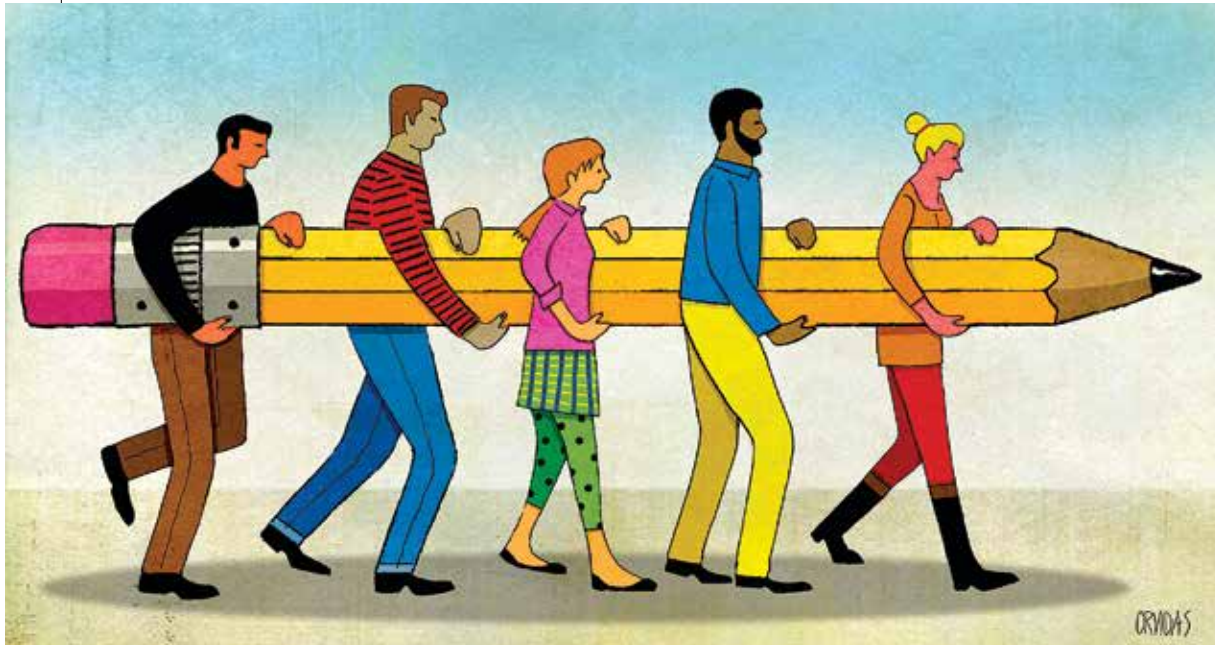
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What Drives Successful Crowdsourcing?

KARIM LAKHANI SAYS his work poses a provocative question: can a crowd of random people outsmart Harvard experts?

Lakhani, professor of business administration, seeks the answer in his role at Harvard's Institute for Quantitative Social Science, where he is principal investigator at the Crowd Innovation Lab and NASA Tournament Lab.

Lakhani's interest in crowds took root when he worked at General Electric in the mid 1980s and noticed that open-source

software developers—groups of people volunteering their time to write code—were producing better software than GE itself. To explore this phenomenon further, he began studying at MIT's Sloan School of Management, working with Eric von Hippel, a professor of management of innovation and engineering systems who investigates how users of products—like California hot-rod modifiers in the 1960s, or snowboarders more recently—often find ways to improve them. Lakhani's twist on that theme examined how communities innovate to create prod-

ucts such as open-source software, and asked whether contests could be used to organize crowds that might outsmart small numbers of experts.

His research got a real-world boost when he began teaching at Harvard Business School (HBS). After he presented a case study on crowdsourcing at an HBS executive-education program, one of the attendees—NA-

SA's chief medical officer—asked whether such a contest could help the agency. "Give me a test case," Lakhani responded.

NASA asked him to come up with an algorithm that would identify the ideal contents for a space emergency medical kit. Using Topcoder, a crowdsourcing company that brings random groups of developers and designers together to work on problems, and \$25,000 in prize money, the contest led to a solution that worked better and faster than one NASA had developed internally. That led to the creation of the NASA Tournament Lab, which added economists to help design effective contests, as well as post-docs in physics and computer science to tackle the full range of problems NASA wanted to solve. In six years, the lab has run hundreds of competitions on Topcoder, addressing challenges ranging from solar-flare detection to the counting of asteroids. Almost all have produced effective code for the agency.

The Tournament Lab also addresses a crucial problem with competitions: lack of empirical evidence for *why* they work. Lakhani notes that a crop of good textbooks explains how to design competitions and other theoretical aspects of competitions, but “What’s been missing is field evidence” of what—apart from sports or internal contests—motivates crowds to solve problems.

The lab has provided answers. People form crowds to solve problems for three reasons, Lakhani says: extrinsic benefits (improved professional profile or rewards like cash); intrinsic benefits (it helps solve a problem, or it’s fun); and pro-social benefits (participants like being part of something bigger than themselves that makes the world a better place).

Many coders, drawn to interesting problems, participate in these competitions over long periods of time. Topcoder, formed in 2001, now has more than a million members. Another contest crowdsourcing site, InnoCentive, has more than 500,000. “Most people don’t get access to the types of problems that people at NASA or Harvard or Pfizer get to work on,” Lakhani points out. “Now all of a sudden there’s a rich flow of very interesting problems that people can put their minds to.”

A constant risk, of course, is that crowds *won’t* form. Asking people to cure cancer is too broad. Asking them to look at how a particular enzyme might work in a biomedical process is better. Rewards must be calibrated to the problem, which should be clearly defined. And organizations that want to run contests must be committed to implementing the solutions that are developed, or people will not take them seriously. “There’s not a magic pixie dust of crowds,” he says, but careful governance.

With the right structures in place, though, a very wide range of problems can be addressed, in part because crowdsourcing opens problems to cross-disciplinary approaches, as Harvard itself found when—in collaboration with Harvard Catalyst (a shared-resource center supporting clinical and translational health research)—it used a University-wide contest to generate ideas about diabetes research. Lakhani’s crowdsourced approach has also worked remarkably well even in the esoteric world of computational biology. In a matter of weeks, and for prizes of \$20,000 or

less, it created algorithms that solve data processing bottlenecks in the development of precision medicine applications at least an order of magnitude (or 10 times) better than those previously produced by teams of experts at places like the Broad Institute of MIT and Harvard.

Recently, the U.S. Agency for International Development approached Lakhani to ask whether an algorithm could be developed to predict atrocities. His group started by launching a contest to find appropriate data sources, and discovered GDELT, which aggregates news sources from around the globe and makes them available via an application-programming interface. Then it asked for machine-learning algorithms that could take the GDELT news feed and

predict atrocities within subregions. The algorithm is being modified, and through crowdsourcing, may become a publicly available predictive service.

Is the crowd smarter than a Harvard expert? Crowds that compete in esoteric contests or in writing open-source software usually draw people with real expertise. But often they don’t define problems well. “The real role for Harvard experts,” Lakhani says, “is to help define the problem, think hard about how to evaluate the solution, and then to take the solution from the crowd and implement it.” —MICHAEL FITZGERALD

CROWD INNOVATION LAB WEBSITE:
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COMPENSATING COLLECTORS?

Tax Collection and Civil Society

AROUND THE WORLD, tax receipts in low- and middle-income countries are much lower than they ought to be. Poor recordkeeping makes it easy for people to pay less than they owe; distrust that taxes will be

turned as government services undermines people’s willingness to pay. Absent a strong culture of civic participation, policymakers need to find ways to improve tax compliance without further degrading public faith in institutions.



Asim Khwaja's experiments in taxation aim to buttress the legitimacy of government in developing nations.

Asim Khwaja, Sumitomo-FASID professor of international finance and development, who directs the Evidence for Policy Design program at the Harvard Kennedy School, has spent the last few years working with the government of Punjab (the most populous province in Pakistan, home to Lahore and more than 100 million people) to study that problem. In Pakistan, tax collectors' salaries are largely predetermined, based on experience and education. With no financial incentive to bring in more revenue, collectors frequently collude with taxpayers, accepting large bribes in exchange for tax write-offs. Both taxpayer and tax collector thus benefit—at the expense of the state. Khwaja and his colleagues, London School of Economics professor Adnan Khan and MIT professor Benjamin Olken, thought that improving the tax collectors' performance would be straightforward: pay them based on how much revenue they collected. And indeed this is what they found: employees incentivized in this way collected much more than employees paid through the existing system.

Khwaja tested three different versions

of this incentive system. One simply paid the collectors large bonuses based on how much money they raised; one paid based on amount of money raised, taxpayer satisfaction (did citizens become angry when forced to pay higher taxes?), and accuracy of assessed property values; the third, and most subjective, awarded bonuses based on all these factors, plus a rating by the employee's manager. On average, the incentive system paid employees 30 percent of any tax revenue collected above a historical benchmark. The plan based on revenue alone did the most to increase tax receipts, which after two years grew 46 percent under that system, compared to 28 percent in a control group. The other two versions raised receipts by 41 percent and 36 percent, respectively. These more complex programs can confuse employees about how best to improve their performance, particularly if some criteria appear directly contradictory—such as collecting more tax money while increasing taxpayer satisfaction.

But a compensation system based on total revenue alone poses potentially enormous moral and political risks. Khwaja warns,

“There’s a certain laziness, intellectually, in thinking that there’s such a thing as a straightforward best practice.” Because a simple revenue-based incentive system increases the reward for collecting more money, it also increases the bargaining power of tax collectors relative to taxpayers, allowing them to demand higher bribes. The researchers predicted that this would have a significant effect on taxpayers’ attitudes toward the government—and yet surveys of taxpayers didn’t show one. “The scheme should have had huge political costs,” Khwaja explains. “But the tradeoff between raising money and limiting political repercussions didn’t seem to be that severe.”

To understand why, he analyzed how tax payments changed under the new system. Total revenue shot up, but most of that money came from a small group of relatively well-off taxpayers. Everyone else, to avoid paying taxes in full, had to pay higher bribes: after the new program took effect, property owners reported that the “going rate” for bribe payments had risen. “We forgot that the tax collector is *living* in the community that he’s taxing,” Khwaja says. “He had al-



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Harnessing Evolution

ready internalized the political cost.” To increase revenue while minimizing backlash from their fellow citizens, for example, tax collectors may have targeted for full payment those property owners with relatively little political power, though this is difficult to confirm through the experimental data. Of course, an increase in bribe payments itself poses a risk to the legitimacy of the tax system. Khwaja suggests that policymakers ought to be cautious about implementing a crude pay-for-performance system that lacks a mechanism to discourage bribery. And increasing tax compliance alone can’t create a civil society with faith in its government. This has moved Khwaja to ask a much more ambitious question: his next project aims to link taxes to public benefits that directly meet the expressed needs of people in the community, to test whether this can improve government’s legitimacy. He jokes, “It’s only the entire basis of the social compact of the state.” —MARINA BOLOTNIKOVA

ASIM KHWAJA WEBSITE:

hks.harvard.edu/about/

[faculty-staff-directory/asim-khwaja](https://hks.harvard.edu/faculty-staff-directory/asim-khwaja)

APPLYING EVOLUTION in the laboratory poses a fundamental problem: the experiments can take so long, researchers may turn gray waiting for results. The process rests on random mutations passed on during reproduction: beneficial mutations that improve fitness spread in subsequent generations, detrimental changes are pared. But even in fast-reproducing organisms, a round of laboratory evolution takes about a week. For “100 rounds of evolution, that’s two years,” says professor of chemistry and chemical biology David Liu. “If you need to do a thousand rounds, that’s two decades. It’s just not practical to set up experimental evolution on that time scale,” especially given the risk that an experiment might not work.

Today a technique called PACE, developed in Liu’s lab in 2011 in an effort led by then-doctoral student Kevin Esvelt (see

“Editing an End to Malaria,” May-June 2016, page 50), has cut the time required for this trial-and-error cycle more than a hundred times, allowing researchers to run experiments at a rate of a thousand rounds of evolution every six weeks. To reach this high velocity, the system uses as its backbone a virus that replicates with extraordinary speed: every 10 minutes. Scientists place the gene they want to rapidly evolve into the virus; at the end of the process, they can place the evolved gene back into the organism it came from, or into another species, such as a plant. The achievement has allowed researchers to tackle problems that would be impractical to solve using conventional evolution methods, from a fundamental question about evolution itself to an important problem facing modern agriculture.

Viruses, which consist of genetic code in a protein capsule, reproduce by hijacking

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the machinery of cells. The virus and host combination at the heart of the PACE system (the acronym stands for phage-assisted continuous evolution) is filamentous bacteriophage, which infects *E. coli* cells. PACE forces the virus into a dependent relationship with the host cell. To engineer this dependency, researchers remove a piece of the viral genome critical to the virus's survival and place it in the *E. coli* cell's genome instead. Now the virus can't survive unless the cell provides what it needs. At the same time, the researchers modify the host cell to produce what the virus needs only if the gene the researchers are forcing to evolve is increasingly active in the virus. What results is a biological machine for evolution that promotes the activity of the specific DNA sequence the researchers have introduced.

In 2013, Liu's team used PACE to tackle a basic science question posed by the late Agassiz professor of zoology Stephen Jay Gould. If the tape of life as it evolved on Earth could be rewound and run again, would it turn out the same way?

To answer that question for a specific protein, Liu and his colleagues created four viral populations—identical at the outset (to the extent humanly possible)—and tracked their evolution. In each case, the “goal” for these populations was to promote the activity of a particular gene, which would require many generations of mutations to achieve. To monitor the process, the researchers analyzed the mutations that occurred along

the way—and discovered that each population reached that goal, with varying degrees of success, in different ways, by following different evolutionary paths. “How is it that sibling populations created in parallel worlds at the same time came to different answers?” asks Liu. What they found was that “small, seemingly random changes early on in the evolutionary history...could have profound permanent effects on [the] future evolutionary course, because choices made early on, even ones that had very little impact on the final selection pressure, could prevent other solutions from evolving, because the two mutations wouldn't play well together.”

In another example, Liu showed that a particular combination of mutations could set the stage for a dramatically beneficial mutation to occur that wouldn't have been able to evolve without specific preconditions. “In other words,” he explains, “it's the complicated, interwoven context of dependence—the reliance on past mutations to determine how future mutations increase or decrease fitness—that makes evolution, at least in the case we studied, so path-dependent and so irreproducible.” If the findings apply more broadly, then life on Earth might indeed have turned out very differently.

In 2016, Ahmed Badran, one of Liu's graduate students, used PACE to tackle a more down-to-earth problem—pest control. A favored method for controlling caterpillars that eat crops such as cotton, corn, and soybeans has been to engineer the plants to ex-

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press a natural protein that kill insects but is harmless to humans and other animals. Called Bt, this protein is made by the common soil bacterium *Bacillus thuringiensis* and is also used as a spray in organic gardening.

Bt works by binding to cells in the gut of the caterpillar and forming an open pore. This kills the cells and ultimately, the caterpillar. But over time, caterpillars have evolved resistance by decreasing the expression of the proteins on the surface of their gut cells to which Bt binds, or by mutating these gut cell proteins so they no longer engage Bt.

Badran and Liu, in collaboration with scientists at Monsanto, wanted to see if they could evolve Bt to attach to a different gut protein. After 22 days of PACE, and about 500 generations—a decade's work using conventional methods—they were able to restore the ability of evolved Bt to kill Bt-resistant insects. Monsanto is now using PACE to evolve Bt toxins that target a variety of resistant insect pests.

At the moment, PACE works only with *E. coli* as the host cell, though Liu notes that there are efforts in other laboratories to develop a mammalian-cell version of the system. PACE has allowed testing “long evolutionary trajectories that would each normally occupy most of a Ph.D.,” he says. “Even though PACE experiments can still fail, now we get the negative results quickly enough that we can try many different evolutionary paths, learning something new from each one.” —JONATHAN SHAW

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From left to right: *Awa Province: Naruto Whirlpools* (1855), at the Clark Art Institute; from *The Penitent Magdalene* (ca. 1670), at the Davis Museum; and an artist's rendering of "gravitational waves," a lecture topic at the Harvard-Smithsonian Center for Astrophysics

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STAFF PICK: Music and Meditation

On Sunday nights, a sign taped up outside the First Church in Cambridge invites passersby to Night Song: "Let music transport you...to a place of serenity, calm, and renewal." Inside, lighting is dim. Candles burn. People are scattered among the pews, in silence. At 7 P.M., a black-clad choral ensemble files into the sanctuary and performs "a unique fusion of contemplative modal instrumental improvisation by jazz musicians blended with ancient and modern chant and punctuated by glorious polyphonic choral music from the Renaissance," according to organizers of the weekly refuge.

First Church in Cambridge
www.nightsong.org
November–April, 7 P.M., vocalists
with jazz musicians
(May–October, 8:30 P.M., vocalists only)

Ethereal sounds resonate. People close their eyes, and meditate. Others revere the chant, motet, or hymn, Christian in content, as integral to religious journeys. For those supine on thickly cushioned pews (it's encouraged!), the singing, especially of Canticum Vespertinum's soprano soloists, may swim in and out of their dozy dream states.

The music lasts an hour. There are no sermons, no socializing. Time is granted purely to private reflection, safe from nagging concerns or the complexity of worldly matters. "I find the experience just very soothing," one visitor says. "It sets the tone for my whole week." ~N.P.B.



The Harvard Museum of Natural History

www.hmnh.harvard.edu

Commune with frogs, talk with scientists, and learn about bones, fossils, and gemstones at the **I ♥ Science 2017 Annual Family Festival**. (February 11)

"Next of Kin: Seeing Extinction through the Artist's Lens" calls attention to the biodiversity extinction crisis through an exhibition of works by artist and photographer Christina Seely, in collaboration with Edward Morris, A.M. '01, and Susannah Saylor (co-founders of the Canary Project). A February 22 panel discussion features the trio and professor of visual and environmental studies Carrie Lambert-Beatty, among others.

THEATER

Gore Place

www.goreplace.org

Rob Velella's one-man, "living history" show, **Edgar Allan Poe: Master of the Macabre**, offers readings, biographical notes, and suitably dark humor. (January 21)

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American Repertory Theater

www.americanrepertorytheater.org

Trans Scripts, Part I: The Women. Using phrases gleaned from interviews with people around the world, the play's seven characters explore diversity within the transgender community. Loeb Drama Center. (January 23-28)

NATURE AND SCIENCE

The Arnold Arboretum

www.arboretum.harvard.edu

Trees: Intimate Portraits. Photographer Jennifer Weigel delights in burls, cracks, scars, fungi, and other natural imperfections. (Through February 5)

The Harvard-Smithsonian Center for Astrophysics

www.cfa.harvard.edu/events/mon.html

Skyviewing (weather permitting) and a lecture on the discovery of gravitational waves, by MIT professor of physics emeritus Rainer Weiss. (February 16)

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

Spotlight

Of the 27 ingeniously painted jugs, jars, bowls, and plates in "Nasca Ceramics: Ancient Art from Peru's South Coast" at the Peabody Museum of Archaeology & Ethnology, some "had as much importance as a statue of a saint in a church," museum director Jeffrey Quilter notes, "and some as much as Aunt Millie's plate of Niagara Falls."

The jar at right was likely a household object symbolizing "warriorship and prowess in battle," says Quilter. The Nasca, who flourished 2,000 years ago, were "fairly violent," he adds, as well as sophisticated artists. All the objects on display were hand-constructed by coiling and shaping clay around a base, then fired and decorated with images of pelicans, cats, foxes, falcons, and mythological beings. The colors came from 15 different mineral pigments—among the most diverse palettes known in the Americas. Co-curated by Quilter and Donald A. Proulx, professor of anthropology emeritus at the University of Massachusetts Amherst, the exhibit represents about one-

sixth of the museum's Nasca collection. "The Maya and the Moche get a lot of press here," Quilter explains, "but here is another culture that is radically different and created this brilliant, polychrome ceramic tradition—isn't that interesting?"

Quilter himself favors a small bowl depicting black mice with squiggly tails. "I can't see how people looking at this would not find it cute and endearing, because small creatures have a certain kind of appeal no matter the time or place," he adds. "But we could be wrong. It could've been made because they'd had plagues of mice—and hated them."

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



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WHY I JOINED THE HARVARD CLUB OF BOSTON

There are many different reasons to join the Harvard Club of Boston. Karen Van Winkle is a Harvard alum and has been a member for nearly 35 years. She was recently named the first female president of the Harvard Club of Boston. Here's why she joined.

"I joined the Harvard Club immediately upon graduation, and from the first moment I walked in the door, other members encouraged me to get involved in leadership positions. I've served on several committees, including the House Committee and Program Committee and have had two tours on the Board of Governors. The incredible diversity of people here is one of the main reasons I value my membership. It's a supportive environment for women to develop and hone their leadership skills, and a great place to network and connect with some of Boston's most influential people." - **Karen Van Winkle '80**

For more information visit harvardclub.com



Celebrating Cinema

“Not just entertainment” at the Harvard Film Archive

by NELL PORTER BROWN



The screening of Kent Garrett's *Black GI* (top left); Busby Berkeley's *Footlight Parade*; Jonas Mekas in triptych; HFA director Haden Guest and programmer David Pendleton; and Ha Gil-Jong's *March of Fools*

FOUR NIGHTS A WEEK, anyone can saunter down to the lowest level of the Carpenter Center for the Visual Arts, buy a ticket, and slide into a cushy seat at the Harvard Film Archive's (HFA) *cinémathèque* to view “rare and scholarly works of art, films that would otherwise be impossible to see,” says archive director Haden Guest—or at least see *properly*, in their original formats, and on a big screen.

On tap this winter are typically disparate films. “Busby Berkeley Babylon” (December 9 through January 23) explores the

Hollywood director and choreographer's musicals, including Depression-era dazzlers like the archives' own, hard-to-find, 35-millimeter print of *Footlight Parade* (1933), starring dancer-turned-actor James Cagney. Even now, the film's “By a Waterfall” song-and-dance number featuring nearly naked “nymphs” and armies of synchronized swimmers forming elaborate geometric and floral patterns—filmed from above *and* underwater—is a delightful technical feat. “People may be surprised by the strange eroticism of some of these films,” particularly those from pre-Hays Code Hollywood, says HFA programmer David Pendleton. “These dance numbers really push the envelope: you have lines of chorus girls who are bent over at the waist and the camera travels down the line, between their legs.”

No less stimulating are the experimental, diaristic films of Lithuanian-American artist

Jonas Mekas (January 20–February 18). The prolific nonagenarian, considered the godfather of American avant-garde cinema, is still producing books and films and is scheduled to discuss his *oeuvre* in person, in conjunction with showings of *Walden* (*Diaries, Notes,*



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Pendleton shows off the cinephiles' lair (a.k.a. the HFA's offices); film technician John Quackenbush aims to project films in their original formats.

The HFA's collection has since grown to nearly 30,000 titles, making

it among the largest and most important university-based motion-picture archives in the United States, according to Guest. It encompasses "prints from across film history and from around the world, from Soviet silent films to contemporary American indie classics," he reports, as well as home movies, shorts, animation, and experimental, avant-garde, and documentary films. In addition, there are more than 4,000 vintage posters,

a growing store of filmmakers' personal papers, and miscellaneous artifacts, animation models, technical manuals, and film equipment.

Alumni in the industry—including Terence Malick '65, Michael Fitzgerald '73, Edward Zwick '74, Mira Nair '79, Darren Aronofsky '91, Andrew Bujalski '98, and Damien Chazelle '07—have contributed to the collection, and appeared over the years for HFA events. In November, during the series "Say It Loud! The Black Cinema Revolution," the HFA hosted documentarian Kent Garrett '63 for screenings of his *Black GI* (1971), a chronicle of combat soldiers' experiences on and off the killing fields in Vietnam, and *Black Cop* (1969). The latter, he told the audience, explored "whether blacks should be cops," and the complex roles they can play, through candid interviews with officers in New York City and Los Angeles during the height of the Black Power movement.

Still sobering and relevant, both films were made for *Black Journal*, the groundbreaking, public-television program co-developed



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by Garrett. On a national level, it represented the “first time blacks had a say in what was going on” in current events and how the media represented them, Garrett told the audience during the post-screening question-and-answer session.

“History comes around,” he said, when asked about *Black Cop*’s relevance to current debates over the role of police and their relationships with minority communities—although, he added, “the level of brutality then was not at the level, in terms of shooting black men, that it is today.”

Also shown was a stirring clip from Garrett’s work-in-progress, *The Last Negroes at Harvard*, about his 1963 class of 18 men and one woman who, in 1959, were the largest single group of blacks ever admitted to the College. “They came into Harvard as negroes,” Garrett said of the era, “and left as blacks.” Throughout his career, the news journalist and filmmaker has “always believed” in the power of “the media, video, and news to really change peoples’ consciousness,” he said, “and that’s what I’ve always wanted to do.”

The point of the archive is, after all, to educate. Its film holdings alone have grown three-fold since Guest arrived a decade ago, and the general archives have expanded through gifts like the Lothar and Eva Just Film Stills Collection, containing about 800,000 items, pledged in 2009.

Meanwhile, Guest recently announced another windfall: the complete papers and films of experimental American director Godfrey Reggio. The documents will become part of the Harvard Theatre Collection at Houghton Library, Guest says, “and people can step next door here to study his films.” Reggio is best known for his profoundly prescient 1980s *Qatsi* trilogy (*Koyaanisqatsi*, *Powaqqatsi*, and *Naqoyqatsi*), which depicted, solely through poetic images and music, the modern destruction of the environment.

The materials also cover Reggio’s early years as a monk working with youth gangs during the 1960s Chicano nationalist movement, says Guest, and his subsequent “media saturation campaign to raise consciousness about the kind of government

surveillance taking place in the name of ‘social security.’ Reggio was, and still is, way ahead of his time.”

A MOVIE THEATER, classroom, and library, the HFA’s structure is uncommon among universities. The year-round *cinémathèque*’s public programs, funded by admission fees and tiered-membership dues, are often paired with visits by guest artists—directors Ang Lee and William Friedkin, actress Angela Lansbury, and Canadian filmmaker Guy Maddin, among them.

Yet its core mission is to support study and teaching at Harvard, and to maintain its resources for scholars everywhere. (As such, it was moved administratively from the department of visual and environmental studies to the Harvard College Library; see “Cinema Veritas,” November-December 2005, page 35.)

This winter, Guest researched and curated “Ha Gil-Jong and the Revitalization of Korean Cinema” (February 3-27)—the first retrospective of the 1970s South Korean art-



JIM HARRISON

HFA assistant curator Jeremy Rossen and filmmaker Kent Garrett during the “Say It Loud! The Black Cinema Revolution” series

ist outside his own country. Ha’s films are wrenchingly “emblematic of the struggles of an artist working under the totalitarian regime of [then-president] Park Chung Hee,” Guest explains, “at a time when cinema was expected to toe the party line.”

An orphan, Ha traveled to America as a young man and wound up in California, where he was the first Korean to earn an M.F.A. and a master’s degree in film studies at UCLA before returning to South Korea. There he rejoined a circle of artists and political critics, and produced his feature films. In his salient and affectionate *March of Fools* (1975), which was a surprise commercial hit, disaffected university students search for love and meaning. Ha “used

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richly ambiguous narrative and imagery to show that things are not as they might appear, revealing deeply planted seeds of discontent," Guest notes. Unfortunately, the success also drew attention from censors and made it harder for Ha to produce more such innovative work. He died of an "alcohol-induced" brain aneurysm at age 38, according to Guest.

Ha is not widely known in the West; the HFA had to borrow prints from the Korean Film Archive. Yet his work, Guest suggests, like that of Busby Berkeley, can teach viewers about how to learn from history and engage in the world. Berkeley reveals aspects of

how life was lived during the Depression, responses to the onslaught of automation, and the rise of media-driven sexual currency. Ha offers the perspective "of Koreans living under a military dictator at a time when there is political oppression here and around the world," Guest says. "These films can help us find and forge the freedom we so urgently need."

As Harvard strives to elevate the arts on campus, Guest is among those coordinating resources among the libraries, museums, and arts departments, and promoting more interdisciplinary events.

In October, the HFA and the Hutchins

Center for African and African American Research presented "Pam Grier, Superstar!" It looked at Blaxploitation and other films reflective of African-American experiences and the cultural upheavals of the 1970s; Grier's protagonists, the HFA stated, are "defiant, authoritative, resourceful vigilantes whose intellectual, physical, and sexual adeptness American movie screens had never experienced the likes of before." The actress was at Harvard to receive the Hutchins Center's 2016 W.E.B. Du Bois Medal, and spoke about her life and work following the HFA screenings of *Foxy Brown* (1974) and *Jackie Brown* (1997). Quentin Tar-

ALL IN A DAY: Providence, R.I.

Ditch the car and take the train to Providence. Numerous attractions clustered around the city's vibrant downtown district are within easy walking distance of the station.

There's outdoor ice-skating at the huge (and typically uncrowded) rink on **Kennedy Plaza**—within sight of the historic **Providence Biltmore** hotel, which was saved from the wrecking ball in the 1970s. Dip into the nearby **Ellie's Bakery** for hot chocolate and a chunk of babka, or meander east, across the Providence River, to the **RISD Museum**.

The ancient Greek and Roman art galleries are open this winter, as is the exhibit "Inventing Impressionism," which explores the radical nature of paintings and drawings by the likes of Édouard Manet, Georges Lemmen, and Camille Pissarro. (The fifth-floor European art galleries, however, are closed for renovation.) The museum's Café Pearl opened last year; it serves baked treats

and the locally coveted Bolt Coffee, and is a quiet place to regroup. Or head back outside and walk two minutes to the **Providence Athenaeum**, to learn about the library's role in the ill-fated romance between Edgar Allen Poe and Providence poet Sarah Helen Whitman, and about author H.P. Lovecraft's love of the place. Take a self-guided tour, or just be inspired by three floors crammed with books and assorted prints, paintings, and sculptures.

From there, walk back down Benefit Street, past the museum, to the **first First Baptist Church in America**. Join the **Independence Trail**, a lively and free self-guided tour, accessible by smartphone, to hear about the impressive white structure, with the strongest steeple around, and a bit of Provi-

dence's history: it was founded in 1636 by Roger Williams after he was banished from the Massachusetts Bay Colony for promoting the separation of church and state. The trail, marked by a green line on the sidewalk, is a 2.5-mile circular route that highlights more than 100 culturally significant sites, including the old and new State Houses and the spot from which colonists rowed out to attack the HMS *Gaspee* in 1772.

It also stops at the Providence Place Mall. Don't linger there. Instead, for food and shopping, head behind the Providence Biltmore to the locus of the downtown arts and entertainment scene anchored by Washington and Westminster Streets. Check out **AS220**, an artist-run organization that coordinates rotating galleries, shops, performances, and classes, while managing a restaurant and bar, too. Also worthwhile is **Craftland**, a gallery of handmade objects, and the excellent **Symposium Books** and **Cellar Stories Bookstore**.

Providence is full of innovative restaurants. Downtown, try the **Figidini Wood Fired Eatery** or **The Dean Hotel's** restaurant **Faust**. On a Saturday night, there's probably also time to attend a show or concert at the **Trinity Repertory Company** or the **Providence Performing Arts Center**; the last MBTA Commuter Rail train to Boston leaves at 10 p.m.—or take the more expensive (but faster) Amtrak train at 10:35 p.m. Either way, a day in this dynamic small city is well spent. ~N.P.B.



Clockwise from top: open-air ice-skating downtown; the first First Baptist Church in the United States; a bibliophile's dream at the Providence Athenaeum; and the RISD Museum's modern appeal



CLOCKWISE FROM TOP: CHICKEDOOD/DREAMTIME.COM; ISTOCK PHOTOS; SCOT LANE/PROVIDENCE ATHENAEUM; COURTESY OF RISD MUSEUM

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antino's homage to her and the tumultuous era.

Guest and Pendleton were also instrumental in organizing "Houghton at 75," inspired by holdings at that Harvard library. The March series includes Jane Campion's *Bright Star* (2009), a fictional account of John Keats's last years; Peter Ustinov's *Billy Budd* (1962), adapted from Herman

Melville's novel; and Warren Beatty's *Reds* (1981), based on the life of journalist John Reed, A.B. 1910.

British filmmaker Terence Davies, a past HFA guest, will also be on hand for a screening of his film about Emily Dickinson, *A Quiet Passion* (2017), for which he made previous trips to Harvard to pore over the poet's hand-sewn manuscript books and letters

at Houghton. The series reveals how "the spirit of the original literature lives in the films," Guest says. "Cinema is not just entertainment, not just a complement" or a mode of elucidating other disciplines, he asserts. "We are dedicated to presenting, exploring, and breaking new ground, and to showing cinema to be at the same level as great literature."

CURIOSITIES: The "Scandalous Mansion"

Built between 1899 and 1902, the Ayer Mansion on Commonwealth Avenue is a rare surviving residence designed by Louis Comfort Tiffany. It was an outlier, commissioned by outliers. The textile magnate and marketing savant Frederick Ayer was a self-made man with a sixth-grade education, and his second wife, Ellen Barrows Banning (30 years his junior), an amateur actress from Minnesota. Before buying up mills throughout New England and establishing the largest factory in Lawrence, Ayer also helped develop the charming marketing campaign, featuring heartfelt testimonials and visions of cherubic children and tropical locales, that sold Ayer-brand patented remedies. The Cathartic Pills, Hair Vigor, and Sarsaparilla (it "cured" jaundice, ringworm, carbuncles, dropsy, and syphilis) were concocted by his medical doctor-brother James Cook Ayer, who amassed a fortune.

The Ayers did not fit into Boston society, and probably realized that they never would, notes Jeanne M. Pelletier, preservation adviser for the Campaign for the Ayer Mansion (led by Scott C. Steward '86), which has been restoring the house since 1998.

Thumbing their noses at neighboring Brahmins, the Ayers hired A.J. Manning of New York City as architect of record, and Tiffany, who by then had developed materials and techniques that had revolutionized the glass industry. Although not a trained architect, Pelletier notes, Tiffany was nevertheless the driving visionary behind some of the era's most opulent homes. And with the Ayers's approval, he "plopped down this modern, stark, mosaic-covered façade," she adds, amid the staid red-brick and brownstone town homes proliferating in the fashionable Back Bay. "It was really scandalous."

The tallest home on the block, the five-story mansion (part of which has been used as a university women's residence for decades) is faced with an almost white variety of granite and features glass-embedded stone columns flanking massive, copper-clad front doors with eight-pound knockers, along with bulging bow-front windows topped with elaborate stained-glass panels. Inside, the entrance hall combines Tiffany's beloved "exotic" architectural elements—here primarily "Oriental" and Moorish—in curving plastered walls painted a buttery tone and covered with shellac, and a marble semi-circular staircase with glass-mosaic risers. They lead to an apse-like "stage" on which Ellen Barrows Banning gave dramatic readings.

Perhaps most remarkable is the wall behind the stage. It features a glass-mosaic *tromp l'oeil* depicting an ancient Greek temple; the columns are composed of semi-transparent glass backed by gold foil, so when they reflect light, the temple appears to glow from a rising sun. Tiffany started his career as a decorator and interior designer, Pelletier says, although all the houses he designed—including the magnificent Havemeyer House in Manhattan (its suspended staircase was adorned with gold filigree and a fringe of crystals that tinkled underfoot) and his own Long Island estate, Laurelton Hall—are gone. "He would create or specify everything: the architecture, lamps and lighting fixtures, the wall coverings, the floors, even the furniture," Pelletier says, pointing out the Ayer Mansion's Favrite green-glass vases and hefty cream-colored dining table with matching chairs. "He was a micro-manager who thought of houses as architectural masterpieces."

A National Historic Landmark since 2005, the house is open year-round for concerts and lectures; tours (typically on the first Saturday and third Wednesday of each month) highlight continuing preservation projects.

— N.P.B.

Ayer Mansion
395 Commonwealth Avenue, Boston
www.ayermansion.org



The front hall holds a pint-sized proscenium arch made of glass mosaics; the bold façade (top right) was designed to set the home apart.



New in Town?

Latest additions to Cambridge's restaurant scene

by NELL PORTER BROWN



"Global tapas" and fresh seafood at Little Donkey (left); Mamaleh's specializes in Jewish deli fare, like matzo-ball soup or toasted bagels with smoked whitefish salad, capers, and onions (above).



COURTESY OF LITTLE DONKEY (3)

(\$9): jolts of curry, chilies, and lime juice and pert legumes. Wok-fried chow fun (wide, chewy noodles) swim in a bowl of rich broth with salty black beans and hunks of soft-shell crab (\$16). BLT lettuce wraps (\$12) come DIY, with lamb bacon and zesty accompaniments—pimento cheese, ripe tomatoes, picked red onion, and sliced plums. Also rich, but thankfully leaner, is the dry-aged beef burger (\$15), topped with oniony mayonnaise and a handful of jalapeño chips. These "global tapas" are comfort food at its best. There's also a cocktail bar, raw bar, pastry bar—and a separate breakfast menu. Little Donkey, named for the dependable creature, takes up a huge and hospitable space in Central Square, and is open from 8 A.M. to 2 A.M. Chef-owners Ken Oringer and Jamie Bissonnette envisioned creating a neighborhood haunt serving diverse inhabitants, the hours they keep, and food that grabs

DIVERSE new city restaurants are attracting both tonier grown-ups and the young professionals and students who dominate bars and nightlife—and who simply eat out, a lot. With their long hours, popular themed menus, and intimate ambience, or targeting of connoisseurs, these places are nothing if not accommodating.

The food at Little Donkey (www.little-donkeybos.com) is all over the map—in a good way. There's red lentil and kale dhal

their wide-ranging attention spans.

Mamaleh's (www.mamalehs.com), the new "modern-era Jewish delicatessen" in Kendall Square, is one of the few places around to offer a legitimate chocolate egg cream (\$4.50). The traditional New York City beverage (which might have originated among Eastern European immigrants) is a refreshing mélange of whole milk, seltzer, and chocolate-flavored syrup. If that sounds unappetizing, Mamaleh's soda fountain also serves celery-, lemon-cardamom-, and pickle-flavored sodas—along with milkshakes and ice-cream floats: try a scoop of chocolate with Dr. Brown's black cherry cola (\$6). On to the food. The rich matzo-ball soup (\$6/\$8) will cure anyone's lack-of-light win-

COURTESY OF MAMALEH'S (3)



COURTESY OF THE SMOKE SHOP (2)

Barbecue, with Southern-style fixin's, at The Smoke Shop, in Kendall Square

ter blues. The knishes—plain

potato or packed with pastrami (\$4/\$6)—are delicate *and* bold, especially with mustard. And the dreamy roast-beef sandwich, as hefty as its \$12 price, came on soft rye bread slathered with horseradish mayonnaise. Open for breakfast, lunch, and dinner, the restaurant has a full bar, with peppsy cocktails: “The 866” (\$11) combines aquavit, Cam-

pari, and grapefruit juice seasoned with salt and dill. The concept and menu occasionally cross into *shtick*, and some will argue about the spelling of “Mamaleh,” and whether it truly is a Yiddish “term of endearment for a young child,” as the restaurant’s website claims, but the food, and the passion behind it, beckon diners to return.

Across the courtyard, barbecue dominates The Smoke Shop (www.thesmoke-shopbbq.com). Champion pitmaster Andy Husbands fulfills messy-meat cravings with a Southern-styled menu featuring dishes like brisket (\$19.50) and ribs (\$22-\$31, depending on the size of the slab). There’s also Thai-flavored fried chicken (\$22) and, for vegetarians who dare show up, glazed tofu and mushroom slaw (\$11). If indulging in salty-sweet-spicy hunks of meat anyway, it’s hard to resist getting side orders of grits fries (\$7), bacon and collard greens (\$6), and Texas toast (\$3)—extra-thick sliced white bread good for sopping up sauce. The décor is handsome, with a 1970s feel: lots of brown wood, rust-colored walls, and exposed brick. The front bar zone is popular, but can be noisy.

Far less buzzy is Forage (www.forage-cambridge.com), which opened last year in the subterranean space that had long housed Ten Tables (and Craigie Street Bistrot before that). The speakeasy ambience is gone, unfortunately, but new owner Stan Hilbert is appreciably devoted to a “hyper-local, ingredient-driven menu.” Evidence: a salad of chrysanthemum greens (\$10)—which taste like the flowers smell, and are used in Asian soups and stews—and a dish of lobster mushrooms (\$13). During a visit, the latter came with ripe, fat blackberries, but was otherwise bland. There were two tagines, lamb (\$29) and eggplant with yellow-eyed beans (\$24). Spiced with preserved lemons, prunes, and mint, the slow-cooked North African stews, paired with crunchy couscous fritters, are an ideal cold-weather meal. A juicy filet of bluefish came with roasted potatoes (\$27), but fermented chilies put on such a fiery show, the dish had to be doused (by request) with a dollop of homemade labneh.

As for drinks, other restaurants could learn from Forage’s care with its \$8 mocktails. Vinn’s Cup #2 featured rhubarb syrup



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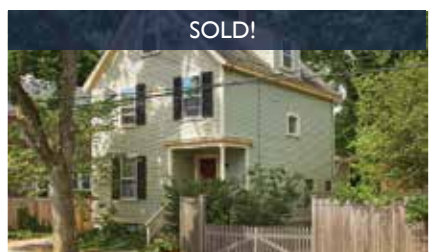
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HARVARD SQUARED

and a neroli blossom. The excellent wine list emphasizes organic whites and reds, and therefore matches Forage's grounded feel. The dining room even offered "natural" noise: human conversation, in lieu of loud, piped-in music.

A small, enthusiastic crowd dines at The Table at Season to Taste (www.cam-bridgetable.com). The 20-seat restaurant, with plate glass windows that overlook



The Table (below) has a modern, country-cottage feel; Waypoint's gray tones, stainless steel, marble, and neon (right) make it handsomely sleek.



COURTESY OF THE TABLE AT SEASON TO TASTE (2)

Massachusetts Avenue north of Porter Square, is simply decorated with wooden tables, colorful artwork, and tin lighting fixtures. It grew out of the adjacent catering business and serves a frequently changing, four-course, prix-fixe menu for \$65 per person. Wait staff know their food and wine, and are happy to suggest excellent pairings. A sampling of recent fare found rigatoni in a puttanesca sauce with chunks of swordfish; pork belly in a yellow curry sauce; seared hake lathered in cream; and sautéed shrimp with corn and heirloom tomatoes. Chef Carl Dooley, a Cambridge native, abandoned the stoves in the open kitchen to present the evening's *amuse-bouche*: handmade corn tortillas with cheese (quesadillas) and a trio of accompaniments, like *huitlacoche* (a fungus that forms galls on ears of corn, and is a delicacy in Mexico).

For a stepped-up attitude and accompanying haute couture cuisine, Shepard (www.shepardcooks.com), which replaced neighborhood mainstay Chez Henri, might do. It looks spare and neat, like its food,



COURTESY OF WAYPOINT

which constantly changes. The *moins petit* fare might include rabbit terrine, blistered tomatoes paired with a quail egg, or spelt cavatelli with caramelized crab. (Prices range from \$14 to \$28.) Waypoint (www.waypointharvard.com), the new restaurant opened last summer by chef Michael Scelfo (of Alden & Harlow), is also relatively refined, but feels less precious. Its roominess, open kitchens, and raw bar lend a sense of abundance, and "coastally inspired" food is served with enthusiasm. Pizza with chopped clams (\$16), fried smelts (\$13), and king crab with black rice and brown-butter aioli (\$22) just *satisfy*.

What could be better on a cold night out in Cambridge?

~N.P.B.

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JOHN HARVARD'S JOURNAL



Bioentrepreneurship

THE UNIVERSITY'S encouragement of entrepreneurial endeavors now is three-legged: on November 3, the student-focused Harvard Innovation Lab (2011) and alumni-oriented Harvard Launch Lab

(2014) were joined along Western Avenue by the 15,000-square-foot Pagliuca Harvard Life Lab, complete with 36 wet-lab benches and 50 "coworking desk spaces" to incubate life-sciences and biotechnology start-ups. Initial users include 17 ventures, from Akouos (hearing loss) through XGenomes

(gene sequencing), each typically consisting of two to five people. Benches rent for \$2,500 per month, and a private lab suite for a fledgling resident team is \$15,000 to \$18,000 monthly.

Harvard hopes that the innovation centers, Business School, and engineering and applied sciences complex (scheduled to come on line in 2020) will have a synergistic effect—and will, over time, help to populate the planned "enterprise research campus" envisioned for Allston, much as MIT and the adjacent, booming Kendall Square have become the center for biotech and pharmaceutical companies. To that end, the new lab facility began life auspiciously: it bears the name of donors Judy Pagliuca, M.B.A. '83, and Stephen Pagliuca, M.B.A. '82, co-chair of Bain Capital, the \$75-billion private-investment firm. And just before Thanksgiving, Bain filed to solicit funds for a life-sciences investment pool. ~J.S.R.

The Best of Times...

HARVARD'S annual financial report, for the fiscal year ended June 30, 2016 (released in late October), was full of good tidings: operating revenue up 5.6 percent (more than a quarter-billion dollars), to nearly \$4.8 billion; operating expenses up 5.3 percent (\$237 million)—meaning more funds applied to research and teaching; resulting in a margin of \$77 million, a surplus for the year. Unsurprisingly, the underlying indicators were favorable, as well:

- **Revenue.** Each of the principal sources rose: operating distributions from the endowment (36 percent of revenue), up 7.0 percent (\$112 million); tuition and fees (21 percent), up 7.4 percent (\$68 million)—led, as in recent years, by continuing education and executive programs; and sponsored-research support (17 percent), up 4.9 percent (\$40 million)—helped by a larger infusion of federal funds, the chief source of such support, though lagging in the years after the end of U.S. economic-stimulus spending from 2009 through 2011. And Harvard Campaign-augmented giving for current use (9 percent) remained a robust \$421 million—essentially even with the past few favorable years.

- **Expenses.** Salaries and wages (38 percent of expenses), rose 5.6 percent (\$96 million), reflecting merit increases and a larger workforce. The associated employee benefits (11 percent) rose 6.1 percent (\$30 million)—but that figure was increased by interest-rate-driven changes in pension and retiree medical costs. Healthcare costs for active employees, a source of constant University concern in recent years, increased just 3 percent even with rising employment. (That apparently reflects the effects on care choices and spousal enrollment since the

imposition of deductibles and coinsurance on nonunionized employees at the beginning of calendar year 2015; see harvard-mag.com/benefits-17). Interest expense fell about \$16.4 million (to \$235 million), reflecting redemption of \$316 million of debt early in the fiscal year—and more such savings are in the offing (see below).

Yet financial officers must not only document past achievements but fret about the future. Of the year that was, Thomas J. Hollister, vice president for finance and CFO, said, “The only bad thing is that it’s over.” In her customary cover letter, President Drew Faust warned, “American higher education is entering an era of constrained financial circumstances” driven by “challenging endowment returns” (for institutions like Harvard that *have* significant endowments) and “intense pressures on both federal research funding and tuition revenue. Long-anticipated shifts across the sector have arrived....” Turning from higher education as a whole to Harvard, Hollister and treasurer Paul J. Finnegan wrote that “each of the schools and operating units is adjusting their spending plans to the new environment. If, as some expect, higher education revenue growth rates are in the 2-3 percent range in the next few years, down from 4-5 percent in the recent past, it will significantly constrain the University’s ability to balance budgets.” They stressed the need to “carefully analyze our expense ledger,” and emphasized further increasing revenue from continuing and executive education, and expanding research funds from “foundations, individual donors, and corporations.”

Some of these major anxieties merit further review.

Foremost is the *endowment*—which declined \$1.9 billion in value during fiscal 2016 (“The Endowment Ebbs,” November-December 2016, page 18). As the annual report documents, operating distributions totaled \$1.7 billion; other distributions (“decapitalizations”) were \$128 million; and total investment return was a negative \$626 million—reducing the endowment’s value by nearly \$2.5 billion. Gifts, reflecting the fruits of the capital campaign, were a robust \$492 million, up sharply from fiscal 2015. And so, the endowment was valued at \$35.7 billion last June

30, down from \$37.6 billion the year before.

The Corporation’s formula for endowment distributions (described in detail at harvard-mag.com/distribution-16) means that this most important source of the faculties’ funds will now be constricted. In fiscal 2016, the distribution from existing accounts went up 6 percent (and combined with returns on gift

proceeds, rose another percentage point). For the current year, that distribution is budgeted to rise 4 percent—before being held to *no* growth in fiscal 2018. In its own annual report, the Faculty of Arts and Sciences (FAS), which derives 51 percent of its operating funds from endowment distributions, forecast that the flat 2018 distribution will by itself “again result in a deficit” start-

ing that year: sobering, given a capital campaign that by then should have brought FAS \$3 billion or more in current-use, construction, and endowment resources.

The long-term concern is perhaps even greater. The Corporation’s model is sensitive to inputs. It assumes that Harvard Management Company (HMC)—whose new leader arrived in early December—achieves its targeted rate of investment return on endowment assets of roughly 8 percent. Looking beyond the last year’s modestly negative rate of return, its five- and 10-year annualized rates of return are now 5.9 percent and 5.7 percent, respectively. If investment returns are indeed headed for a “challenging” period, closing that gap becomes even harder.

The administration has been encouraged by the growth in *executive-education and extension tuition*. The margins on mature programs are sufficient to throw off unrestricted funds to support schools’ core teaching and research. Hollister cited examples such as Harvard Business School’s (HBS) world-renowned offerings and FAS’s booming operation. (During the year, the 13-person expansion of the continuing-education staff represented the largest increment in FAS’s cohort of 2,617 full-time-equivalent employees. During the past three years, continuing-education expenses have grown, as planned, more than 40 percent; that investment, about \$25 million, has been essentially matched by equivalent increases in revenue.) The education, law, and medical schools also have especially rapidly growing revenue.



PAIGE BROWNE/COURTESY TUFTS MEDICAL CENTER

Thomas J. Hollister

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Asked whether any of that income (particularly HBS's management programs) might be economically sensitive, Hollister affirmed that it could be—and amplified the point: outlays for financial aid, endowment returns, and government budgets for research are all correlated with the larger economy. Undergraduate financial aid, which soared during and after the Great Recession, has been essentially level for the past several years (“It’s the economy,” he said). The U.S. expansion has lasted longer than average, at this point, Hollister noted, and although the rate of growth has been subdued, continued favorable economic circumstances cannot be assumed indefinitely.

The rapid growth in *research funding* from nonfederal sources (up more than 9 percent) helps buffer the uncertain prospects for the much larger pool of federal funding. But nonfederal money is often more narrowly focused than federal support for basic research, and is accompanied by much less adequate coverage for indirect costs and overhead (laboratory buildings, libraries, and so

on). Asked about continuing deficits posted by FAS, the Paulson School of Engineering and Applied Sciences (SEAS), and the medical school, Hollister noted that “wet-lab basic research” is, essentially, a money-losing proposition. (FAS also is shouldering the costs of House renewal and its large financial-aid budget.) Capital-campaign proceeds will help, he noted; SEAS is the beneficiary of a \$400-million unrestricted endowment pledge, which will, when fulfilled, presumably yield about \$20 million in annual operating revenue. But as it prepares to move into its \$1-billion Allston facility at the turn of the decade, it remains a small faculty with large—and it hopes growing—scientific research and teaching costs. Shouldering basic research costs remains a long-term concern, University-wide.

Finally, the *capital campaign* is now in its later stages. From fiscal 2012, before the public launch of the fund drive, through fiscal 2016, Hollister and Finnegan noted, current-use giving increased by nearly 50 percent—but now appears to have leveled off. In its second phase, payment of prior pledges for

gifts of capital begins to ramp up (as the 45 percent jump in gifts to the endowment in fiscal 2016 suggests).

On the other hand, gifts for facilities and loan funds diminished during the year. Harvard is spending a lot on “capital projects and acquisitions,” some \$597 million in fiscal 2016 (including \$97 million to purchase 19 acres in Allston from CSX). In its financial report, FAS alone disclosed investments of \$174 million in fiscal 2016 and future-year spending for buildings and equipment (including some \$62 million for House renewal; \$16 million for the Cabot Library renovation; \$24 million for projects to accommodate newly appointed professors’ research; and \$15 million for “annual renewal” programs). Harvard’s financial leaders have been emphasizing the costliness of maintaining and updating a huge physical plant, and the past year makes that point vividly. Spending on House renewal and the science complex in Allston are both likely to rise this year.

Pledge balances naturally declined (by more than \$100 million). The pipeline, so generously filled by the University’s sup-

Here Come the Quants!

It’s not news that student interest in computer science and other applied disciplines is burgeoning nationwide, for diverse reasons: intellectual interest in using new tools to solve pressing problems; a Facebook effect (the transformative power of computing meets who wants to be a billionaire?); strong employment prospects (have you seen starting salaries in Silicon Valley?).

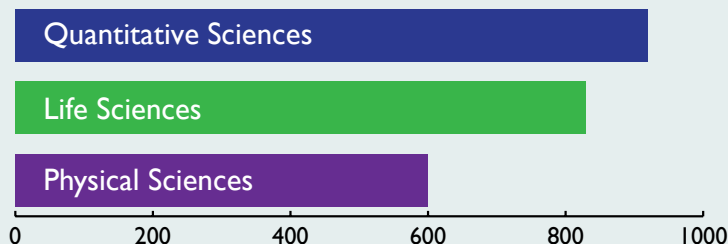
There is interesting evidence on just how attractive this lure has become for Harvard undergraduates. Looking within the traditional academic divisions (arts and humanities; social science; science; and engineering and applied sciences) to actual concentrations reveals a swift, tectonic shift in fields of study. Based on recent data, the clearly quantitative courses of study (computer science, applied mathematics, mathematics, and statistics) now have more than 920 disciples: about triple the census just before the financial crises and recession in 2007-2008. The surprise is that this outnumbers the 830 or so concentrators in the eight biology- and life-sciences-

growth in quantitative concentrators, and steady cohorts in life and physical sciences, undergraduates as a whole have swung decidedly toward scientific fields, broadly defined, in the recent past.

Math-related concentrators appear to have outstripped those in life-sciences right at the midpoint of this decade, propelled by the expected, continuous expansion of computer-science enrollments, beginning with the astounding success of the gateway CS 50 course and significant renewal of and growth in those faculty ranks; strong interest in applied math; and a little-noticed explosion of excitement about studying statistics. The latter likely reflects not only intellectual advances and the enthusiasm for big data, but also a refreshed faculty and improvements in pedagogy and outreach to potential concentrators. (*The Harvard Crimson* highlighted statistics in a September article, noting a nearly tenfold growth in concentrators and joint concentrators in just the past seven academic years.)

For what it is worth, the faculty ranks are evolving, too. Faculty of Arts and Sciences data show that in the fall of 2006, when there were 701 ladder faculty members, 30 percent were in arts and humanities disciplines, 35 percent in social science, and 35 percent in sciences and engineering and applied sciences combined. This past fall, when the census numbered 732 professors, the relative proportions were 27 percent, 33 percent, and 40 percent.

—J.S.R.



porters during the past four years, is now perhaps on the point of emptying somewhat.

Turning to *expenses*, Harvard is likely to record higher employee-benefits costs when it reports fiscal 2017 results. Interest-rate-driven and other changes in accrued retirement obligations (\$287 million in fiscal 2016) dictate higher charges this year. The University does not provide estimates of active employees' healthcare costs, but Hollister characterized the 3 percent growth in fiscal 2016 as a very good financial result, and has continued to focus on such costs as the primary benefits challenge for all employers. For the 2016 and 2017 calendar years, employee premiums have risen at about a 7 percent annual rate, and under its progressive premium program, Harvard will also assume a larger share of those costs for its lowest-paid workers (see page 22), starting in January. So it is at least plausible that University spending on health benefits will inflate more rapidly.

The University scored a significant success in reducing one expense under its control after fiscal 2016 closed. In early autumn, it refinanced \$2.5 billion of long-term debt (assumed at high rates in the years 2008 through 2010) and also extended maturity of \$400 million in existing short-term debt. The net effect of those transactions is to achieve annualized interest savings of about \$35 million, Hollister estimated—funds that can be invested in Harvard priorities. The timing was fortuitous: the transactions closed about a month before the spike in interest rates that followed the November presidential election, enabling Harvard to lock in what are believed to be the lowest 30- and 40-year yields in U.S. corporate bond history (from 3.159 percent to 3.334 percent).

Hollister emphasized that Harvard does not have an “asset problem”: it is blessed with those endowment billions, and with buildings that are in good condition or on a trajectory (protracted in some cases) to be brought into shape. Nor does the institution have a “leadership problem” or a “liability problem”: from the Corporation through the president and on down, he said, financial planning and budgeting disciplines are sound and effective—and the University has not left its pension and retiree obligations to the future. What Harvard faces is “a revenue pinch for the next few years.” Matching that reality to campaign-fueled perceptions of abundance, within the com-



Heather Henriksen

“This might be a little in the weeds, but trust me, it’s cool.” Heather Henriksen is warming up an impassioned (but definitely cool) oration about a University-wide push to get harmful chemicals—“flame retardants, antimicrobials, stain repellents, water repellents”—out of campus buildings. “I’m a bit obsessed with this.” It’s her job to be: Henriksen directs the Office for Sustainability, a post she took in 2008, a few months after the office formed as a successor to the Harvard Green Campus Initiative. Among her tasks: shepherding into existence Harvard’s five-year Sustainability Plan, a wide-ranging “road map” for enhancing well-being and reducing the University’s overall environmental footprint by 2020. The campus, she says, is “an excellent test bed” for solutions: “If we can pilot and prove it here, we can scale it” to the world beyond. “That’s the real goal.” A child of northern California, Henriksen grew up hiking, biking, and volunteering for beach cleanups. “I was the kid who was reading the *Berkeley Wellness* letter.” She interned one summer with Save the Bay, removing mercury pollution from the San Francisco Bay—and would discover 10 years later that her own mercury levels had skyrocketed from eating fish. “That’s when I said, ‘OK, this environmental work isn’t casual anymore.’” Before coming to Harvard as a Kennedy School student (she’s M.P.A. ’08), she worked for five years in business development for Time Warner in New York; she spent her off-hours two blocks away at the National Resources Defense Council, listening, learning, working. These days Henriksen spends her nights with her two-year-old daughter, Liv, whose name means “life” in Danish. “She reminds me why we’re doing all this.”

—LYDIALYLE GIBSON

Yesterday's News

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

1922 Jerome Napoleon Charles Bonaparte, A.B. 1899, declines an invitation to ascend the Albanian throne. "Sometimes Harvard indifference is really carried too far," comment *Bulletin* editors.

1927 At a Harvard Club of Boston colloquium titled "What is the Sub-Freshman Thinking About?" the principal of Phillips Exeter Academy reports that many high-school seniors and college freshmen alike answer, "with surprising frankness, 'Why, Mr. Perry, most of us are not thinking at all.'"

1942 The Faculty of Arts and Sciences approves a compulsory four-hours-a-week program of physical exercise for all undergraduates for the duration, with an emphasis on "physical conditioning and hardening," not recreation.

1947 A *Bulletin* "agent" reports that graffiti have been scrawled on Claverly Hall: "Heloise loves Abelard" appears on one corner, "Henry Tudor is insatiable" on another.

On January 7, 300 men gather in a new glass-and-brick building north of Pierce Hall for the official opening of the University's Computation Laboratory.

1987 "Harvard's endowment is so large," report *Bulletin* editors, "that market swings can have dramatic consequences. In January alone,...the endowment rose 13.75 percent, or \$495 million, to reach an all-time high of \$4.1 billion." But University financial managers issue warnings amid the good news: "Expenses for personnel and physical-plant maintenance are rising at a time when federal support for research and for student aid is dropping."

1997 The magazine's editors report on the advent of Crimson Cash, which was rolled out in College dining halls the previous fall. It has just been extended to the College Library (replacing the 10 separate copier cards required for its 10 component libraries, recalls then-program administrator Jeff Cuppett), and is about to be extended to laundry and vending machines in all undergraduate dorms and Houses.

munity and externally, means shifting from 5 percent revenue growth to 3 percent. "And that's no fun," he acknowledged.

As autumn progressed and administrative deans and financial officers digested the implications of the flattening endowment distribution, Hollister said, concerted work to restrain fiscal 2017 budgets was their "dominating focus" across the institution.

—JOHN S. ROSENBERG

Workers and Wages

AT A TIME of national concern about stagnating incomes, rising inequality, and middle-class malaise, the University confronted contentious issues with its lowest-paid workers throughout the autumn, yielding the first strike in more than three decades; a last-minute agreement with another union; and an unprecedented organizing election among graduate students and other teaching and research assistants.

For several years, Harvard has sought to control rising costs for employee health benefits. It subjected nonunionized faculty and staff members to deductibles and coinsurance beginning in 2015, and made similar changes a focus of bargaining with its unions thereafter. The settlement between the University and its largest union, the Harvard Union of Clerical and Technical Workers (HUCTW), last January, seemed to set something of a pattern: somewhat slimmer salary increases than in prior contracts; higher copayments for medical care—but no deductibles or coinsurance; and, under Harvard's progressive insurance structure, a new tier for workers whose incomes are less than \$55,000, who will now pay 13 percent of premiums (in the previous low tier, under \$70,000, workers paid 15 percent). HUCTW also gave Harvard some concessions on retiree health coverage. (Details are available at harvardmag.com/huctwcontract-16.)

But both Harvard University Dining Services (HUDS) workers, represented by UNITED HERE Local 26, and custodians, represented by 32BJ SEIU (the Service Employees International Union), present a different employee profile. They are, in general, paid less than most HUCTW members, and even though their hourly wages and employee benefits are superior to those of many workers in com-

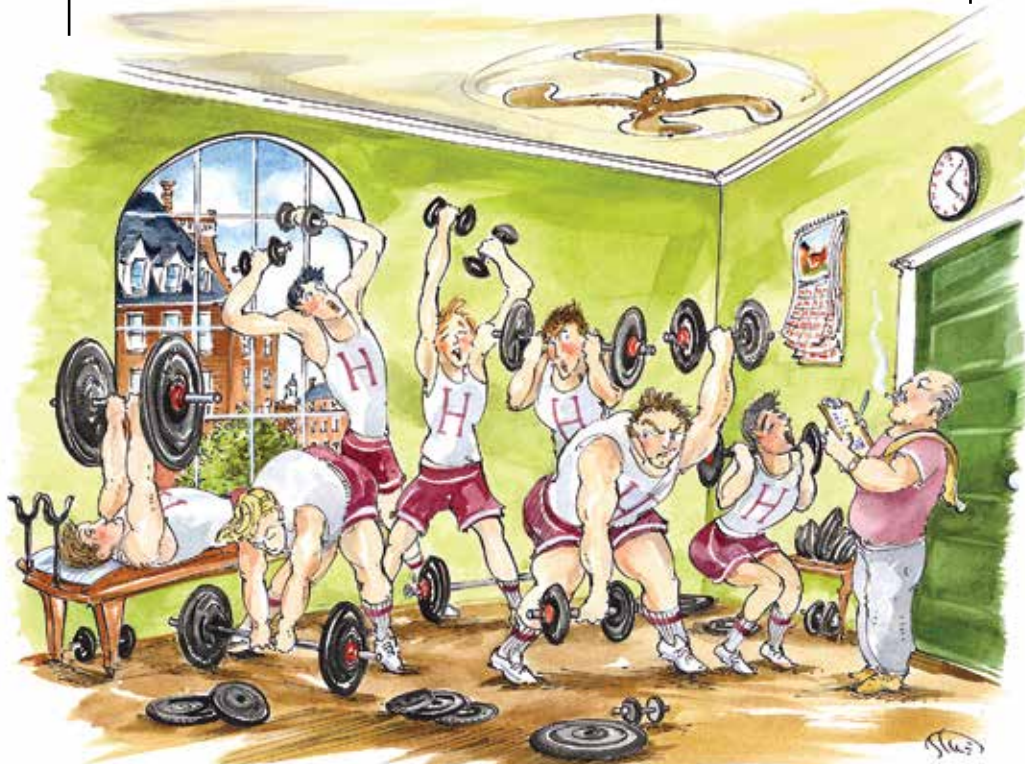


Illustration by Mark Steele

parable positions elsewhere, the HUDS staffers' total earnings have been low because most union members have had regular work only when Harvard is in full session: typically, less than eight months per year.

A \$35,000 yearly income guarantee for full-time workers figured prominently in the dining workers' negotiating position, along with the demand that their healthcare costs not increase. Harvard offered summer stipends of about \$150 per week for workers with between five and 20 years of service at the University, and \$250 per week for workers with more than 20 years; it also proposed the higher copayment schedule adopted by HUCTW (details appear at harvardmag.com/hudsstrike-16). The union turned down those proposals, and after four months of negotiations, the workers went on strike October 5—the first strike at Harvard since 1983.

During the next three weeks, striking workers paraded around campus, chanting and beating out rhythms on five-gallon buckets. They appeared to attract significant support from students, many of whom are friendly with the staff they see daily at meals. Most dining halls closed, but HUDS managers (and nonunion employees who were asked by their supervisors to pitch in) maintained operations at some facilities.

Following a 22-day strike, negotiators reached agreement after a marathon bargaining session (accompanied by a large student sit-in at the building where the talks were conducted), and the workers voted 583-1 to approve a contract. It provides a \$35,000 guaranteed income for those who work full time during the academic year, achieved by paying a stipend of \$2,400 across 13 weeks, or about \$185 per week (rising to \$3,000, or about \$231 per week, by 2020), with a prorated stipend for part-time workers. Wages will increase 2.5 percent annually for the five-year term of the agreement. And health coverage will remain unchanged for the next two years, and then will move toward higher copayments, but with part of workers' added costs covered by a flexible spending account for each worker. Read a full report at harvardmag.com/hudscontract-16.

Next up were the 700 custodians, who also appeared headed for a strike. But a middle-of-the-night settlement on November 16 averted another walkout. It calls for a 12.5 percent increase in wages across four years; because janitors earn slightly more per hour than dining-hall workers, and most of them work year-round rather than the seven and

a half months per year typical for the latter, their financial situation is notably better. The typical custodian earns \$22.07 per hour and \$45,676 per year, according to the University; that hourly wage will increase to \$24.67 by the end of the contract. About 30 percent of custodians work part-time; the contract, according to the union, "includes language to promote full-time work." Workers will also have the option of joining a healthcare plan offered by SEIU without any monthly premiums, and with visits to certain doctors without a copayment. Harvard's plan, which has monthly premiums and a broader network of doctors, will introduce in 2018 a sub-\$55,000 premium tier, like the plans the University has introduced for other groups of employees. Read more at harvardmag.com/bjseiucontract-16.

WITH those negotiations resolved, attention turned to the November 16-17 balloting, overseen by the National Labor Relations Board (NLRB), for possible union recognition for graduate-student teaching and research assistants (as well as undergraduates who perform paid teaching duties in classes like Computer Science 50). Harvard graduate students have been organizing for more than a year to form a labor union. They won the legal right to do so last summer, after the NLRB—unswayed by an amicus brief filed by the University urging a decision against student unionization—ruled that graduate students at private universities have the right to form labor unions (as reported at harvardmag.com/grad-unions-16).

Student organizers reported in the spring that a majority of graduate students had signed authorization cards indicating their support for a union. But as the vote drew closer in the fall, a number of students publicly made the case against unionizing in op-eds in *The Harvard Crimson* and posters scattered throughout campus. Their arguments

mirrored some of those used by University administrators: that a union could interfere with the academic relationship between students and professors, and that union dues might cost more than whatever benefits students gain through a union.

About 1,000 of the roughly 3,500 ballots cast have been challenged due to questions about voter eligibility, significantly delaying the outcome of the vote. Some students remained confused about their eligibility even on the eve of voting. (Joshua Gilbert, a spokesman for the Harvard Graduate Student Union, said that students not yet engaged in teaching or paid research for Harvard—including many



Picketing and strike signs appeared on campus for the first time this millennium as dining-hall workers sought a new contract.

first- and second-year graduate students—were ineligible.) At press time, the results were still unknown. Visit harvardmag.com/grad-unionvote-16 for an update.

Much attention has been drawn to the ways in which universities mirror society's broader inequities and economic anxieties. From the conditions of its lowest-paid blue-collar workers, to those of students training to become scholars and teachers, Harvard's financial responsibilities to its community have become a subject for debate, too.

—MARINA BOLOTNIKOVA
and JOHN S. ROSENBERG

Gender Agenda

EVEN AS the Faculty of Arts and Sciences (FAS) intensely debated the College's proposed rules sanctioning student participation in single-gender final clubs and similar social organizations, which are not officially recognized by Harvard, an outcry arose over overtly sexist behavior by two men's sports

teams—decidedly official Harvard groups, with the substantial institutional budget and staff support that match athletics' status and assumed role in undergraduate life. Herewith, a summary of the parallel developments during the fall semester.

In May 2016, dean of Harvard College Rakesh Khurana recommended, and President Drew Faust endorsed, that beginning in

the class of 2021, members of unrecognized, single-gender social groups—final clubs, plus sororities and fraternities—be prohibited from holding leadership roles in recognized activities (for example, serving as an athletic team's captain), or from receiving Harvard's endorsement for fellowships such as the Rhodes Scholarship (see the details at harvardmag.com/finalclub-16).

In the announcement, Faust wrote, "Over time, Harvard has transformed its undergraduate student body as it has welcomed women, minorities, international students, and students of limited financial means as an increasing proportion of its population. But campus culture has not changed as rapidly as student demography." Students should be

able "to participate in the life of the campus free from exclusion on arbitrary grounds. Although the fraternities, sororities, and final clubs are not formally recognized by the College, they play an unmistakable and growing role in student life, in many cases enacting forms of privilege and exclusion at odds with our deepest values." Khurana, countering objections that the rules in effect undermined students' freedom of association, observed that they would still have the right to join discriminatory groups, but that doing so is contrary to Harvard's values. "These new policies will not prevent undergraduates from choosing their own paths while at Harvard," he argued. "The recommendations are instead focused exclusively on decisions

belonging to the College about what it funds, sponsors, endorses, or otherwise operates under its name."

But a former dean of the College, McKay professor of computer science Harry Lewis, did object to this perceived infringement on students' freedom of association. Colleagues who concurred introduced a motion, debated in the November 1 faculty meeting, "that Harvard College shall not discriminate against students on the basis of organizations they join, nor political parties with which they affiliate, nor social, political or other affinity groups they join, as long as those organizations, parties, or groups have not been judged to be illegal." The debate—shaped by the terms and genesis of

Getting Greener

Harvard has reduced its greenhouse gas (GHG) emissions by 30 percent during the past decade, the Office for Sustainability announced in early December. The goal, adopted in 2008 and measured from a 2006 baseline, was met despite 15 percent growth in square footage and an increase in energy intensity of existing space. (New laboratories, which use 46 percent of the energy on campus but represent just 22 percent of the space, account for a significant portion of this intensification.) The University achieved its goal by reducing demand (net energy use declined 10 percent during the decade); by shifting to renewable energy sources; and by "decarbonizing"—seizing the opportunity to make more use of low-priced natural gas, a less carbon-intensive fossil fuel than oil or coal (whether used to generate electricity or burned directly for heating and cooling).

Ninety-seven percent of the University's emissions are attributable to energy use in buildings, the sustainability office reported (see page 21 for a portrait of its director). Thus, nearly a quarter of the reduction in GHG emissions came from re-

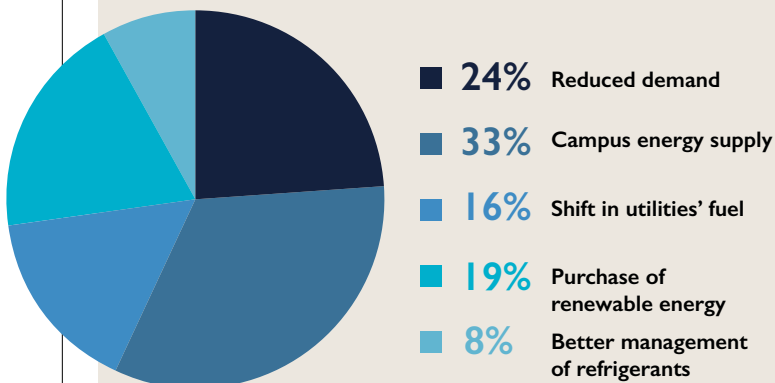
duced demand, achieved largely through more efficient lighting, heating, and cooling of buildings; a further 19 percent of the reductions reflects the purchase of renewable energy—principally wind power from Maine and shares of hydroelectric power from existing generators in Massachusetts. Another 8 percent was due to improved tracking and management of potent, short-lived pollutants called refrigerants.

But the largest gains are attributable to *switching fuels*, from oil and coal to natural gas, which fell in price during the decade as new domestic supplies became available. This was true both for the regional supply grid from which Harvard buys electricity (16 percent of the total emissions reduction reflects these suppliers' less-carbon-intensive fuels) and for Harvard's own district energy supply (representing 33 percent of the emissions reduction, a portion of which is attributable to the switch to natural gas). A major factor was converting a University steam plant to natural gas. Other upgrades to Harvard-run utilities, including an expanded, combined heat-and-power system, energy-efficient boilers, and improvements to the efficiency of chilled-water plants further reduced the emissions impact of Harvard's utilities.

Even with cheap natural gas as a powerful tailwind, attaining Harvard's initial GHG-reduction goal is notable, given the University's simultaneous growth in physical plant and energy use. The second goal President Drew Faust articulated in 2008—cutting emissions 80 percent by 2050—will likely prove a far greater challenge. Renovations to the undergraduate Houses are leading to *higher* operational costs, because their systems have been brought up to modern codes, common spaces are air-conditioned, and previously unused basement storage areas have been repurposed into classrooms and studios (see "The Endowment Ebbs," November-December 2016, page 18). Attaining the 2050 goal will thus require significant reductions in energy consumption as the campus grows further, as well as a substantially larger role for renewable supplies in place of fossil fuels. (For a more detailed report, based on data scheduled to appear after this magazine went to press, see harvardmag.com/sustainability-17.)

—JONATHAN SHAW

How Harvard Reduced Emissions



the College proposal—focused far more on rights of association, governance, and education in values than on gender exclusion per se. (Read a full report, with extensive excerpts from speakers' remarks, at harvardmag.com/finalclub-fas-16.)

Lewis observed that “This motion stands on its own as a statement of principle that we, the Faculty of Arts and Sciences, have long honored in practice....When this Faculty considered how to respond to the dilemma posed by ROTC’s discriminatory membership practices coupled with Harvard students’ desire to join as cadets, a faculty committee recommended that we cut off support to ROTC. But the same committee considered and explicitly rejected as ‘excessively paternalistic’ the option of punishing students who chose to join MIT ROTC.” He maintained that “the signatories to the motion are not defending any or all of these organizations. Nor are we denying the problems they create. Nor are we against change! About all that the 12 of us probably agree on is that Harvard should avoid making rules restricting students’ civil liberties—of speech, of religion, or of association.” In

his view, “the College is creating a blacklist, an index of prohibited organizations....Join one of the heretical clubs, and you can remain a Harvard student, but there are certain blessings Harvard won’t bestow.”

He introduced a second objection, on governance: “This policy is disappointing both for the dangerous precedent it sets, and for the irregular way it was enacted, by administrative fiat after the last faculty meeting of the year this past spring....Our concern is that having enacted a college policy of this importance without consulting this body or its elected representatives, the dean and the president would at a later date be empowered to enact other policies, about this matter or others, that properly lie within the jurisdiction of this body.”

Finally, he said, “My deepest concern is educational. The policy teaches our students, who watch everything we do, bad lessons. It is illiberal—it teaches students that it is OK to sacrifice basic individual freedoms in



Last year, Fox Club undergraduates admitted female members; the graduate board ruled the memberships provisional.

pursuit of large but only vaguely related social goals....Part of our commitment to diversity is our institutional confidence that students may think differently than we do, and may make private choices of which we disapprove. By all means, if we conclude that students should not visit or join these organizations, let’s tell them they shouldn’t go, and why. Let’s tell them loudly and clearly and persistently”—emphasizing education and suasion over rulemaking and sanctions.

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Lerner professor of biological sciences Daniel Lieberman, a member of the Faculty Council, opposed the motion. First, he said, Harvard doesn't need another anti-discrimination policy, because the one it now has is comprehensive. Second, he emphasized the narrow scope of the new rules, noting that it would leave students free to join all sorts of discriminatory and potentially objectionable organizations. "The only exception," he said, "is that they cannot represent our University in leadership positions while being members of social organizations on campus that discriminate against other members of our community." He termed the sanctions a revocation of privileges, rather than an imposition of penalties. Finally, he predicted that if the motion passed and the new policy were overturned, "we will face a deluge of unrecognized Greek organizations that will continue to erode our House system, and we will find our campus riven by more, not less, discrimination."

Professor of government Eric Nelson said that "Harvard has never before conditioned fellowships, research support, or eligibility for leadership positions on anything other

than academic merit and the confidence of one's peers.... This generational good sense is now to be set aside in favor of the view that students who have in no way violated the rules of the College should be sanctioned for associations that run afoul of (what are said to be) our values—and we can look forward to decades of acrimonious and dangerous debate about which associations are in and which are out."

Undergraduate Council president Shai-ba Rather and vice president Daniel Banks spoke in favor of the proposed College policy: "Organizations which discriminate on the basis of gender are antiquated.... Women have been attending Harvard College for decades. To allow continued and active discrimination is the failure of the integration process: a promise to merge Radcliffe and Harvard and offer the full resources of this institution to all its students. Gender is a deciding factor.... To claim that these institutions are not part of the Harvard community is to hide history and fact behind technicality, to allow the mistakes of our past to trump the opportunities—the equal opportunities—of our future." Characteriz-

ing the issue as personal, Rather and Banks said they "view this policy as an opportunity for a new chapter in Harvard's history and hope you embark in the writing process with us." (In polling during council elections later in the month, *The Harvard Crimson* reported, a majority of students opposed the College policy.) Debate resumed on December 6, but voting was deferred until early February; visit www.harvardmagazine.com for updates.

As THESE exchanges unfolded, enterprising *Crimson* reporters unveiled a document in which members of the 2012 men's soccer team evaluated and characterized members of the women's team in crude, explicitly sexual "scouting reports" (see www.thecrimson.com/article/2016/11/4/soccer-suspended-scouting-report-harvard). The fallout—a *Crimson* essay by former women soccer players confronting the implications of the men's behavior and inviting them to confront the problem as well; an investigation by the office of general counsel at Faust's instruction; and the finding that the behavior had continued through 2016, and that participants had not been forthcoming—ultimately resulted in forfeiture of the season for the men's team, which had been on the verge of qualifying for the NCAA tournament. Director of athletics Robert L. Scalise, who had been scheduled to travel to Shanghai for an alumni event during the week of the men's basketball game there against Stanford, canceled his trip to deal with the crisis. (The men's cross-country team voluntarily reported similar, if somewhat less egregious, behavior to its coach, the *Crimson* reported; on December 2, after a University finding that that team's behavior was not intended to "denigrate or objectify particular women," it was put on "athletic probation"—training and supervision, but not a limit on competing this season, according to *Crimson* accounts.)

As it happened, the announcement of the soccer sanctions coincided with a long-planned, inaugural Harvard Alumni Association "Women's Weekend." A scheduled panel on women in sports suddenly had a new agenda item, concerning overtly sexist discrimination against female athletes. The forum, held in the former Radcliffe gymnasium, opened with Radcliffe Institute dean Elizabeth Cohen telling listeners, "Certainly much has changed. But damaging social attitudes persist, and not just among the men of

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FROM TOP: ROSE LINGCOLN/HFAC; MARTHA STEWART/HARVARD KENNEDY SCHOOL; STEPHANIE MITCHELL/HFAC

Other Honorands

Xander University Professor Douglas Melton, co-director of the Harvard Stem Cell Institute, has been awarded the Ogasawara-Yamanaka Stem Cell Prize for his work on cellular reprogramming as part of his research on diabetes; it comes with a \$150,000 honorarium....

Higgins professor of chemistry emeritus Richard H. Holm is a 2016 recipient of the Welch Award in Chemistry, which is accompanied by a \$500,000 honorarium; he was cited for broad contributions to inorganic chemistry. (Previous winners have included several other Harvard scientists, among them Flowers University Professor George M. Whitesides and the late Jeremy R. Knowles, former dean of the Faculty of Arts and Sciences.)...Reischauer professor of Japanese politics Susan J. Pharr has been awarded the Japan Foundation Award for her "richly balanced and fair stance of understanding for Japan and for her humble and sincere character."

Research Roster

Ten Harvard scientists were among 84 recipients of the initial round of HHMI Medical Scholars awards from the Howard Hughes Medical Institute and two supporting foundations. The awards, supporting early-career scientists of exceptional promise, come with five-year research grants of \$600,000 to \$1.8 million. Harvard's heroes are Emily Balskus, Kahn associate professor of chemistry and chemical biology; Thomas Bernhardt, professor of microbiology and immunobiology; Fernando Camargo, professor of stem cell and regenerative biology; Flaminia Catteruccia, associate professor of immunology and infectious diseases (see "Editing an End to Malaria?" May-June, page 50); Victoria D'Souza, professor of molecular and cellular biology; Benjamin Ebert, associate professor of medicine; Chenghua Gu, associate professor of neurobiology; Stephen Liberles, associate professor of cell biology; Jayaraj Rajagopal, associate professor of medicine; and

Brevia



NOBEL HONORANDS: Furer professor of economics Oliver Hart shared the prize in economic sciences with MIT's Bengt Holmström for their work on contract theory. Hart's insight was on *incomplete contracts*: a contract cannot possibly predict every scenario that might arise between an employer and an employee, or a patient and an insurance company. Hart has developed models for understanding what happens in such scenarios and how contracts can be designed to improve them. Colombian president Juan Manuel Santos, M.P.A. '81, was awarded the Nobel Peace Prize for negotiating a peace treaty with the Revolutionary Armed Forces of Colombia (FARC), a leftist guerrilla group, after five decades of conflict—even though the treaty had been rejected by Colombians by a narrow majority a few days earlier. (It has since been revised and approved.)

John Rinn, professor of stem cell and regenerative biology.

Honor Code, Year One

The Harvard College Honor Council, which reviews possible violations of ac-

ademic integrity under the new Honor Code, has detailed in its first annual report the 115 cases brought before it in the 2015-2016 school year. One-quarter (29 cases) resulted in determinations that there was no cause for action or no sub-

stantiation of an accusation. Twenty cases were "referred for local sanctions" (from mandatory tutoring to failure for an assignment). Of the remaining cases, 66 (57 percent of the total) resulted in the increasingly serious sanctions of admonishment (warning of a violation, and imposition of a state of jeopardy; 15); probation (37); or the requirement to withdraw, typically for two to four terms (14). No students were recommended for dismissal or expulsion. Sophomores were involved in more cases than other classes (followed by seniors), and there were far more cases from the sciences and engineering and applied sciences than from humanities and social sciences.

The matters brought before the council most often involved allegations of plagiarism (46 cases) or inappropriate collaboration on assignments (28), with problem sets, a common assignment, a special concern. The report may be read at <http://honorcouncil.fas.harvard.edu/statistics>.

Scientists-in-Chief

Computer scientist Martha E. Pollack, provost and executive vice president for academic affairs at the University of Michigan, has been elected president of Cornell, which is building a technology campus in Manhattan. She did her graduate studies at the University of Pennsylvania, where she was a doctoral student of Barbara Grosz, now Harvard's Higgins professor of natural sciences. Pollock's appointment follows Stanford's selection of a life scientist as its new president (Brevia, May-June 2016, page 27), suggesting the importance of those disciplines to research universities today.

On Other Campuses

The Bill & Melinda Gates Foundation (co-led by Microsoft founder Bill Gates '77, LL.D. '07), has given \$210 million to

the University of Washington to support its population health initiative.... Penny and Phil Knight—a University of Oregon business alumnus and co-founder of Nike—have given that institution \$500 million, their latest in a series of enormous higher-education gifts, to underpin a new campus for accelerating scientific impact, a three-building laboratory and research complex....Professor of medicine Charles S. Fuchs, chair of Dana-Farber Cancer Institute's pancreatic cancer program, has been appointed director and physician-in-chief at Yale Cancer Center and its Smilow Cancer Hospital.

Nota Bene

THE UK CALLING. This year's Rhodes Scholars include Spencer D. Dunleavy, Nancy Ko, and Maia Silber—all seniors—and Anthony Wilder Wohns '16. Seniors Maille Radford and Reylon Yount were awarded Marshall Scholarships.

LONDON CALLING. The Graduate School of Design has inaugurated its Richard Rogers Fellowship, a program of research residencies on the built environment, based at Wimbledon House, designed by the eponymous British architect. The house, designed by Rogers for his parents in the 1960s, was donated to the school in 2015 by Lord Richard and Lady Ruth Rogers to ensure its continued residential use. Six fellows per year will be awarded three-month residencies, travel expenses to London, and \$10,000 stipends.



NEW UNIVERSITY PROFESSOR: Professor of government and of education Danielle Allen, who also directs the Edmund J. Safra Center for Ethics, has added another title: she has been appointed a Conant University Professor. University Professors hold the highest faculty rank at Harvard, reflecting the eminence of their scholarship; they are free to teach and conduct research in any school. Allen is a political theorist and philosopher who joined the faculty in 2015; her scholarship was profiled in depth in "The Egalitarian" (May-June 2016, page 40).

MEDALS OF FREEDOM. In a White House ceremony on November 22, President Barack Obama conferred the Presidential Medal of Freedom on 21 recipients, including Harvard affiliates: Bill '77, LL.D. '07, and Melinda Gates, founders of the eponymous foundation; architecture honorary-degree recipients Frank Gehry ('00) and Maya Lin ('96); and the late Rear Admiral Grace Hopper, who as a member of Howard A. Aiken's Harvard Computation Laboratory was among the first programmers of the Mark I computer.

ACCLAIMED AUTHORS. Colson Whitehead '91 was awarded the National Book Award for fiction for *The Underground Railroad*; he was profiled in these pages in "A Literary Chameleon" (September-October 2016, page 32). Congressman John L. Lewis, LL.D. '12, Andrew Aydin, and Nate Powell were awarded the prize for young people's literature for *March: Book Three*, a graphic memoir of the civil-rights movement, in which Lewis was a pioneer. And the Literarian Award was conferred on Cave Canem, a writer's center that has supported the careers of several black poets; its role was reported in "Elbow Room," the magazine's March-April 2016 cover story.

ADMISSIONS LITIGATION. The Project on Fair Representation/Students for Fair Admissions lawsuit alleging that Harvard College discriminates against Asian-American applicants has proceeded to discovery. Harvard has been ordered to provide data on applicants between the fall of 2009 and the spring of 2015: many tens of thousands of people, few of whom were granted admission. If a trial

is held, it is unlikely to begin this year. A report on the the litigation appears at harvardmag.com/asianam-suit.

ADDRESSING THE WHITE HOUSE. In the wake of reports that President-elect Donald Trump's senior counselor, Stephen K. Bannon, M.B.A. '85, had crudely disparaged the "Seven Sisters" colleges in a 2011 interview, Radcliffe Institute dean Elizabeth Cohen and the leaders of the other institutions sent him an open letter in which they expressed "deep exception to these comments and ask that you take a more expansive, informed, and tolerant world view in your leadership role." Separately, President Drew Faust joined scores of other academic leaders in a statement supporting the Deferred Action for Childhood Arrivals program, under which undocumented immigrant students who arrived in the country before their sixteenth birthday and before June 2007 have been able to pursue their studies at U.S. institutions of higher education.

MISCELLANY. David M. Rubenstein, co-founder and co-CEO of The Carlyle Group, a private-equity and investment firm, who joins the Harvard Corporation July 1 (see harvardmagazine.com/rubenstein-17), has been elected chair of the Smithsonian Institution's board of regents....James Voorhies, who in early 2014 was appointed the first Robinson Family director of the Carpenter Center for the Visual Arts (where Harvard's art-making classes and studios are based), has decamped; he is now dean of fine arts at California College of the Arts....Cornel West, who departed Harvard during the presidency of Lawrence H. Summers, subsequently teaching at Princeton and Union Theological Seminary, is apparently returning to the University, with appointments at Harvard Divinity School and the Faculty of Arts and Sciences; details were pending as this issue went to press.



Colson Whitehead

COURTESY OF COLSON WHITEHEAD

the Harvard soccer team.” Moderator Janet Rich-Edwards, associate professor of medicine, told the audience, “I want to take a second to talk about the elephant in the room.” She criticized the male players’ “witless cruelty” and offered as an opposing note these

words from the women who wrote the *Crimson* essay: “We are hopeful that the release of this report will lead to productive conversation and action on Harvard’s campus, within collegiate athletic teams across the country, and into the locker room that is our

world.” (A full account appears at harvardmag.com/womensportspanel-16.)

It was a beginning, but the airing out of attitudes in locker rooms, and elsewhere, still has a long way to go.

~JONATHAN SHAW and JOHN S. ROSENBERG

Connecting Body and Soul

A DEVOUT 35-year-old Latina woman with two young children lies in the intensive-care unit (ICU) of a Boston-area hospital, dying from cancer. With no sign of improvement, the medical team advises withdrawing life support, but the woman’s husband refuses. The couple has been pushing for aggressive therapies, along with prayer support. Members of their Pentecostal church hold vigils at the woman’s bedside, praying that God will perform a miracle and cure her, but eventually she dies.

With most Americans placing a high value on faith, it’s no surprise that religious and spiritual beliefs can be a source of comfort, hope, and meaning during life’s most fraught moments, like those faced by this family.

“Illness is a spiritual experience for most patients with advanced disease,” says Tracy A. Balboni, associate professor of radiation oncology at Harvard Medical School (HMS) and a radiation oncologist and palliative-care physician at Dana-Farber/Brigham and Women’s Cancer Center. “Patients want to be seen as whole persons, not just as bodies affected by illness.” But doctors, she says, are often unprepared to connect body and soul. “As I went through medical training, I was given tools to manage the physical realities of disease, but barely any to recognize or engage the spiritual and existential aspects of illness. They were clearly considered separate, even though there were so many natural connections, particularly in the setting of incurable disease.”

For the past decade, Balboni has been conducting research to illuminate how spirituality affects the patient experience, especially at the end of life. That work, published in leading medical journals, is now a centerpiece of Harvard’s interfaculty Initiative on Health, Religion, and Spirituality. The effort, launched in 2013, aims to promote rigorous research, provide training for students and medical residents, and spark collaborations across and beyond the University at the in-



From left: Michael Balboni, Tyler J. VanderWeele, and Tracy A. Balboni

tersection of religion, medicine, and public health. Although centered at HMS and the Harvard T.H. Chan School of Public Health (HSPH) and affiliated hospitals, it also involves chaplaincy leaders and faculty members from the Divinity School (HDS) and other Harvard schools.

“Many patients today are making decisions at least partly informed by their religious beliefs. We need to bring research to bear on understanding and describing what’s really going on,” says initiative co-leader Michael Balboni, a theologian, HMS instructor in psychiatry, and palliative-care researcher at Dana-Farber. (He is also Tracy’s husband and collaborator.)

Research led by initiative members, along with collaborators at Harvard and beyond, has already yielded insights on health outcomes, patient-clinician relations, and costs. For example, Tracy Balboni and her colleagues, drawing on the national Coping with Cancer Study, have found that terminally ill patients who receive spiritual support from their *medical* team are more likely to use hospice, seek less-aggressive treatments, and have better quality of life near its end.

On the other hand, outcomes are different when the spiritual support comes from patients’ own faith communities. In a 2013

study, Balboni and other investigators reported that patients with advanced cancer who are well supported by their religious communities choose hospice care less and aggressive medical measures more when they’re near death. Such patients “had six-times higher odds of dying in the ICU,” says Michael Balboni. (As described by initiative leaders, “spirituality” is a connection to something larger than oneself that gives life meaning, while “religion” refers to beliefs and practices shared by a community.)

To DELVE more deeply into these issues, the Balbonis surveyed physicians, nurses, and terminally ill cancer patients at four Boston teaching hospitals from 2006 to 2009. The resulting study, *Religion and Spirituality in Cancer Care*, revealed that most patients want spirituality to be part of their cancer care and—somewhat surprisingly to the researchers—most oncologists and nurses think it’s appropriate for clinicians to provide spiritual care, at least occasionally. That might include asking about a patient’s spiritual outlook, requesting a chaplain’s bedside visit, or even praying with patients.

But these interactions are not common, according to the Balbonis. In a 2013 paper published in the *Journal of Clinical Oncology*,

they and colleagues in the Harvard medical community—many of them now part of the initiative—showed that most patients with advanced cancer had never received *any* form of spiritual care from their oncology nurses or physicians (87 percent and 94 percent, respectively). The investigators concluded that lack of training is the main barrier.

These findings could have financial consequences, given the high cost of intensive end-of-life treatments. One analysis conducted by initiative members and others at Dana-Farber, HMS, and HSPH, reported in the journal *Cancer* in 2011, suggested that if medical teams routinely provided spiritual care to dying cancer patients, the annual cost savings in the United States would total \$1.4 billion (based on 2009 data).

Another focus of inquiry involves the health benefits of going to church or other religious services. A team led by initiative co-leader Tyler J. VanderWeele, a professor of epidemiology at HSPH, mined data from Harvard's long-term Nurses' Health Study and found that women who attended religious services more than once a week were

33 percent less likely to die, and lived an average five months longer, during a 16-year follow-up period (1996-2012) than women who never went. Frequent attendance, the investigators note, appears to increase social support, decrease depression, discourage smoking, and boost optimism.

The data also revealed an association between attending religious services and significantly lower rates of suicide. Among the 90,000 women in the study, those who regularly attended religious services were nearly six times less likely to commit suicide during the study follow-up years (1996 to 2010) than those who did not. (These findings appeared in the *Journal of the American Medical Association's JAMA Internal Medicine* and *JAMA Psychiatry* last May and June, respectively.)

"The research suggests that there is something very powerful about the communal religious experience," VanderWeele says. "Religious participation appears to be an important social determinant of health, and yet one that we have neglected in our discussions on the distribution of health outcomes."

VANDERWEELE TEACHES a Wintersession course on religion and public health—one of the handful of curricular offerings on spirituality and medicine across the University; others include a few at HDS, an HMS elective on "Spirituality and Healing in Medicine," and a required course in the Harvard Longwood Psychiatry Residency Training Program. Associate professor of psychiatry John R. Peteet, who co-teaches the medical school and residency courses, says it's important for clinicians to understand the religious, spiritual, and cultural dimension of illness—and to recognize how their own spiritual beliefs, whether religious or secular, "can be an important resource for working well." (Peteet has co-edited *The Soul of Medicine: Spiritual Perspectives and Clinical Practice* with associate professor of anesthesia Michael N. D'Ambra.)

Initiative leaders hope their work will eventually expose more students and providers to these topics and lead to better practice. They are pleased that the Joint Commission, a national healthcare accreditation organization, has begun to recognize the role of spiritual care. But, the Balbonis say, its guidelines are "ambiguous" and not yet enforceable because empirical research on spirituality and medicine is still new, and many knowledge gaps remain. They, along with VanderWeele and other colleagues, plan to continue tackling such unanswered research questions as: What role should doctors play in delivering spiritual care? How does witnessing their patients' spiritual moments, like being at peace with God, affect clinicians themselves? Is religious attendance "healthful" for people of faiths beyond the mostly white Christian population surveyed in the Nurses' Health Study?

Academic medicine, initiative leaders say, also seems to be more receptive now to addressing issues around spirituality in patient care. "Thirty or 40 years ago," says Michael Balboni, "I don't think people would even whisper about these things, certainly not publicly." In 2015, the initiative hosted a national conference on medicine and religion that drew 300-plus attendees, and it convened a December 2016 symposium to highlight current research and implications for clinical practice. Adds Tracy Balboni, "It's encouraging to see the growing recognition, at Harvard and other academic institutions, that these questions are important to a comprehensive understanding of what comprises health."

—DEBRA BRADLEY RUDER

Crimson on Capitol Hill: 115th

Other Republican victories in November notwithstanding, the tally of Harvard degree-program graduates or matriculants in the 115th Congress continues to tilt Democratic. At press time, the GOP contingent numbered six senators and seven representatives (two of them alumnae); across the aisle were seven senators and 29 representatives (three of them alumnae). Below, asterisks mark newcomers since the election of 2014:

Senate Republicans: Tom Cotton '99, J.D. '02 (Ark.); Michael D. Crapo, J.D. '77 (Id.); Rafael Edward "Ted" Cruz, J.D. '95 (Tex.); Ben Sasse '94 (Nebraska); Daniel S. Sullivan '87 (Alas.); Pat Toomey '84 (Pa.)

Senate Democrats: Richard Blumenthal '67 (Conn.); Al Franken '73 (Minn.); Timothy M. Kaine, J.D. '83 (Va.); John F. (Jack) Reed, M.P.P. '73, J.D. '82 (R.I.); Charles E. Schumer '71, J.D. '74 (N.Y.); Christopher Van Hollen Jr., M.P.P. '85 (Md.); Mark R. Warner, J.D. '80 (Va.)

House Republicans: Ron DeSantis, J.D. '05 (Fla.); Martha McSally, M.P.P. '90 (Ariz.); John Moolenaar, M.P.A. '89 (Mich.); Bruce

Poliquin '76 (Me.); Michael R. Pompeo, J.D. '94 (Kans.); Elise Stefanik '06 (N.Y.); *Scott Taylor, A.L.B. '14 (Va.)

House Democrats: Brendan Boyle, M.P.P. '05 (Pa.); *Anthony G. Brown '84 (Md.); Joaquin Castro, J.D. '00 (Tex.); Katherine Clark, M.P.A. '97 (Mass); Gerry Connolly, M.P.A. '79 (Va.); James H. Cooper, J.D. '80 (Tenn.); Elizabeth Esty '80 (Conn.); Bill Foster, Ph.D. '83 (Ill.); Ruben Gallego '02/'04 (Ariz.); John Garamendi, M.B.A. '70 (Calif.); *Josh Gottheimer, J.D. '04 (N.J.); Brian Higgins, M.P.A. '96 (N.Y.); Jim Himes '88 (Conn.); Joseph P. Kennedy III, J.D. '09 (Mass); Ron Kind '85 (Wisc.); *Raja Krishnamoorthi, J.D. '00 (Ill.); James R. Langevin, M.P.A. '94 (R.I.); Sander M. Levin, LL.B. '57 (Mich.); Stephen F. Lynch, M.P.A. '99 (Mass.); Seth Moulton '01, M.B.A.-M.P.A. '11 (Mass.); *Jamie Raskin '83, J.D. '87 (Md.); Raul Ruiz, M.D.-M.P.P. '01, M.P.H. '07 (Calif); John P. Sarbanes, J.D. '88 (Md.); Adam B. Schiff, J.D. '85 (Calif.); Robert C. Scott '69 (Va.); Terri Sewell, J.D. '92 (Ala.); Bradley J. Sherman, J.D. '79 (Calif.); Mark Takano '83 (Calif.); Juan C. Vargas, J.D. '91 (Calif.)

Mise en Scène

by LILY SCHERLIS '18

A PROFESSOR once advised me that I shouldn't have possessions until I have tenure. "Then," he said, "you can start to collect books." I've given away so many of my books over the years. *The Harvard Advocate's* library gets replenished every spring because students don't want to pay to store their labored-over coursebooks. This year, to fill my five-tier Ikea bookshelf, I rented a Zipcar and drove about four dozen of my old, carefully annotated, paperbacks from the *Advocate* back to my new off-campus apartment.

Once you have your own space, populating it becomes an extracurricular. My mother and I drove my antique childhood desk up to Cambridge from my home in Pittsburgh in anticipation of the four empty rooms I would need to fill with things. Later, my friend and I rented a truck and drove to north Medford to pick up an \$80 Craigslist couch, whose previous owner dropped racial slurs with impressive density; while I pulled the car around he asked my friend to scrub his bathtub. I still don't think of the things I acquired from Craigslist adventures—coffee tables, dressers, lamps, armchairs—as mine for the long haul.

Up until this fall, everything I owned had to go into boxes once a year. My possessions were limited to things that could be compacted to fit into a 24-inch cube. This rhythm comes with a sense of anticpa-

tion: I could relocate to another city at the drop of a hat. At this stage of our lives, we should always be ready to move, I am told, and since I moved to boarding school at age 14 I've used mobility as the cornerstone of my identity as an independent young thing.

Letting go of this freedom has been an adventure in commitment; I am beginning to come around to the idea of *having* things. That antique desk still has a ghost-shaped eraser where a drawer pull should be: my first clear memory is of screwing that eraser on circa 1998. I bought myself the succulent on my desk after a break-up. Possessions function as receptacles for meaning and recipients of my impulse to take care of something. All the more to leave behind when I do go.

Before this move, I spent five years with the same ubiquitous dorm furniture. I had five different desks, five different dressers, five different bed frames and mattresses, all probably manufactured in the same factory. By the last iteration I had a system for what went in each of my four desk drawers. I knew just how to layer my various mattress pads for optimum comfort on an XL twin. Other people are sleeping on each of those mattresses now and keeping their underwear in my old underwear drawers. Dorm rooms were wiped clean of history at the end of each year, though the barely visible stains of previous lives refused to entirely come out of their carpets. We were always trying to transcend this transience, this material ubiquity: at boarding school we would Sharpie notes to future denizens into the drawers of our desks: words of encouragement for when the work got too hard and the weather too cold, or anecdotes of past shenan-



gans to which the room had borne witness.

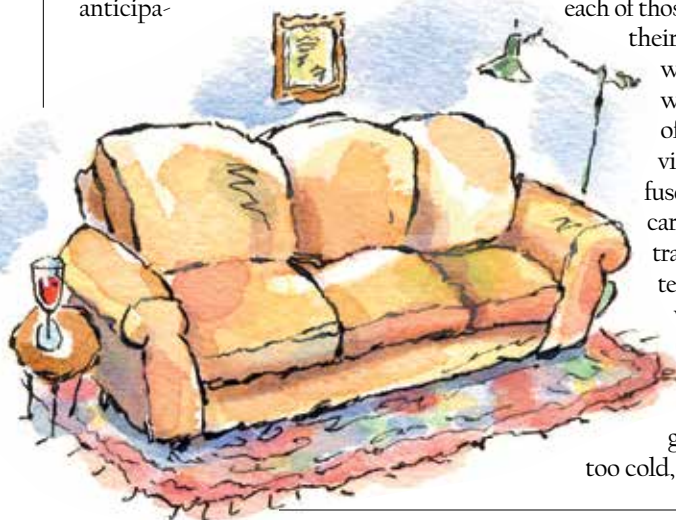
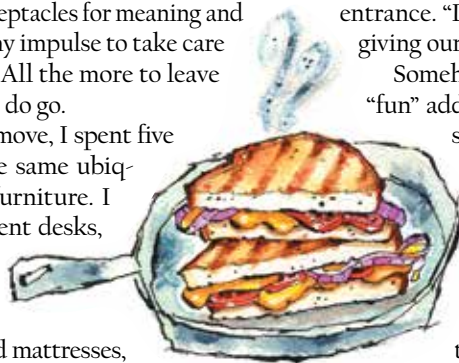
Sophomore year, I lived in a shiny one-room double in newly renovated Dunster House: two desks, two dressers, two beds. Ten square feet of open floor space. It was pristine, but it was also sterile. I felt like I was living in a hotel or a hospital.

You get used to being stared at by the tour groups in the Yard, but when you live in a space that exists as a model for donors you start to feel like a part of the furniture. You have a bed for sleeping and a dining hall for eating and a shower for getting clean. The space in which you dwell was built to satisfy, and to do so with minimal effort on your part. It's not spartan: Dunster has televisions and squash courts and pool tables and a grille—all the things we are supposed to require in order to relax. But the squash courts have big windows and the pool tables are right in the entrance. "Look," Harvard says, "we are giving our students wholesome lives."

Somehow using these supposedly "fun" additions feels like yet another stage for performance. Now we are demonstrating how *relaxed* we can be while still achieving at such a high level. Suddenly the criteria of satisfaction feel like a set of checkboxes on some administrator's list of things a consult-

ing group has decided we need. This brain-in-a-jar lifestyle aligns with Harvard's ethos of packed schedules and intellectual maturation. It makes room for the good stuff by eliminating the time-suck involved in taking care of a space. But after five years of boarding school and college dorm life, I felt like a catatonia patient on an IV drip of food and gym machines and single-ply toilet paper.

THIS YEAR, as a junior, I live in a three-story cube behind Peabody Terrace. It isn't New Dunster: recently a mouse crawled into a box of my winter clothing and died there. The walls are cracked in places and bored with the holes screws left behind. But we have a living room, a kitchen, and a library, each with austere large-paned windows that cast quadrangles of cold sunlight over the grey walls. I sit on my bed as I wake up and feel like the pensive woman in pink in Hopper's *Morning Sun*. Out my bedroom window is the



neighborhood: yards and parking lots and garages spill into one another. I don't have a view of the river, but I can see the Peabody Terrace playground with its newfangled jungle gym, and to its left, the Blackstone Steam Plant's brick industrial mass. There's a community garden next door where the sunflowers grew above my head.

A 2015 *Crimson* op-ed claims that only 2 percent of students, or about 120 people, move off campus. It's a motley crew—students who have taken extensive time off, married undergrads, the rare fraternity brothers who choose to live in their frat house, people with special medical requirements. Harvard's admissions website refers to undergraduates who have been "granted permission" to live off campus as if it's a big privilege, but I just checked a box on an online form.

It was surprisingly easy to extricate myself from typical undergrad life. Most students don't even consider doing so, and those who do are generally put off by perceived obstacles that I don't think are grounded in reality. The general conception is that apartments are only for the really rich kids (though my living expenses for a full 12 months of the year will be exactly \$1,400 more than what Harvard charges for seven months). I get it: it's scary to go off on your own. I was scared. Easier not to.

I'm still learning how to live like a grown-up. I've dragged my friend group along for the ride. In the first weeks when friends came over they would tentatively apologize for failing to bring a bottle of wine or a salad or something, looking at me as if I were some kind of authority on grown-up social etiquette. In reality all of us—me included—felt discomfitingly unsure of whether that was actually an expectation. We were all comfortable bringing half a box of Franzia to a friend's dorm room, but something about an Apartment spawned a different sense of obligation. Mastery of these novel rituals feels more like the real threshold of adulthood than competency in cooking or cleaning. Suddenly everyone around me is clumsily trying to navigate adult social behaviors, the codes of guesthood and ways of occupying each other's spaces that we've watched our parents seemingly execute with effortless style.

But I don't want people to feel they are leaving their comfort zones to spend time in my world. I want my world to extend that comfort zone beyond the buildings accessible only with an activated College ID card. I

want my apartment to be the kind of neutral social space that Harvard knows it can't provide. The spaces that aren't heavily administered by the University itself belong to all manner of smaller institutions, each with its own reputation and code of social behavior. Don't get me wrong: I have deep affection for the buildings of my own organizations. They're a rare privilege unavailable to undergraduates at any other college. They provided a comfortable communal space during my two years in College housing. But I hope I can give my friends a spot that stands outside of Harvard's dense network of formal affiliation and social regulation.

On our free evenings during the dining-hall workers' strike in October, my friends came over for dinner; we made our signature grilled cheese with Colby jack and spicy tomatoes and onions. They came off the skillet one by one, so we ate in turns. Later we retired to the fire escape with a couple of beers and my Bluetooth speakers. There are only two chairs out there (the blue lawn chair



we inherited from the previous tenants and the white-washed wood one borrowed from the *Advocate* building), so whoever was left sat on a towel on the cinder block.

We watched the steam from the Blackstone smokestacks join the clouds for hours. Friends floated in and out throughout each evening, and we joked about rigging up a sensor to my door that would play a bass riff every time someone entered the apartment, like on *Seinfeld*. "I feel like this is the set for the sitcom of our lives," my friend said. This is what I want: to provide the *mise en scène*, but not be its only protagonist.

Our speech habits say it all. "I'm going back to my room," I would say for those years I lived on campus. Or, "I'm going back to Dunster." I don't say this anymore. In the daytime I spend long hours reading in the *Advocate* building. I camp out with my work on the patio of the Carpenter Center and go to class on the third floor of Barker. I hang around the Lampoon in the evening, and then at the end of the night I go home. ▢

Berta Greenwald Ledecy Undergraduate Fellow
Lily Scherlis '18 is looking for a live studio audience.

SPORTS

Bitter Ending

A disappointing finale mars a nerve-jangling season.

IF ANY DOUBT REMAINED that the favored Harvard football team would be in for a real bulldogfight against Yale in the 133rd edition of The Game on November 19 at Harvard Stadium, it vanished with the second-half kickoff. The score was 7-7 and the Crimson offense was scheduled to get the ball to start the third quarter. Having teed up the pigskin on the Elis' 40-yard line, Yale kicker Blake Horn approached it—then gave it a tap with his foot and followed it. When it had traveled 10 yards, thus becoming a free ball (meaning, either team could recover it), Horn pounced

on it. No Harvard player was within yards of him. So it was the Yale offense, not Harvard's, that took the ball and, within four plays, rammed home a touchdown.

The surprise move set the tone for the afternoon. Harvard would tie the game but later miss a fourth-quarter field-goal try that would have put the Crimson ahead. Given its own opportunity to take the lead, Yale cashed in on a three-yard touchdown pass from freshman quarterback Kurt Rawlings to classmate Reed Klubnik with a little more than four minutes to play. The 21-14 margin held up. Yale's win broke a nine-

game losing streak in the ancient rivalry. “We have a one-game winning streak now,” exulted coach Tony Reno after the game.

For Harvard coach Tim Murphy and his charges, it was a bitter end to a season that just eight days before had them on the precipice of a fourth straight Ivy title. Instead, the defeat by its ancient rival, coupled with a similarly heartbreaking 27-14 loss the week before at Penn, dropped the Crimson into third place

in the Ivy standings with a 5-2 conference record, behind the 6-1 marks of co-champions Princeton and Penn. Overall, Harvard finished 7-3. Murphy was clear-eyed in his summation. “The things that prevented us from being a championship team: we struggled to finish defensively and we made too many mistakes offensively,” he said.

Given the grievous graduation losses (including 13 All-Ivy performers) from 2015’s Ivy



Frustrated in regulation by Princeton defenders such as Luke Catarius, Harvard’s quarterback Joe Viviano prevailed in overtime, diving for a one-yard touchdown that gave the Crimson a 23-20 victory.

like to think the adversity we faced strengthens you, so we have no excuses,” the coach said. “The bottom line is that nothing came easy and some of the outstanding, exciting wins we had—we just weren’t able to duplicate that in those last two games.”

co-champions (with Penn and Dartmouth), it was testament to the coaching of Murphy and his staff that the Crimson stayed in the hunt as late as it did. The league was as competitive as it has been in years. “We seem to be in an era of Ivy League football of if not unparalleled parity, at least rare parity,” said Murphy. “Every game is a trap game, and you better get used to it.” This year, Harvard’s final six games were nail-biters. “You

A championship run was on track in the early going as the Crimson vanquished Rhode Island, Brown, and Georgetown (see “Rebuilding...or Reloading?” November-December 2016, page 29). The major curiosity was new quarterback Joe Viviano ’17, who had missed the previous two seasons with foot injuries. As the season progressed, Viviano’s strengths—most notably, his strong arm and his ability to scramble

MATTHEW DESHAW/THE HARVARD CRIMSON

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for first downs—helped keep the Crimson afloat. “Joe really battles,” said Murphy. “He showed that he’s an outstanding leader and a tough kid. We have to be reminded that it not only was it his first season at quarterback but it was his first substantial practice time. The combination of that didn’t allow him and our offense to take the next step that you have to be able to take to score

of 15.6 yards and seven touchdowns, both team receiving highs. On many third downs, Firkser was Viviano’s go-to guy. “Anthony is probably our offensive MVP and definitely one of the most accomplished tight ends/H-backs in our history,” said Murphy—high praise indeed, given that the coach recently produced three players at the position (Kyle Juszczyk ’13, Cam Brate ’14, and Ben Braunecker ’16) who are in the NFL. Murphy thinks Firkser will get a chance to join them. “He has quick hands and—bang!—he’s transitioning to yards after the catch. He transcends whatever his speed is. He plays faster than he is.”

Then came a three-game road stretch. For a non-league game at Holy Cross, with Murphy mindful of the Ivy rigors ahead, the Crimson sat Viviano, Shelton-Mosley, and lead running back Semar Smith ’18. The 27-17 defeat was not only the season’s first loss but also the Crimson’s first road defeat after 16 road wins and 16 non-league victories. On the ground, the Crusaders limited the Crimson (led by quarterback Tom Stewart ’19) to 29 yards in 26 carries. The paltry result was a microcosm of Harvard’s off-and-on rushing woes. The Crimson employed a running-back-by-committee approach, with Smith, sophomores Noah Reimers and Charlie Booker, and freshman Lavance Northington (“a quarterback by trade,” noted Murphy) all at times taking the plunge. “I thought our running-back group did a very solid job,

HM Explore More

For an online-only article about The Game, see:

“We’ll Get ‘Em Next Year”

Watching the Harvard-Yale game from the sidelines with Crimson football’s faculty fellows

harvardmag.com/football-fellows-16



KIT WU/THE HARVARD CRIMSON

In its victory over Cornell, Harvard unleashed a gang-tackling defense in which cornerback Wesley Ogsbury (10) and linebacker Luke Hutton (35) helped limit the Big Red to 80 yards on the ground. Hutton will captain the 2017 team.

points in general—to finish drives and to win championships.”

In Week 4 Harvard dispatched Ivy rival Cornell at the Stadium 29-13. With the defensive line pressuring Big Red quarterback Dalton Banks, the Crimson forced three Cornell turnovers, including an interception on the game’s first play by linebacker Anthony Camargo ’19 and two more by safety Tanner Lee ’18. “Our defensive line—led by seniors James Duberg, Miles McCollum, Langston Ward, and Doug Webb—gave us a chance to compete and to be in every game,” said Murphy. (He might have added to the list energetic sophomore DJ Bailey, who led the team with seven sacks.)

Against the Big Red, tight end/H-back Anthony Firkser ’17 was unguardable, nabbing eight catches for 90 yards and a touchdown. The sure-handed Firkser would finish the season with 45 catches (second on the team only to the 48 of star wideout Justice Shelton-Mosley ’19) for a spectacular average gain

All-Ivy cornerback Raishaun McGhee was a one-man gang at Dartmouth, making a crucial interception and taking down Big Green receiver Houston Brown for one of his 14 tackles.



GIL TALBOT/HARVARD ATHLETIC COMMUNICATIONS

when we got everybody healthy,” the coach said. “None of them had the overall experience and health to sustain us on their own.” (It didn’t help that three-fifths of the previous season’s offensive line had graduated, although the holdovers—Max Rich ’19 and Larry Allen ’18—remained formidable.)

Murphy’s sacrifice of a non-Ivy game might have paid dividends the next two weekends. On a rainy day at Princeton, the battle with the Tigers left fans of both teams soggy and limp. The regulars were back, but they were eclipsed by a new Crimson star: wide receiver Adam Scott ’19, seeing his first action after injury. “When we got Scott back, we gave people a lot of problems as to who to cover,” Murphy said. The 5-foot-7, 165-pound Scott seemed to be the one player on the field who had his footing, grabbing eight passes, including a 34-yarder, on which he put a diabolical move on his Princeton defender and sailed into the end zone. That gave Harvard a 14-0 lead, but the Tigers relentlessly battled back to make it 17-17 at the end of regulation. In the overtime, Princeton was awarded the ball first but had to settle for a field goal after linebacker Luke Hutton ’18 made a clutch third-down pass breakup. Now it was the Crimson’s turn to get the ball. On third down, Viviano scrambled to the Princeton three. Two plays later, he dove and stretched the ball over the goal. Touchdown! Game over! Harvard 23, Princeton 20.

The next week at Hanover, the Crimson again jumped to a 14-0 lead, then withstood determined Dartmouth for a 23-21 win. The star this time was hard-hitting defensive back Raishaun McGhee ’17, who made a game-high 14 tackles and whose intercep-

tion on the opening series set up Harvard's first touchdown. Back in Cambridge (finally!) in Week 8, the Crimson scored three third-quarter touchdowns to overhaul upset-minded Columbia 28-21.

At this point Harvard was 7-1 overall and, at 5-0, the lone unbeaten in the Ivy League. "I was very happy with our team at that point but there just wasn't enough substance to finish it off. That all comes back to me," said Murphy. In a Friday-night showdown at Penn, the Crimson battled back from a late 14-6 deficit, with Viviano tossing a 26-yard touchdown pass to Joseph Foster '17, then scoring the tying two-point conversion himself by catching a pass from Shelton-Mosley (who had been handed the ball by Northington). But in the remaining three minutes the Quakers used a drive deftly engineered by All-Ivy quarterback Alek Torgersen and a fumble recovery to score two touchdowns to win 27-14.

Still, title hopes were very much alive when Harvard squared off against Yale. On a balmy day before a rare sellout crowd, there was neither a fumble nor an interception. In the first period, the Crimson uncharacteristically threw only one pass (incomplete). The early action was dominated by the two punters, Harvard's Zach Schmid '18 and Yale's Alex Galland. In the first half, there were 11 punts (six by Galland), many of them pinning the foe in the shadow of his own goal line. It took a while, but the Crimson was the first to break through. Viviano hit Scott for a 28-yard gain to the Yale 27. On the next play, Viviano handed the ball to Booker, who bounced off a Bulldog defender and ran down the sideline into the end zone. Jake McIntyre '20 kicked the extra point. Harvard 7, Yale 0.

Yale was resilient. The Elis went 10 plays in four minutes and 18 seconds. The highlight was one of the most ingenious plays of the season. Facing fourth and four from the Crimson 19, Reno sent in the holder on his field-goal team, Andrew Johnson. Johnson



lined up right behind center, took the snap, ran toward the line—and flipped a jump pass to receiver Leo Haenni, who snatched it just before it hit the ground. Said Murphy later of this play, called "Full Polecat": "We practiced against it and we just got sucked in." Four plays later Alan Lamar ran a yard for a touchdown. Galland kicked the extra point. Harvard 7, Yale 7, at the half.

The second half featured the deviously brilliant onside kick, which was followed shortly by a 28-yard, Rawlings-to-Klubnik touchdown pass. Harvard came right back. Viviano took his offense 84 yards in 10 plays, the two biggest being a 36-yard toss to Firkser and a 34-yarder to Shelton-Mosley that brought the ball down to the Yale 2. On third down, Viviano found tight end Ryan Halvorson '17 in the end zone. McIntyre again added the point. Harvard 14, Yale 14.

Then came a tale of two opportunities, one squandered, one cashed in. Pinned at its three-yard-line after another artful Galland punt, the Crimson mounted a 16-play drive at the end of the third and the beginning of the fourth quarter that consumed nearly seven minutes. It ended in a 35-yard McIntyre field-goal attempt that missed—wide left. Rawlings then led the Elis on a nearly seven-minute drive of their own. Harvard simply couldn't hold them. On third and goal from the Harvard three,

Rawlings hit Klubnik for the game-winning touchdown. Galland booted the point. Yale 21, Harvard 14. Four minutes remained, but in two possessions the Crimson never seriously threatened. For the first time

Surrounded by Yale defenders and with teammate Anthony Firkser (42) in support, Harvard tight end Ryan Halvorson (85) gathered in a one-yard scoring pass from quarterback Joe Viviano. The third-quarter touchdown forged a 14-14 tie.

in 10 years, when the final whistle sounded, it was the Eli supporters who surged from the stands to celebrate.

It was at least consolation that Harvard maintained its streak of winning a minimum of seven games. It now stands at 16 years, a mind-boggling record of excellence. "We take great pride in that," said Murphy. He will now focus on building another championship team—and beginning a new winning streak in The Game.

TIDBITS: Linebacker Luke Hutton of Austin, Texas, and Leverett House, was voted the 144th captain of Harvard football. In 2016, the economics concentrator led the team in tackles with 56. His ascension marks the thirteenth straight season that a defensive player will captain the Crimson....Harvard had two unanimous selections for the All-Ivy first team: wide receiver Justice Shelton-Mosley and defensive tackle James Duberg. Other first-team selections were offensive linemen Larry Allen and Max Rich, and tight end Anthony Firkser. The Crimson also placed four on the second team (including Hutton), and four others garnered honorable mention....Tim Murphy is second all-time in Ivy wins, with 115, behind only the 135 of Yale's iconic Carmen Cozza....The all-time record in The Game now stands at Yale 66 wins, Harvard 55 wins, and eight ties....The 2017 season will open on Saturday, September 16, at Rhode Island. ~DICK FRIEDMAN

Harvard Hardwood

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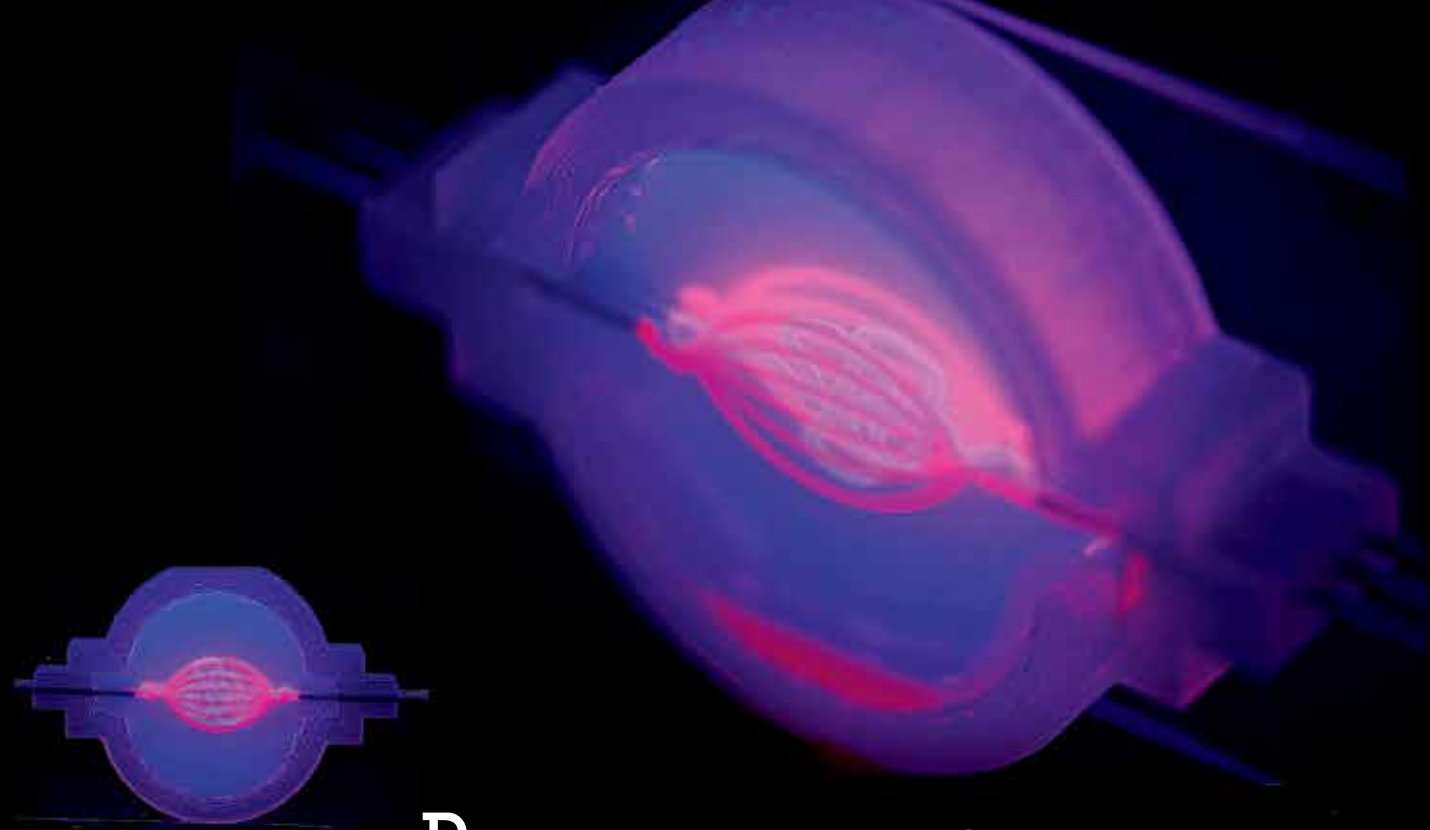
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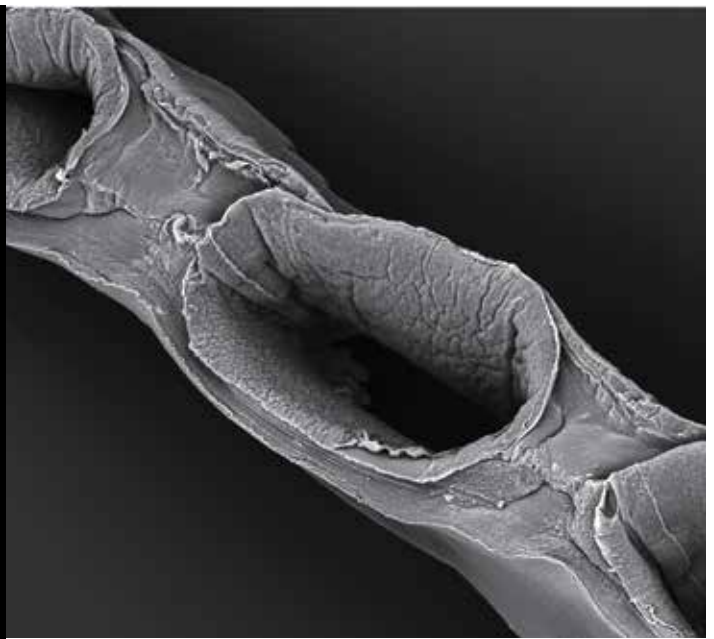
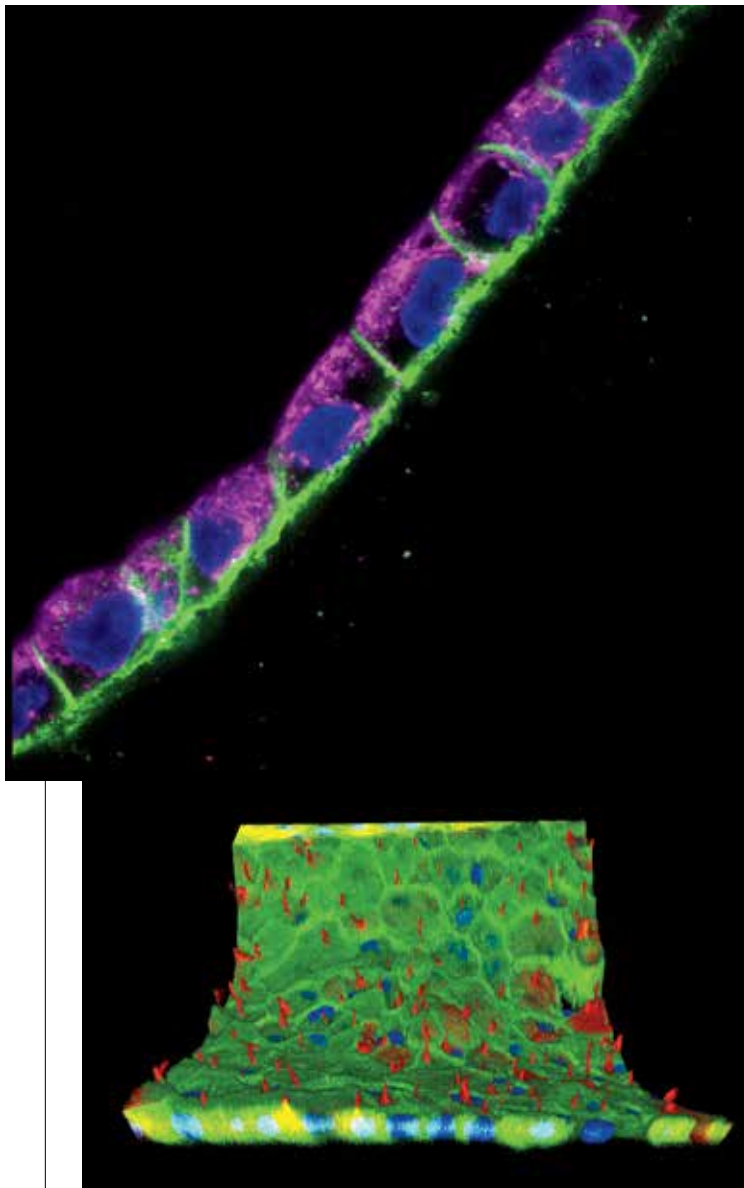
BUILDING TOWARD A KIDNEY

JENNIFER LEWIS'S QUEST TO
ADVANCE 3-D ORGAN PRINTING

BY LYDIALYLE GIBSON

"ALL RIGHT," says David Kolesky, Ph.D. '16. "The moment of truth." As many times as he's done this, there's still always that pause. Wearing blue latex gloves and a white lab coat, Kolesky is about to see what the morning's work has yielded. In front of him on a glass slide is a two-inch chip maybe a quarter-inch deep that he and two lab-mates spent the past few hours making: a translucent rectangle filled with a gelatinous mix of proteins and fibers mimicking the body's extracellular matrix, the molecules that give support to living cells. And snaking through the middle of it, invisible for the moment, two tiny tubular structures, each a hundred microns or so in diameter (about the width of a human hair)—both produced on the massive black 3-D printer standing a few feet away. One of those tubes, the straighter of the two, will be transformed into a working blood vessel. The other will become something called a proximal tubule, a subcomponent of a nephron—the basic structural and functional unit of the kidney.

Kolesky is a postdoctoral researcher for materials scientist Jennifer Lewis, the Wyss professor of biologi-



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cally inspired engineering at the Harvard Paulson School of Engineering and Applied Sciences and a faculty member in the Wyss Institute for Biologically Inspired Engineering. Lewis's work using 3-D printing technology to fabricate human tissues—"bioprinting," she calls it—is increasingly important in the emerging field of tissue engineering, a science whose ultimate aspiration is to build three-dimensional tissues and entire organs that can repair or replace a patient's damaged liver, or heart—or kidney: Lewis and her bioprinting team, whose core members are Kolesky and fellow post-docs Kim Homan and Mark Skylar-Scott, recently constructed a functioning proximal tubule; an October *Scientific Reports* article laid out the details. Inside the proximal tubule's convolutions, 65 to 80 percent of nutrients are reabsorbed and transported from the renal

Confocal microscope images (above and top) show hair-like primary cilia (in red) protruding from the cells lining a proximal tubule, and a cross-section of tubule tissue, with cell nuclei in blue and expressed proteins in green and purple. At right are multiple tubules, printed side by side and sliced, seen under a scanning electron microscope.

filtrate back into the bloodstream. It isn't a whole kidney yet—it's not even a whole nephron—but it's a key subunit, a piece of a piece. It's a start. "We're breaking the nephron down into these modular units," Lewis says, "laying the foundation for the building blocks. We're testing the structure and function of the modular units with ultimately the goal of trying to assemble a single nephron."

And from there, eventually, a kidney. That's the dream.

But many steps lie in between—and many unanswered questions. And so Lewis is careful not to overuse the "big O-word": organ. Not to over-promise. "We're still so far away," she says, from that first fully functioning organ printed in a lab. Along the way, there are very real advances to be made. Bioprinted tissues can offer a more precise platform for modeling disease and screening new drugs. Scientists can see not only whether those drugs work but understand exactly how, in an environment that replicates actual tissue behavior more closely than a two-dimensional layer of cells spread out on a dish, or even animal models. Right now, one in five drugs fails in Phase III clinical trials. That's a huge failure rate, Lewis says. At that late stage, these potential drugs have been put through multiple layers of preclinical and then clinical testing, with hundreds of millions of dollars and long years of research sunk into their development. "We want to provide a fail-fast step," she says, "to assess drug toxicity early." (And not only for the kidney: recently, she collaborated with Wyss Institute colleague Kevin Parker on a report in *Nature Materials* showing how they used 3-D printing to create a "heart-on-a-chip" model with embedded sensors capable of measuring cardiac tissue responses to drugs and toxic compounds.)

Still, though: the dream is printing *organs*. And Lewis's work during the past four years has cleared some difficult hurdles. In 2014, she and several team members, including Kolesky and Homan, published a paper in *Advanced Materials* describing a way to print tissues made of human cells and vasculature inside an extracellular matrix. For years, this had been a stumbling block in tissue engineering: without blood vessels to carry nutrients in and carry waste out, cells locked in the interior of a printed tissue soon die, even as those along the edges flourish and multiply. The study was a major breakthrough—"our first home run," Lewis

says—and she and her team followed it up last fall by constructing their proximal tubule, a winding, hollow tube that filters nutrients into the bloodstream.

Back in the laboratory, Kolesky, flanked by two undergraduate research assistants with instruments at the ready, pulls two metal pins out from either side of the 3-D-printed chip, releasing a clear liquid from inside the tubes to reveal the two channels they've printed: the vascular one and the more serpentine proximal tubule. And suddenly now they're visible, two perfect thin lines running the length of the chip, white against the milky-gray translucence. Later, Lewis's team will flow in human epithelial cells, which will stick to the interior walls and grow and proliferate. One channel the scientists will steer toward becoming a proximal tubule, the other toward becoming a blood vessel. Today's work is part of a broader experiment to see whether Lewis's team can encourage a proximal tubule to interact with new blood vessels. "In the regions where they're very, very close, we should see proteins being transported from the kidney side, the tubule, to the vasculature, the blood vessel," Kolesky says. "That's exactly what happens in the body. And that's what we're trying to make, something that actually behaves like a vascularized proximal tubule."

Jennifer Lewis (left) with her bioprinting team: Mark Skylar-Scott (seated), David Kolesky, and Kim Homan

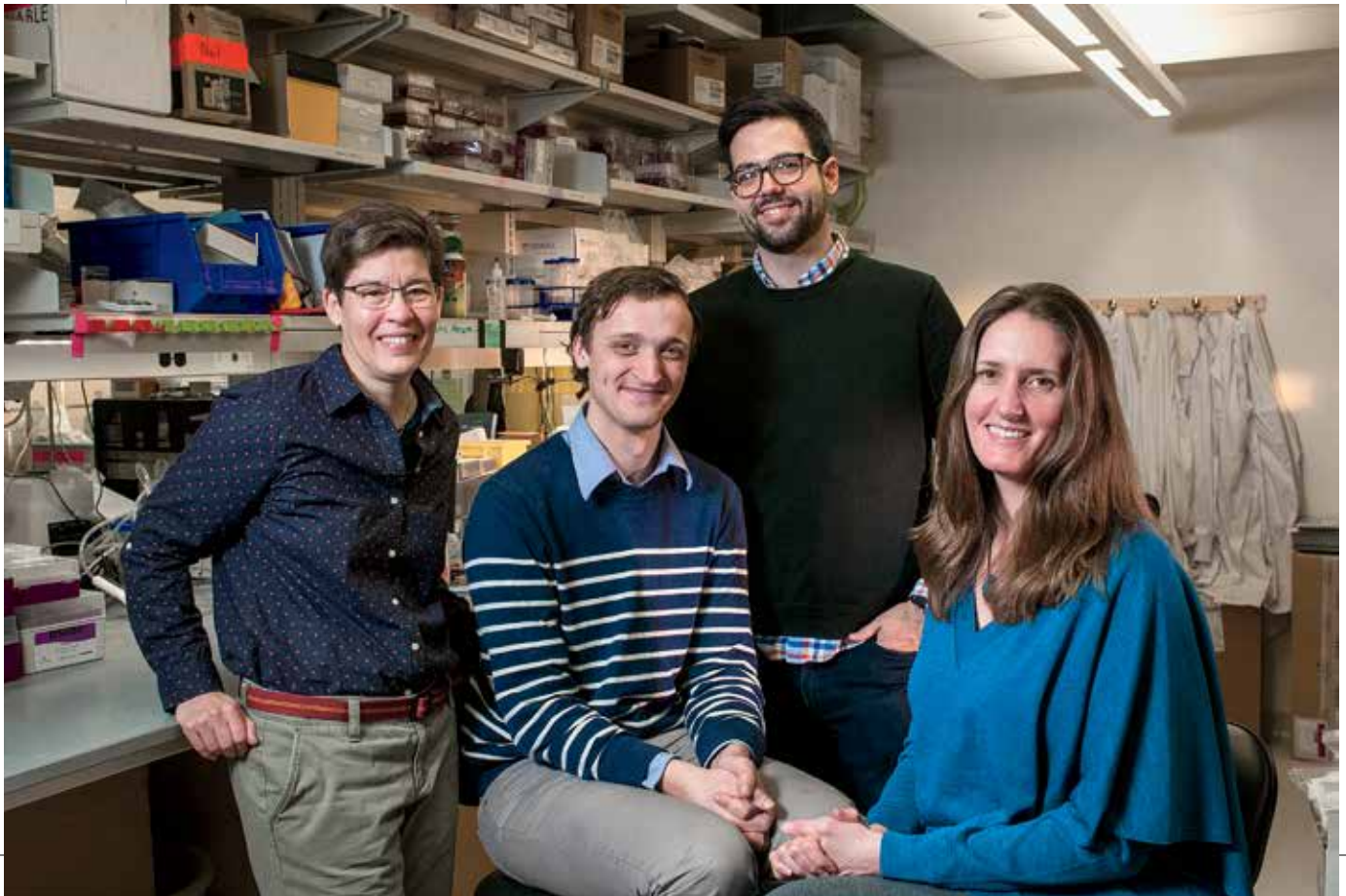
THE FIRST 3-D printers appeared about 30 years ago. In 1984 an American engineer named Charles Hull patented what he called a stereolithography

LEWIS IS CAREFUL NOT TO OVERUSE THE "BIG O-WORD": ORGAN. NOT TO OVER-PROMISE. "WE'RE STILL SO FAR AWAY" FROM THAT FIRST FULLY FUNCTIONING ORGAN PRINTED IN A LAB.

apparatus, a machine that could make solid objects by "printing" them out in thin layers laid one on top of another. The "ink" in Hull's machine was an acrylic liquid that turned hard when exposed to ultraviolet light. The earliest applications for this technology were industrial: computer-designed prototypes for complex parts in airplanes and cars and other vehicles, customized equipment components that could be made quickly and cheaply and on demand. Inventors could test out their creations without much upfront manufacturing cost.

These days, 3-D printers are everywhere—in stores and offices and homes (the first desktop 3-D printer went on sale in 2009)—and they make all kinds of things: earrings and necklaces, eyeglass frames, fitted insoles and midsoles for running shoes, smartphone cases, action figures (and not just of superheroes—customers can upload photos and have figures made of themselves), souvenir replicas of the Eiffel Tower and the Statue of Liberty and Michelangelo's *David*. Car bodies and concrete walls for houses can be built with 3-D printers, which can print plastics, metals, ceramics, wax, and even food.

The technology has long been used in medical settings too, to



JIM HARRISON

custom-build stents, prosthetics, hearing aid shells, acrylic dental crowns, orthodontic braces, and detailed surgical models on which physicians can practice. In 2014, doctors in the Netherlands saved a woman's life by replacing most of her skull with a 3-D-printed one made from plastic.

The first person to print out *biological* materials was Thomas Boland, a biomedical engineer who in 2003 filled the ink cartridge of a Lexmark inkjet printer with collagen, and later *E. coli* cells, and then mammalian cells from rats and hamsters. Ninety percent of the cells remained alive after printing.

The chase to build a fully functioning human organ began in earnest in 2007, when Gabor Forgacs, a biological physicist at the University of Missouri, printed spherical particles containing several different types of chicken heart cells onto large sheets of gel-laden paper. After they were printed, the cells began to coalesce into a single structure, like droplets of water coming together. And then they began to beat.

LEWIS EXUDES the coiled energy of an athlete at rest. With her close-cropped hair, wire-rimmed glasses, and button-down shirts rolled to the elbow, she is amiably intense. Even when she's seated at her desk, you feel like she might be on the balls of her feet.

She started out not in biology, but materials science. Raised just outside Chicago, she went to college at the University of Illinois

IT WASN'T HARD TO SEE THAT THIS METHOD, INSPIRED BY BIOLOGY, MIGHT HAVE BIOLOGICAL USES.

at Urbana-Champaign and as a freshman joined the ceramic-engineering program. Later, at MIT, she got a doctorate in ceramic science. Ceramics are inorganic and nonmetallic, and they possess unusual diversity and breadth of behaviors: they can form electronic components, ultrasound transducers, high-temperature insulation—like the tiles that coat the space shuttle—as well as window glass and pottery.

After MIT, Lewis returned to Urbana-Champaign in 1990, where she established her own research group and, working with materials scientists Scott White and Nancy Sottos, developed a self-healing plastic that could repair itself over and over when damaged, not unlike the way human skin does. The researchers' approach was to embed a three-dimensional network of microchannels throughout the material—like veins and arteries—so that when a crack formed, a liquid healing agent inside this nexus would wick toward the damage and polymerize. Essentially, it would form a "clot."

To create those microchannels, Lewis and her colleagues at Illinois used a 3-D printable ink that would melt when it was heated. But in 2011, Lewis began formulating a new ink, one that

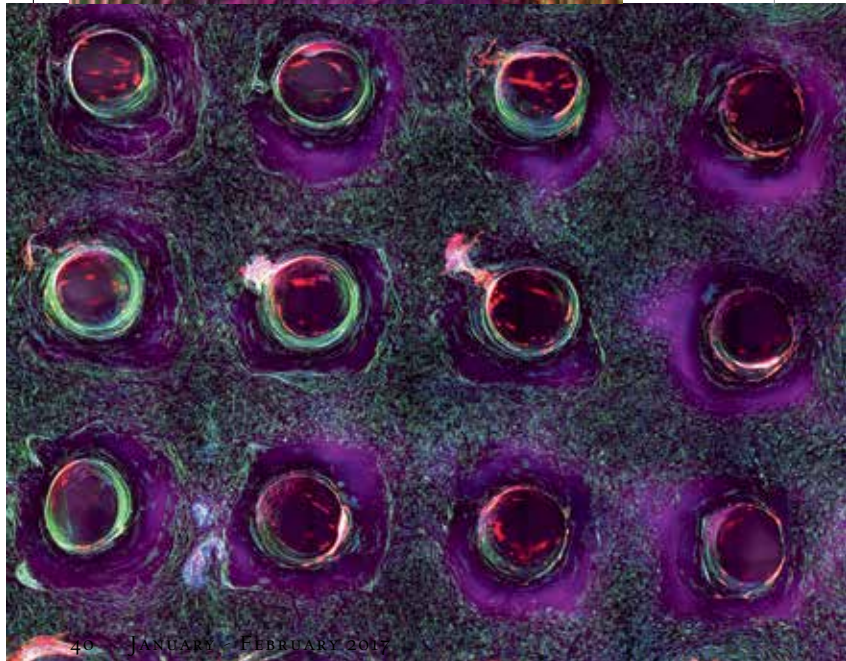
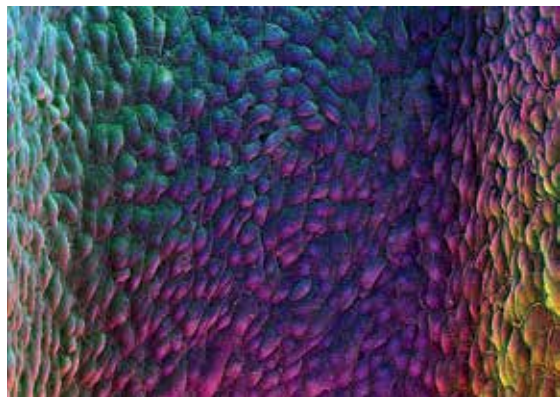
at room temperature had roughly the consistency of toothpaste but turned to liquid when cooled to just above freezing. Using this ink, she could print hydrogels (supportive gelatinous substances) filled with elaborate vascular networks, then lower the temperature until the ink liquefied and remove it, leaving a system of open channels. Lewis coined the term "fugitive ink" to describe her innovation.

It wasn't hard to see that this method, inspired by biology, might have biological uses.

In 2013, Lewis came to Harvard, with bioprinting on her mind. "We moved here primarily to launch this entirely new effort," she says, "building on our expertise in materials, in design of materials, in 3-D printing of materials." Before arriving in Cambridge, she had never worked with cells directly in her own lab. Several graduate students made the cross-country move with her; among them was Kolesky, who scrapped his original doctoral focus in materials science to do a thesis on bioprinting of vascularized human tissues. "We're materials scientists gone rogue," he jokes.

Bioprinting isn't the lab's only focus: her team is also involved in soft electronics, robotics, and composites, all relying on 3-D printing. The two dozen graduate students, undergraduates, and postdocs have printed wearable soft sensors, antennas made from conductive silver nanoparticles, and rechargeable microbatteries on a millimeter scale to power small wireless sensors and medical devices. In 2016 her lab, led by Skylar-Scott, pioneered a technique for printing 3-D metal structures in midair—without the supportive sub-

Confocal microscope views of printed tissue: at left, a "confluent layer" of densely packed cells inside a sliced-open proximal tubule; below, a cross-section of bone-like tissue with rows of blood vessels, which other cells migrate to and encircle closely



JAMES WEAVER

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strate previously required—and, collaborating with Wyss Institute researcher Robert Wood, built the first-ever completely soft, autonomous robot, in the shape of an octopus. Nicknamed “octobot,” the small and surprisingly charismatic pneumatic device was made from silicone gel and powered by a chemical reaction that pushed gas through the chambers in its rubbery legs. The work was published in *Nature*. That same year, Lewis and her team used a hydrogel composed with cellulose fibers to create a series of “four-dimensionally printed” flowerlike structures that change shape when they’re immersed in water—twisting, ruffling, and bending the way plant leaves do in response to environmental stimuli.

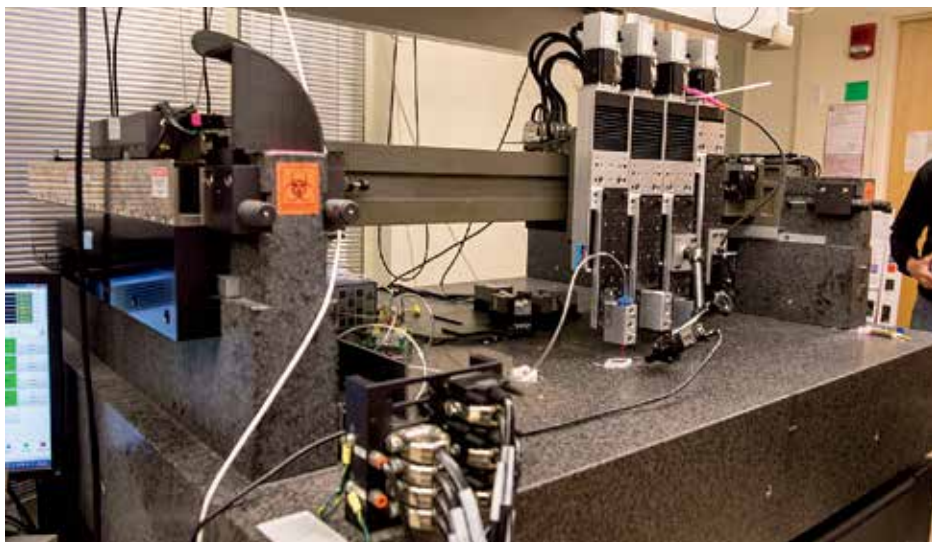
Increasingly, though, the central focus of Lewis’s research is tissue engineering. (In October, the Wyss Institute launched a cross-cutting initiative aimed at 3-D organ engineering, co-led by Lewis and Christopher Chen, who runs Boston University’s tissue microfabrication laboratory.) The 3-D printer Lewis’s team uses for bioprinting, one of four printers in her lab, is colossal. It sits on supports at the back of the busy maze of her lab: a black enormity with a granite base that weighs a ton and a half—the weight provides stability for the printer’s fine-scale work. Above sit the ink dispensers, mounted on four rectangular steel plates that can move independently, allowing for multiple inks to be sent through the tiny nozzles at the bottom of each dispenser. A tangle of tubes and wires connect the dispensers to the printer, whose motion is controlled by a computer that sits just off to the left.

In February 2014, almost a year to the day after her arrival at Harvard, Lewis and her team published the *Advanced Materials* paper describing how fugitive ink could be used to print channels for tissue vasculature. “That was the big advance,” Kolesky says. “That made everything else possible—this sacrificial material that templates out a channel, and then just goes away,” leaving an opening for the team to inject with cells to line its walls. Skylar-Scott, who came to Lewis’s lab with an undergraduate degree in electrical engineering and a Ph.D. in biomedical engineering, offers a bit of context: every cell in the human body is only about 200 microns away from the nearest blood vessel, he says. Even the thinnest tissues, like skin, are highly vascularized, covered in nerve endings and capillaries.

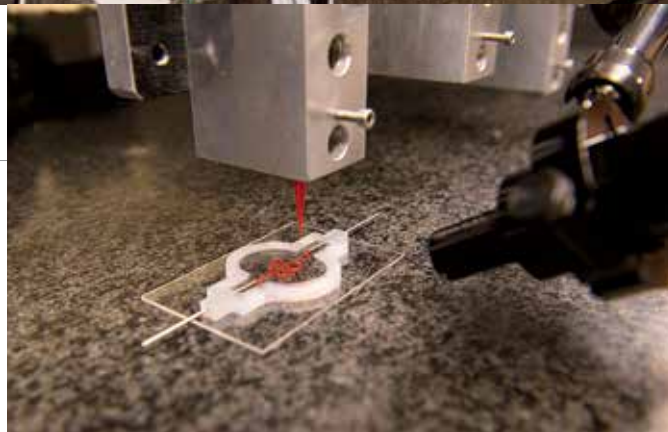
Homan explains further: “The reason this ink was so critical is because other fugitive materials require high temperatures or other crazy treatments for removal that would kill the cells nearby.” Lewis’s requires only 10 minutes in the fridge.

Then last year in *Proceedings of the National Academy of Sciences*, Lewis’s team demonstrated the effectiveness of their bioprinting approach by creating a multi-layer tissue, more than a centimeter thick (most other printed tissues have been less than a millimeter thick), combining vasculature with printed human stem cells that ultimately become a bone-like tissue. “We differentiated these

Weighing a ton and a half, the 3-D printer’s granite base provides stability for the team’s fine-scale work. The four ink dispensers move independently and deposit different inks through tiny, pipette-sized nozzles.



JIM HARRISON

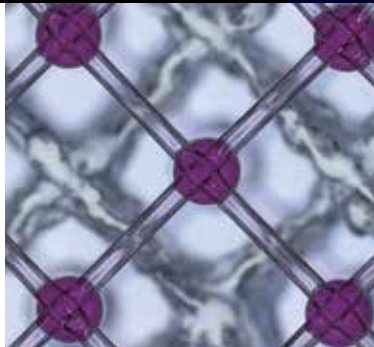
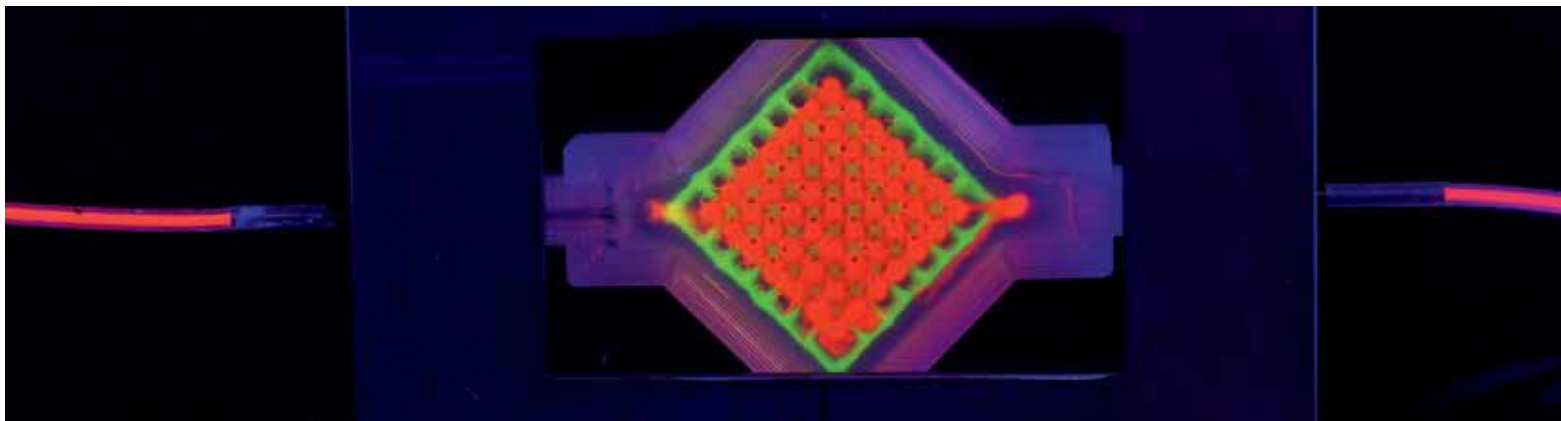


JIM HARRISON

cells down an osteogenic pathway, so they started laying down calcium phosphate, the primary mineral in bone, within the tissue,” Lewis says. The tissue survived for more than six weeks. Inside the chips, cells reorganize, they grow, they take on a life of their own and remodel their environment. “We went up to about a centimeter cubed thickness,” Kolesky says. “That’s about 10 times thicker than what people have been doing—and we’re not sure what the limit is, or if there is a limit.”

STRUCTURE MATTERS. The difference between a single layer of cells on a two-dimensional dish and full-fledged, fully functioning tissue, even if it’s just a centimeter thick, is tremendous. “They take on a significantly different morphology,” Homan says. “They behave in such different ways.” In the paper they published last fall on printing proximal tubules, Lewis and her team showed that the cells in their 3-D system grew taller than in a monolayer of kidney cells on a dish. Hair-like structures called microvilli, which stick out into the center of the tube and absorb nutrients and other media flowing past, were much longer and more robust in the 3-D cells, and the extra-long primary cilia, sometimes missing from cells raised on a dish, were clearly visible.

Until a few years ago, the mainstay of biological research was a cell culture on a dish. As Skylar-Scott explains: “That’s where all these pathways were found, where a lot of drugs were tested, and starting in the early 2000s, around the same time as the Genome Project, a few key organisms”—the *C. elegans* worm, the fruit fly, the zebrafish, the mouse, the chimpanzee—“were selected for close study so that we could use them as three-dimensional



Clockwise from left: a top-down microscope view of Lewis's fugitive ink (in purple) and cell-laden grayish ink within a gel matrix; 3-D-printed tissue embedded with vasculature, which Lewis's team kept alive for more than six weeks; a cross-section of that centimeter-thick tissue; and top-down and cross-sectional views, under a confocal microscope, of a printed vascular channel lined with endothelial cells (red) inside a supportive gel matrix (green)

models to gain an understanding of biology. So essentially you have these half-dozen studied-to-death organisms because biologists realized that 2-D cell culture was just not telling them how things really work. We don't exist as a single cell type on a flat surface. Cell-to-cell signaling isn't just a byproduct of biology; it is biology. And it doesn't exist in a dish."

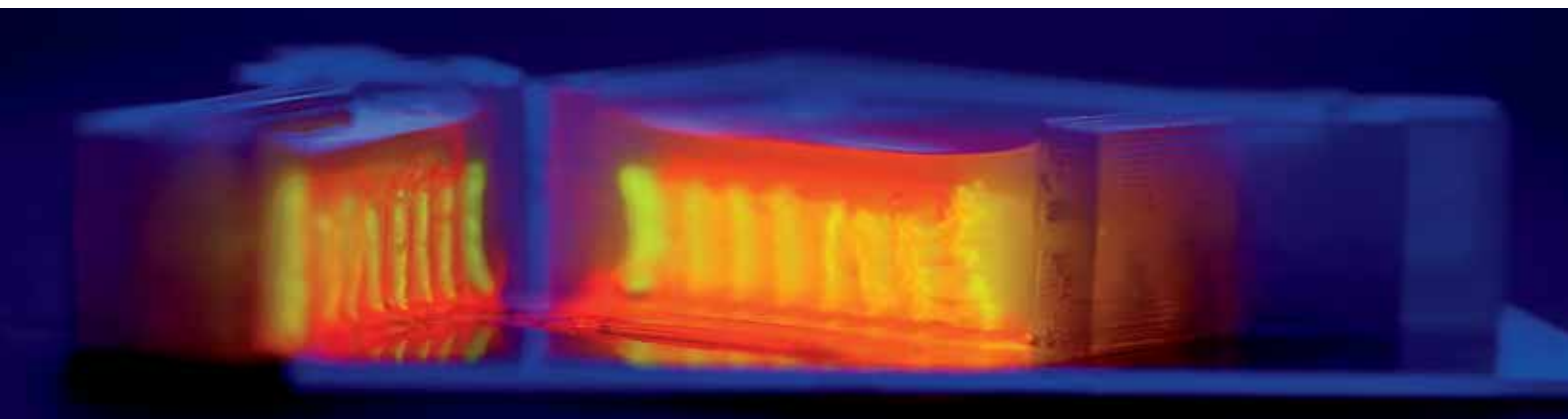
Lewis and her team began working on the kidney a little more than two years ago, after they decided to take the "moonshot" toward the O-word. Having already shown that they could print tissue and keep it alive for months at a time by threading blood vessels through it, Lewis wanted to focus on tissue that would not merely be "demonstrative," she says, but also functional. As Homan puts it, "Functionality is the point."

Kidneys are badly needed. Of the roughly 120,000 Americans on the national organ-donor waiting list, more than 100,000 are waiting for kidneys. Every year 4,500 people die without transplants. As the population ages and obesity increases, there are ever more patients with diabetes or on dialysis, or with acute kidney failure. (Lewis's kidney research is funded in part by the Swiss pharmaceutical company Roche, and Annie Moisan, a Roche scientist with whom Lewis began collaborating two years ago, coauthored the *Scientific Reports* study.) In a 2015 talk at Dartmouth, Lewis described some of the emails she and her team had begun receiving from ordinary strangers out in the world, people she didn't know who happened to hear about her work. The talk's moderator, Dartmouth computer scientist Dan Rockmore, asked her whether in the course of fabricating living tissue, she had ever heard from people accusing her of playing God. No, she said. "I get the more heartbreaking letters, actually: 'My daughter or my son—' and 'When is this going to be available?' And we're still such a long way from something that can have an impact in the clinic....But those are the emails that are difficult. Because you

want to be able to help people. And they motivate you."

Shaped like a long, curving filament, the proximal tubule is a complicated piece of renal architecture. Circulating drugs and their metabolites can accumulate in high concentrations there, and when the kidney is damaged, proximal tubules are most often the site. "This is a foundational building block," Lewis says. But it's not the only one. There are other important subunits to build: the glomerus, where the nephron's filtering process begins, and the Bowman's capsule that surrounds it, and other, smaller components. "Right now we're trying to construct a single nephron," Lewis says. In a human kidney, there are a million of them. "But once you have the nephron, then it gets interesting. Once you can say, 'We can construct a nephron and it's fully functional'—and to be clear, we're not there yet—then it's like saying, 'We have a transistor.'" She searches through the files on her computer and brings up an image of a graph with a line sloping sharply upward. "Here's the first transistor, in 1947," she says, pointing. That was the year it was invented, at Bell Labs. "It took 25 years just to get to this, a single solid-state transistor," the basis of all computer chips. "And from there, it took very little time for this rapid upward trajectory, so that now you have computer chips made of *billions* of transistors....Right now, we're still here at the bottom. We have a part of one nephron. But we're getting closer to having a complete one—and once we've got one, the key question is, will it follow this same trajectory? I don't know. But this is illustrative. It tells you what might be possible."

As the team moves from the proximal tubule to other components of the kidney, there are basic science questions to be asked and answered about how, precisely, kidneys function. "We've never before been able to put two tubules close together to see vectorial transport—the mechanism by which nutrients are sent back into the bloodstream and everything else is sent to the urine," says Homan. "There are a ton of questions." A central one relates to the problem of scaling up: in other words, figuring out just how much of the kidney, as it exists in the body, must be replicated in order for a replacement kidney to work. There are about 150 billion cells in an adult kidney, and the organ's microvasculature, Skylar-Scott says, "probably stretches from here to San Francisco"—do scientists have to print every one? That would take days and days of continuous printing, and cells can survive for only a couple of hours outside their nourishing media. "We set a timer as soon as we lift the cells off the plate" to print them, he says. "You watch the timer and you work fast. It takes more than one person to do

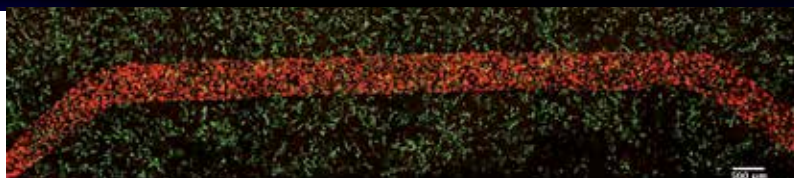


this. That's why it's always been a team effort amongst us." Adds Homan: "You really don't want to bioprint alone." Meanwhile, printing cells too quickly can damage them.

A similar question of scaling confronts the formation of vasculature. "The smallest blood vessels that we print are usually about 400 microns in diameter," Kolesky says. The very thinnest ones they've printed are about 75 microns. "But the smallest blood vessels in the body are 5 to 10 microns. If we have to build a tissue capillary by capillary, it's going to take forever....Can we print the larger-scale blood vessels and have the smaller ones assemble on their own?" In the body, that process is called angiogenesis. Lewis likes to describe it using an analogy: "We lay down the highways," she says, "and then let the cells create the smaller roads and driveways." Skylar-Scott explains, "If you take your arteries and arterioles and veins and stretch them all out, they probably wouldn't reach the end of this room. But you exponentially grow in length when you get down to the scale of capillaries. That's when you're talking about hundreds of thousands of miles of those tiniest blood vessels throughout your body." In creating vasculature, the aim is to encourage biology to build as much of the tissue as possible.

"WE WANT TO ELUCIDATE WHAT PART OF THE ORGAN WE HAVE TO PRINT," LEWIS SAYS, "AND WHAT PART WE CAN LEAVE TO BIOLOGY."

The same principle goes for entire organs. "We want to elucidate what part of the organ we have to print, and what part we can leave to biology," Lewis says. "The stem cells themselves are going to interact with the matrix around them and lay down their own matrix. They're going to grow and proliferate, and differentiate into different cell lineages....We really don't want to construct an entire organ, cell by cell, capillary by capillary. That's a daunting challenge. But what we don't know yet, what we haven't yet teased out, is how far down the path we have to go before biology will do the rest, before you can implant something in a patient that the body will accept. What are the right cell types to print and with what spatial precision and what density? How close to that billion cells per milliliter do we need to get to recapitulate function?" When is a kidney a kidney?



IN A DARKENED, closet-sized room off the lab, Homan sits gazing into a monitor attached to a confocal-laser scanning microscope. On a dish under the lens are cross-sectional slivers of proximal tubules, which, after living and growing inside the chip for four weeks, have been sliced up and stained with antibodies that attach to specific proteins. "We chop it up to see what it's been doing, what properties it's exhibited, and how it's behaving at a protein-expression level," she says. She's looking to see if the cells in the proximal tubule are functioning the way they would in the human body. It's slow, careful work. Not every

sample yields an answer, and it can take hours for Homan to find what she's looking for. When she activates the microscope's laser, the antibodies light up if the protein is present: blue, green, red, purple. "I look for a lot of things: cell height, how tightly packed they are, any sign of contamination, how well the cells stain, if the stain is supposed to be on one side of the cell versus the other side....

We also look at their uptake: we might send a protein into the tube while it's still in the incubator and then look at the cells' ability to uptake that protein."

Today she's scanning for six or eight different proteins. "We're looking for that," she says, bringing up a microscope image taken from an earlier sample. It's gorgeous, almost like a photograph captured from space: a chain of tightly packed cells curving up and to the right, blue-stained nuclei encased in walls of green and purple, each color representing a different protein. "It's nice, right?" Today, though, she's still looking. Hours later, she's refilled her water bottle and eaten a banana and a cup of yogurt. She returns to the microscope. "I'm going to keep at it," she says. ▢

Lydialyle Gibson is a staff writer and editor at this magazine.

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (9)



IN FLIGHT

*Documenting the refugees fleeing
war to seek safety in Europe*

PHOTOGRAPHS AND CAPTIONS BY MACIEK NABRDALIK



IN THE FALL of 2015, Maciek Nabrdalik, a Warsaw-based documentary photographer, turned to a contemporary humanitarian crisis: the plight of refugees fleeing ceaseless wars. Nabrdalik, a Nieman Foundation fellow at Harvard this year, is studying migration.

Describing this project, he has written, “They first appear as small, undefinable spots on the horizon. Nobody knows exactly when and where they will appear—but what is certain is that they keep coming. Several dozen times a day. Within an hour, usually, those spots begin to come into focus. Those spots are humans. Fifty heads—side by side. Fifty stories, tragedies and dreams clustered in small black rubber dinghies, which set sail from the Turkish coast toward Europe. They escape from Syria, Af-

SKALA SIKAMINEAS,
LESBOS, GREECE

Refugees from Syria rest on the coast of the Greek island of Lesbos. Thousands of refugees cross the Aegean Sea from Turkey in rubber boats every day, fleeing conflicts in Syria, Iraq, and Afghanistan.

A Syrian refugee who came to Lesbos that week by one of many boats told me his new life had just started. “New life as a human being,” he added.

I hope he will not question this emotional sentence on the long way to a new home even though there are signs from the first seconds of their arrival that the refugees didn’t land in a paradise.

Every boat that comes to the island is greeted by two groups. There are dedicated volunteers who work in shifts during day and night to help refugees in their first hours in Europe—and then there are also groups of “engine hunters,” as they are called here. Very often they come first. They only care for the boat. The engines are removed before the last person is taken care of. Business is business.

It was a long week full of almost surreal scenes...



ghanistan, Iraq, Somalia, fleeing war, fear, and poverty. For some, these couple of kilometers of the Aegean Sea will be the most expensive journey of their lives. Many people see this first contact with Europe as a rebirth. They rejoice in the help that they receive in the beginning of a new, better life. But maybe they don't think about the real journey, which is just beginning. A journey in which their identities, their reasons for escaping, once again

become a blur. For at least several weeks, these people will become a shapeless migration mass, associated by European Union countries with 'imposed quota policies,' a dangerous, foreign wave of immigrants flooding Europe. They will face weeks of waiting, arduous journeys on foot, by train, bus. They will experience bleak conditions, uncertainty, humiliation and pain. But their persistence will endure."

His work was first exhibited locally at the Harvard Ed Portal last fall.

~The Editors



Visit harvardmag.com to explore more of Maciek Nabrdalik's photographs of refugees in flight in Europe.



(Clockwise from above)

SKALA SIKAMINEAS, LESBOS, GREECE

Two overcrowded dinghies are about to land on the coast of the Greek island of Lesbos after crossing the Aegean Sea from Turkey.

We were told this day would be quiet. The day before we heard a few reasons why: the weather was supposed to be bad, the prices for the life-changing boat trip were going to be higher than the day before, and, finally, the celebrations of Eid al-Adha were going to stop the traffic for some time. None of these changed the situation. By 9 a.m., we saw at least 15 boats like these. Each person had to pay around \$1,000 for this chance.

MYTILENE, LESBOS, GREECE

Thousands of refugees board two overnight ferries to Athens to continue their exhausting journey through the Balkans to northern Europe.

SKALA SIKAMINEAS, LESBOS, GREECE

A group of refugees walk toward Eftalou, a small village on the north coast of Lesbos, where the volunteers provide necessary aid and direct them toward Mytilene, the island's capital.

They will soon realize that these few kilometers are just the beginning of their long journey. For the next two weeks they will mainly walk, wait, commute between borders, and sleep in temporary camps before they will reach their destinations.

Williamina Fleming

Brief life of a spectrographic pioneer: 1857-1911

by ALAN HIRSHFELD

As 22-year-old Williamina Paton Fleming steamed across the Atlantic toward Boston in November 1878, she had no idea how brightly the stars overhead would shine in her future. One of nine children of a Scottish craftsman and his wife, she already knew the cold reality of family survival. Her father had died when she was seven; at 14, she had become a student teacher to help support her mother and siblings. At 20, she had married a Dundee bank employee and widower, James Orr Fleming, 16 years her senior—who would abandon her and their unborn child shortly after her arrival in the United States. Despite it all, “Mina” Fleming would rise to a key position in Harvard’s astronomy program and be hailed as the nation’s preeminent woman astronomer.

In mid 1879, she became a maid in the home of Edward C. Pickering, director of the Harvard College Observatory. (That she named her son Edward Charles Pickering Fleming reveals both the gravity of her situation and her gratitude to her employer.) Impressed by her vigor and lively intellect, Pickering gave her part-time clerical work and, in 1881, added her to the observatory’s permanent staff.

Fleming arrived at a fortuitous time. Pickering, who served 42 years as observatory director, sought to bring industry-inspired efficiencies to the exploration of the cosmos. His research protocol, aided by an 1886 bequest from the widow of New York amateur astronomer Henry Draper, swapped out the human eye for a camera at the operator’s end of the telescope. By night, Harvard astronomers photographed stars and nebulae; by day, specially trained office workers—“computers”—inspected and analyzed the images. For that task, Pickering hired women, believing them better suited to such repetitive drudgery, and he placed Fleming in charge. (Legend says that he took his own advice after angrily telling a male employee that his housemaid could do a better job.) She is reputed to have been a spirited, if stern, ruler of her pocket Amazonian domain.

Augmenting the observatory camera was a spectrograph that projected onto a single photographic frame the spectra of dozens of stars. The burgeoning collection of spectrum plates became the wellspring of much of Fleming’s scientific work. By identifying distinctive features within each star’s spectrum, she and Pickering developed a classification scheme to distill the multitude of stellar spectra into categories. For the first edition of the *Draper Catalogue of Stellar Spectra*, in 1890, Fleming classified 28,266 spectra of 10,351 stars on 633 plates—by far the most extensive star compilation of the era. (Later editions raised the number of entries to more than 300,000.)

She also served as the observatory’s production manager: writing, editing, and proofreading research papers, annual reports, and data tables, as well as the voluminous *Annals*. In her personal journal, she lamented the conflicting demands on her time: “If one

could only go on and on with original work..., life would be a most beautiful dream; but you...use most of your available time preparing the work of others for publication.” She did publish the results of her own investigations, though, and was among the few women who participated in research conferences. In 1898 she received an ovation from a national gathering of astronomers after Pickering related her heroic work ethic. During her career, she discovered 10 novae, 59 gaseous nebulae, and more than 300 variable stars, plus the iconic Horsehead Nebula in Orion. She also recognized the existence of hot, Earth-sized stars later dubbed white dwarfs.

Meanwhile, she advocated for more women in astronomy. Her 1893 article “A Field for Woman’s Work in Astronomy,” published in the journal *Astronomy & Astrophysics*, declared, “While we cannot maintain that in everything woman is man’s equal, yet in many things her patience, perseverance, and method make her his superior.” She also challenged the salary discrepancy between the sexes. (The base wage for female computers at Harvard was 25 cents an hour, far less than entry-level men earned.) In a journal entry made after confronting Pickering, she wrote: “I am immediately told that I receive an excellent salary as women’s salaries stand....Does he ever think that I have a home to keep and a family to take care of as well as the men?...And this is considered an enlightened age!”

Work and family exerted counter-tugs. “My home life,” she wrote, “is necessarily different from that of other officers of the University since all housekeeping cares rest on me, in addition to those of providing the means to meet their expenses. My son Edward...knows little or nothing of the value of money and, therefore, has the idea but that everything should be forthcoming on demand.” Whatever complaints she harbored in private, though, the public Fleming engaged life with brio: hosting dinner parties, attending the theater, and cheering at Harvard football games.

In 1899, she became “Curator of Astronomical Photographs”: the first Corporation appointment ever made to a woman. Seven years later, she became the first American woman elected to honorary membership in England’s Royal Astronomical Society. Despite “trying illnesses,” she traveled to a California conference in September 1910 and then worked until her final hospitalization, for pneumonia, the following spring. Her own words provide a fitting epitaph: “Labor honestly, conscientiously, and steadfastly, and recognition and success must crown your efforts in the end.” ▽

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.



Facets of Williamina Fleming: her Observatory domain; a formal portrait; in the center of her “computers” at play (above) and at work (where Edward Pickering stands at far left); and a 2015 Hubble Space Telescope infrared image of one discovery, the Horsehead Nebula


"Feelings Ought to



Be Investigated"

Deidre Lynch on the cult of Jane Austen
and the complexities of loving literature

by Spencer Lenfield



"JANE AUSTEN'S FICTION AND FANS" is a class so well-liked that its instructor has been forced to put it on pause. "It grew so much in my first two years at Harvard that it has almost become too big to do it anymore," says Deidre Lynch, Bernbaum professor of literature since 2014. "The problem is that the materials we use in Houghton Library are getting worn away by the wear and tear." She asks her students to examine primary evidence—the scrapbooks, commonplace books, and custom-illustrated texts of everyday nineteenth-century readers—to analyze the reading lives of people in Austen's time: their habits, tastes, quirks, interactions. In addition to writing essays on her novels, students discuss the modern fan culture surrounding Jane Austen: how it changes perceptions of her writings, how today's fans differ from earlier "Janeites," and the sometimes tense relationship between Austen scholars and Austen adulators.

Lynch's class closes with a choice of assignments: students can interpret a work of Austen fan culture, past or present, or they can create *their own* work of fan art inspired by Austen's writings, accompanied by a self-analytic essay on process, method, and results. The results, she says, are delightful and instructive: "Somebody recomposed the music to a film adaptation; other people have written songs; one person, with totally charming results, made Harriet Smith's box of favorite treasures [from *Emma*], and then put a treasure in it for each of the Austen heroines—what *they* would keep in a box of keepsakes." For the better part of a semester, Lynch heightens awareness of the distinctions between Austen fandom and Austen scholarship, and then asks her students to transgress them in the name of learning. "I think students now love making things, and like to feel as if they are participants in, rather than mere observers of, literary culture."

Fans may sometimes do some silly things, but understanding fannish behavior is necessary to making sense of Austen's novels, contends Lynch, who has made her name as a scholar of the eighteenth-century novel. Her first book, *The Economy of Character*, traced how readers' expectations of characters transformed amid the emerging culture of mass

audiences for novels. Her 2000 edited collection, *Janeites: Austen's Disciples and Devotees*, argues that "there are more productive things to do" with the adaptations, reviews, rewritings, and appreciations of Austen that have accumulated in nearly two centuries than merely adjudicate between "faithful and unfaithful" readings. For example, Lynch points out that an obsessive devotion to books and the authors who write them is rife in the novels themselves. *Northanger Abbey's* Catherine Morland devours Gothic novels; *Sense and Sensibility's* Edward Ferrars says Marianne Dashwood would "buy up every copy" in London of the poets James Thomson, William Cowper, and Walter Scott if only she had the money. Reading habits define other characters' personalities: in *Pride and Prejudice* alone, Mr. Bennet is said to never be without a book, Elizabeth spurns the Misses Bingley's card game in favor of reading a book alone, and Lydia and Kitty gape aghast when Mr. Collins, who never deigns to read novels, reads Fordyce's sermons aloud to the family in a monotone.

Lynch is quick to add that fan culture is neither a recent phenomenon nor limited to Austen. Indeed, throughout the eighteenth century and into the nineteenth, readers reacted to novels by Samuel Richardson, Henry Fielding, Frances Burney, and Walter Scott—all less prominent than Austen's today, though wildly popular at the time—with the entire range of passions and behaviors now seen on Twitter, Tumblr, and online fan platforms like DeviantArt and Archive of Our Own. "Readers would write to Samuel Richardson: 'Don't let Clarissa die! Please, please! Have her marry!'" she explains. "And then they wrote alternate endings for *Clarissa* and expected him to accept them."

Yet Lynch is no uncritical fan of fans. She looks with a cool professional detachment at fan love, and at the readings and misreadings that spring from its ardent flames. Her scholarly interest in fans and readers speaks to a fascination with the power they have wielded over literature since the dawn of mass print and consumer culture—not as merely passive receivers, but as dynamic forces in the literary world. Much of her published work seems driven by twinned sympathy and skepticism: she knows what

it's like to love a piece of literature, but is unconvinced that love is always a straightforward or good thing.

Lynch wants to know *why* so many self-declared partisans of literature believe that love is the most meaningful relationship with a work of literature. She herself is unwilling to presume it has always been that way and wants to re-open alternative possibilities that may have fallen by the wayside. In her 2015 book *Loving Literature: A Cultural History*, she points out that the notion that readers not only can but *should* love literature is a fairly recent assumption, born of the late eighteenth century. Moreover, that new norm displaced other, earlier relationships to literature—for example, the view that literature is principally *useful* for learning to do things or be good, or that it teaches readers to be more eloquent, or helps create a sense of group identity.

This new imperative to love literature took root at roughly the same time as English literature was first accorded the dignity of professional study in universities like Oxford and Cambridge, using methods that had previously been applied only to ancient languages. Lynch argues that these two historical events converged. Studying English became both a kind of work *and* a kind of love, and so the relationship between work and love was complicated from the very beginning for scholars in the field. Do scholars need to love their work? Or is their work better when untainted by emotion? With only a few small changes, modern academics have inherited this messy conundrum in more or less the same form.

Many people aren't sure exactly what literature professors *do*, or how their research generates knowledge in the way that a physicist's or an historian's does. Lynch's point is that answering those questions demands exploring the relationship among emotion, work, and literature, because they were historically connected. Understanding this shift is as important to English as understanding the emergence of the Baconian method is to the sciences: it changed the structure of how scholars explain what they do. Lynch has skewered more than one person for quoting words from Austen out of context; nevertheless, what Henry Tilney tells Catherine Morland in *Northanger Abbey* comes to mind to describe what she does: "Such feelings ought to be investigated, that they may know themselves."

IT IS OFTEN ALLEGED that the people who teach literature in high school and college take the fun, magic, and love out of reading. Through an insistence on abstract and abstruse concepts—ranging from metaphor to meter to Marxist literary theory—they ignore and too often quash those very aspects of fiction, poetry, and drama that inspire and move students. The humanities are in crisis today because no one in the profession really cares about literary quality anymore; they would rather sound off about culture and politics, veering onto turf that properly belongs to historians, anthropologists, philosophers, and economists. If only such teachers and scholars recommitted themselves to imparting the love of reading, literary studies would be returned to their rightful place in the university and in contemporary culture at large—a golden age of literate discourse. But they don't and they never will, because deep down they have forgotten what the love of literature feels like, or perhaps they never knew it to begin with.

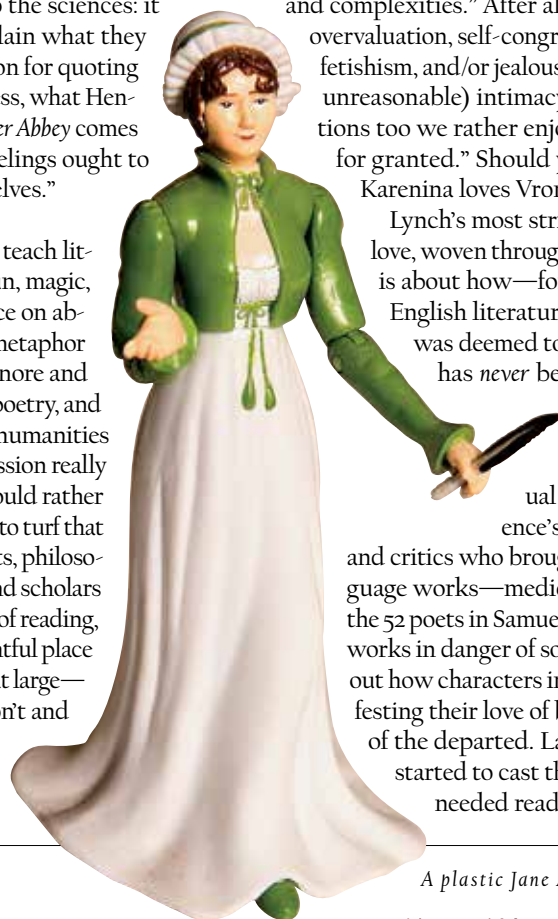
It is against these attitudes, which can be found in newspapers and magazines on the left and the right, as well as in movies and even novels (a short list: A.S. Byatt's *Persuasion*, Peter Weir's *Dead Poets Society*, Zadie Smith's *On Beauty*, Noah Baumbach's *The Squid and the Whale*), that Lynch chose to write *Loving Literature*. Her book takes the long way around in making its case. It is a work of literary history; it is not an op-ed. Her chapters focus on the emotional negotiations in the work of the eighteenth-century medievalist Thomas Warton, who checked out one-ninth of the books in the Bodleian Library; the quarrels over whether Samuel Johnson was a true lover of books or not; the clockwork reading habits of people who claimed to reread all the Austen novels every year or a poem of Wordsworth's every day. It is a slow apologia for, by, and about the professor of English, not meant for those looking for a retaliatory sound-bite. "It's not going to be a crossover book, and it wasn't written as a crossover book," she admits.

But it *was* meant for literature students who are wondering why they do what they do, and what place belongs to love in the scholarly life. Lynch wants to complicate the view that there is simply "a separation of a specialist caste of interpreters from a general reading public and the divvying up of meaning and feeling, knowledge and pleasure, between the two." Most scholars do love reading, and are stung by the suggestion that they don't; most non-scholarly readers think about issues of historical context, message, and style when they read.

That story of separation also papers over the problems not just with detached critical reading, but with love-driven reading as well. "The phrase 'the love of literature' gets used as though its meaning were transparent and as if the structure of feeling that it designated were wholly healthy and happy," Lynch writes in her introduction. "It is as though those on the side of the love of literature had forgotten what literary texts themselves say about love's edginess and complexities." After all, love can involve "misrecognition, overvaluation, self-congratulation, aggressivity, transference, fetishism, and/or jealousy[;] it too brings with it (sometimes unreasonable) intimacy expectations, [and] in these relations too we rather enjoy taking the presence of the other for granted." Should you love your books the way Anna Karenina loves Vronsky?

Lynch's most striking story of partially pathological love, woven through several chapters of her monograph, is about how—for scholars and non-scholars alike—

English literature was no sooner formulated than it was deemed to be in danger. In other words, there has *never* been a time when English literature wasn't, for one reason or another, dying; and yet it has survived since at least the time of *Beowulf*, a perpetual convalescent created out of its audience's literary hypochondria. The scholars and critics who brought together a canon of English-language works—medieval romances, Shakespeare's plays, the 52 poets in Samuel Johnson's *Lives*—presented them as works in danger of some degree of oblivion. Lynch points out how characters in Gothic novels are constantly manifesting their love of bygone works as if they were ghosts of the departed. Later, the Romantics and Victorians started to cast the great literary dead as figures who needed readers to need them—an attitude that



A plastic Jane Austen figurine from Lynch's collection

still thrives today in fears of so-and-so (insert Spenser or Shakespeare or Milton) being “forgotten” from the English curriculum. “Literature is never more lovable than when at death’s door,” she observes. Before we think about how to “save literature,” we should call into question why we’re so invested in seeing the species as endangered, and whether it actually is.

LYNCH GREW UP as a compulsive reader surrounded by a family who rarely read and moved frequently from town to town in the Prairies of Canada. She describes herself as “a Brontë-mad kid—I read *Wuthering Heights* over and over again in my early teens,” who exhausted at least one small-town library and loved “binge reading”: “I’ve always loved reading in series...Before there were box sets, I wanted literature to be like box sets, I guess.” Her father was a pilot for Air Canada; her mother had emigrated from England just before the Depression and still owned her family’s copy of Dickens’s *Pickwick Papers*. Lynch attributes the unusual spelling of her name (Deidre, both syllables long: “dee-dree”) to her mother: “I think this was a little protest against marrying into an overwhelmingly Irish-Canadian family. She says it’s the Breton version of the name; I think she’s making that up!”

As an undergraduate, Lynch studied at the University of British Columbia, where she ended up choosing English over French; though she loved both literatures, and French (a required language for government jobs in Canada) was in some ways more practical, she wanted to be reading novels and poetry rather than taking linguistics and speech classes. She continued to graduate school in English at Stanford, where she studied with the critics John Bender and Terry Castle. (She also met her husband, Tom Keirstead, an historian of medieval Japan who is currently Reischauer visiting professor of Japanese studies at Harvard.) “I came to graduate school sure that I would write about George Eliot or Virginia Woolf,” she recalls, “but then I had my mind blown by how different the eighteenth-century novel was.”

Eighteenth-century prose fiction has often been cast, most famously by the critic Ian Watt, as “the rise of the novel”—a set of steady developments toward the escalating psychological realism (now associated with the novels of Jane Austen) that eventually culminated in the interiority of twentieth-century novelists like Woolf and James Joyce. In the dissertation that ultimately became her first book, *The Economy of Character*, Lynch overturned that notion, arguing that eighteenth-century audiences understood character not on a spectrum between round and flat, but rather between general and specific, where for a long time “economical” characters composed of a few deft strokes were the most admired, and “overcharged” characters were even more of a danger than nondescript ones. They came out of a world where commerce was reorganizing class and gender, public and private, to place more value on the distinguishable individual—and making characters the drivers of fiction helped cope with those changes.



The distinctive Lynch approach to literature is probably this: take some deeply held, apparently commonsensical idea about literature (characters should be round, fiction should be loved), and point out that it wasn’t always so: that what seems axiomatic in our current view of literature actually evolved more recently and contingently than we might have imagined, and we need not be bound by the conceptual equipment with which the past has furnished us. Lynch’s research occupies an interesting place in English studies. Her work is located at the confluence of several significant trends in literary criticism within the past 20 years. She was trained at a moment when New Historicism was widely influential: the movement—born of the belief that knowledge of historical context is necessary for a full understanding of literature—often compared canonical works with more ephemeral pieces of their contemporary culture in order to explore the workings of power

in a society. Slightly later, as a young faculty member, she found her work dovetailed neatly with that of a growing group of scholars interested in analyzing readers and their reading habits, as well as the material form of books (paper, bindings, type), in a field now generally called “book studies.” And *Loving Literature* was published at a moment when academics have begun to label a diverse range of new ways to analyze readers’ individual responses to literature under the name of “affect theory.”

Yet her writings deliberately avoid easy identification with a single camp or movement. Lynch’s prose, while densely charged with active verbs, quietly avoids much of the technical vocabulary that marks out various schools of literary theory (and for which English professors have been, perhaps unjustly, pilloried for several decades). She mentions that she works hard to eschew jargon, and wants her prose to give her readers aesthetic pleasure. Nancy Glazener, a professor of English at the University of Pittsburgh who attended graduate school with Lynch, says, “We were part of a generation that wanted to produce a less ponderous, more agile way of thinking about literary texts and culture in history, and didn’t want to just line up behind certain Big Man theorists.” For her part, Lynch is frustrated by her sense that too often, in English departments, expressing an interest in one subfield or theory involves disavowing another. “I’m not convinced that you *have* to choose,” she insists.

LYNCH CAME TO HARVARD in 2014 after previous positions at SUNY-Buffalo, Indiana University, and the University of Toronto. (She mentions in passing, with audible frustration, that she is still trying to get her green card, and still thinks of Toronto as home—“It’s a great city.”) In Toronto, at least two of her students liked her class on the eighteenth-century novel so much that they got tattoos inspired by Richardson’s *Clarissa*. She has quickly earned students’ devotion at Harvard as well; the class of 2016 named her one of their favorite professors. Her colleague Leah Price, Higginson professor of

English literature, writes in an email, “Deidre’s skepticism about the plot of *Dead Poets Society* has not prevented her from crowding Harvard classrooms with self-identified Janeites or from reaching students outside the humanities.” Lynch muses that there’s something special about “undergraduates especially, their readiness to ignore historical distance and make things incredibly relevant to their lives—I love that... It can’t be all that they do, but I love that they do it.”

She is one of the nine faculty members who teach Humanities 10, the year-long introductory literature course aimed at freshmen. Each professor lectures at least once and leads a weekly discussion session of 10 students. This past semester, Lynch chose to assign Austen’s *Emma*—the novel about a well-to-do young woman who trusts a little too much in her own matchmaking skills. She contemplates in advance about how students are going to hear what she says: “What preconceptions about Austen are the students going to come with, and what other ways of seeing her should I introduce?” The popular view of Austen has changed over the course of Lynch’s career: while the novels used to be taken by readers like Virginia Woolf and W.H. Auden as masterpieces of ironic detachment, the two decades of film adaptations (hallmarked by the 1995 BBC production of *Pride and Prejudice*) have made Austen’s popular image far more sentimental. When she began teaching in the early 1990s, Lynch observes, “Austen wasn’t as Hollywoodized—and I certainly used to have more men taking Austen than I subsequently had.”

Fanny can seem excessively self-flagellating and moralizing—survival strategies for a girl placed among an unfamiliar higher class.

Lynch refuses to let herself collapse into stereotype, however: she neither sneers at warm and gooey readings of Austen, nor lets those readings persist undisturbed when she finds them. “Education is often about making people uncomfortable—waking them up so that they can’t sit slack-jawed going through the motions,” she asserts. “But I think you’re always hoping to build on the attachment and affection that people feel toward their reading matter. You just want to teach them to have multiple reasons for those attachments.”

This compromise between (the words cannot be avoided) sense and sensibility helped pilot Lynch’s attentions toward her latest project, which came out last October: an annotated and illustrated edition of Austen’s *Mansfield Park*—the final volume in Harvard University Press’s series The Jane Austen Annotated Editions. The format of the Harvard edition, which is just shy of coffee-table size, lets Lynch bring some of her love of using tangible artifacts in the classroom into the hands of a wider audience. For example, “Austen’s narrator tells us there was a collection of ‘transparencies’ on the wall. Well, what are transparencies? You can get one and illustrate it.” Though the material details of Austen’s world are dismissed by some critics as costume-drama ornament, Lynch argues forcefully in her new edition that Austen in *Mansfield Park* takes an innovative interest in using objects to deepen the representation of the heroine’s inner life. She points out in her 40-page introduc-

tory essay that the protagonist, Fanny Price, uses her collection of keepsakes as a kind of therapeutic tool to avoid trauma: “With their assistance, she conjures a version of the recent past in which even the ‘afflictions’ have become possessed of ‘charm.’”

It is the least telegenic of the Austen novels, “the ugly duckling of the canon,” as Lynch puts it: Fanny has neither money nor beauty, and in contrast to the iridescently witty and irreverent consciousness of Lizzie Bennet, she can often seem prim and meek. (Fanny notoriously spends much time and energy insisting on the immorality of staging an amateur play, an episode that even Lionel Trilling, the novel’s most famous fan, admitted “can seem to us a mere travesty of virtue.”) In recent years, the novel has been attacked for a complacent, conservative, and imperialist social vision as well. Lynch says that taking it on was a kind of “rescue fantasy”: “It’s absolutely brilliant and much misunderstood—it’s a little Fanny Price in itself.”

Any effort to bolster the reputation of this least sentimental of Austen’s novels, Lynch acknowledges, must focus to some extent on its protagonist. Interestingly, she does this by excavating precisely those qualities in its heroine that seem to call out most strongly to the sympathies of a modern reader. Her Fanny Price is a victim recovering, and the novel “an exploration of a damaged psyche.” Fanny can seem excessively self-flagellating and moralizing, but these are common survival strategies for a girl suddenly placed among an unfamiliar higher class. And where other Austen heroines lack one or another kind of impor-

tant erotic self-knowledge at the outset of their stories, Fanny knows her own desires from the very beginning: “She has given her heart away. She has done so without sanction, without questioning, either, that this heart is her own to give,” Lynch writes. Coming to grips with *Mansfield Park* may, then, demand that we find *more* to like in Fanny, or at least a bit more of the modern mind. Lynch gives sentiment at least a few inches here to take root.

In her latest work, Lynch seems to reject the idea that a scholar needs to find the perfect middle ground between analytic distance and emotional proximity, as if they are opposite ends of a spectrum. Instead, she sets about finding new ways to configure those two approaches, as if they were building blocks—the “history of the literary affections” found in *Loving Literature*, the defense of *Mansfield Park*. “One of the narratives of graduate study is that you love literature when you’re an undergraduate, and then—graduate students themselves say this—then you get to graduate school, and they teach you to hate it,” Lynch reflects. “I don’t actually think that’s true, but I wonder if it becomes a self-fulfilling prophecy.” She remembers a colleague telling her once when she was up for tenure, with surprise, “I read your book and you *do* love literature!”—as if it were proof that “my character was good or something like that, that there was this ethical question as well as an intellectual or professional question.” She doesn’t think that any of those three categories applies straightforwardly to the study of literature. “I don’t want to use literature to teach critical thinking solely, but I don’t want simply to say that literature is for us to become attached to. Let’s expand our sense of what literature is for.” ▢

Spencer Lenfield ’12, currently a fellow at Dumbarton Oaks, is a contributing editor of this magazine. He profiled Danielle Allen in the May-June 2016 issue.



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Daguerreotype of Renty, an African-born slave, taken by J.T. Zealy in 1850. Commissioned by Louis Agassiz. Peabody Museum, Harvard University.

To learn more about the day and the live webcast, please visit **www.radcliffe.harvard.edu**.

DO PEOPLE BEHAVE DIFFERENTLY when they think they are being watched? When former National Security Agency contractor Edward Snowden revealed the mass surveillance of American citizens in June 2013, the question suddenly grew in importance. Can the behavior of an entire population, even in a modern democracy, be changed by awareness of surveillance? And what are the effects of other kinds of privacy invasions?

Jon Penney was nearing the end of a fellowship at Harvard Law School's Berkman Klein Center for Internet & Society in 2013, and he realized that Snowden's disclosures presented an opportunity to study their effect on Americans' online behavior. During research at Oxford the following year, Penney documented a sudden decline in Wikipedia searches for certain terrorism-related keywords: *Al Qaeda*, *Hezbollah*, *dirty bomb*, *chemical weapon*, and *jihad*, for example. More than a year later, when the study ended, such searches were still declining. "Given the lack of evidence of people being prosecuted or punished" for accessing such information, Penney wrote in the

bases its surveillance on this fact. It *wants* people to self-censor, because it knows it can't stop everybody. The idea is that if you don't know where the line is, and the penalty for crossing it is severe, you will stay far away from it. Basic human conditioning." The effectiveness of surveillance at preventing crime or terrorism can be debated, but "if your goal is to control a population," Schneier says, "mass surveillance is awesome."

That's a problem, he continues, because "privacy is necessary for human progress. A few years ago we approved gay marriage in all 50 states" (see "How Same-Sex Marriage Came to Be," March-April 2013, page 30). "That went from 'It'll never happen' to inevitable, with almost no intervening middle ground." But to get from immoral and illegal to both moral and legal, he explains, intervening steps are needed: "It's done by a few; it's a counterculture; it's mainstream in cities; young people don't care anymore; it's legal. And this is a long process that needs privacy to happen."

As a growing share of human interactions—social, political, and economic—are committed to the digital realm, privacy and security

THE WATCHERS

Assaults on privacy in America

by JONATHAN SHAW

Illustrations by DAVIDE BONAZZI

Berkeley Technology Law Review (which published his research last June), he judged it unlikely that "actual fear of prosecution can fully explain the chilling effects suggested by the findings of this study." The better explanation, he wrote, is self-censorship.

Penney's work is the sort of evidence for negative social effects that scholars (and courts of law) demand. If democratic self-governance relies on an informed citizenry, Penney wrote, then "surveillance-related chilling effects," by "detering people from exercising their rights," including "...the freedom to read, think, and communicate privately," are "corrosive to political discourse."

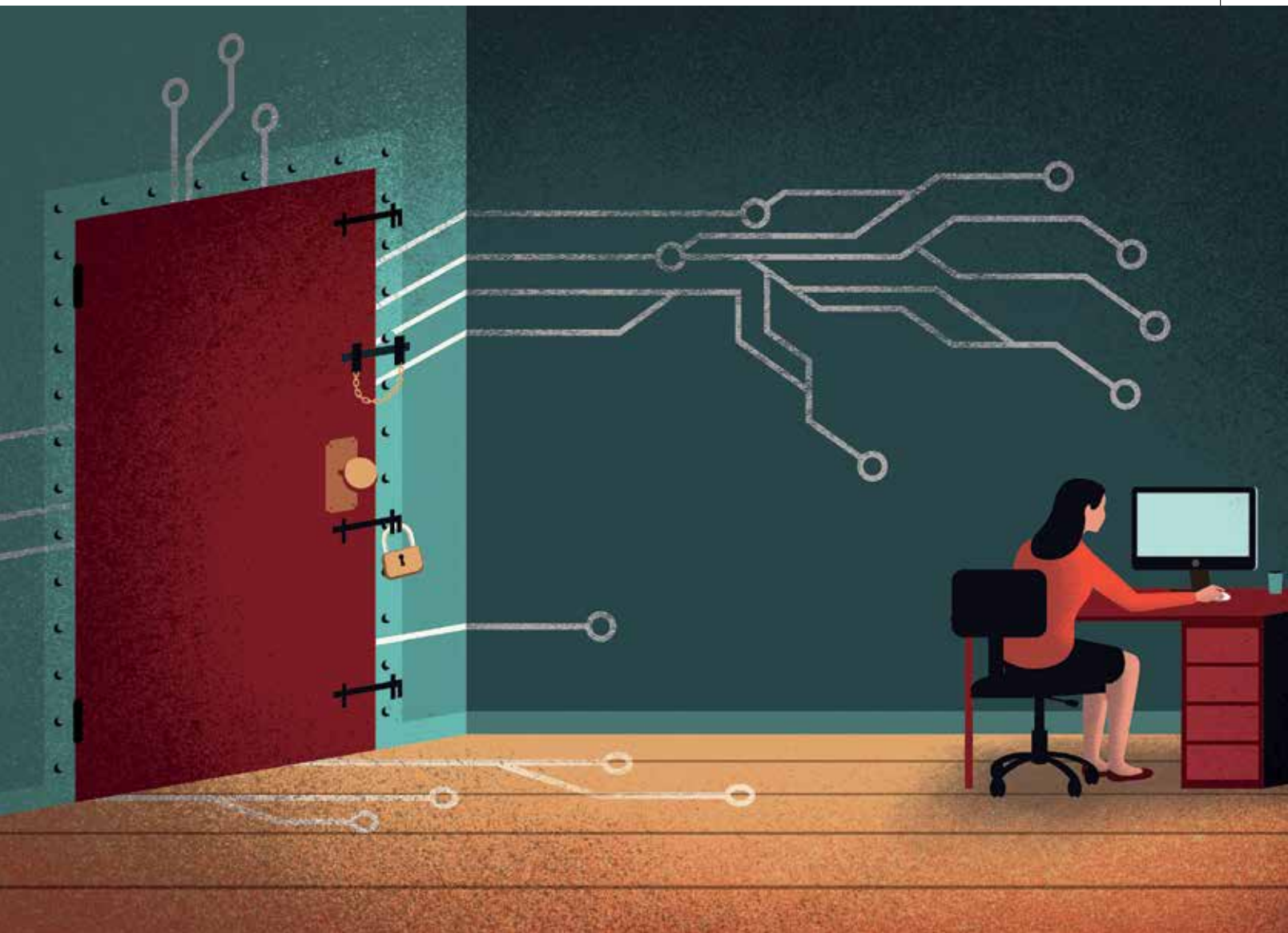
"The fact that you *won't* do things, that you will self-censor, are the worst effects of pervasive surveillance," reiterates security expert Bruce Schneier, a fellow at the Berkman and in the cybersecurity program of the Kennedy School's Belfer Center for Government and International Affairs. "Governments, of course, know this. China

as values and as rights have risen in importance. When someone says, "My life is on my phone," it's meant almost literally: photos, passwords, texts, emails, music, address books, documents. It is not hard to imagine that the Declaration of Independence, redrafted for an information society, might well include "security and privacy," in addition to the familiar "life, liberty, and the pursuit of happiness," among its examples of "unalienable rights."

Although Snowden highlighted government surveillance, it may not be the worst problem. Corporations hold vast and growing troves of personal information that is often inadequately protected, its use largely unregulated. Since 2005, hackers have stolen hundreds of millions of credit-card numbers from major retailers such as Target, Home Depot, TJX, and eBay. In 2014, someone stole the keys to half a *billion* Yahoo accounts without being detected. And everyday threats to privacy are so commonplace that most

people are numb to them. In exchange for free email, consumers allow companies such as Google to scan the content of their digital messages in order to deliver targeted ads. Users of social media, eager to keep in touch with a circle of friends, rarely read the standard agreement that governs the rights and use of what they post online. Smartphones know their owners' habits better than they themselves do: where and with whom they sleep, what time they wake up, whom they meet, and where they have been. People accept such tradeoffs in exchange for convenience. They don't really have a choice.

for instance, between government documents and *private* documents authored by people who were once government officials, [between] documents released under the Freedom of Information Act, and documents leaked by a whistleblower. It's all just seen as... 'stuff is porous, and we can get it.' As "the ability to hack is democratized," Zittrain worries that people have lost sight of the original value behind whistleblowing, which is to make powerful *institutions* publicly accountable. Now everyone is vulnerable. "Over time," he wrote recently, "continued leaks will lead people to keep their thoughts to themselves, or to furtively communicate unpopular



Bemis professor of international law and of computer science Jonathan Zittrain, faculty chair of the Berkman Klein Center, worries that the ubiquity of privacy threats has led to apathy. When a hacker released former Secretary of State Colin Powell's private assessments of the two leading presidential candidates prior to the recent election, "I was surprised at how little sympathy there was for his situation, how it was treated as any other document dump," Zittrain explains. "People have a hard time distinguishing,

views only in person." "That does not seem sustainable to me," he said in an interview, "and it doesn't seem healthy for a free society."

The perception that the Information Age has put privacy and security at risk is widespread. Necessarily, the search for solutions is equally broad-based. In Washington, D.C., Marc Rotenberg '82, president and director of the Electronic Privacy and Information Center (EPIC), seeks legal solutions to privacy problems (see page 60). At Harvard, research into privacy and security is focused at

the Berkman Klein Center; at the Paulson School of Engineering and Applied Sciences' Center for Research on Computation and Society; at the Kennedy School's cybersecurity program; at the Institute for Quantitative Social Science's (IQSS) Data Privacy Lab; and also within the schools of medicine and public health (and at the affiliated hospitals), where researchers seek to protect patient data so that it can be shared appropriately, particularly in the case of rare conditions. Solutions to privacy and security problems thus involve computer scientists and legal scholars, as well as experts in healthcare, government, and business.

SECURITY: "We Have Lost Control"

ASSURING the privacy of information means making it secure. "I actually can't give you privacy unless you have security," Bruce Schneier points out: that involves protecting data through technological or legal means. Door locks, tall fences, and burglar alarms work well in the physical world. The problem, he explains, is that "in security, technology scales badly." If a burglar gets past a lock to rob a single house in a community of 100,000 people, that may be a tolerable risk.



But anyone who finds a flaw in all *digital* locks could break into every home. "What happens," Schneier asks, "when systems become connected such that our risks are connected?"

Ordinary individuals, he points out, can do very little to mitigate this kind of systemic risk. Advice like don't have an email address, don't use your credit card, is "moronic. You can't be a fully functioning human being in the twenty-first century [like that.] So in a lot of ways, we have lost control."

In the past 15 years, entire corporations, even nations, have found their data and systems vulnerable to attack. The intrusion at the

U.S. Office of Personnel and Management, disclosed in April 2015, was reportedly the most significant breach of federal networks to date: hackers, thought to be state-sponsored, took personal data for four million employees and political appointees, leading to the recall of American intelligence agents posted abroad. The 2016 digital break-in at the Democratic National Committee's headquarters was like a modern iteration of Watergate, but initiated by a foreign power seeking to interfere in the presidential election.

The stakes can become very high indeed. "Someone is learning to take down the Internet," wrote Schneier in September. He described how an unidentified entity had been probing the defenses of companies that provide critical Internet infrastructure, slowly ramping up repeated, carefully metered attacks, as if seeking to quantify precise points of failure. Although his best-selling book, *Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World*, has led to his reputation as a consumer-privacy-rights advocate, Schneier is also chief technology officer for Resilient, an IBM company that handles online incident response. He brings that security background to a new fellowship at the Kennedy School's

Cyber Security Project. The project focuses on policy research into the U.S. military's operations in cyberspace; it puts "people with a technical background together with people with policy experience," in order to help inform debates in Washington, says project director Michael Sulmeyer, former director for plans and operations for cyber policy at the Department of Defense. "One of the biggest debates going forward will be the roles and missions for the military's 6,000-person force for cyberspace operations."

That Cyber Command is charged with protecting the Defense Department's weapons systems, millions of computing devices, and more than 15,000 data networks (say, in support of network operations for a battalion in Afghanistan fighting the Taliban). It also provides offensive cyber capabilities

to commanders around the world in the event that hostilities break out (analogous to the access they have to air and sea power capabilities). And it is responsible for defending the nation—including aviation, financial, and power-transmission systems—against a significant cyberattack.

The structure of the Internet itself makes that defensive mission difficult. Eviatar Matania, the head of Israel's National Cyber Bureau, discussed that challenge last September at the Kennedy School. He noted that unlike the agricultural and industrial revolutions, the cyber revolution has both restructured society and created a space,

“THE INCREASED INTERCONNECTIVITY OF THE WORLD WE ARE LIVING IN [HAS LED TO] A LEVEL OF VULNERABILITY THAT WE DON’T TRULY UNDERSTAND.”

“a new artificial domain.” Israel’s bureau was founded five years ago as a way to allow that small country to be “much bigger and stronger than in a physical domain,” Matania continued. But defending cyberspace is extremely difficult because it lacks both borders and distance. There are no clear boundaries between countries, and no clear divisions between corporate and government networks: “Everyone is connected to everyone.”

That implies that the defense mission is expansive. Admiral Michael Rogers, director of the NSA and head of U.S. Cyber Command, said during an October visit to the Kennedy School that the unit increasingly finds itself “helping defend systems across the broader U.S. government” and even “being called upon to...help within the private sector. These are big growth areas for us.”

But as the mission grows, vulnerabilities are becoming *more* complex, not less. The Internet of Things—chip-equipped, network-connected household items such as living-room televisions that can respond to commands to change the channel—present huge security (not to mention privacy) concerns. “The increased interconnectivity of the world we are living in,” explained Rogers, has led to “a level of vulnerability that we don’t truly understand.” The automobile, for example, used to be “a mechanical system with a one-way radio”; today it’s “a series of interconnected software applications and capabilities,” involving a host of remote connections that the driver doesn’t understand or even know about. “That offers both amazing capability, insight, and knowledge—data that could make the car safer, make decisions faster, and eventually lead to remotely piloted autonomous vehicles.” But “that car now has a whole lot of vulnerabilities that it never had before.”

OPENNESS: “We Have to be Extremely Skeptical”

IT MAY SEEM LOGICAL for a centralized military organization to provide national cybersecurity and defend against cyber war. But Yochai Benkler points out how 9/11 led to war and “unjustified claims for extending surveillance powers, or extending detention and kidnapping powers, let alone torture.” The Berkman professor for entrepreneurial legal studies argues that “We have to be extremely skeptical of claims made in the name of national security in general, not because the people making them are bad people, but because the people making them...operate in a world where the only downside to failing to extend their power is that one day somebody will look at them and say, ‘Where were you when the world came down?’”

“We should take with many grains of salt the claims of national security experts who see cyber war as the next domain,” he continues, “and operate in an environment where they want to control everything as much as possible in order to minimize risks, but come to their conclusions from a framework that...is relatively insulated from potential alternative viewpoints.”

Accordingly, Benkler advocates systems that allow personal data to remain in the hands of consumers—minimizing the privacy risks posed by governments, corporations, and hackers because personal information is not concentrated in a single place. (The technical term is “distributed network ecosystems based on open-source

software.”) “Relying on a small number of high-end companies to provide security creates a single point of failure for hundreds of millions,” he says, referring to the 2014 theft of Yahoo user accounts. “If all those...people had decentralized email storage at home, and sign-on credentials that were not valid for diverse critical sites, collecting [that information] would be much harder.”

“It’s a challenge to get people to adopt safe habits,” he admits, “but it’s not impossible. You have to change users’ culture, and you have to design secure systems that are under the control of end users, not single companies.” The iPhone, secured with a PIN or a fingerprint, is an example of such encrypted, secure-by-default systems. Such devices aren’t hard to build—but, he says pointedly, “It’s hard to do so [within] a business model that depends on spying on your customers so you can sell them to advertisers.”

Furthermore, says Benkler, systems built in part with “free software developed by communities that don’t have the imperatives either of profit-making companies, or of dealing with the tensions between rights and the state of emergency, get better as their vulnerabilities are constantly probed, exposed, and then corrected in a constant, evolutionary, back and forth.” Such robustness is obviously desirable.

But it may not be as practicable as he hopes. Although the idea that users can enjoy more privacy and better security in a distributed computing environment is becoming more tangible as smartphones’ computing power rivals that of desktops, executing it consistently poses significant challenges. Ben Adida, a software engineer and architect and former fellow of Harvard’s Center for Research on Computation and Society, acknowledges this is “the vision that many security advocates, myself included, pushed for for a very long time.”

But now he thinks “we are far less secure” adopting that technological approach. (For a computer scientist’s perspective, and a description of a project to protect research data involving human subjects, see the online extra, “The Privacy Tools Project.”) Adida developed Helios, one of the first encrypted yet verifiable online voting systems; he’s now head of engineering at Clever, a startup that manages private student data for schools. Providing security to a range of companies has led him to discover how easy it is for small companies to err when implementing and defending the security of their systems, whether in cryptography, access control, network-level security, or in the internal audit processes used to ensure data is compartmentalized. A large company like Google, on the other hand, “does a really good job of making sure that only I can log in,” he explains. “They’ve added two-factor authentication, they have all sorts of heuristics to check whether a person is logging in from a different location than usual. There’s all sorts of work that they do to make sure that only the right people are accessing the right data.”

Like Benkler, Adida agrees that centralized data is too easily accessed by law enforcement, but says that for now, “We need to rethink how to defend that data through a combination of legal and technical means.” Technically, that might mean discarding chats more than few months old, for example; and legally, resisting official requests for user data in court. He advocates “evolution in the law, too.” The Fourth Amendment guarantees the “right of the people

“PRIVACY TURNS OUT TO BE AN EXTRAORDINARILY POWERFUL AND COMPREHENSIVE HUMAN-RIGHTS CLAIM, PARTICULARLY IN THE DIGITAL AGE, BECAUSE SO MUCH ABOUT US IS BASED ON OUR DATA.”

to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures...,” but historically, that has been interpreted to mean that obtaining data held by a *third* party doesn’t require a search warrant. That means personal documents stored in Google’s cloud, for example, are exposed. Adida says he nevertheless keeps “extremely private data hosted by a third party because that is the right operational thing to do. Everybody hosting their own stuff just doesn’t make any sense”—but he hopes that someday, if the government wants access to that information, it “would require a warrant, just as if they were knocking down someone’s door.”

CONFIDENTIALITY:

“Privacy Is about Accountability”

IN THE HERE AND NOW, using encryption, firewalls, and passwords is one way to keep information secret. But secrecy is just “a very small slice” of what privacy is about, says Marc Rotenberg of EPIC. Through “creative advocacy, litigation, and public engagement,” the Washington, D.C.-based nonprofit aims to shape policy and advance the legal framework for safeguarding personal liberty. Rotenberg, an attorney and adjunct professor at Georgetown University Law Center, has won cases before the Supreme Court, filed numerous amicus briefs, testified before Congress, and given awards to leading privacy advocates across the political spectrum.

“Privacy is about accountability,” he says. “It’s about the fairness of decisionmaking. It’s about holding large government actors and private companies accountable for their decisionmaking. It turns out to be an extraordinarily powerful and comprehensive human-rights claim, particularly in the digital age, because so much about us is based on our data.”

Getting a loan or health insurance, or gaining admission to a certain school, are all data-driven determinations, Rotenberg points out. He asks how those data are being used. What personal information does an organization consider relevant? Are people pulled out of line at an airport because of their nationality, their religion, or because of a book purchased on Amazon? Given all the ways in which personal information drives decisions, Rotenberg says, secrecy “almost isn’t even relevant to the discussion. Because paradoxically, what we *keep secret* is almost certainly what we *don’t* need privacy law for. We need privacy law for everything else: for the things that we don’t have the physical ability to control. When you give sensitive test information to your doctor, for example, it’s no longer in your control. The credit card company has all your transactional records. What are you going to do? Nothing. *That’s* when we start to ask questions about what type of safeguards are in place to protect our personal information held by others.”

“I see privacy as closely tied to the strength of democratic governance,” he continues. Recalling the first time he read the NSA’s foreign intelligence surveillance court order demanding that Verizon turn over all customer telephone-call records (perhaps the most significant of Snowden’s revelations), Rotenberg says, “I looked at

that order, ‘Provide all records, because all records are relevant,’ and actually thought it was satirical, a joke from *The Onion*, or an exercise attached to a privacy-law exam asking students to draft an unlawful court order....And then I realized it was a real order—that the NSA thought it had the authority to collect all domestic telephone records on all U.S. telephone customers.”

EPIC brought a petition to the Supreme Court arguing that the Foreign Intelligence Surveillance Court had exceeded its legal authority, and a broad coalition of legal experts and former members of Congress joined the campaign. But the Court did not rule on the merits of the petition. “That was after the Solicitor General twice sought extensions,” Rotenberg explains, “which gave the foreign intelligence surveillance court enough time to issue an opinion justifying the program. We call that just-in-time lawmaking.” The EPIC petition nevertheless marked the beginning of a broad bipartisan coalition to pass legislation, the USA Freedom Act of 2015, ending the NSA’s bulk collection of such information.

Such battles almost never stay won, says Rotenberg. “The Europeans were very upset, obviously, about the U.S. surveillance activities that Snowden had documented, but then you had the terrible tragedy of *Charlie Hebdo*, and suddenly the French government created new surveillance authorities that go beyond what the U.S. does.”

“When governments make these decisions,” he reflects, “it is almost as if they’re saying, ‘We can’t afford as much democracy, we can’t afford as much openness, we can’t afford to trust our citizens as much, we need to engage in more surveillance, we need less judicial review and less accountability.’” But privacy, he says, is not a trade-off: “I’ve been in Washington long enough to know that when someone says, ‘We need to strike the right balance,’ it means they probably don’t know what they’re talking about. A sacrifice of privacy is also a sacrifice of democracy.”

In the mid 1990s, *The New York Times* quoted Rotenberg saying that the protection of privacy in the Information Age would be like the protection of the environment in the Industrial Age—“which is to say it’s so much a part of the nature of economic production today, you don’t solve it, you have to manage it.” Many people predicted the end of privacy. But Rotenberg believes people don’t understand the full consequences: “Among other things, you would lose your democratic state if everyone said, ‘Why do we care if the government knows everything about us? Who needs a private phone call? Who needs a building with walls? Why should data be accurate?’ Everything collapses. And we know what that world looks like: that’s what [Jeremy] Bentham described as the Panopticon”—designed so an observer can watch everything, but without being seen. “When you’re under constant surveillance,” says Rotenberg, “you’re in a prison.”

On the corporate front, EPIC brought the complaint that forced Snapchat, the photo-sharing service, to fulfill its promise to delete images. When Google tried to move all Gmail users onto Buzz, its social-media platform, EPIC complained to the Federal Trade Commission (FTC), and established a significant precedent for Internet

privacy. When WhatsApp announced that it would share users' secure-message data with Facebook (which had recently acquired the company), EPIC intervened. Likewise, when Facebook started changing user privacy settings after consumers had set them, EPIC brought the matter to the FTC, which stopped the practice. Most recently, EPIC has been active in the discussion over how student data are collected and used.

EPIC may seem the proverbial finger in the dike, barely holding back the flood. But Rotenberg says he is "actually a bit of an optimist about all of this," citing the Supreme Court's "remarkable 9-0 opinion, written by Chief Justice Roberts, that says the search of a cell phone following an arrest requires a warrant"—a case in which EPIC's extensive brief was cited. Rotenberg calls the 2014 decision "a strong statement about privacy in the modern age. And the fact that it was a unanimous court, I think, was remarkable."

EPIC also studies diverse privacy laws to advance legal protections. A project begun in 2015 to identify states with the best privacy laws examines data security and breaches, drone surveillance, police body cameras, and student privacy, to name a few. EPIC considers Massachusetts's 2007 data-protection law one of the best in the country; California has crafted very good data-breach-notification regulations. Farther afield, Rotenberg admires the European Court of Justice's decision on the "right to be forgotten," which involved personal bankruptcy records that had been published in

a newspaper 10 years earlier. The Spanish plaintiff asked both the newspaper and Google to remove the records. Spain's privacy agency decided not to touch the newspaper, but ordered Google to remove the record from search results—drawing "a very thoughtful line" between the protected free expression of news organizations and the commercial operations of data brokers, who commodify personal information.

DISCRIMINATION: "Algorithmic Accountability"

ROTENBERG HAS RECENTLY BEGUN advocating for laws that would require companies to disclose how algorithms use personal data—for hiring, credit determinations, or online advertising. As businesses demand more information from people, he thinks companies should reveal how they make decisions. Businesses regard their algorithms as intellectual property, but Rotenberg argues that their rights "extend as far as my personal data....And if that creates a problem for them, don't collect my data." The algorithms act invisibly and without accountability. Rotenberg says the solution is straightforward: "There should be algorithmic accountability. We should be able to open the code."

One computer scientist, famous for her work on privacy technol-

ogy and re-identification of anonymous subjects in large data sets, approaches this problem as a technologist, seeking to expose the inner workings of algorithms in ways that make them susceptible to existing laws (see "Exposed," September-October 2009, page 38).

Google seemed to think professor of government and technology in residence Latanya Sweeney might have an arrest record. A simple search for the name of this African-American computer scientist, now faculty dean of Currier House, yielded ads implying that she had a criminal past. When former Reuters reporter Adam Tanner, now an Institute for Quantitative Social Science (IQSS) fellow, sug-



gested that resulted from her "black-sounding name," Sweeney at first resisted his explanation. Then she discovered that a search for "Latanya" turned up images of black women, and a search for "Tanya" turned up images of whites. She decided to dig deeper.

Because she runs Harvard's Data Privacy Lab, based in IQSS, Sweeney has resources to find out what makes an algorithm tick. Using lists of first names given more often to black babies than to white ones, she Googled the names of real people from Internet addresses around the country, capturing 100,000 ad impressions. For some names, ads implied the existence of an arrest record as much as 80 percent of the time, even when there was none. "Blacks are a protected group. Employment is a protected setting," she notes. If an employer Googles an applicant's name and ads pop up implying that there is an arrest record, she says, that is enough to trigger a federal discrimination investigation.

Her work showed, Sweeney says, that these unforeseen consequences can be studied and the results used "to empower the government structures we already have for oversight." Rather than demanding new laws that focus on new technologies, she used science to expose the workings of technology, so (please turn to page 82)

existing law could be applied.

Armed with this tool for “algorithmic accountability,” Sweeney took a year’s sabbatical in 2014 to work as chief technology officer at the FTC. The commission had lacked pertinent technological expertise to investigate the issue; Sweeney’s presence persuaded the chairwoman to hire additional technologists.

While at the commission, Sweeney studied the practices of advertisers targeting the sites of sororities, fraternities, and other student groups, including Omega Psi Phi, a black fraternity celebrating its centennial. Ads routed to its website included options for graduate

book implement business practices and technology together in a package in a certain way doesn’t mean that’s the *only* way. The technology...and the business practices didn’t have to be that way. And that has to be unpacked.”

COMMERCE: “Surveillance Capitalism”

SHOSHANNA ZUBOFF, the Wilson professor of business administration emerita, would agree. She thinks about the information landscape in economic terms and says that there is even more at stake than privacy. Zuboff says that corporate use of personal data has set society on a path to a new form of capitalism that departs from

Apple and Amazon use their customers’ data largely to customize those individuals’ online experiences. Google’s founders once said they weren’t interested in advertising. But Google “didn’t have a product to sell,” she explains, and as the 2001 dot.com bubble fell into crisis, the company was under pressure to transform investment into earnings. “They didn’t start by saying, ‘Well, we can make a lot of money assaulting privacy,’” she continues. Instead, “trial and error and experimentation and adapting their capabilities in new directions” led them to sell ads based on personal information about users. Like the tinkers at Ford, Google engineers discovered “a way of using their capabilities in the context of search to do something utterly different from anything they had imagined when they started out.” Instead of using the personal data to benefit the *sources* of that information, they commodified it, using what they knew about people to match them with paying advertisers. As the advertising money flowed into Google, it became a “powerful feedback loop of almost instantaneous success in these new markets.”

“Those feedback loops become drivers themselves,” Zuboff explains. “This is how the logic of accumulation develops...and ultimately flourishes and becomes institutionalized. That it has costs, and that the costs fall on society, on individuals, on the values and principles of the liberal order for which human beings have struggled and sacrificed much over millennia—that,” she says pointedly, “is off the balance sheet.”

Privacy values in this context become externalities, like pollution

or climate change, “for which surveillance capitalists are not accountable.” In fact, Zuboff believes, “Principles of individual self-determination are *impediments* to this economic juggernaut; they have to be vanquished. They are friction.” The resulting battles will be political. They will be fought in legislatures and in the courts, she says. (See EPIC’s cases, above.) Meanwhile, surveillance capitalists have learned to use all necessary means to defend their claims, she says: “through rhetoric, persuasion, threat, seduction, deceit, fraud, and outright theft. They will fight in whatever way they must for this economic machine to



education and for travel—and one that implied the need for a criminal lawyer. Credit-card ads included only the lowest-ranked cards, whereas Sweeney found that the sites of similar fraternal student organizations turned up ads for American Express Blue. How, she wondered, did that decisionmaking occur in a supposedly neutral algorithm? “If, through their practices, technology companies are dominating the online experience” and shaping people’s experiences of the Internet, she says, “then it’s *those* practices that have to be addressed, or at least connected to...societal norms. Just because Google or Face-

earlier norms of market democracy.

She draws an analogy from the perfection of the assembly line: Ford engineers’ discovery a century ago, after years of trial and error, that they had created “a logic of high-volume, low-unit cost, which really had never existed before with all the pieces aligned.” Today, many corporations follow a similar trajectory by packaging personal data and behavioral information and selling it to advertisers: what she calls “surveillance capitalism.”

“Google was ground zero,” Zuboff begins. At first, information was used to benefit end users, to improve searches, just as

“IN SURVEILLANCE CAPITALISM, RIGHTS ARE TAKEN FROM US WITHOUT OUR KNOWLEDGE, UNDERSTANDING, OR CONSENT, AND USED TO CREATE PRODUCTS DESIGNED TO PREDICT OUR BEHAVIOR.”

keep growing.” Consumer-citizens feel the assault, but for the surveillance capitalists, their creation is like “a living organism now, that has to grow.”

“Privacy,” according to Zuboff, “is having the right to decide how you want to live, what you want to share, and what you choose to expose to the risks of transparency. In surveillance capitalism, those rights are taken from us without our knowledge, understanding, or consent, and used to create products designed to predict our behavior.” These products are then sold into new markets that she calls “behavioral futures markets.” At each stage, “our lives are further exposed to others without our consent.” In losing decision rights, we lose privacy, as well as autonomy and self-determination. Such rights don’t vanish, she points out. “We lose them to someone else. Google is an example of a company that amasses ‘decision rights’ that once belonged to us. Decision rights are fundamentally political. So these are concentrations of political power, in institutions that we have not authorized. We didn’t elect them, we didn’t vote for them, we didn’t sanction this transfer of rights and power.”

Targeted ads—about which consumers already express concern—are the beginning of a much more ambitious program of modifying and influencing behavior toward profitable ends, Zuboff argues. “No one ever said mass production was only for automobiles, and surveillance capitalism isn’t only for advertisers.” There are many other companies and industries, she says, that want to participate in the new behavioral futures markets. Early examples include sectors such as insurance, retail, and health.

Behavioral futures markets develop in stages, she explains. Predictive analytics is a familiar use of data in which patterns are identified in order to predict whether somebody might be pregnant, or getting married, or has just lost a loved one. (The technique is already being used to place police officers in locations where crime is more likely to occur.) Zuboff notes that Google Maps, to take another example, recently introduced

a feature that suggests a destination based on what it knows about users before they’ve even indicated where they’re going. “Maybe it picked up from an email that you’ve recently moved and need to get tools for the workshop,” Zuboff explains, “so it suggests a hardware store that you can go to. Would you think that hardware store is an innocent recipient of Google’s largess?”

The stakes are getting higher. She points to the wildly popular game Pokémon Go, which rewards players with virtual experiences. “I can send you to the dry cleaner, I can send you to the car mechanic, I can send you to the restaurant—anywhere I want to with this reward system. All these entities pay to play in the new marketplace for behavior.” Even before the game launched in Japan, McDonald’s had paid to designate its 3,000 restaurants as destinations (called “gyms”) within the game. The game’s developer is Niantic, formerly a lab within Google run by John Hanke, who also led Google’s geolocation services. (The core mapping technology was funded by the CIA’s venture-capital arm.) Having mapped a virtual world onto the physical one with Google Maps and Google Earth, use of smartphone location services closes the loop, populating that cyber domain with people in the physical world.

At the moment, the project is “allowing the public to get exposed to this kind of interaction, and become habituated to it,” says Zuboff. Pokémon players have fun, without realizing that it is also another form of social and economic control.

“I think it’s very important to connect the dots,” she explains, “and see that all of this makes sense when we frame it as a new form of capitalism that has particular requirements in order to be successful. Technology is never a thing in itself. It is always designed and deployed to reflect the aims and needs of a particular economic order. Suddenly, we can see that these ventures are part of a cohesive, internally consistent, and coherent economic logic. And when we can do that, then I think as a society we are far better positioned to increase and expand our advocacy and reform efforts, [to figure out how]

to successfully tether information-based capitalism to pro-social and pro-democratic values and principles,” rather than solely serving third-party economic interests. “The challenge of surveillance capitalism becomes part of the larger historical project of harnessing capitalism to society.”

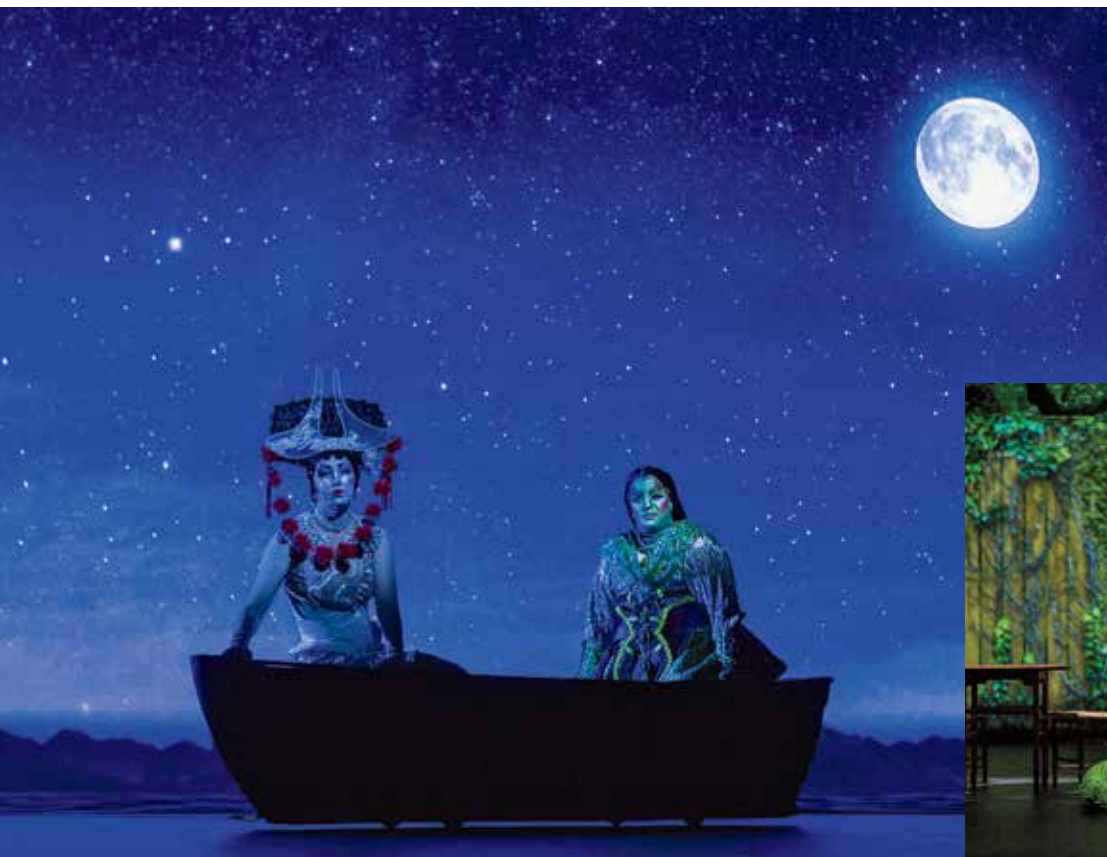
Surveillance capitalism, driven by the profit motive, “has been able to gather to itself concentrations of knowledge and power that exceed anything imaginable even a few years ago,” she says. “One of its consequences is the deletion of privacy. But if we fight this only on the grounds of privacy, we’re bound to meet with constant frustration and limited success. This is an economic logic that *must* delete privacy in order to be successful.” This is why, despite the “brilliant and heroic scholarship” that has come out of Berkman, and despite the “brilliant and heroic advocacy that has come from many quarters in the United States, including Marc Rotenberg and his amazing team at EPIC,...this thing keeps growing.”

History may suggest better ways to respond, she says. “We have experience in taming capitalism, and binding it to pro-social and pro-democratic principles. In the late nineteenth century, the Gilded Age, there was no protection for labor, and capital had complete freedom to do whatever it wanted to do with resources, with people, with communities, producing extreme economic and social inequality along the way.” The twentieth century “was a long journey to correct that imbalance.” The social challenge now, she says, is to insist on a new social contract, with its own twenty-first century legislative and regulatory innovations, that harnesses information capitalism to democratic values and norms. This begins, she believes, with deepening social understanding and awareness. “We have to create the political context in which privacy can be successfully defended, protected, and affirmed as a human right. Then we’d have a context in which the privacy battles can be won.” ▢

Jonathan Shaw ’89 is managing editor of this magazine.

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Art, books, diverse creations



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The Lawyer Librettist

Creating otherworldly operas

by SOPHIA NGUYEN

“**L**UCIFER’S CAR was towed,” someone announced to the room—they’d have to start without him. The three Fates reviewed some new choreography; by the piano, Persephone, a tall soprano, nervously rolled a pencil between her fingers as she approached a tricky high note. “My blood rubies, centuries old,” she sang, her eyes darting to the composer for his reaction. He gave

a thumbs-up. When the devil finally arrived with breathless apology, the workshop cast of *Rev. 23*—all graduate students in the New England Conservatory’s opera program—prepared to take act one from the top. The curtain rises: the apocalypse is over. Heaven reigns on Earth. “Don’t get bogged down by plot issues,” the director



Characters in the Ouroboros trilogy include (clockwise) Madame White Snake and her companion; half-woman, half-snake Xiao Qing, dragging a wheeled tail; and an abbot, here advising a conflicted mortal in *Gilgamesh*.

reassured them. Gesturing toward the colleagues seated behind him, he added, “That’s *their* problem.”

Mainly, plot fell under the jurisdiction of librettist Cerise Lim Jacobs, J.D. ’81. *Rev. 23*, an imagined sequel to the Book of Revela-

tion, begins when Lucifer conspires with Hades to destroy the power plants that enforce endless, paradisiacal summer. Later, they enlist Persephone and Sun Tzu in their rebellion; sometime in act two, Adam and Eve show up, as does the archangel Michael. Jacobs, along with composer Julian Wachner and dramaturg Cori Ellison, watched as the singers waded through this madcap, overstuffed plot. In workshop, “We find out whether something sounds stupid when it’s sung,” says Jacobs, “or if something stinks. Everything looks good on paper, sounds good on paper—but there’s nothing like putting it on its feet.”

A freewheeling approach to different cultures is typical of Jacobs’s work, which is fantastical and afterlife-obsessed. Her libretti star characters from Chinese legend, with dream sequences set in Sumerian myths and lines borrowed from *King Lear* and *The Song of Songs*. This hodgepodge reflects her upbringing in Singapore, with its stew of faiths and languages. Jacobs’s Cantonese-speaking parents initially sent her to a Chinese school, where she learned Mandarin; then they had second thoughts (“They were afraid I would be converted to this horrid little Communist in their midst”), and switched her to a Methodist missionary school, where she learned hymn singing and Bible study. The family regularly celebrated Hindu festivals and the end of Ramadan with their Tamil and Malay friends, Jacobs recalls. And: “We watched Chinese opera religiously, every Sunday, at my grandmother’s house.” The genre differs from Western opera not just in musical scale but in overall duration, she points out: a single work can go on for days, with attendees eating throughout. Jacobs attempted to recreate a version of that experience with her *Ouroboros Trilogy*, which audiences could watch in all-day musical marathons at Boston’s Cutler Majestic Theater this past September. “They do not allow you to bring in food,” she laments. “Munching on French fries as you’re watching—it wasn’t possible. But if it were, I would want that!”

Ouroboros follows a snake demon and her besotted companion as they’re reincarnated at three different points in time. In each of the operas—*Madame White Snake*, *Naga*, and *Gilgamesh*—a dogmatic man of religion becomes their adversary, and other humans get tragically caught up in the conflict. Spanning fictional eons, the complete cycle runs a little over five hours, and began

O P E N B O O K

Bare-Knuckle Politics

administration David A. Moss developed a course on American governance and politics using the Business School’s case method—in which students are presented with facts and issues, and then discuss potential outcomes. He has now pulled that material together in *Democracy: A Case Study* (Harvard, \$35), a unique textbook. Moss (whose Tobin Project was featured in “Rebooting Social Science,” July-August 2014, page 54) describes American governance as “an organism, not a machine” in the introduction, where he also has this to say:

[D]emocracy in America has always been a contact sport. Words like “cooperation” and “consensus” may sound appealing and even comforting, but American democracy has survived and thrived from one generation to the next on the basis not principally of harmony but of conflict—sometimes intense conflict—mediated, generally, by shared ideals.

Indeed, democratic decision-making in the United States has nearly always been rooted in disagreement and tension, including plenty of bare-knuckle politics. The nation witnessed intense partisan, ideological, and often sectional conflict in everything from the battle over ratification of the Constitution in 1787-1788 to the repeated fights over a national bank (in the 1790s, 1830s, and 1910s) to the bitter struggles over health care and gun laws today. Intense political conflict has always been with us and is, in fact, profoundly American.

The critical question is what makes this conflict either constructive or destructive. Indeed, this is the central question of this book. Political conflict is not a disease, as some pundits contend, but instead an essential feature of American democracy. In most periods across the nation’s history, it has served as a powerful source of strength. But not always. And this, in a nutshell, is what we need to figure out. Why has fierce political conflict proved highly constructive at

In the wake of a contentious U.S. election, faculty members of two Harvard professional schools have published on the nation’s democratic origins and traditions (see also “A Conservative Counter-revolution,” page 69). Cherington professor of business



many historical moments and severely destructive at others, and which type of conflict...characterizes the nation’s democracy today?

...[T]he logic of what I call productive political tension...runs...beyond policy-making to the very foundation of democratic governance itself. Productive tension between competing factions serves not only as a vital source of diverse policy ideas, but also as a critical check on democratic excess, as Madison observed on the eve of the Constitutional Convention....The words “productive tension” appear nowhere in the Constitution, of course, nor is there any certain recipe or formula for creating and sustaining it. But...[i]t is, in short, one of the intangibles of American democracy, which breathes life into the republic in the most mysterious of ways, animating an otherwise static set of structures and rules as powerfully—and subtly—as the oxygen carried in our bloodstreams.

ISTOCK



Cerise Lim Jacobs

JAMES DANIEL

as a lark. Having practiced law for more than two decades, Jacobs was three years into retirement when, in 2005, she began to write a song cycle as a birthday present for her music-loving husband. Pushed by his ques-

tions about the characters and plot, she expanded it into a full-length work. Potential composers balked at the prospect of writing something that would be performed only in the family's Brookline living room, so Jacobs cold-called Opera Boston. *Madame White Snake* premiered there in 2010, directed by Robert Woodruff (former artistic director of the American Repertory Theater); its score, by Zhou Long, won the Pulitzer Prize for music in 2011.

Now, Jacobs is intent on building an oeuvre for herself. "I have this master plan to commission and produce one new work a year for the next five years," she says, matter-of-factly. *Ouroboros* is her grand epic; *Rev. 23*, premiering in September 2017, will be her comic opera, with a cast small enough to travel. (She has also finished drafting the next work, *Permadeath*, which will involve an augmented reality, video-game component.) Jacobs, who often accessorizes with a purple, gargoyle-shaped

backpack, has an elfin appearance and whimsical imagination. But her undeniable, entrepreneurial energy brought composers like Long, Paola Prestini, and Scott Wheeler aboard her flights of fancy: her can-do spirit is matched by will-do drive.

Collaboration does require compromise. Days in, the NEC rehearsals for *Rev. 23* foundered amid the cast's confusion about character motivations and narrative twists. The production team had an all-day meeting to brainstorm. "I needed a breakthrough," says Jacobs. They lost a subplot involving angelic wings, but kept another about the Book of Life; they added more comedy. "As a lawyer, you're used to being edited, people arguing against you," she says, with a sigh. "Trying to make you better, you know." Occasionally, she adds, "I have to step back and say, I'm at the end. I'm at the final phase of my life. I need to remember *why* I'm doing this. I'm doing it for the love of it. For the fun of it."

The Art of Protest

Poetry in the age of Black Lives Matter

by LYDIALYLE GIBSON

BEFORE YOU GET to any of the poems in Clint Smith's new book, *Counting Descent*—some with titles like "How to Fight," and "No More Elegies Today," and "Ode to the Only Black Kid in the Class"—you'll find an epigraph from Ralph Ellison's interview with the *Paris Review* in 1954. It reads: "I recognize no dichotomy between art and protest."

Smith, a third-year Ph.D. candidate in education, thinks about that quote a lot. For him, Ellison's words are deeply felt. And deeply lived. "It doesn't even make sense to me that art and protest would be separate," he says. "Part of what it means to be an artist is to imagine the world as it could be, and to not be confined by what seem like the political possibilities of the day. To reject false caricatures of humanity. And to complicate our understanding of history."

People often ask if *Counting Descent* is a book about "the black experience." Not exactly, he tells them; it is *his* black experience. Everything is in there: the childhood in New Orleans, full of gumbo and books

and family affection. His parents dancing in the kitchen to Frankie Beverly & Maze. One grandfather ("a quarter century / older than his right to vote") who cleaned floors for white people; and the other, Smith's name-

sake, a zoologist who as a teenager had to move to a different Mississippi county because his own didn't have a high school for blacks. Smith himself, a runner and stand-out soccer player (with, the poems attest, no basketball jump shot), turned 17 on August 25, 2005. Four days later, Hurricane Katrina destroyed his family's home. "I come from a city that is drowning," he would later write in a poem called "what is left," "while being told it is rinsing itself clean."

One night during a summer internship in



Clint Smith

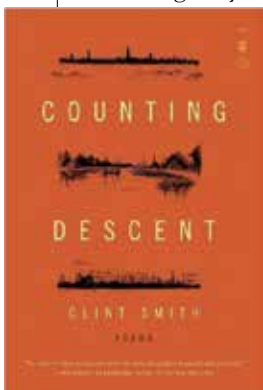
COURTESY OF CLINT SMITH

New York, he found his way to the Nuyorican Poets Café, a spoken-word mecca on the Lower East Side. The first poem he heard was from a woman with cerebral palsy. Smith was transfixed—and transformed: “I wanted to be a part of that.” He became a National Poetry Slam champion, with spoken-word poems on immigration, food deserts, and other subjects that landed on YouTube, where hundreds of thousands of people have watched them. “History Reconsidered,” which he performed often during his *Counting Descent* book tour, is written as a letter to five slave-owning American presidents: “James Madison, when you wrote to Congress that black people should count as three-fifths of a person, how long did you have to look at your slaves

to figure out the math?” Another stand-by is “My Father Is an Oyster,” a filial love song prompted a few years ago by his father’s sudden illness. (He is healthy again, after a kidney transplant.) Smith first performed it standing with his family beside the hospital bed.

In August 2014, during the first week of Smith’s doctoral program, Michael Brown was killed in Ferguson, Missouri. That event, and everything that followed—the grief, the protests, the Black Lives Matter movement, more police shootings spawning further grief and protests—has shaped his life and work. That semester, he began writing the poems that would become *Counting Descent*. Its shortest poem, “Canon,” reads: “Our stars weren’t meant for / their sky. We have never known / the same horizon.” In another, “How to Make an Empty Cardboard Box Disappear in 10 Steps,” the innocuous-sounding title darkens as the poem unveils a parade of tragic and familiar names: Trayvon Martin, Renisha McBride, Jordan Davis, Michael Brown, Eric Garner, Freddie Gray. The way to get rid of a cardboard box, the poem instructs, is to make signs from it, for protesting the deaths of slain African Americans.

Smith didn’t figure on becoming a teacher: after college, he worked in public health in South Africa, en route, he thought, to a career in international development. But a Teach For America recruiter put a bug in his ear: what about the help needed in your own back yard? After a year in Johannesburg, he went to Prince George’s County,



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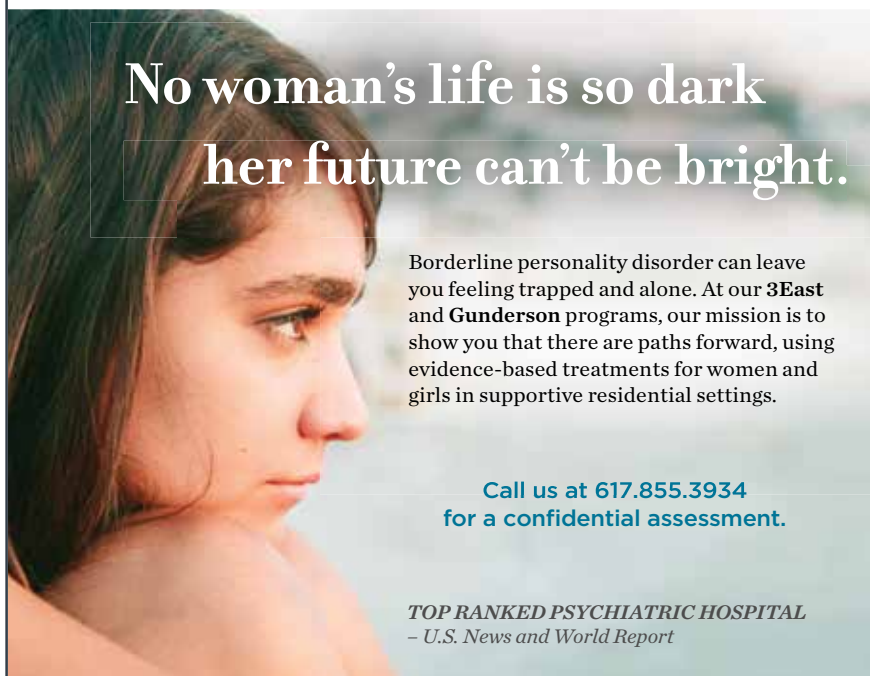


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Maryland, to teach English to mostly poor, mostly nonwhite tenth-graders. "It's one of the most important things that's ever happened to me," he says.

When he came to Cambridge, Smith returned to teaching, this time at a state prison in Massachusetts, where he traveled every other week to discuss great literature with men serving life sentences. "I wanted to find something that would keep me grounded while I was in grad school," he says, "something that would remind me why I came." Before long, it *became* the reason why.

Initially planning to study how young people cultivate a civic and social identity, Smith kept thinking instead about education and incarceration. The prisoners had formed

a longstanding and deeply rooted literary community, reading and writing together for years, Smith says: "It was the teachers who cycled in and out." The men were thoughtful and brilliant in a way he was not prepared for. Smith began to wonder whether recidivism and after-release employment were really the best metric for assessing the overall value of prisoner education. For the almost 200,000 people serving life sentences in the United States, that measure makes no sense. "It's almost a human-rights question," Smith says: "Just because society will never utilize these men's vocational skills one day out in the world, does that mean we shouldn't be investing in them as people?" He continues, "Part of what literature does, or history, or

any education that's not geared toward specific vocational training, is that it makes you a fuller person, a more empathic person, more compassionate; you're more likely to recognize common threads of humanity in all of us. And I think that's the case whether you're teaching high-schoolers or men who are serving life sentences in prison."

In "How Malcolm Learned to Read," Smith puts it this way: "Malcolm, could you ever have imagined / what this dictionary would make of you? Do you / remember who you were before you picked up the pen?"



Visit harvardmag.com to see video of Smith performing his poetry.

Off the Shelf

Recent books with Harvard connections

The Ethics of Invention, by Sheila Jasanoff, Pforzheimer professor of science and technology studies (W.W. Norton, \$26.95). In an era of digital databanks and gene engineering, technology—far from being neutral—is entwined intimately with ethics and human rights. Jasanoff focuses on the implications for governance and policy, as her title suggests. Advancing the underlying work itself, Venkatesh Narayanamurti, founding dean of what is now Harvard's school of engineering and applied sciences, and Tolulawo Odumosu, of the University of Virginia, write in **Cycles of Invention and Discovery** (Harvard, \$24.95) that the distinction between basic and applied science is outmoded and hinders research, as they

demonstrate by exploring the experiences of practitioners in major research laboratories.

Aging with a Plan, by Sharon Hoffman, J.D. '88 (Praeger, \$37). A Case Western Reserve law professor helpfully and systematically explores "What should middle-aged individuals contemplate, study, decide, and do to be as well equipped as possible for their own aging and that of loved ones?" A chattier take on the phenomenon itself is **The Age of Longevity**, by Rosalind C. Barnett, Ph.D. '64, and Caryl Rivers (Rowman & Littlefield, \$35), who encourage a positive perspective on the "new, healthy stage of life" between 65 and 79.

The People and the Books: 18 Classics of Jewish Literature, by Adam Kirsch '97 (W.W. Norton, \$28.95). The author, a poet and prolific critic who directs the Jewish studies master's program at Columbia, guides readers through texts that have been fundamental to Jewish culture and belief for more than two millennia, from the book of Deuteronomy through Theodor Herzl and Sholem Aleichem. Kirsch is a contributing editor of this magazine.

A scene from the Old Testament's Book of Esther, as depicted by Rembrandt c. 1660



Legal Affairs I. A new president and Congress may engage with matters penal and otherwise. **23/7**, by Keramet Reiter '03 (Yale, \$32.50), an in-depth examination of the rise of solitary confinement by a young scholar at the University of California, Irvine, offers evidence for coming debates over sentencing and imprisonment. In **Liberating Minds: The Case for College in Prison** (The New Press, \$26.95), Ellen Condliffe Lagemann, former dean of Harvard Graduate School of Education, presents examples of, and makes the broader argument for, educating the incarcerated.

Legal Affairs II. Stand Your Ground, by Caroline E. Light, lecturer on studies of women, gender, and sexuality (Beacon Press, \$25.95). The author, a southern Virginian from a skeet-shooting family, examines the origins and risks of a "do-it-yourself security citizenship," one of the gun-related issues likely to be legislated and litigated soon. In **Praise of Litigation**, by Alexandra Lahav, J.D. '98, of the University of Connecticut School of Law (Oxford, \$29.95), vigorously restates the case for lawsuits as "critical to American democracy" on matters large and small. The ultimate litigation, of course, ends up in the Supreme Court; contributing editor Lincoln Caplan '72, J.D. '76 (see also page 69), succinctly reports in **American Justice 2016** (University of Pennsylvania, \$24.95) on what he subtitled "The Political Supreme Court"—not the familiar process of confirmation proceedings, but the operation of the institution as currently constituted.

The Happy Misanthrope

Dramas of power and cruelty

by OLIVIA SCHWOB

BETTY SHAMIEH '96, RI '06, isn't in the house tonight, but she is on stage. The small Off Broadway theater staging *Fit for a Queen*, her latest play, is sparsely lit. The glitz of the set's palace—flashing lights, booming music, scantily draped slaves bearing platters of fruit and flowers—has receded. Queen Hatshepsut, till now languid on her throne, jumps up, her cool cracking: "You know I hate it when

you make it sound like you don't love me."

The figure at whom Hatshepsut lashes out is Senenmut, her favorite slave, who is prostrate on the floor. In the language of the play, "favorite" is code for consort-by-coercion, but with that role comes an expectation that the coercion remain unspoken. Senenmut becomes "sweet Senenmut"; Hatshepsut is "Happy," and open to affectionate ribbing. But now, Senenmut invokes her servility,



Betty Shamieh

cutting Happy to the bone. If she can goad the queen into offing her dying husband, the pharaoh, and claiming the throne, then

Dancing in the Rain, by Jerome T. Murphy, another former HGSE dean (Harvard Education Press, \$60 cloth; \$30 paper), is a practical guide for coping with the pressures of teaching through mindfulness and emotional health—a reminder that this is hard work, and not just in prison settings.

A House Full of Females: Plural Marriage and Women's Rights in Early Mormonism, 1835-1875, by Laurel Thatcher Ulrich, 300th Anniversary University Professor (Knopf, \$35). Drawing on her extensive knowledge of women's history, material culture, and the personal evidence in diaries and letters, the author brings back to life the early women of Mormon "plural marriage" and their little-known political and other rights.

Asian Ascents. Park Chung Hee and Modern Korea: The Roots of Militarism, 1866-1945, by Carter J. Eckert, Yoon Se Young professor of Korean History (Harvard, \$39.95). This sweeping study of contemporary Korea situates its origins as an economic powerhouse in the period of Japanese colonial militarism—the shaping influence on its foundational, modernizing ruler's ascent and leadership (the subject of the projected second volume). For a related but somewhat different path forward in the same neighborhood, **Unlikely**



These women of Zion sat for their photograph in July 1867.

length, essayistic reflection by a "white cisgender male," a UCLA sociologist and specialist in ethnicity, who found that debates about the fluidity of gender and racial identities took him by surprise, leading to an exploration of "the possibilities for choosing and changing" those identities.

Partners: Chinese Reformers, Western Economists, and the Making of Global China, by Julian Gewirtz '13 (Harvard, \$39.95), provides new insight into the contest between reformers and devout Maoist conservatives during the transforming Deng Xiaoping era.

How America Lost Its Secrets: Edward Snowden, The Man and the Theft, by Edward Jay Epstein, Ph.D. '73 (Knopf, \$27.95). The veteran reporter, who has investigated the national intelligence system, conspiracies, and related issues, has found an ideal subject for his interests: a deep dive into American security, and the individual who has become publicly identified with its reach and flaws—but is himself shrouded in mysteries.

Trans: Gender and Race in an Age of Unsettled Identities, by Rogers Brubaker '79, G '91 (Princeton, \$24.95). A book-

Curating America, by Richard Rabinowitz '66, Ph. D. '77 (University of North Carolina Press, \$39.95). Given the prevailing historical amnesia, it is productive to have, from the founder and president of the American History Workshop—a veteran curator—a guide to the evolution of public history and the ways Americans engage with their origins and past: not just the official public record, but "journeys through storyscapes" of the people themselves.

Beyond Timbuktu, by Ousmane Oumar Kane, Prince Alwaleed Bin Talal professor of contemporary Islamic religion and society (Harvard, \$39.95). At a time when Americans know little about Islam locally, and still less of what appear to be remote trouble spots and breeding grounds for radicalism in Africa, it is notable that serious scholarship on the intellectual evolution of Muslim learning in West Africa proceeds.

Senenmut—through the woman who loves her (and whom she can therefore manipulate)—will have control.

Shamieh thinks *Fit for a Queen*, which ran through last October, may have attracted attention due to its election-season parallels: it follows a woman gunning for a place at the top of the political food chain (previously occupied by her husband, no less). But it's Senenmut who's her favorite kind of antihero: the oppressed subject who refuses to play angel, the recipient of horrors who manages to deliver some horrors of her own. She's bundled contradictions, as the best-written characters always are: power-hungry but empathetic; hardened through experience but naive enough to be betrayed; often the smartest person in the room, so always surprised when she's outwitted. Senenmut's cruelty, though, reflects what Shamieh believes to be basic, if difficult, human truths: power makes people capable of extreme cruelty, and people are terrifying when acting in their own interests.

Shamieh sees her tough truths as fortifying. "I'm a happy misanthrope," she says. "I believe that self-awareness is how we manage to not be horrible people. The horrible people in our lives are the people who are oblivious to their own flaws. People who say, 'Everyone's kind of a jerk,' and include themselves in that, are less dangerous than the ones who say, 'There are good people, and I'm one of them.' We're used to stories with heroes and angels, but there are angelic demons in my plays. Everyone's an asshole."

Fit for a Queen is also funny, both witty—Shamieh's sharp-tongued women lacerate one another and their shared opponents—and farcical. (When Senenmut's house-of-cards manipulation comes crashing down and the pharaoh's men come to execute her, a slapstick chase scene ensues.) Humor is

how Shamieh makes difficult insights digestible: rather than browbeat, she opts for the laugh of recognition. And she believes that audiences also recognize her empathy for her creations: "I've been all of those characters on stage, and I'm clearly imbuing them with my experience."

Earlier plays seemed to draw more di-

rectly on that experience: *Chocolate in Heat*, interconnected monologues about Arab-American young womanhood, made a splash at the New York Fringe Festival in 2001, and sold out subsequent small runs in New York. Then came her 2004 Off Broadway debut, *Roar*, a "small family drama" recalling August Wilson, Tennessee Williams, and Eugene O'Neill that traced the wilting dreams and stinging disappointments of a family of Palestinian refugees in Detroit during the Gulf War. Though critics

took exception to the play's derivative flavor—and in the long shadow of the September 11 attacks, some deemed it insufficiently "political"—Shamieh was hailed as a notable emerging voice for Arab Americans in theater.

But Shamieh doesn't see herself as speaking to the Arab-American experience in particular. She insists that all playwrights—even Arthur Miller and O'Neill—write about their ethnic identities in order to access broader human truths. Her more recent work has moved away from those contemporary, realist stories and toward what Shamieh calls "big historical moments and larger-than-life characters." *The Black Eyed*, her 2007 set of monologues telling Arab women's stories, traversed history and began in Biblical times. And *Territories* (first developed with an Israeli company, and later adapted into an opera at Princeton) centered on an Islamic prisoner and the Christian crusader who tortures her, the two locked in a battle of wills, seduction, and manipulation. Yet her work still focuses on power at the personal level: critics praised the latter play for how it took an outsize historical episode and distilled it into an intimate portrait of wartime. Shamieh mines historical moments that have a mythical, other-worldly quality—



LELAND DURAND THOMPSON



COURTESY OF BETTY SHAMIEH



RUBY WASHINGTON

Shamieh's plays span time and place (top to bottom): *Fit for a Queen* is set in ancient Egypt, *The Black Eyed* in the afterlife, and *Roar* in 1990s Detroit.

true stories with the potential to become legend—looking for the lesser-known players who help us better understand who we are today. One future project, *Veritas*, will tell the story of the first Native American students to enroll at Harvard under “Apostle to the Indians” John Eliot’s stewardship in the mid-seventeenth century, a topic with considerable potential to plug into current conversations about universities as sites for

forging an inclusive, diverse civic body.

Shamieh got the idea for the play during her Radcliffe Institute fellowship, when she learned that Native Americans had been enrolled at the school within the first decades of its founding. Incredulous that she had never heard the story, she set out to mine its human essence; even in a world populated by Puritans, there are no pure moral actors. In seventeenth-century Massachusetts,

colonized Natives themselves owned slaves; she points out that even though contemporary audiences may find Eliot’s attempts to “civilize” indigenous people distasteful, he was in many ways doing the best he knew. She will return to Harvard on a Guggenheim fellowship this spring to continue her research and begin to write the characters to life. With a determined set to her jaw, she says, “I want to make them lore.”

A Conservative Counterrevolution

The anti-democratic origins of the Constitution

by LINCOLN CAPLAN

WHEN THE Revolutionary War ended in 1783, the American states went into a severe economic depression. The British government barred its people from buying American goods they could get elsewhere, and kept the country’s shipping companies from buying American-made ships. The gross national product fell precipitously. Yet despite the depression, most of the 13 states hiked taxes to pay down their war debts and cover their share of the nation’s—and the new taxes were much higher than Americans had paid under British rule.

The states taxed land and people especially, and required that the taxes be paid in gold or silver, as Congress and foreign creditors demanded—an unusual hardship for farmers, whose wealth was in land and crops, not coins. Tens of thousands lost their farms while remaining burdened with debt. Many people turned to politics for relief. Most of the states eased the supply of money by issuing paper currency that could be used to pay taxes. Some states deferred the obligation to pay taxes and approved other

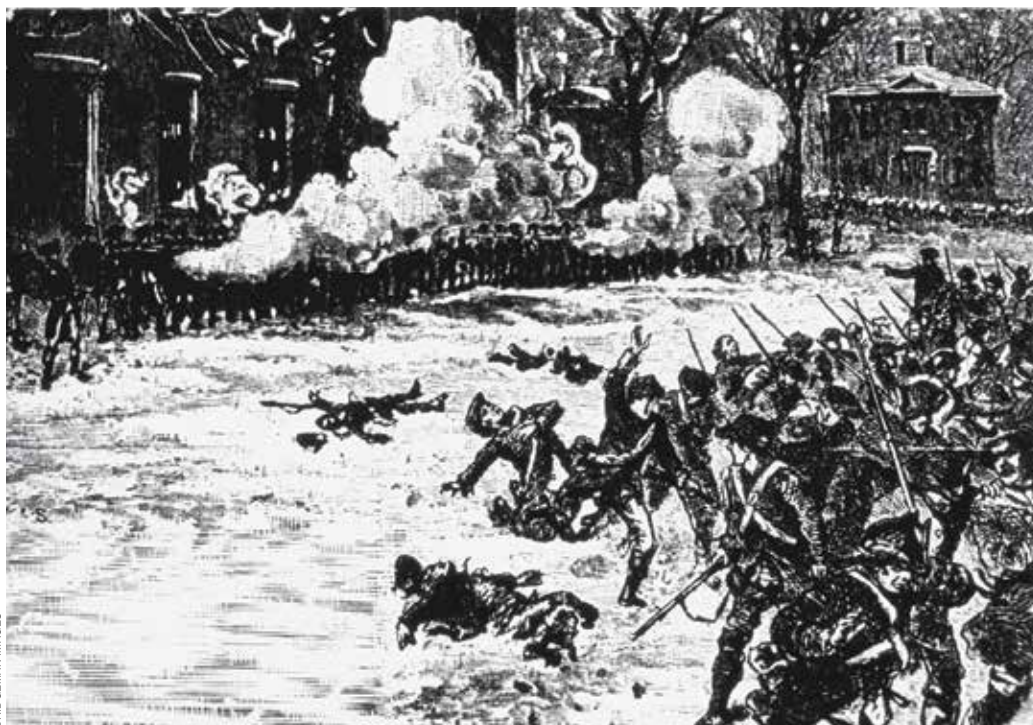
forms of debt relief, like allowing people to repay in installments.

Struggling Americans viewed the relief as essential in a punishing time. Prosperous citizens regarded it as indulgence fostering indolence. Paper money, the Virginian James Madison wrote, was “unjust, impolitic, destructive of public and private confidence, and of that virtue which is the basis of republican governments.” The disagreement was fierce. State legislatures that passed relief laws did so in some cases to stave off vio-

lence. In 1786, when Madison contradicted himself by voting in the Virginia legislature to let tobacco be used to pay taxes, he said that was “a prudential compliance”—not as bad as paper money.

The conservative Federalist government of Massachusetts chose neither to issue paper money nor to pass meaningful tax or debt relief. In the western part of the state, a sometimes violent rebellion erupted in August 1786, named for the farmer and war veteran Daniel Shays. The climax of Shays’s Rebellion came in January 1787, when he led about 1,200 insurgents in a raid on a federal arsenal of weapons and ammunition in Springfield. Government militia repelled them with a volley of artillery that killed four Shaysites, as Federalists called

*The Framers’ Coup:
The Making of the United
States Constitution, by
Michael J. Klarman
(Oxford, \$39.95)*



A contemporary rendering of the Springfield arsenal attack during Shays's Rebellion—a shaping event for the Founders

BRIDGEMAN IMAGES

their antagonists. It was the beginning of the end of the uprising.

Yet many rebels were prosperous leaders in their communities who resented the state's eastern elite and its aristocratic rule. In April 1787, insurgents or their sympathizers were elected to fill a large majority of seats in the state legislature, which slashed taxes and eased tax collection. Populism triumphed in Massachusetts, too, as it had earlier in most of the other states.

Members of the Massachusetts elite deplored this development. So did members of the political elite throughout the country. To them, the rebellion and its after-effects were proof that the American revolution had gone too far, and that the new country needed a powerful national government that could-

Michael Klarman interprets the drafting of the Constitution as a coup.

succeed without being undermined by the excesses of democracy prevailing in the states. Beginning that May, these concerns became the project of what was then called the federal Convention.

In his new book *The Framers' Coup*, Michael J. Klarman explains how this brief, geographically isolated, and seemingly thwarted uprising fundamentally shaped American governance. The Bancroft Prize-winning legal historian and Kirkland & Ellis professor of law writes, "Shays's Rebellion played a critical role in the creation of the Constitution."

IT WAS A COUP, Klarman lays out, because Madison—now known as the father of the Constitution and a primary shaper of it—and key colleagues went to the convention in Philadelphia with a frankly anti-democratic agenda and, by and large, fulfilled it. By anti-democratic, Klarman does not mean *autocratic*. Instead, he means opposed to a purely democratic system in which the majority would always rule. After persuading the other delegates to deliberate behind closed doors and keep what happened there a secret, the Federalists led the convention to approve a constitution that was, in Klarman's words, "nationalist and democracy-constraining." Madison later observed that "no constitution would ever have been adopted by the convention if the debates had been public."

To solve problems Congress had struggled with in the wake of the war, the new document gave that body power that was "virtually unlimited" to impose taxes, regulate commerce, and create a military. The constitution said that, once it was ratified, it would be "the supreme law of the land," along with federal laws and treaties. To enforce that principle, it commanded the creation of a supreme court and authorized Congress to create lower federal courts.

Most state constitutions equipped voters to keep their representatives on short leashes: the tools included, as Klarman writes, "annual elections, small constituencies, mandatory rotation in office, and (often) instruction of representatives"—the right of voters to tell their representatives what to do in office. The national constitution established terms "longer than any existing under state constitutions," with four years for presidents and six for senators. Even for the members of the more democratic House of Representatives, the delegates' anti-democratic bias showed: they established two-year rather than one-year terms; large constituencies for each member, rather than small; and no provisions for "instruction, recall, or mandatory rotation in office."

Some delegates wanted the constitution to be far more nationalist, either by empowering Congress to veto state laws it disliked, or by abolishing the states altogether—in order, as one delegate put it, to create "one nation instead of a confederation of republics." But the convention struck the balance

Chapter & Verse

Correspondence on not-so-famous lost words

Dennis De Witt inquires about the origin of the phrase "wretched excess." He has found citations to *The Edinburgh Review* (1805), Sir Walter Scott (c. 1830), and the sixteenth-century Jesuit Martin Delrio, but hopes to learn more.

Alethea Black asks who wrote: "What is the thing which man will not surrender? That which he never fully possessed, or missed in its true season."

William Benemann seeks the source of a motto tattooed on the arm of a Massachusetts sailor in 1872: "Not a star shall fall." He has found the phrase in the farewell speech that Colonel J.J. Seaver gave to the men of the Sixteenth New York Volunteers at the end of the Civil War, but further online searches suggest that Seaver was quoting an earlier source.

Eve Menger would like to learn "the earliest usage of the word 'Union' in distinction to 'Confederacy.' Union Square in San Francisco is said to have been named in honor of pro-Union, anti-slavery rallies held there, led by the Unitarian minister Thomas Starr King. However, there is an 1853 newspaper article which refers to that area as Union Square. Was 'Union' used at that time in the political sense?"

Truth in the well (November-December 2016). No links to Harvard's Pump have emerged, but John Gordon and Jenny Rood, citing *The Oxford Book of Proverbs*, noted that "We know nothing certainly, for truth lies in the deep" is attributed to Democritus, and the revision, "Truth lies sunk in a well," to Lactantius (*Institutiones Divinae* III, xxviii). Gordon added that Judith Oster, in *Toward Robert Frost: The Reader and the Poet* (page 82) cites Democritus for "Of truth we know nothing, for truth lies at the bottom of a well." In addition, Bernard Witlieb shared Jean-Léon Gérôme's painting, *Truth Emerging from Her Well* (with a whip to use on humanity), and Louise Abbot recalled Sully Prudhomme's sonnet, "Le doute," beginning: *La blanche Vérité dort au fond d'un grand puits*.

"between...business and eternity" (November-December 2016). Joseph Marcus identified the speaker as English bishop Zachary Pearce (said to be citing a reply first made to Emperor Charles V), based on Hugh James Rose's *A New General Biographical Dictionary* (1850; vol. 2, page 3).

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

it did in September 1787 because its leaders understood that nine of the 13 states would need to ratify the document to turn it into the Constitution and that popular support was imperative for that to happen. The next June, New Hampshire became the ninth to ratify. Congress determined that the newly constituted government of the United States, operating under the Constitution, would commence in March 1789.

In *Ratification: The People Debate the Constitution*, the late historian Pauline Maier '60, Ph.D. '68, drawing on 21 of the now 24 volumes of *The Documentary History of the Ratification of the American Constitution*, recounted what she described as "one of the greatest and most probing public debates in American history": the choleric, pub-to-pew disputes throughout the states. In the *Harvard Law Review*, in 2011, Klarman accurately called Maier's book "one of the best books ever written about the American Founding." Writing that review, he says in the preface to *The Framers' Coup*, got him hooked on "the primary source materials of the Founding—correspondence, newspaper essays, pamphlets, legislative and convention debates." He spent four years immersed in them while composing his book.

His goals were to write "a comprehensive account of the Founding," as much as possible "in the words of the participants," and to advance his version of the view that "the Constitution was a conservative counterrevolution against what leading American statesmen regarded as the irresponsible economic measures enacted by a majority of state legislatures in the mid-1780s."

The book has the authority and elegance of a reference work written for the ages. It spans from an account of the deficiencies of the Articles of Confederation, that first constitution intended to empower the Continental Congress to coordinate the states' efforts in the Revolutionary War, to a review of the Bill of Rights. Ordinary citizens forced the Federalist leaders to add this section of the document, codifying the rights of citizens, that now dominates constitutional law. The book is meticulously researched, cogently written, and rich with voices and insights. It has the allure that the historian Daniel J. Boorstin '34, said a first-rate history should have: the sense that the author is figuring out, along with the reader, how the story will come out, though both already know. It is also a handsomely made volume, with scores of wonderful illustrations.

An historian's comment about the book

opposite the title page calls it a "page-turning narrative," which is true yet somewhat misleading. Each of the 631 pages of text is so laden with facts that it sometimes feels like it takes two hands to turn a page. The comprehensiveness that Klarman achieved is a mild affliction, translating into denseness that can challenge a reader. Occasionally, that spills over into tendentiousness when he repeats his theme about the Federalists' anti-democratic agenda.

But the book is often revelatory. After he reports that the first official act of the Constitutional Convention was to elect George Washington president of the gathering and a former personal secretary of his, William Jackson, as "secretary to keep the official minutes," Klarman includes a footnote about the historical records of what was said at the Pennsylvania statehouse during the course of those mythologized months that led to a new kind of nation. Madison, for example, "kept detailed notes" and "was present every day of the proceedings," but his "notes could not have captured even 10 percent of the words that were spoken." In addition, he summarized points rather than recording speeches verbatim, drained emotion from other delegates' speeches, and paid scant attention to points that didn't interest him (like the jurisdiction of the federal courts). He also "tended to revise his own speeches to make himself appear less dogmatic." Klarman's point, as he summarizes, is that "while we have a fairly detailed record of what transpired at the Philadelphia convention, it is important to be aware of the limits on what we can know."

KLARMAN SHARES the customary view that the "delegates were, in general, an extraordinarily talented bunch," quoting Benjamin Franklin that they were "the most august and respectable assembly" he ever joined. But he writes that a more revealing reflection of Franklin's has been neglected: that "when you assemble a number of men to have the advantage of their joint wisdom, you inevitably assemble with those men, all their prejudices, their passions, their errors of opinion, their local interests, and their selfish views."

That is one of Klarman's core judgments: impressive as they were, the framers "had interests, prejudices, and moral blind spots. They could not foresee the future, and they made mistakes." They argued "in terms of political principles," but those arguments "simply served as rationalizations for the

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interests being advanced." Those interests were elementary and clashed constantly, with delegates working to give their states as much power as possible. Large states squared off against small ones, northern states versus southern ones, manufacturing states versus slave-dependent agricultural ones, Federalists versus Antifederalists, and nationalists versus statist.

The enduring question that Klarman frames is the extent of the duty that American citizens today owe to an old, imperfect document, written "by people possessed of very different assumptions, concerns, and values"—which led almost all of them to accept and protect the institution of slavery, to exclude women from the protection of political and civil rights, and to adopt many undemocratic mechanisms in the Constitution.

When Donald J. Trump defeated Hillary R. Clinton for the presidency, he was the second candidate in 16 years (and the fourth

in American history) to win in the Electoral College despite losing the popular vote (the number of electors in a state equals its number of representatives in Congress plus its two senators, which favors less populated states by making their voters' votes count more). As Klarman underscores, the malapportionment of the Senate defies the modern principle of one person, one vote, with states of widely varying populations each having two senators so states with small populations exert much more than their share of influence in presidential elections.

These days, 230 years after the convention, the Constitution is still usually spoken about with reverence and interpreted as a document expressing legal and political philosophy. But Klarman argues persuasively that Americans must defend their political, economic, and social interests on the merits, not by invoking the Constitution as a sacred text. History warrants this realism, as he shows:

the framers designed America's basic law to serve their sometimes undemocratic interests, rather than always making paramount the democratic ideals on which they founded the country. They did not intend that their intentions would bind future Americans.

OF EQUAL IMPORTANCE, Klarman shows the framers' genuine capacity for compromise and how, through the centuries, the Constitution they shaped has been amended and interpreted to rid the document of its prejudices and provide a platform on which America has built progress. In the book's index, there are a score of entries for "democracy," but none for "republic." Yet the skepticism about providing unbridled power to the majority, which has led to, among other things, the protection of minorities, reflects the wisdom of the Republic that the framers both empowered and prudently constrained, with checks and balances.

Klarman ends with a thought from Thomas Jefferson, that each generation has "a right to choose for itself the form of government it believes most promotive of its own happiness." That understates what *The Framers' Coup* teaches. The Constitution was not inevitable. The progress that Jefferson envisioned has never been inevitable either.

Each generation has a duty to apply or amend the Constitution, so the Republic fulfills the commitments of the document's Preamble, above all to securing "the Blessings of Liberty to ourselves and our Posterity." Failure to fulfill those commitments would end or sorely test the great American experiment in self-government. The Constitution kindled its promise, but leaves in the hands of the People the full responsibility for its fate. ▢

Contributing editor Lincoln Caplan '72, J.D. '76, wrote "Death Throes," about capital punishment, in the November-December 2016 issue.

ALUMNI

Reports from the "New America"

A Latino-American journalist's sundry roles

by NELL PORTER BROWN

THE PIONEERING media site LatinoRebels.com, founded in 2011 by Julio Ricardo Varela '90, criticized a Coors Brewing Company advertising campaign for linking Puerto Ricans to drunkenness; the ads were pulled. It published video of Puerto Rican independence supporters burning an American flag to protest an island visit by President Barack Obama—an act that LatinoRebels.com found "disgraceful." And Varela himself opposed a gossipy, homophobic puppet called La Comay, a modern fixture on Puerto Rican television, and promoted a social media campaign that helped push the doll off the air.

Then comprised of Varela and 20 bloggers (mostly his friends), the hub was modeled

after *The Daily Show*, an outlet for raw opinions and frustrations. "I wrote what I wanted and followed my own stories," Varela explains. It quickly became a hot spot for other young, bicultural, bilingual Latinos, and, he adds, "a means of entering the 'national conversation' about what it truly means to be Latino and American in this country."

Still fiery six years later, Varela has waded closer to the mainstream media as senior digital media editor at Futuro Media. Founded by Emmy-winning veteran journalist Maria Hinojosa in 2010, the Harlem-based nonprofit organization produces *Latino USA*, which airs weekly on National Public Radio, as well as the PBS documentary series *America by the Numbers*; both explore diversity, often reporting on

populations and stories missed or ignored by commercial national-news outlets. Varela, whose first career was in elementary-level and bilingual educational publishing, sees himself continuing to teach people as a journalist. But Futuro's "bigger mission," he says, is to amplify "intelligent voices outside of the Latino space and look more at the 'new America.' It's like Latino 2.0—now we are a more multicultural society, and how do we fit in?"

At Futuro, Varela is responsible for all digital and social-media content. His earthy laugh, quick opinions, and comedic timing (he has dabbled in improv) make him a natural on air, where he also appears as a commentator or host. In shepherding and cohosting the organization's newest venture, the weekly political podcast *In the Thick*, he's "unapologetic" about featuring only journalists of color. "We couldn't wait anymore," he explains during an interview prior to an episode titled "That Mexican Thing" (after then-Indiana governor Mike Pence defended Donald Trump's rhetoric about Mexican "rapists" during the vice presidential debate in October). Launching into a critique of minority-news coverage and minority representation in newsrooms, he asserts that mainstream media "do not understand that the majority of Latinos are English-dominant, are second- and third-generation immigrants—I'm not even going to say 'immigrants'—are Americans, right? And

[the media] don't want to know their track record has been pretty atrocious. The fact that you don't have a major cable news host who is Latino, and I'm talking about MSNBC and CNN—I would never expect Fox to do that—especially during this past election, is shameful.”

He acknowledges that his role is fluid: media critic, advocate, agitator, and pundit. Since starting LatinoRebels.com, “I’ve been called everything—from a right-wing supporter of the death squads in El Salvador, to a sellout, to a leftist, radical Communist,” he reports. “People often think I’m an angry person. I’m not. And as I get older in life, I don’t really care how people label me, right? ‘Cause I know who I am.”

VARELA WAS BORN in Puerto Rico in 1969, to an Italian-American mother from a political family in the Bronx and a Puerto Rican father. (The couple met on the island, where she was vacationing after graduating from nursing school.) At the time, his maternal grandfather, Mario Biaggi, a highly decorated New York City police officer and a lawyer, was running for U.S. Congress. “His notion of Puerto Ricans came from patrolling Hell’s Kitchen in the ’50s and ’60s,” says Varela: “It was like from *West Side Story*—Puerto Ricans were gangbangers, criminals. So the fact that my mother would marry a Puerto Rican and actually have a child with him—Ahhhhhoohargh!!!” He utters an anguished, furious sound, raising his arms to the sky. “So when I was born she stayed in Puerto Rico, welcomed by my father’s family with open arms.” (Biaggi won the election, and held his seat as a hugely popular and influential Democratic representative until resigning amid scandals in 1988; Varela, then at Harvard, recalls walking by Out of Town News and seeing his grandfather’s face on the front of the *New York Post*.)

He lived in Puerto Rico until age seven, although the family traveled to the Bronx periodically and helped in Biaggi’s campaigns. During his grandfather’s unsuccessful mayoral run in 1973, a photograph of him sitting on Biaggi’s lap appeared in the Spanish-language newspaper *El Diario* (Varela has posted it on his Facebook page) and his father canvassed the city’s predominantly Puerto Rican neighborhoods. “All of a sudden, be-



Julio Ricardo Varela

ing Puerto Rican wasn’t a problem,” says Varela. “I was part of the political narrative.”

His bilingual/bicultural heritage was not unusual at Fordham Preparatory School (which he thanks for a Jesuit education that taught him to “question everything!”). Only after arriving at Harvard did Varela begin to feel “different...not part of the community.” His Latino identity solidified, influenced through classes taught by John Womack Jr. (then Bliss professor of Latin American history and economics, whose *Zapata and the Mexican Revolution* Varela “devoured”) and Madero professor for the study of Mexico Jorge Domínguez (also a graduate of Fordham Prep, who taught a “comprehensive” version of the Cuban revolution).

Varela concentrated in history and literature, focusing on Latin America (graduating cum laude), while working as a sports editor on *The Harvard Crimson* and promoting awareness of Puerto Rican culture on campus through La O. It was clear to him and other students of color at the time, he says, “that there was an inherent misperception that ‘you’re not good enough to be here.’ So anytime we spoke out, we were seen as the radical ones.” These views were updated during a May 2015 return to campus for a bilingual, Latino-centric graduation ceremony the day before Commencement: “I realized that my old uncomfortable home re-

ally was changing...was becoming welcoming and loving,” he wrote in a subsequent LatinoRebels.com post, even though “our voices had been on mute (both imposed and self-imposed) for endless years” at Harvard.

A year out of college, Varela put his writing and Spanish fluency to work at Houghton Mifflin, developing and presenting bilingual materials in urban school districts across the country; he rose through the ranks and worked for similar companies until the 2008 recession.

By then he had married Sheila Egan Varela, now a school-committee member in Milton, south of Boston, and settled there. He moved around professionally: building up a Latino-American “content hub” called Publish; working as an independent education consultant for Univision; and then spending about a year as a contributor to NBC Latino, a branch of NBC News.com, and another 10 months as the digital producer of Al Jazeera America’s *The Stream*, before he was among those the struggling network laid off in 2014. Having already founded LatinoRebels.com, Varela renewed his efforts there, and ultimately joined Futuro—in time to start covering the presidential race in 2015.

VARELA JUMPED ON Donald Trump’s June candidacy speech, protesting its degradation of Mexicans and the candidate’s tying

inadequate immigration controls to terrorism; as the campaign wore on, he giddily predicted historic turnout among Latino voters—but according to limited data based on exit polls conducted soon after election day, that didn't really happen: about 48 percent of eligible Latino voters (there are an estimated 27.3 million) came out, only slightly more than in 2012, and Trump appears to have done better than expected among them. Varela is not alone in questioning the validity of exit polls, and he plans to evaluate the final voting data—which should reveal a more comprehensive picture of Latinos' political views—"to see why this happened and how we can progress." Still, the turnout and votes for Trump are "an 'inconvenient truth.' It's sad," he says. "I think the Republican Party has now learned 'We don't need the Latino vote; we just need to get enough white voters and enough Latinos in certain districts.'"

What's probably more critical for politicians and journalists to take into account moving forward, he explains, is that "Latinos" are not a monolithic demographic, as they are often portrayed—they come from more than 20 countries, have wide-ranging religious and political beliefs, and are assimilated to differing degrees.

He touts the potential power of younger Latinos to spur significant political and cultural changes. About one-third of the Latino population (17.9 million people) is under age 18, and another quarter are millennials—and that group, according to the Pew Research Center, based on 2014 figures, is the largest

share of millennials in the American adult population. Many of those younger people, Varela maintains, are disaffected independents—they tend to be left-leaning, but that did not translate into votes for the Democratic party. "This is a defining time for Latinos in U.S. politics, but we don't know what we want," he asserts, and "we are still being represented by white males. There has to be a Latino-American agenda about how to achieve political power—now, more than ever....Latinos can't be satisfied with the current state of political representation. And if my role is to keep saying 'That's not good enough,' and if that's going to upset people, then I'm good with that."

Ideally, he favors an "ambi-cultural" society, in which communities of color coalesce, or at least share in a more explicit solidarity. That's already under way, he says, especially in the country's urban areas, and was evident even when his own parents met and married. "Will we go through a messy, ugly process to get to this utopian vision? Yes," he continues. "Do I think it will be violent and tragic? There's a part of me that thinks that will happen, although I don't want it to. I try to have faith in people—but it's a tough call."

As for representation in the newsroom, Varela acknowledges that whatever strides were made to diversify staff were undermined by the recession and the financial decimation of the industry—largely as a result of the rise of online media. (The same Internet, he admits, also popularized LatinoRebels.com.) During the last three decades, the number of Latino journalists in

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The Buddies in the Boat

In this year's Head of the Charles, one alumni crew celebrated 50 years since their first regatta outing.

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print media has risen by only 1 percent, and by only 3 percent in broadcast newsrooms, according to "Good News, Bad News: Stormy Seas for Latino Journalists," in the winter 2016 issue of *Latino* magazine. More bluntly, the article reports that according to the American Society of News Editors, there has been an overall "net loss of 721 Latino journalists since 2002." (Print newsrooms have shed tens of thousands of employees since then.)

Varela readily tangles with questions about the need for specifically "Latino journalists," and assertions that such ethnic or racial affinities bring inherent biases to news coverage. "There's no such thing as a journalist who is not biased," he answers. "If people have a problem with that [statement], they can disagree with me." Even raising that question "is part of the problem: people don't hear voices like mine in the mainstream media, so I come across as antagonistic." White journalists have been covering white politicians and white social issues since America was founded, he points out, and their inherent "bias" is not disputed. In fact, he adds, one of "my biggest problems with political journalism right now is that a Donald Trump is put on the same plane as a Hillary Clinton because you're supposed to be 'balanced and unbiased.'"

Journalists of color are often put in difficult binds; they are called to report on topics perceived as relevant to their identified groups—"boxed into" talking about "Latino" issues, Varela says, in order to "get my voice out there"—when, in fact, he's "sick of talking about immigration and Donald Trump." Yet as an advocate, he feels compelled to do it, and at the same time cor-

A Women's Weekend

Harvard's first University-wide Women's Weekend drew more than 400 alumnae and friends to campus in November to network, get reacquainted with people and places, and educate themselves during often pointed and personal panel discussions and workshops that touched on sexuality, race, work-life balance, public service, and women's health and rights across the globe.

Addressing attendees at an evening reception in Harvard Business School's Spangler Center, President Drew Faust celebrated the "once unimaginable" gathering of women at Harvard—or at any number of universities that had barred their entry: "When I was in college I was not allowed to wear pants to class. I would not have been able to apply to Princeton or Yale, or get a credit card without a male co-signer." (Read more on her remarks and other weekend events at harvardmag.com/womens-weekend-16.)

The three-day program, organized by the Harvard Alumni Association, was developed in partnership with similarly focused Shared Interest Groups. Not on the weekend agenda, but prompted by events, was sharp discussion of sexist behavior by some of Harvard's men's sports teams; see page 23.

rect misinformation, falsehoods, and stereotypes. “I come from a family of fighters—on both sides,” he says, and is heir to historically very different immigrant experiences.

Varela’s paternal grandfather, Juan Varela, completed only elementary school yet became a successful fabric-shop owner; Mario Biaggi was the son of Italian immigrants, a charwoman and a marble cutter. While Varela was at Harvard, Biaggi was among those swept up in the series of New York City corruption trials that dismantled the Bronx political establishment and aided the rise of then-U.S. attorney for the Southern District of New York Rudolph Giuliani (another son of Italian immigrants); Biaggi was

“...if my role is to keep saying ‘That’s not good enough,’ and if that’s going to upset people, then I’m good with that.”

convicted and served prison time for taking an illegal gratuity, and for his role in the Wedtech racketeering scandal.

Varela sees the prosecutions as politically motivated, and is proud of “being the grandson of a great man.” The congressman was a working-class hero and stood up for human rights in Northern Ireland when others stayed mum, Varela explains; he realized the full impact of that only after meeting his “Boston Irish” wife. “Everyone in that Boston community appreciated and knew my grandfather,” he recounts. “Tip O’Neill would call him ‘Marty.’ They were old-fashioned, constituent politicians. The last of a breed.”

Varela’s own teenage children are now busy finding their own voices. “They’re in the Milton schools’ French-immersion program,” he says, laughing, but have assured him they will learn some Spanish at some point. “Are they influenced by the work I do? Do they know why I take the positions I do? Yes,” he says. “There’s no lack of opinion in our household, that’s for sure,” he adds. “But they are new Americans—tri-cultural. And then whoever they marry will make them ‘sext-cultural,’ or whatever it will be called.”

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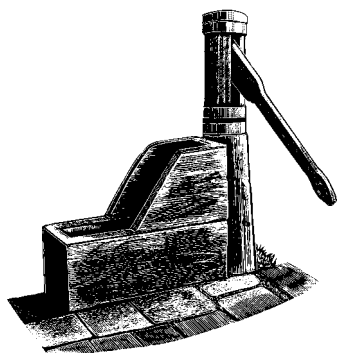


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Signs of the Times



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

DURING THEIR DIASPORA while their permanent digs are renovated this year, Winthrop House residents inhabiting one of the swing spaces found their interim home dubbed "The Winn at Harvard," a bow toward the Inn at Harvard formerly operating there.

Primus encountered this new sign, and rediscovered some amusing ones, on clement autumn walks through campus. For instance, the Graduate School of Design café, Chauhaus, nods to history, too: a cheeky reference to the Bauhaus and Walter Gropius, whose flight from Nazism brought him to Cambridge, where he famously chaired the school's department of architecture.

The very wired Harvard Business School (HBS) campus recalls the hardworking bosses-to-be of an earlier era with a commemorative plaque on the side of Baker Library. From 1945 until the 1980s, it advises, "First-year students were required to submit a biweekly paper for Written Analysis of Cases (WAC). The course's strict deadline was 9 P.M. Saturday, when students had to drop their papers through this chute before

it was locked. Those who submitted their work with time to spare would form two lines to cheer on classmates running to beat the final toll of the Baker Library Bell." (Perhaps a desktop e-bell should "toll" when one hits "Send" on an assignment nowadays?)

But no antecedent comes to mind for this HBS sign (below). During the demolition of Kresge Hall and its replacement with the now-opened Ruth Mulan Chu Chao Center, executive-education students and

others were accommodated at a temporary (but very nice!) dining facility sited between the dean's house and Burden Hall (soon to

be razed, too). With food service permanently relocated, this amenity is now in place. It is unknown whether M.B.A. candidates find it relaxing, or another venue for exercising the competitive invisible hand of capitalism.

TURNING TO DIFFERENT SIGNS of the times: in the climate-change sense, Harvard is becoming ever greener (see page 24). But the physical campus is, ironically, becoming less so, visually. To combat an infestation of rodents, significant bits of landscaping have been ripped out, thinned, or cut back of late. In the Yard, the ivy and shrubbery alongside the staircase descending from Lamont Library to Wigglesworth has largely given way to mulch. A small bulldozer uprooted

the groundcover around Boylston early in the fall semester; dreary mulch and riprap are now in place. The faunal eruption may reflect disturbances from construction; others speculate that a warmer climate has enabled critters to survive winter better; and still others point to more expansive food service, and the litter from picnicking visitors who use the common-spaces seating available fall and spring in the Old Yard.

Those visitors and tourists have definitely compacted the soil more, and age and weather have taken down some landmark trees: one beside Mass. Hall and Matthews, a giant tulip poplar at Barker Center.

Finally, the greens themselves have altered the scene. Some of the turf in front of Emerson, facing Tercentenary Theatre, was paved to accommodate bicycle racks, which also uprooted hollies at Warren House, with unfortunate, asymmetrical effects.

Winter will surely give way to spring green—but less green than would otherwise have been the case.



MASSACHUSETTS is hardly about to emulate Texans' campus-carry laws for gun owners. Harvard apparently had its moment with armed students some time ago—April 7, 1759, to be exact, when the faculty "consider'd a Petition of the Undergraduates, for Liberty to exercise the Fire lock, & the following Vote come into" effect, granting permission to fire away "at convenient Hours" but "in the Play-Place only, and That, at no other time, but after Evening Prayers."

These were unsettled times (the French and Indian War was under way), but the connection between guns and prayer, if any, is not clear from the records. ~PRIMUS VI



Collecting Ukraine

Harvard's holdings, from 1574 to today



tions can be viewed at Houghton, too, part of a collection spanning thousands of volumes across Harvard's libraries—one of the largest Ukrainian-language repositories in the world. Scholars from Ukraine visit often, seeking books

they can't find at home, says Olha Aleksic, Jacyk bibliographer of the collection.

A political cartoon from the collection's contemporary holdings, housed at Widener, displays a pompous-looking Leonid Brezhnev, with a mug brimful of beer in one hand and a stockfish in the other.

The caption warns:

"First beer, then

black tulips." Signposts on either side of him point to Prague and Kabul, alluding to the Soviet invasions of Czechoslovakia in 1968

and Afghanistan in 1979. When the cartoon was printed, right before the Soviet Union's collapse, Ukrainians would have recognized the "black tulips" as the planes that carried the dead bodies of Soviet soldiers back from Afghanistan. In the cartoonist's rendering, tying Ukraine's fate to the Russians would bring endless war for an unknown cause. Brezhnev is driven by drunkenness and ego, not by human rights, justice, or even communism.

To westward-looking Ukrainians, Russia's yoke still looms. On a visit to Harvard, activist Yulia Marushevska, whose video *I Am a Ukrainian* went viral during the 2013-2014 Euromaidan protests, donated a hard hat from the demonstrations to the Ukrainian collection. Covered in bright chestnut blossoms, a symbol of Kiev, the hat and others like it were worn by demonstrators after the Ukrainian parliament banned their use at protests. Says Aleksic, "Thousands of people showed up in the streets wearing hard hats, helmets, collanders on their heads in defiance of the law."

—MARINA BOLOTNIKOVA

(Clockwise from top left): A poster invites citizens to protect protesters from attacks at Maidan Nezalezhnosti, or Independence Square, in Kiev during the 2013-2014

Euromaidan protests. Joseph Stalin proclaims the Soviet constitution the most democratic in the world, while the document is housed in a forced-labor camp. Another cartoon ridicules Soviet invasions of Czechoslovakia and Afghanistan. A hard hat worn by demonstrators during the Euromaidan protests displays chestnut blossoms symbolizing Kiev.



ONE HUNDRED YEARS after Gutenberg mass-produced his first Bibles in Germany, book printing emerged in eastern Europe. Ivan Fyodorov was working as a deacon in Moscow's Kremlin when he began printing church texts, starting with *Apostol* in 1564. Later, he would move to Lvov, at the western edge of Ukraine, where he published the earliest printed books produced there. The only remaining copy of his 1574 *Bukvar*, or primer, for teaching children to read Old Church Slavonic, the language of Eastern Orthodoxy, is at Houghton Library.

The early books were largely liturgical; later, the works of Ivan Kotliarevsky and Taras Shevchenko, eighteenth- and nineteenth-century thinkers who wrote in Ukrainian, not Church Slavonic, would give form to a Ukrainian national culture. Their first edi-

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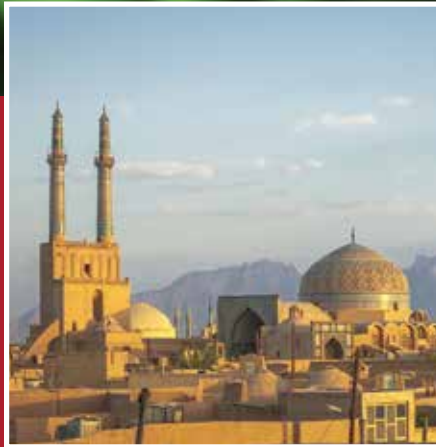


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